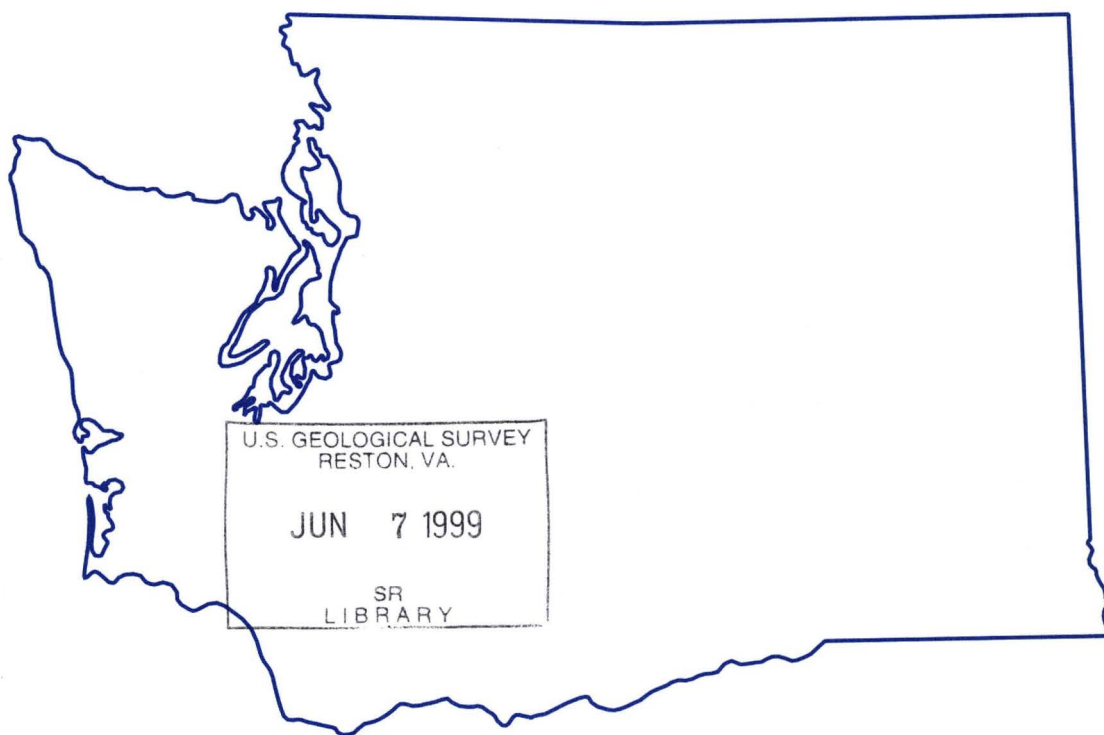


R  
(200)  
Ga3  
Washington  
1996



# Water Resources Data Washington Water Year 1996



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT WA-96-1  
Prepared in cooperation with the State of Washington  
and with other agencies



# CALENDAR FOR WATER YEAR 1996

1995

OCTOBER							NOVEMBER							DECEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
1	2	3	4	5	6	7				1	2	3	4						1	2
8	9	10	11	12	13	14	5	6	7	8	9	10	11	3	4	5	6	7	8	9
15	16	17	18	19	20	21	11	12	13	14	15	16	17	10	11	12	13	14	15	16
22	23	24	25	26	27	28	19	20	21	22	23	24	25	17	18	19	20	21	22	23
29	30	31					26	27	28	29	30			24	25	26	27	28	29	30
														31						

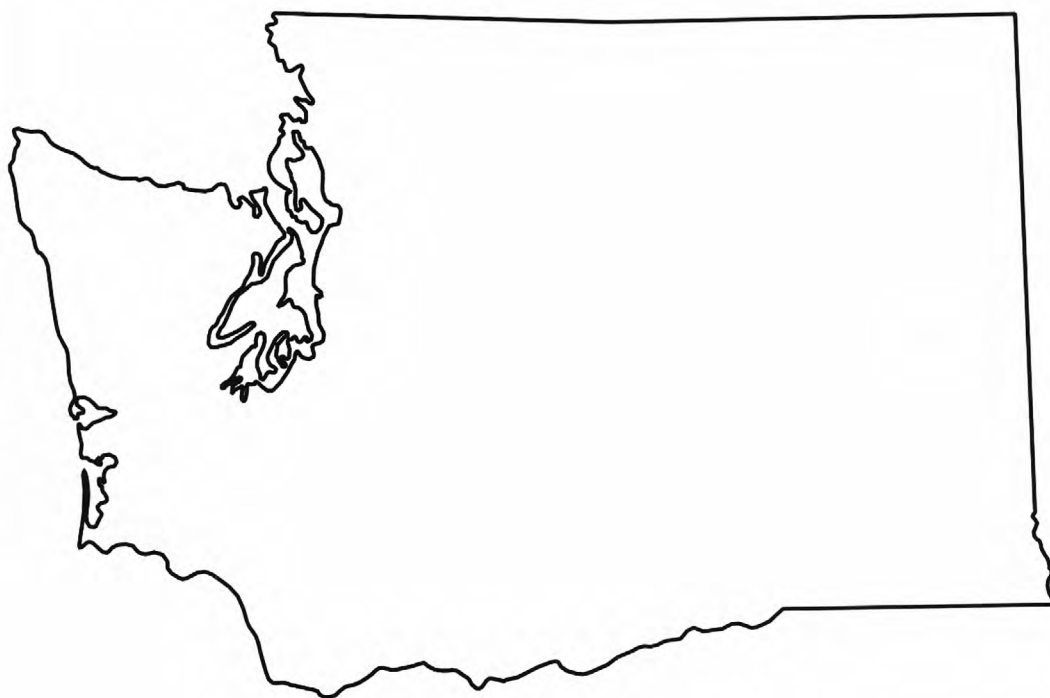
1996

JANUARY							FEBRUARY							MARCH						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3						1	2
7	8	9	10	11	12	13	4	5	6	7	8	9	10	3	4	5	6	7	8	9
14	15	16	17	18	19	20	11	12	13	14	15	16	17	10	11	12	13	14	15	16
21	22	23	24	25	26	27	18	19	20	21	22	23	24	17	18	19	20	21	22	23
28	29	30	31				25	26	27	28	29			24	25	26	27	28	29	30
														31						
APRIL							MAY							JUNE						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6				1	2	3	4							1
7	8	9	10	11	12	13	5	6	7	8	9	10	11	2	3	4	5	6	7	8
14	15	16	17	18	19	20	12	13	14	15	16	17	18	9	10	11	12	13	14	15
21	22	23	24	25	26	27	19	20	21	22	23	24	25	16	17	18	19	20	21	22
28	29	30					26	27	28	29	30	31		23	24	25	26	27	28	29
														30						
JULY							AUGUST							SEPTEMBER						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
	1	2	3	4	5	6					1	2	3	1	2	3	4	5	6	7
7	8	9	10	11	12	13	4	5	6	7	8	9	10	8	9	10	11	12	13	14
14	15	16	17	18	19	20	11	12	13	14	15	16	17	15	16	17	18	19	20	21
22	23	24	25	26	27		18	19	20	21	22	23	24	22	23	24	25	26	27	28
28	29	30	31				25	26	27	28	29	30	31	29	30					



# Water Resources Data Washington Water Year 1996

by W.D. Wiggins, G.P. Ruppert, R.R. Smith, L.L. Reed,  
L.E. Hubbard, and M.L. Courts



U.S. GEOLOGICAL SURVEY WATER-DATA REPORT WA-96-1  
Prepared in cooperation with the State of Washington  
and with other agencies



U.S. DEPARTMENT OF THE INTERIOR

BRUCE BABBITT, Secretary

U.S. GEOLOGICAL SURVEY

Mark Schaefer, Acting Director

For additional information:

District Chief, Water Resources Division  
U.S. Geological Survey  
1201 Pacific Avenue - Suite 600  
Tacoma, Washington, 98402

See additional USGS information on water resources of  
Washington  
on the World Wide Web at  
<http://www.dwater.wr.usgs.gov>

## PREFACE

This volume of the annual Washington hydrologic data report is one of a series of annual reports that document hydrologic data gathered from the U.S. Geological Survey's surface- and ground-water data-collection networks in each State, Puerto Rico, and the Trust Territories. These records of streamflow, ground-water levels, and quality of water provide the hydrologic information needed by State, local and Federal agencies, and the private sector for developing and managing our Nation's land and water resources.

The report is the culmination of a concerted effort by dedicated personnel of the U.S. Geological Survey who collected, compiled, analyzed, verified, and organized the data, and who edited and assembled the reports. In addition to the authors, who had primary responsibility for assuring that the information contained herein is accurate, complete, and adheres to Geological Survey policy and established guidelines, the following individuals contributed significantly to the collection, processing, and tabulation of the data:

Rodger M. Adkins, Steven P. Anders, Robert R. Adsit, Mark K. Bryant,  
Dwight D. Copeland, Robert E. Drzymkowski, Ken E. Frasl, Joseph C.  
Gilbert, Kathleen A. Greene, Thomas W. Hale, John E. Jern, F. Marlene  
Johnson, Katrina D. Kasnick, Dennis J. Kent, Richard L. Kittelson, Scott  
M. Knowles, David L. Kresch, Stephanie R. Lisle, Mark C. Mastin, Thomas  
E. McKenna, Maurice B. Miles, Jeanette F. O'Neil, Donita J. Parker, Bryan  
S. Peck, Gregory J. Perry, Sidney L. Phipps, Ralph E. Quistorff, Jr.,  
Andrew W. Records, Dennis R. Saunders, Galen J. Schuster, Johnna L.  
Sheehy, F. William Simonds, Brett A. Smith, Daniel T. Smith, Kurt R.  
Spicer, William A. Taylor, Evan D. Templeton, James C. Tilque, Stewart A.  
Tomlinson, Richard J. Wagner, Bronwen Wang, Shawn G. Welch, Roy E.  
Wellman, Brian J. Zalewsky.

This report was prepared in cooperation with the State of Washington and with other agencies under the general supervision of Thomas J. Zembrzuski, Hydrologic Data Section, Carl R. Goodwin, District Chief, Washington District, and T. John Conomos, Regional Hydrologist, Western Region.



REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE October 1997		3. REPORT TYPE AND DATES COVERED Annual 1 Oct 95 - 30 Sept 96
4. TITLE AND SUBTITLE Water Resources Data, Washington Water Year 1996			5. FUNDING NUMBERS	
6. AUTHOR(S) W.D. Wiggins, G.P. Ruppert, R.R. Smith, L.L. Reed, L.E. Hubbard and M.L. Courts				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Geological Survey, Water Resources Division 1201 Pacific Avenue, Suite 600 Tacoma, WA 98402			8. PERFORMING ORGANIZATION REPORT NUMBER USGS-WDR-WA-96-1	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Geological Survey, Water Resources Division 1201 Pacific Avenue, Suite 600 Tacoma, WA 98402			10. SPONSORING / MONITORING AGENCY REPORT NUMBER USGS-WDR-WA-96-1	
11. SUPPLEMENTARY NOTES Prepared in cooperation with the State of Washington and with other agencies.				
12a. DISTRIBUTION / AVAILABILITY STATEMENT This report may be purchased from: U.S. Department of Commerce, NTIS 5285 Port Royal Road Springfield, VA 22161			12b. DISTRIBUTION CODE No restrictions on distribution	
13. ABSTRACT (Maximum 200 words)  Water resources data for the 1996 water year for Washington consist of records of stage, discharge, and water quality of streams; stage and contents of lakes and reservoirs; and water levels of wells.  <ul style="list-style-type: none"> <li>• Water discharge for 225 gaging stations on streams, canals and drains.</li> <li>• Stage only records for 2 sites.</li> <li>• Discharge data for 32 partial-record or miscellaneous sites.</li> <li>• Stage and (or) contents for 34 lakes and reservoirs.</li> <li>• Water-quality data for 68 streams, canals, lakes and wells.</li> <li>• Water levels for 4 observation wells.</li> <li>• Water-quality record for 1 observation well.</li> </ul> These data represent that part of the National Water Data System operated by the U.S. Geological Survey and cooperating State and Federal agencies in Washington.				
14. SUBJECT TERMS *Washington, *Hydrologic data, *Surface water, *Ground water, *Water quality, Flow rate, Gaging stations, Lakes, Reservoirs, Chemical analyses, Sediment, Water temperatures, Sampling sites, Water levels, Water analyses.			15. NUMBER OF PAGES 529	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT Unlimited	

## CONTENTS

	Page
Preface . . . . .	iii
List of surface-water stations, in downstream order, for which records are published in this volume . . . . .	viii
List of ground-water wells, by county, for which records are published in this volume . . . . .	. xv
List of discontinued surface-water discharge or stage-only stations . . . . .	xvi
List of discontinued surface-water-quality stations . . . . .	xxxii
Introduction . . . . .	1
Cooperation . . . . .	2
Summary of hydrologic conditions . . . . .	3
Surface water . . . . .	3
Surface-water conditions . . . . .	7
Surface-water quality . . . . .	26
Ground water . . . . .	29
Special networks and programs . . . . .	29
Explanation of the records . . . . .	30
Station identification numbers . . . . .	30
Downstream order system . . . . .	30
Latitude-longitude system . . . . .	31
Local identifier well-numbering system . . . . .	31
Records of stage and water discharge . . . . .	32
Data collection and computation . . . . .	32
Data presentation . . . . .	34
Station manuscript . . . . .	34
Data tables of daily mean values . . . . .	36
Statistics of monthly mean data . . . . .	36
Summary statistics . . . . .	36
Identifying estimated daily discharge . . . . .	38
Accuracy of the records . . . . .	38
Other records available . . . . .	38
Records of surface-water quality . . . . .	39
Classification of records . . . . .	39
Arrangement of records . . . . .	39
On-site measurements and sample collection . . . . .	39
Water temperature . . . . .	40
Sediment . . . . .	40
Laboratory measurements . . . . .	41
Data presentation . . . . .	41
Remark codes . . . . .	42
Records of ground-water levels . . . . .	42
Data collection and computation . . . . .	42
Data presentation . . . . .	43
Access to WATSTORE data . . . . .	43
Definition of terms . . . . .	44
Publications on Techniques of Water-Resources Investigations . . . . .	55
Station records, surface-water . . . . .	62
Discharge at partial-record stations and miscellaneous sites . . . . .	487
Crest-stage partial-record stations . . . . .	487
Miscellaneous sites and special investigations . . . . .	488
Station records, ground water . . . . .	491
Ground-water levels . . . . .	491
Quality of ground water . . . . .	492
Index . . . . .	493



## ILLUSTRATIONS

	Page
Figure 1. Selected streamflow stations, climatological sites, and drainage basin ....	4
2. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Quinault River at Quinault Lake .....	14
3. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Chehalis River near Grand Mound .....	15
4. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Puyallup River near Orting .....	16
5. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Nooksack River at Deming .....	17
6. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Wenatchee River at Plain .....	18
7. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Methow River near Pateros .....	19
8. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Klickitat River near Pitt .....	20
9. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Ahtanum Creek at Union Gap .....	21
10. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Walla Walla River near Touchet .....	22
11. Daily discharges for water year 1996 and median and quartile discharges for period of record for the Hangman Creek at Spokane .....	23
12. Monthly streamflow October 1995 to March 1996 .....	24
13. Monthly streamflow April to September 1996 .....	25
14. Map showing location of 1996 NASQAN, Federal Benchmark and Department of Enrgy surface water-quality stations and selected water quality constituents for period of record .....	27,28
15. System for numbering wells and miscellaneous sites .....	31
16. Local identifier well-numbering system .....	32
17. Comparison of discharges at two long-term representative gaging stations during 1996 water year with median discharge for water years 1961-90 in Western Washington .....	59
18. Comparison of discharges at two long-term representative gating stations during 1996 water year with median discharge for water years 1961-90 in Eastern Washington .....	60
Location of surface-water and water-quality stations in the:	
19,20. Naselle and Willapa River Basins .....	63,64
21,22. Chehalis River Basin .....	68,69
23,24. Quinault, Queets, Hoh and Quillayute River Basins .....	84,85
25,26. Hoko, Elwha and Dungeness River Basins .....	90,91
27,28. Big Quilcene River, Duckabush River and Big Beef Creek Basins .....	103,104
29,30. Skokomish River Basin .....	107,108
31,32. Minter Creek, Case Inlet and Vaughn Bay Basins .....	126,127
33,34. Deschutes and Nisqually River Basins .....	129,130
35,36. Chambers Creek Basin .....	145,146
37,38. Puyallup River Basin .....	150,151
39,40. Duwamish River Basin .....	173,174

## ILLUSTRATIONS--Continued

Figures--Continued	Page
Location of surface-water and water-quality stations in the:	
41,42. Lake Washington and Sammamish River Basins .....	199,200
43,44. Snohomish and Stillaguamish River Basins .....	225,226
45,46. Skagit River Basin .....	264,265
47,48. Nooksack River Basin .....	280,281
49,50. Columbia River Basin above Franklin D. Roosevelt Lake and including Colville, Kettle and Pend Oreille River Basins .....	296,297
51,52. Spokane River Basin .....	315,316
53,54. Columbia River Basin from Coulee Dam to Wells Dam including Okanogan and Methow River Basins .....	348,349
55,56. Columbia River Basin from Chelan to Priest Rapids gage including Chelan River, Entiat River, Wenatchee River and Crab Creek Basins .....	369,370
57,58. Columbia River Basin from Priest Rapids Dam to Kennewick including Eyles Lakes, Scootenay Reservoir, Yakima River and Esquatzel Coulee Basins .....	394,395
59,60. Grand Ronde, Snake, Asotin and Palouse River Basins .....	409,410
61,62. Columbia River between Wallula Lake and Stevenson including Walla Walla, Klickitat and White Salmon River Basins .....	430,431
63,64. Lewis and Cowlitz River Basins and downstream to mouth of Columbia River .....	445,446

## TABLES

Table 1. Key for streamflow stations, climatological stations, and additional information .....	5
2. Maximum stages and discharges during floods of November 29, 30, 1995 at selected U.S. Geological Survey gaging stations .....	8
3. Maximum stages and discharges during floods of February 8, 9, 1996 at selected U.S. Geological Survey gaging stations .....	10



SURFACE-WATER STATIONS IN DOWNSTREAM ORDER, FOR WHICH  
RECORDS ARE PUBLISHED IN THIS VOLUME

NOTE--Data for miscellaneous sites are published in separate sections of the data report. See references at the end of this list of page numbers for these sections.

Letter after station name designates type of data: (d) discharge; (e) elevation; (g) gage height; (v) contents; (c) chemical, including periodic biological, microbiological, sediment, pesticide, and radio-chemical where applicable; (t) water temperature; and (k) specific conductance.

	Station number	Page
PACIFIC SLOPE BASINS		
NASELLE RIVER BASIN		
Naselle River near Naselle (d) .....	12010000	65
WILLAPA RIVER BASIN		
Willapa River near Willapa (d) .....	12013500	66
NORTH RIVER RIVER BASIN		
North River near Raymond (d) .....	12017000	67
CHEHALIS RIVER BASIN		
Chehalis River near Doty (d) .....	12020000	70
Newaukum River near Chehalis (d) .....	12025000	71
Skookumchuck River near Vail (d) .....	12025700	72
Skookumchuck River below Bloody Run Creek, near Centralia (d) .....	12026150	73
Skookumchuck River near Bucoda (d) .....	12026400	74
Chehalis River near Grand Mound (d) .....	12027500	75
Chehalis River at Porter (d,c) .....	12031000	76
Satsop River near Satsop (d) .....	12035000	77
Wynoochee Lake near Grisdale (e,v) .....	12035380	78
Wynoochee River near Grisdale (d) .....	12035400	79
Big Creek near Grisdale (d) .....	12035450	80
Wynoochee River above Save Creek, near Aberdeen (d) .....	12036000	81
Schafer Creek near Grisdale (d) .....	12036400	82
Wynoochee River above Black Creek, near Montesano (d) .....	12037400	83
QUINULT RIVER BASIN		
Quinault River at Quinault Lake (d) .....	12039500	86
QUEETS RIVER BASIN		
Queets River near Clearwater (d) .....	12040500	87
HOH RIVER BASIN at U.S.Highway 101, near Forks (d) .....	12041200	88
QUILLAYUTE RIVER BASIN		
Calawah River near Forks (d) .....	12043000	89
HOKO RIVER BASIN		
Hoko River near Sekiu (d) .....	12043300	92
ELWHA RIVER BASIN		
Elwha River:		
Elwha River above Lake Mills, near Port Angeles (d,t) .....	12044900	93
Lake Mills at Glines Canyon, near Port Angeles (g,v) .....	12045000	98
Elwha River at McDonald Bridge, near Port Angeles (d,c,t) .....	12045500	99
DUNGENESS RIVER BASIN		
Dungeness River near Sequim (d) .....	12048000	102
BIG QUILCENE RIVER BASIN		
Big Quilcene River below diversion dam, near Quilcene (d) .....	12052210	105
DUCKABUSH RIVER BASIN		
Duckabush River near Brinnon (d) .....	12054000	106
SKOKOMISH RIVER BASIN		
North Fork Skokomish River below Staircase Rapids, near Hoodsport (d,t) .....	12056500	109
North Fork Skokomish River below Lower Cushman Dam, near Potlatch (d,t) .....	12058800	113

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH  
RECORDS ARE PUBLISHED IN THIS VOLUME

ix

	Station number	Page
PACIFIC SLOPE BASINS--Continued		
SKOKOMISH RIVER BASIN--Continued		
North Fork Skokomish River near Potlatch (d) .....	12059500	116
South Fork Skokomish River near Union (d) .....	12060500	117
Skokomish River near Potlatch (d,k,t) .....	12061500	118
BIG BEEF CREEK BASIN		
Big Beef Creek near Seabeck (d) .....	12069550	120
DEVILS HOLE BASIN		
Devils Hole Creek at Bangor Subbase, near Bangor (d) .....	12069600	121
PORT GAMBLE BASIN		
Gamble Creek near Port Gamble (d) .....	12069651	122
LIBERTY BAY BASIN		
Johnson Creek DNR Site, near Poulsbo (d) .....	12070040	123
North Fork Johnson Creek near Poulsbo (d) .....	12070045	124
Johnson Creek near Poulsbo (d) .....	12070050	125
MINTER CREEK BASIN		
Minter Creek:		
Huge Creek near Wauna (d) .....	12073500	128
DESCHUTES RIVER BASIN		
Deschutes River near Rainier (d) .....	12079000	131
Deschutes River at E Street Bridge, at Tumwater (d) .....	12080010	132
NISQUALLY RIVER BASIN		
Nisqually River near National (d) .....	12082500	134
Mineral Creek near Mineral (d) .....	12083000	135
Alder Reservoir at Alder (v) .....	12085000	136
La Grande Reservoir at La Grande (g,v) .....	12085500	137
Nisqually River at La Grande (d) .....	12086500	138
Mashel River near La Grande (d) .....	12087000	139
Ohop Creek near Eatonville (d) .....	12088000	140
Centralia Power Canal near McKenna (d) .....	12089208	141
Nisqually River at McKenna (d) .....	12089500	142
CHAMBERS CREEK BASIN		
Chambers Creek:		
Clover Creek:		
North Fork Clover Creek near Parkland (d) .....	12090400	143
Clover Creek near Tillicum (d) .....	12090500	144
Flett Creek at Tacoma (d) .....	12091100	147
Leach Creek near Fircrest (d) .....	12091200	148
Leach Creek near Steilacoom (d) .....	12091300	149
PUYALLUP RIVER BASIN		
Puyallup River near Electron (d) .....	12092000	152
Puyallup River near Orting (d) .....	12093500	153
Carbon River near Fairfax (d) .....	12094000	154
South Prairie Creek at South Prairie (d) .....	12095000	155
White River:		
Greenwater River at Greenwater (d) .....	12097500	157
White River below Clearwater River, near Buckley (d) .....	12097850	158
Mud Mountain Lake near Buckley (e) .....	12098000	159
White River near Buckley (d) .....	12098500	160
White River Canal at Buckley (d) .....	12099000	161
Boise Creek at Buckley (d) .....	12099600	162
White River at Buckley (d) .....	12100000	163
White River near Auburn (d) .....	12100496	164
Lake Tapps near Sumner (g,v) .....	12101000	165
Lake Tapps diversion at Dieringer (d) .....	12101100	166
Puyallup River at Puyallup (d,c) .....	12101500	167
Clarks Creek at Tacoma, near Puyallup (d) .....	12102075	168
Clear Creek at Pioneer Way, below fish hatchery, nr Tacoma (d) .....	12102140	170
Swan Creek at 80th Street East, near Tacoma (d) .....	12102190	171

x SURFACE-WATER STATIONS IN DOWNSTREAM ORDER, FOR WHICH  
RECORDS ARE PUBLISHED IN THIS VOLUME

	Station number	Page
PACIFIC SLOPE BASINS--Continued		
HYLEBOS CREEK BASINS		
Hylebos Creek at Highway 99, at Fife (d) .....	12103020	172
DUWAMISH RIVER BASIN		
Green River above Twin Camp, near Lester (d) .....	12103380	175
Howard A. Hanson Reservoir near Palmer (v) .....	12105800	178
Green River below Howard A. Hanson Reservoir (d) .....	12105900	179
Green River at purification plant, near Palmer (d) .....	12106700	180
Newaukum Creek near Black Diamond (d,k,t) .....	12108500	181
Big Soos Creek above hatchery, near Auburn (d,k,t) .....	12112600	183
Green River near Auburn (d) .....	12113000	186
Spring Brook Creek near Orillia (d) .....	12113346	187
Mill Creek at Earth Works Park (d) .....	12113347	188
Mill Creek near mouth at Orillia (d,c,t) .....	12113349	189
Springbrook Creek at Tukwila (c,k,t) .....	12113375	194
Duwamish River at golf course, at Tukwila (k,t) .....	12113390	197
LAKE WASHINGTON BASIN		
North Fork Cedar River (head of Cedar River):		
Cedar River below Bear Creek near Cedar Falls (d) .....	12114500	201
Cedar River near Cedar Falls (d) .....	12115000	202
Rex River near Cedar Falls (d) .....	12115500	203
Boulder Creek near Cedar Falls (d) .....	12115700	204
Chester Morse Lake at Cedar Falls (g) .....	12115900	205
Cedar Lake (Masonry Pool) near Cedar Falls (g) .....	12116060	206
Canyon Creek near Cedar Falls (d) .....	12116100	207
Cedar River at Cedar Falls (d) .....	12116500	208
Taylor Creek near Selleck (d) .....	12117000	209
Cedar River near Landsburg (d) .....	12117500	210
Cedar River below Diversion, near Landsburg (d) .....	12117600	211
Cedar River at Renton (d,t) .....	12119000	212
Mercer Creek near Bellevue (d) .....	12120000	215
Issaquah Creek near Hobart (d) .....	12120600	216
Issaquah Creek near mouth, near Issaquah (d) .....	12121600	217
Sammamish Lake near Redmond (g) .....	12122000	218
Sammamish River:		
Bear Creek near Redmond (d) .....	12122500	219
Sammamish River near Woodinville (d) .....	12125200	220
Thornton Creek, near Seattle (d,c,k,t) .....	12128000	221
SNOHOMISH RIVER BASIN		
Tye River (head of Snohomish River):		
Skykomish River near Gold Bar (d) .....	12134500	227
Wallace River at Gold Bar (d) .....	12135000	228
South Fork Sultan River near Sultan (d) .....	12137290	229
Spada Lake near Startup (e,v) .....	12137300	230
Sultan River below diversion dam, near Sultan (d) .....	12137800	231
Sultan River below powerplant, near Sultan (d,t) .....	12138160	232
Middle Fork Snoqualmie River near Tanner (d) .....	12141300	235
North Fork Snoqualmie River near Snoqualmie Falls (d) .....	12142000	236
South Fork Snoqualmie River above Alice Creek, near Garcia (d) .....	12143400	237
South Fork Snoqualmie River at Edgewick (d) .....	12143600	238
Boxley Creek near Cedar Falls (d) .....	12143700	239
Rattlesnake Lake at Cedar Falls (g) .....	12143800	240
Boxley Creek near Edgewick (d) .....	12143900	241
South Fork Snoqualmie River at North Bend (d) .....	12144000	242
Snoqualmie River near Snoqualmie (d) .....	12144500	243



SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH  
RECORDS ARE PUBLISHED IN THIS VOLUME

xi

	Station number	Page
PACIFIC SLOPE BASINS--Continued		
SNOHOMISH RIVER BASIN--Continued		
Raging River near Fall City (d) .....	12145500	244
Tolt River:		
North Fork Tolt River near Carnation (d,t) .....	12147500	245
South Fork Tolt River near Index (d,t) .....	12147600	248
South Fork Tolt Reservoir near Carnation (e) .....	12147900	251
South Fork Tolt River near Carnation (d,t) .....	12148000	252
South Fork Tolt River below regulating basin, near Carnation (d,t) .....	12148300	255
Tolt River near Carnation (d) .....	12148500	258
Snoqualmie River near Carnation (d) .....	12149000	259
Snohomish River near Monroe (d) .....	12150800	260
Pilchuck River near Snohomish (d) .....	12155300	261
STILLAGUAMISH RIVER BASIN		
South Fork Stillaguamish River:		
North Fork Stillaguamish River near Arlington (d) .....	12167000	262
Stillaguamish River:		
Pilchuck Creek near Bryant (d) .....	12168500	263
SKAGIT RIVER BASIN		
Ross Reservoir near Newhalem (e) .....	12175000	266
Skagit River:		
Thunder Creek near Newhalem (d) .....	12175500	267
Skagit River at Newhalem (d) .....	12178000	268
Newhalem Creek near Newhalem (d) .....	12178100	269
Skagit River at Marblemount (d,t) .....	12181000	270
Sauk River above White Chuck River, near Darrington (d) .....	12186000	273
Sauk River near Sauk (d) .....	12189500	274
Reservoirs in Skagit River basin (e,v) .....		275
Baker River:		
Baker River at Concrete (d) .....	12193500	277
Skagit River near Concrete (d) .....	12194000	278
Skagit River near Mount Vernon (d) .....	12200500	279
NOOKSACK RIVER BASIN		
Nooksack River:		
North Fork Nooksack River below Cascade Creek, near Glacier (d) .....	12205000	282
Middle Fork Nooksack River near Deming (d) .....	12208000	283
South Fork Nooksack River near Wickersham (d) .....	12209000	284
Nooksack River at Deming (d) .....	12210500	285
Nooksack River at North Cedarville (c,k,t) .....	12210700	286
Fishtrap Creek at Flynn Road, at Lynden (d,c,k,t) .....	12212100	289
Nooksack River at Ferndale (d) .....	12213100	293
Nooksack River at Brennan (k,t) .....	12213140	294
COLUMBIA RIVER BASIN		
Columbia River at Birchbank, British Columbia (d) .....	12323000	298
PEND OREILLE RIVER BASIN		
Pend Oreille River at Newport (d,c) .....	12395500	299
Pend Oreille River below Box Canyon, near Ione (d) .....	12396500	300
Sullivan Creek above Outlet Creek, near Metaline Falls (d) ....	12396900	301
Harvey Creek (head of Outlet Creek):		
Sullivan Lake near Metaline Falls (e) .....	12397000	302
Outlet Creek near Metaline Falls (d) .....	12397100	303
Sullivan Creek at Metaline Falls (d) .....	12398000	304
Columbia River at international boundary (d) .....	12399500	305
Columbia River at Northport (c) .....	12400520	306

	Station number	Page
COLUMBIA RIVER BASIN--Continued		
KETTLE RIVER BASIN		
Myers Creek at Chesaw (d) .....	12400900	311
Kettle River near Ferry (d) .....	12401500	312
Kettle River near Laurier (d) .....	12404500	313
COLVILLE RIVER BASIN		
Colville River at Kettle Falls (d) .....	12409000	314
SPOKANE RIVER BASIN		
Spokane River near Post Falls, Idaho (d,c) .....	12419000	317
Spokane River at Spokane (d) .....	12422500	319
Hangman Creek at Spokane (d) .....	12424000	320
Little Spokane River at Dartford (d) .....	12431000	321
Long Lake at Long Lake (e) .....	12432500	322
Spokane River at Long Lake (d) .....	12433000	323
Chamokane Creek below Falls, near Long Lake (d) .....	12433200	324
Blue Creek above Midnite Mine Drainage, near Wellpinit (d,c,k,t) .....	12433542	325
Midnite Mine Drainage near Wellpinit (d,c,k,t) .....	12433556	331
Blue Creek below Midnite Mine Drainage, near Wellpinit (c,k,t) .	12433558	337
Blue Creek near mouth, near Wellpinit (d,c,k,t) .....	12433561	342
FRANKLIN D. ROOSEVELT LAKE:		
DIVERSION AT GRAND COULEE DAM		
Feeder Canal at Grand Coulee (d) .....	12435500	350
Franklin D. Roosevelt Lake at Grand Coulee Dam (e) .....	12436000	351
Columbia River at Grand Coulee Dam (d) .....	12436500	352
Columbia River at Bridgeport (d) .....	12438000	353
OKANOGAN RIVER BASIN		
Okanagan River near Oliver, British Columbia (d) .....	12438700	354
Osoyoos Lake near Oroville (e) .....	12439000	355
Okanagan River at Oroville (d) .....	12439500	356
Similkameen River near Nighthawk (d) .....	12442500	357
Okanagan River near Tonasket (d) .....	12445000	358
Okanagan River at Malott (d,c) .....	12447200	359
METHOW RIVER BASIN		
Methow River above Goat Creek, near Mazama (d) .....	12447383	360
Chewuch River:		
Andrews Creek near Mazama (d,c) .....	12447390	361
Chewuch River at Winthrop (d) .....	12448000	363
Methow River at Winthrop (d) .....	12448500	364
Twisp River near Twisp (d) .....	12448998	365
Methow River at Twisp (d) .....	12449500	366
Methow River near Pateros (d) .....	12449950	367
Columbia River below Wells Dam (d) .....	12450700	368
CHELAN RIVER BASIN		
Stehekin River (head of Chelan River) at Stehekin (d) .....	12451000	371
Lake Chelan at Chelan (e) .....	12452000	372
Chelan River at Chelan (d) .....	12452500	373
ENTIAT RIVER BASIN		
Entiat River near Ardenvoir (d) .....	12452800	374
Entiat River near Entiat (d) .....	12452990	375
Columbia River at Rocky Reach Dam (d) .....	12453700	376
WENATCHEE RIVER BASIN		
Chiwawa River near Plain (d) .....	12456500	377
Wenatchee River at Plain (d) .....	12457000	378
Icicle Creek above Snow Creek, near Leavenworth (d) .....	12458000	379
Wenatchee River at Peshastin (d) .....	12459000	380
Wenatchee River at Monitor (d) .....	12462500	381
Columbia River below Rock Island Dam (d) .....	12462600	382

SURFACE-WATER STATIONS, IN DOWNSTREAM ORDER, FOR WHICH  
RECORDS ARE PUBLISHED IN THIS VOLUME

xiii

	Station number	Page
COLUMBIA RIVER BASIN--Continued		
CRAB CREEK BASIN		
Crab Creek at Irby (d) .....	12465000	383
Crab Creek near Moses Lake (d) .....	12467000	384
Lenore Lake near Soap Lake (e) .....	12469500	385
Soap Lake near Soap Lake (e) .....	12470000	386
Moses Lake at Moses Lake (e) .....	12471000	387
Crab Creek Lateral above Royal Lake, near Othello (d,t) .....	12472380	388
Crab Creek near Beverly (d,t) .....	12472600	391
Columbia River below Priest Rapids Dam (d) .....	12472800	396
Columbia River at Vernita Bridge, near Priest Rapids Dam (c) .....	12472900	397
Columbia River at Richland (c) .....	12473520	399
YAKIMA RIVER BASIN		
Yakima River at Umtanum (d) .....	12484500	400
Naches River:		
American River near Nile (d) .....	12488500	401
Yakima River above Ahtanum Creek, at Union Gap (d) .....	12500450	402
Ahtanum Creek at Union Gap (d) .....	12502500	403
Yakima River at Mabton (d) .....	12508990	404
Yakima River at Kiona (d,c) .....	12510500	405
ESQUATZEL COULEE BASIN		
Providence Coulee (head of Esquatzel Coulee) near Cunningham (d) .....	12512550	406
Esquatzel Coulee at Connell (d) .....	12513000	407
Columbia River on Clover Island, at Kennewick (e) .....	12514500	408
SNAKE RIVER BASIN		
GRANDE RONDE RIVER BASIN		
Grande Ronde River at Troy, Oregon (d) .....	13333000	411
Snake River near Anatone (d,t) .....	13334300	412
ASOTIN RIVER BASIN		
Asotin Creek below Kearney Gulch, near Asotin (d) .....	13334700	415
Asotin Creek at Asotin (d) .....	13335050	416
TUCANNON RIVER BASIN		
Tucannon River near Starbuck (d) .....	13344500	417
PALOUSE RIVER BASIN		
Palouse River at Hooper (d,c,t) .....	13351000	418
Snake River below Ice Harbor Dam (d) .....	13353000	423
Snake River at Burbank (c) .....	13353200	424
WALLA WALLA RIVER BASIN		
Walla Walla River:		
Mill Creek near Walla Walla (d) .....	14013000	432
Mill Creek at Walla Walla (d) .....	14015000	433
Walla Walla River near Touchet (d) .....	14018500	434
Columbia River at The Dalles (d) .....	14105700	435
KLICKITAT RIVER BASIN		
Klickitat River above West Fork, near Glenwood (d) .....	14107000	436
Klickitat River near Pitt (d) .....	14113000	437
WHITE SALMON RIVER BASIN		
White Salmon River near Underwood (d) .....	14123500	438
WIND RIVER BASIN		
Trout Creek near Stabler (d) .....	14127300	439
Wind River near Carson (d) .....	14128500	440
Columbia River at Stevenson (g) .....	14128600	441
Columbia River below Bonneville Dam (g) .....	14128870	443
LEWIS RIVER BASIN		
Muddy River below Clear Creek, near Cougar (d,c) .....	14216500	447
Speelyai Creek near Cougar (d) .....	14219800	450

	Station number	Page
COLUMBIA RIVER BASIN--Continued		
LEWIS RIVER BASIN--Continued		
Reservoirs in Lewis River basin (e,v) .....		451
Lewis River at Ariel (d) .....	14220500	452
East Fork Lewis River near Heisson (d) .....	14222500	453
COWLITZ RIVER BASIN		
Cowlitz River at Packwood (d) .....	14226500	454
Cowlitz River at Randle (d) .....	14231000	455
Cispus River near Randle (d) .....	14232500	456
Cowlitz River near Kosmos (d) .....	14233500	457
Riffe Lake near Mossyrock (e,v) .....	14234800	458
Tilton River above Bear Canyon Creek, near Cinebar (d) .....	14236200	459
Mayfield Reservoir near Silver Creek (e,v) .....	14237800	460
Cowlitz River below Mayfield Dam (d) .....	14238000	461
TOUTLE RIVER BASIN		
Spirit Lake at Tunnel, at Spirit Lake (e) .....	14240304	462
Coldwater Lake near Spirit Lake (e) .....	14240350	463
Castle Lake near Mount St. Helens (e) .....	14240446	464
North Fork Toutle River below Sediment Retention Structure, near Kid Valley (d) .....	14240525	465
South Fork Toutle River at Camp 12, near Toutle (d,c) .....	14241490	466
South Fork Toutle River at Toutle (d,c) .....	14241500	469
Toutle River at Tower Road, near Silver Lake (d,c) .....	14242580	473
Cowlitz River at Castle Rock (d) .....	14243000	477
Columbia River at Beaver Army Terminal (d,c,k,t) .....	14246900	478
Discharge at partial-record stations and miscellaneous sites .....		487
Crest-stage partial-record stations .....		487
Miscellaneous sites and special investigations .....		488



GROUND-WATER WELLS, BY COUNTY, FOR WHICH RECORDS ARE PUBLISHED      xv  
IN THIS VOLUME

GROUND-WATER LEVELS

Page

SPOKANE COUNTY

Well	474011117072901	Local number	25/45-16C1 .....	491
------	-----------------	--------------	------------------	-----

STEVENS COUNTY

Well	475529118052201	Local number	28/37-13K1 .....	491
Well	475530118052301	Local number	28/37-13L1 .....	491
Well	475529118052301	Local number	28/37-13L3 .....	491

QUALITY OF GROUND WATER

STEVENS COUNTY

Well	475529118052301	Local number	28/37-13L3 .....	492
------	-----------------	--------------	------------------	-----

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

The following continuous-record surface-water discharge or stage-only stations (gaging stations) in Washington have been discontinued. Period of record for daily streamflow or stage records collected and published as daily means, or monthly means for some periods, for the period of record, expressed in water years, are shown for each station. Those stations with an asterik (\*) after the station number are currently operated as a crest-stage station. Discontinued stations with less than 3 years of records are included. Information and data regarding any station may be obtained from the District Office at the address given on the back side of the title page of this report.

[Data listed are for discharge, except where noted with the letter: (E) elevation, (S) stage.]

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
SOUTHWEST WASHINGTON RIVER BASINS			
Bear Branch (River) near Naselle, Wa.	12009500	11.7	1963-75
Salmon Creek near Naselle, Wa.	12010500	16.4	1953-65
South Fork Naselle River near Naselle, Wa.	12010700	17.9	1964-75;1977
North Nemah River near South Bend, Wa.	12011000	18.0	1946-54;1964-68;1977
Williams Creek near South Bend, Wa.	12011200	9.43	1964-74;1977
Willapa River at Lebam, Wa.	12011500	41.4	1948-71
Fork Creek near Lebam, Wa.	12012000	20.4	1953-70
Stringer Creek near Holcomb, Wa.	12012500	3.02	1953
Mill Creek near Willapa, Wa.	12013000	23.7	1953
Ward Creek near Willapa, Wa.	12014000	19.3	1953
South Fork Willapa River near Raymond, Wa.	12014500	27.8	1953-71
Elkhorn Creek near Raymond, Wa.	12015000	15.6	1953
Clearwater Creek near Raymond, Wa.	12015100	3.98	1964-75
Smith Creek near Raymond, Wa.	12015200	57.7	1963-66
North River near Brooklyn, Wa.	12015500	29.8	1953-65
Fall River at Brooklyn, Wa.	12016000	41.0	1953
Little North River near Cosmopolis, Wa.	12016500	18.6	1946-49;1953
Johns River near Markham, Wa.	12017500	18.9	1942-43
Newskah Creek near Aberdeen, Wa.	12018000	7.44	1946-49
Charley (Charlies) Creek near Aberdeen, Wa.	12018500	5.93	1946-49
CHEHALIS RIVER BASIN			
Chehalis River near Pe Ell, Wa.	12019000	54.7	1944
Rock Creek near Pe Ell, Wa.	12019500	13.4	1944
Elk Creek near Doty, Wa.	12020500	46.7	1942-50;1967-70
South Fork Chehalis River near Boistfort, Wa.	12020900	44.9	1965-80
South Fork Chehalis River at Boistfort, Wa.	12021000	48.0	1942-50;1961-65
Halfway Creek near Boistfort, Wa.	12021500	13.4	1944
Bunker Creek near Adna, Wa.	12022000	20.1	1944
Stearns Creek near Napaville, Wa.	12022500	14.1	1945
Stearns Creek near Adna, Wa.	12023000	27.1	1944
Chehalis River near Chehalis, Wa.	12023500	434	1929-31
South Fork Newaukum River near Onalaska, Wa.	12024000	42.4	1944-49;1957-71
North Fork Newaukum River near Forest, Wa.	12024500	31.5	1944;1957-66
Salzer Creek near Centralia, Wa.	12025300	12.6	1968-71
Chehalis River at Centralia, Wa. (S)	12025500	--	1910-11
Skookumchuck River near Centralia, Wa.	12026000	61.7	1929-34;1940-69
Hanaford Creek near Centralia, Wa.	12026500	13.3	1944
Lincoln Creek near Rochester, Wa.	12027000	19.3	1942-50
Scatter Creek near Ground Mound, Wa.	12028000	21.0	1944
Wadell Creek near Little Rock, Wa.	12028500	15.9	1944
Black River at Little Rock, Wa.	12029000	63.7	1942-50
Garrard (Garrod) Creek near Oakville, Wa.	12029500	27.7	1944
Rock Creek near Cedarville, Wa.	12030000	24.8	1942-71
Cedar Creek near Cedarville, Wa.	12030500	38.2	1944
Porter Creek at Porter, Wa.	12030900	35.3	1942-49
Wildcat Creek near Elma, Wa.	12032000	19.8	1944
Cloquallum River (Creek) near Elma, Wa.	12032500	64.9	1942-72
Chehalis River at South Elma, Wa.	12033000	1,417	1942-45;1947-52
East Fork Satsop River near Matlock, Wa.	12033500	23.7	1946-47
Bingham Creek near Satsop, Wa.	12034000	30.0	1946-48
East Fork Satsop River near Elma, Wa.	12034200	65.9	1957-71
Middle Fork Satsop River near Satsop, Wa.	12034500	63.0	1942-43
Chehalis River near Satsop, Wa.	12035002	1,761	1977-83
Wynoochee River at Oxbow near Aberdeen, Wa.	12035500	70.7	1925-52
Wynoochee River near Montesano, Wa.	12036500	112	1923-30
Anderson Creek near Montesano, Wa.	12036650	2.72	1972-85

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
CHEHALIS RIVER BASIN--Continued			
City Aberdeen River Intake near Montesano, Wa.	12037000	--	1942
Wynoochee River below Black Creek near Montesano, Wa.	12037500	180	1942-50
Wishkah River near Wishkah, Wa.	12038000	57.8	1942-43
WESTERN OLYMPIC MOUNTAIN RIVER BASINS			
West Fork Hoquiam River near Hoquiam, Wa.	12038500	16.0	1942-44
Humtulpis River near Humtulpis, Wa.	12039000	130	1933-35;1942-79
Moclips River at Moclips, Wa.	12039220	35.0	1975-81
North Fork Quinault River near Amanda Park, Wa.	12039300	74.1	1964-86
Raft River below Rainy Creek near Queets, Wa.	12039520	76.0	1974-81
Clearwater River near Clearwater, Wa.	12040000	140	1932;1937-50
Hoh River below Mt. Tom Creek near Forks, Wa.	12040700	97.8	1985-89
South Fork Hoh River near Forks, Wa.	12040900	50.4	1985-89
Hoh River near Forks (Spruce), Wa.	12041000	208	1926-64
Soleduck River near Fairholm, Wa.	12041500	83.8	1918-21;1933-71; 1977-80
Soleduck River at Snider Ranger Station near Beaver, Wa.	12042000	116	1922-28
Soleduck River near (at) Quillayute, Wa.	12042500	219	1898-1902;1978-80
Bogachiel River near Forks, Wa.	12042800	111	1975-80
East Fork Dickey River near La Push, Wa.	12043080	39.8	1962-68
Dickey River near La Push, Wa.	12043100	86.3	1962-73;1977-80
Ozette River near Ozette, Wa.	12043150	77.5	1976-79
Sooes River below Miller Creek near Ozette, Wa.	12043163	32.0	1976-86
EASTERN OLYMPIC MOUNTAIN RIVER BASINS			
Waatch River below Educket Creek at Neah Bay, Wa.	12043173	9.96	1976-79
Sail River near Neah Bay, Wa.	12043190	5.42	1976-79
Clallam River near Clallam Bay, Wa.	12043350	137	1962
East Twin River near Pysht, Wa.	12043430	14.0	1962-72
Lake Crescent at Piedmont, Wa (S)	12043500	49.1	1919-27
Lyre River at Piedmont, Wa.	12044000	49.5	1918-27
Salt Creek near Port Angeles, Wa.	12044500	8.31	1952
Elwha River near Port Angeles, Wa. (S)	12046000	315	1911-12
Elwha River below Diversion near Port Angeles, Wa.	12046500	318	1951-54
Ennis Creek near Port Angeles, Wa.	12047000	8.32	1952
Morse Creek near Port Angeles, Wa.	12047300	46.6	1966-76
Siebert Creek near Port Angeles, Wa.	12047500	15.5	1952-69
Dungeness River below Canyon Creek near Sequim, Wa.	12048500	170	1897-98
Dungeness River at Dungeness (Sequim), Wa.	12049000	197	1898-1902
Jimmycomelately Creek near Blyn, Wa.	12049500	18.3	1952
Salmon Creek near Maynard, Wa.	12050000	13.0	1952
Snow Creek near Maynard, Wa.	12050500	11.2	1952-72
Andrews Creek near Maynard, Wa.	12051000	10.2	1952
Chimacum Creek near Chimacum, Wa.	12051500	13.8	1952-58
Little Quilcene River near Quilcene, Wa.	12052000	23.7	1926-27;1951-58
Big Quilcene River near (at) Quilcene, Wa.	12052500	66.0	1971-72
Dosewallips River near Brinnon, Wa.	12053000	93.5	1931-50
Dosewallips River at Brinnon, Wa.	12053500	116	1911;1924-25; 1928-30
Hamma Hamma River near Eldon, Wa.	12054500	51.3	1951-71
Jefferson Creek near Eldon, Wa.	12054600	21.6	1958-71
Hamma Hamma River near Hoodsport, Wa.	12055000	83.5	1926-30
Eagle Creek near Lilliwaup, Wa.	12055500	7.06	1951
Finch Creek at Hoodsport, Wa.	12056000	3.45	1951
Lake Cushman (Reservoir) near Hoodsport, Wa. (E)	12057000	93.7	1925-82
North Fork Skokomish River near Hoodsport, Wa. (S 1910-11)	12057500	93.7	1910-82
Dear Meadow Creek near Hoodsport, Wa.	12058000	1.83	1950-73
Dow Creek near Hoodsport, Wa.	12058500	1.67	1950-54
McTaggart Creek near Hoodsport, Wa.	12059000	1.30	1951-53
South Fork Skokomish River near Hoodsport, Wa.	12059800	26.0	1964-70
South Fork Skokomish River near Potlatch, Wa.	12060000	65.6	1924-32;1946-64
South Fork Skokomish River near Union, Wa.	12060500	76.3	1931-84
Vance Creek near Potlatch, Wa.	12061000	15.6	1955-56

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
SOUTHWESTERN PUGET SOUND RIVER BASINS			
Purdy Creek near Union, Wa.	12062500	3.73	1954-60
Union River near Bremerton, Wa.	12063000	3.16	1946-59
Union River near Belfair, Wa.	12063500	19.8	1947-59
Mission Lake near Bremerton, Wa. (S)	12064000	1.83	1945-53
Mission Creek near Belfair, Wa.	12065000	4.43	1946-53
Gold Creek near Bremerton, Wa.	12065500	1.51	1946-70
Tahuya River (Creek) near Bremerton, Wa.	12066000	5.99	1945-56
Panther Lake near Bremerton, Wa. (S)	12066500	0.80	1945-53
Panther Creek near Bremerton, Wa.	12067000	1.00	1945-53
Tahuya River (Creek) near Belfair, Wa.	12067500	15.0	1945-56
Tahuya River near Tahuya, Wa.	12068000	42.2	1947
Dewatto River (Creek) near Dewatto, Wa.	12068500	18.4	1947-54;1958-74
Anderson Creek near Holley, Wa.	12069000	6.30	1947
Stavis Creek near Seabeck, Wa.	12069500	5.60	1947
Dogfish Creek near Poulsbo, Wa.	12070000	5.01	1947-71
Clear Creek near Silverdale, Wa.	12070500	8.50	1947
Wildcat Lake near Bremerton, Wa. (S)	12071000	2.50	1947-50
Kitsap Lake near Bremerton, Wa. (S)	12071500	2.73	1947-50
Chico Creek near Bremerton, Wa.	12072000	15.3	1947-50;1961-74
Blackjack Creek at Port Orchard, Wa.	12072500	14.5	1947-50
Purdy Creek at Purdy, Wa.	12072800	3.44	1960-62
Burley Creek at Burley, Wa.	12073000	10.7	1947-50;1960-65
Unnamed Tributary to Beaver Creek, near Herron, Wa.	12073550	0.21	1991-94
Unnamed Creek near Key Center, Wa.	12073600	0.20	1991-94
Shumocher Creek (Sherwood Creek) near Union, Wa.	12074000	12.2	1951
Mason Lake near Union, Wa. (S)	12074500	20.2	1951-75
Deer Creek near Shelton, Wa.	12075000	13.6	1943;1948-51
Cranberry Creek near Shelton, Wa.	12075500	15.2	1942-43;1948-51
Johns Creek near Shelton, Wa.	12076000	17.7	1943;1948-51
Goldsborough Creek near Shelton, Wa.	12076500	39.3	1951-71
Goldsborough Creek at Shelton, Wa.	12077000	55.0	1943;1951
Mill Creek at Shelton, Wa.	12077500	19.5	1943;1951
Skookum Creek at Kamliche, Wa.	12078000	16.1	1951-59
Kennedy Creek near Kamliche, Wa.	12078400	17.4	1960-71
Kennedy Creek near New Kamliche, Wa.	12078500	18.7	1951
Synder Creek near Olympia, Wa.	12078650	0.52	1971-74
Spurgeon Creek near Olympia, Wa.	12079500	11.0	1949-50
Deschutes River near Olympia, Wa.	12080000	160	1945-54;1957-64
Woodward Creek near Olympia, Wa.	12080500	3.80	1949;1988-90
Woodland Creek near Olympia, Wa.	12081000	24.6	1949-69;1988-90
McAllister Springs near Olympia, Wa.	12081500	--	1951-64
NISQUALLY RIVER BASIN			
Nisqually River near Ashford, Wa.	12082000	68.5	1910-14
East Creek near Elbe, Wa.	12083500	11.5	1918-22;1949-50
Nisqually River near Alder, Wa. 12084000 252 1931-45			
Little Nisqually River near Alder, Wa.	12084500	28.0	1920-43
Tacoma Power Conduit near LaGrande, Wa.	12086000	--	1919-31
Ohop Lake near Eatonville, Wa. (S)	12087400	17.3	1960-75
Lynch Creek near Eatonville, Wa.	12087500	16.3	1949
Nisqually River above Powell Creek near McKenna, Wa.	12088400	431	1969-79
Nisqually River near McKenna, Wa.	12088500	445	1941-63
Tanwax Lake near Kapowsin, Wa. (S)	12088900	4.08	1962-75
Tanwax Creek near McKenna, Wa.	12089000	26.0	1945-50
Muck Creek near Loveland, Wa.	12090000	16.9	1949
Muck Creek at Roy, Wa.	12090200	86.8	1956-72
SOUTH CENTRAL PUGET SOUND RIVER BASINS			
American Lake near Tillicum, Wa. (E)	12090300	24.5	1956-59
Unnamed Trib.to NF Clover Ck, at Waller Rd E, nr Parkland, Wa.	12090365	0.14	1990-94
Clover Creek near Tillicum, Wa.	12090500	73.8	1949-54
Chambers Creek at Steilacoom Lake near Steilacoom, Wa.	12091000	78.4	1939-40
Chambers Creek above Flett Creek near Steilacoom, Wa.	12091040	90.4	1966-71
Flett Creek at 74th Street at Tacoma, Wa.	12091050	4.23	1959-63
Flett Creek at Mountain View Memorial Park at Tacoma, Wa.	12091060	5.91	1967-79
Flett Creek below Flett Springs at Tacoma, Wa.	12091070	6.72	1959-65
Leach Creek at Holding Pond at Fircrest, Wa.	12091180	4.59	1967-90
Chambers Creek below Leach Creek near Steilacoom, Wa.	12091500	104	1937-40;1943-65
Judd Creek near Burton, Wa.	12091700	4.41	1968-75



## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
PUYALLUP RIVER BASIN			
Puyallup River at Electron, Wa.	12092500	131	1946
Kapowsin Creek near Kapowsin, Wa.	12093000	25.9	1927-32;1942-57
Carbon River at Fairfax, Wa.	12093900	76.2	1911-12;1965-78
South Prairie Creek near Enumclaw, Wa.	12094400	22.4	1963-68
Wilkeson (Gale) Creek at Wilkeson, Wa.	12094500	25.0	1949
Voight Creek near Crocker, Wa.	12095500	22.9	1949
Fennel Creek near McMillan, Wa.	12096000	12.5	1949
White River near Greenwater, Wa.	12096600	16.2	1964-70
White River at Greenwater, Wa.	12097000	216	1911-12;1929-75
White River Flume near Buckley, Wa.	12098910	--	1972-73
Boise Creek above Reservoir near Enumclaw, Wa.	12099300	4.60	1963-66
Boise Creek below Millpond near Enumclaw, Wa.	12099400	8.27	1963-66
Boise Creek near Enumclaw, Wa.	12099500	12.3	1945-46;1963-66
White River near Auburn, Wa.	12100496	464	1987-89
White (Stuck) River near Sumner, Wa.	12100500	470	1945-71
Clark Creek at Puyallup, Wa.	12102000	1.66	1946-48
SOUTH CENTRAL PUGET SOUND RIVER BASINS (Continued)			
Wapato Creek near Tacoma, Wa.	12102500	6.00	1949
Hylebos Creek at 5th Avenue at Milton, Wa.	12102900	4.77	1987-88
Joes Creek at Marine Drive near Tacoma, Wa.	12103205	--	1987-88
DUWAMISH (GREEN) RIVER BASIN			
Green River below intake Creek near Lester, Wa.	12103400	34.8	1966-77
Snow Creek near Lester, Wa.	12103500	11.5	1945-65
Friday Creek near Lester, Wa.	12104000	4.67	1945-77
Green River near Lester, Wa.	12104500	96.2	1945-90;1993
Green Canyon Creek near Lester, Wa.	12104700	3.23	1960-70
Smay Creek near Lester, Wa.	12105000	8.56	1947-70
Charley Creek near Eagle Gorge, Wa.	12105500	11.3	1947-55
North Fork Green River near Palmer, Wa.	12105700	16.5	1957-65
North Fork Green River near Lemolo, Wa.	12105710	16.7	1965-87
Bear Creek near Eagle Gorge, Wa.	12106000	4.10	1947-56
Green River near Palmer, Wa.	12106500	230	1932-63
Green River at Kanaskat, Wa.	12107000	240	1911
Icy Creek near Black Diamond, Wa.	12107300	3.29	1963-68
Green River near Black Diamond, Wa.	12107500	285	1939-48
North Fork Newaukum Creek near Enumclaw, Wa.	12107950	1.93	1977-78
Newaukum Creek near Enumclaw, Wa.	12108000	13.0	1945
Clovercrest Outfall at Enumclaw, Wa.	12108050	0.26	1977-78
Newaukum Creek Tributary near Black Diamond, Wa.	12108450	1.52	1977-78
Burns Creek near Black Diamond, Wa.	12109000	3.47	1945
Little Soos Creek near Kent, Wa.	12109500	6.08	1985-86
Big Soos Creek above Jenkins Creek near Auburn, Wa.	12110000	20.9	1944-45;1985-86
Wilderness Lake Outlet near Maple Valley, Wa.	12110003	0.66	1977
South Fork Jenkins Creek near Covington, Wa.	12110400	3.47	1985-86
Jenkins Creek near Auburn, Wa.	12110500	13.5	1985-86
Lake Sawyer near Black Diamond, Wa. (S)	12111000	13.0	1952-75
Covington Creek near Black Diamond, Wa.	12111500	13.0	1953-60
Covington Creek near Auburn, Wa.	12112000	21.6	1944-45
Big Soos Creek near Auburn, Wa.	12112500	62.9	1944-56
Soosette Creek near Auburn, Wa.	12112550	5.50	1985-86
Green River at Tukwilla, Wa.	12113350	440	1960-84
LAKE WASHINGTON - CEDAR RIVER BASIN			
North Fork Cedar River near Lester, Wa.	12113500	9.30	1944-63
South Fork Cedar River near Lester, Wa.	12114000	6.00	1944-83
Cedar River at Chester Morse (Cedar) Lake nr North Bend, Wa.	12116000	77.7	1898-99;1902-03
Middle Fork Taylor Creek near Selleck, Wa.	12116700	5.17	1956-64
North Fork Taylor Creek near Selleck, Wa.	12116800	3.77	1956-64
Rock Creek above Walsh Lake Ditch near Landsburg, Wa.	12117700	4.91	1986-90
Walsh Lake Ditch near Landsburg, Wa.	12117820	9.42	1986-90
Rock Creek Diversion near Landsburg, Wa.	12118000	11.0	1932-48
Rock Creek near Ravensdale, Wa.	12118300	--	1956-58
Rock Creek at State Highway 5A near Ravensdale, Wa.	12118400	11.2	1956-62
Rock Creek near Maple Valley, Wa.	12118500	12.6	1945-73

XX

## WATER RESOURCES DATA FOR WASHINGTON, 1996

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
LAKE WASHINGTON RIVER BASINS			
May Creek near Issaquah, Wa.	12119300	2.82	1978-79
May Creek Tributary at State Road 900 near Issaquah, Wa.	12119302	-	1978-79
May Creek at Renton, Wa.	12119375	7.57	1978-79
Honey Creek near Renton, Wa.	12119450	0.70	1978-79
May Creek near Renton, Wa.	12119500	12.5	1945-50;1955-58; 1964
May Creek at Mouth near Renton, Wa.	12119600	12.7	1964-72;1978-79
Coal Creek near Bellevue, Wa.	12119700	6.80	1964-68
Lake Hills Storm Sewer Outfall at Bellevue, Wa.	12119725	-	1980-82
148th Ave Storm Sewer below Lake Hills Blvd near Bellevue, Wa.	12119730	-	1980-82
148th Ave Upstream Manometer at Bellevue, Wa.	12119731	-	1980-82
148th Ave Downstream Manometer at Bellevue, Wa.	12119732	-	1980-82
Surrey Downs Storm Sewer Outfall at Bellevue, Wa.	12120005	-	1980-82
Juanita Creek near Kirkland, Wa.	12120500	6.69	1945;1963-90
LAKE WASHINGTON - SAMMAMISH RIVER BASIN			
Issaquah Creek near Issaquah, Wa.	12121000	27.0	1945-64
East Fork Issaquah Creek near Issaquah, Wa.	12121500	8.54	1945
East Fork Issaquah Creek at Mouth at Issaquah, Wa.	12121510	9.50	1975-81
Tibbetts Creek near Issaquah, Wa.	12121700	3.90	1963-68;1971-76
Pine Lake near Issaquah, Wa. (S)	12121800	1.06	1956-77
Pine Lake Creek near Issaquah, Wa.	12121810	1.06	1980-81
Sammamish River above Bear Creek near Redmond, Wa.	12122010	102	1975-78
Cottage Lake Creek near Redmond, Wa.	12123000	10.7	1945;1955-65
Cottage Lake Creek above Bear Creek near Redmond, Wa.	12123100	12.2	1985-86
Bear Creek Tributary near Redmond, Wa.	12123200	1.40	1985-86
Evans Creek near Redmond, Wa.	12123500	10.9	1945
Evans Creek above Mouth near Redmond, Wa.	12124000	13.0	1955-76;1985-86
Bear Creek at Redmond, Wa.	12124500	48.2	1945-50;1955-58; 1984-86
Sammamish River near Redmond, Wa.	12125000	150	1939-57
Bear Creek at Woodinville, Wa.	12125500	15.3	1945;1965-69
Penny Creek near Everett, Wa.	12125800	3.67	1985-86
North Creek below Penny Creek near Bothell, Wa.	12125900	9.12	1985-86
North Creek Tributary near Woodinville, Wa.	12125950	4.20	1985-86
North Creek near Bothell, Wa.	12126000	24.6	1945-73
North Creek near Woodinville, Wa.	12126100	27.0	1985-86
Sammamish River at Bothell, Wa.	12126500	212	1940-63;1983-87
Swamp Creek near Alderwood Manor, Wa.	12126800	9.55	1984-86
Scriber Creek near Mountlake Terrace, Wa.	12126900	6.14	1985-86
Swamp Creek near Bothell, Wa.	12127000	21.8	1945
Swamp Creek at Kenmore, Wa.	12127100	23.1	1963-90
Lyon Creek at Lake Forest Park, Wa.	12127300	3.67	1963-68
Lake Ballinger near Edmonds, Wa. (S)	12127400	5.09	1961-77
McAleer Creek near Bothell, Wa.	12127500	7.48	1945;1947-49
McAleer Creek at Lake Forest Park, Wa.	12127600	7.80	1963-72
Thorton Creek near Seattle, Wa.	12128000	12.1	1945-46;1961-68
EAST CENTRAL PUGET SOUND RIVER BASINS			
Powder Creek near Mukulteo, Wa	12128500	2.11	1946
SNOHOMISH RIVER BASIN			
Tye River near Skykomish, Wa.	12129000	79.8	1929-31;1946
East Fork Foss River near Skykomish, Wa. (S)	12129500	21.6	1911
Foss River near Skykomish, Wa.	12130000	54.8	1911
South Fork Skykomish (Tye) River near Skykomish, Wa.	12130500	135	1930-31;1946-50
Beckler River near Skykomish, Wa.	12131000	96.5	1929-33;1946-49
West Fork Miller River near Miller River (Berlin), Wa. (S)	12131500	13.4	1911
Miller River (Creek) at (near) Miller River, Wa.	12132000	13.2	1911-19;1929-31;1946
South Fork Skykomish River near Miller River (Berlin), Wa. (S)	12132500	313	1910-11
South Fork Skykomish River near Index, Wa.	12133000	355	1903-05;1911-82
Troublesome Creek near Index, Wa.	12133500	10.6	1929-41
North Fork Skykomish River at Index, Wa.	12134000	146	1911-22;1929-38; 1946-48
Olney Creek near Gold Bar, Wa.	12135500	8.31	1946-50
Olney Creek neary Startup, Wa.	12136000	10.3	1923-26;1929-34
May Creek near Gold Bar, Wa.	12136500	3.80	1928-35;1946-47

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
SNOHOMISH RIVER BASIN--Continued			
Elk Creek near Sultan, Wa.	12137200	11.4	1977-83
Williamson Creek near Sultan, Wa.	12137260	15.6	1977-83
Sultan River near Startup, Wa.	12137500	74.5	1934-71
Sultan River near Sultan, Wa.	12138000	86.6	1911-27;1929-31
Sultan River below Chaplain Creek near Sultan, Wa.	12138150	92.6	1975-84
McCoy Creek near Sultan, Wa.	12138500	6.17	1946-50
Elwell Creek near Sultan, Wa.	12139000	22.9	1946
Roesiger Creek near Machias, Wa.	12139500	3.80	1946-48
Woods Creek below Roesiger Creek near Monroe, Wa.	12140000	19.0	1946
Carpenter Creek near Machias, Wa.	12140500	8.89	1946
Woods Creek near Monroe, Wa.	12141000	56.4	1946-71
Middle Fork Snoqualmie River near North Bend, Wa.	12141500	169	1907-26;1929-32;1945
Calligan Creek near Snoqualmie, Wa.	12142200	7.31	1964-70
Hancock Creek near Snoqualmie, Wa.	12142300	7.67	1964-71
North Fork Snoqualmie River at Cable Br. near North Bend, Wa.	12142500	85.6	1914-15
North Fork Snoqualmie River near North Bend, Wa.	12143000	95.7	1907-26;1929-38; 1961-71
South Fork Snoqualmie River near Garcia, Wa.	12143500	45.8	1910-15
Beaver Creek near Snoqualmie, Wa.	12144800	4.13	1964-67
Tokul Creek near Snoqualmie, Wa.	12145000	32.2	1907-15;1929-31;1945
Patterson Creek near Fall City, Wa.	12146000	15.5	1947-50;1955-71
Patterson Creek 0.8 miles above Mouth near Fall City, Wa.	12146500	21.3	1945
Griffin Creek near Carnation (Tolt), Wa.	12147000	17.1	1945-70
Phelps Creek near Index, Wa.	12147700	2.04	1961
South Fork Tolt River at Upper Station near Carnation, Wa.	12147800	8.82	1958-59
Stossel Creek near Carnation, Wa.	12148700	5.58	1957-63
Harris Creek near Tolt, Wa.	12149500	8.39	1945
Ames Creek near Tolt, Wa.	12150000	3.17	1945
Cherry Creek near Duvall, Wa.	12150500	19.2	1945-49;1961-64
Evans Creek near Snohomish, Wa.	12151000	2.75	1946
French Creek near Monroe, Wa.	12151500	7.09	1946
Pilchuck River below Worthy Creek near Granite Falls, Wa.	12152000	41.7	1946
Pilchuck River near Granite Falls, Wa.	12152500	54.5	1911;1943-58
Little Pilchuck River near Lake Stevens, Wa.	12153000	17.0	1946-70
Lake Stevens at Lake Stevens, Wa. (S)	12153500	6.83	1946-50
Stevens Creek at Lake Stevens, Wa.	12154000	15.3	1946-50
Dubuque Creek near Lake Stevens, Wa.	12154500	7.16	1946-50
Panther Creek near Lake Stevens, Wa.	12155000	5.93	1946
Snohomish River at Snohomish, Wa.	12155500	1,720	1964-66
Wood Creek near Everett, Wa.	12156000	1.89	1946-48
Allen Creek at Marysville, Wa.	12156500	7.93	1946
Quilceda Creek near Marysville, Wa.	12157000	15.4	1946-69;1975-77
Quilceda Creek above West Fork near Marysville, Wa.	12157005	17.4	1985-86
West Fork Quilceda Creek near Marysville, Wa.	12157020	9.41	1985-86
EAST CENTRAL PUGET SOUND RIVER BASINS (Continued)			
Mission Creek near Tulalip, Wa.	12157250	7.92	1975-77
Lake Goodwin (Tulalip Creek) near Silvana, Wa. (S)	12157500	5.17	1953-75
Lake Shoecraft near Tulalip, Wa. (S)	12158000	6.02	1953-75
Tulalip Creek at Tulalip, Wa.	12158040	15.4	1975-77
STILLAGUAMISH RIVER BASIN			
South Fork Stillaguamish River at Silverton, Wa.	12158500	32.7	1929-32
South Fork Stillaguamish River blw Bender Cr nr Silverton, Wa.	12159000	40.7	1950
South Fork Stillaguamish River near Silverton, Wa.	12159500	43.7	1910-18
Boardman Creek near Silverton, Wa.	12160000	8.52	1950
Benson Creek near Granite Falls, Wa.	12160500	2.70	1950
South Fork Stillaguamish River near Granite Falls (Robe), Wa. (S 1902-03)	12161000	119	1902-03;1928-80
Canyon Creek near Granite Falls, Wa. (S 1911-13)	12161500	55.3	1911-13;1929-32;1950
South Fork Stillaguamish River at Granite Falls, Wa.	12162000	182	1911;1914-16
South Fork Stillaguamish River abv Jim Cr nr Arlington, Wa.	12162500	199	1937-58
Jim Creek near Oso, Wa.	12163000	10.9	1948-50
Cub Creek near Oso, Wa.	12163500	6.44	1949-50
Jim Creek near Arlington, Wa.	12164000	46.2	1938-57
South Fork Stillaguamish River near Arlington, Wa.	12164500	254	1929-37
Squire Creek near Darrington, Wa.	12165000	20.0	1950-69

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
STILLAGUAMISH RIVER BASIN--Continued			
Skykomish River at Sultan, Wa.	12137000	618	1911
North Fork Stillaguamish River near Darrington, Wa.	12165500	82.2	1951-57
Boulder Creek near Oso, Wa.	12166000	27.0	1950
Deer Creek near Oso, Wa.	12166500	65.9	1917-30;1950
Armstrong Creek near Arlington, Wa.	12167500	7.33	1951-58
Stillaguamish River at Silvana, Wa.	12167700	557	1975
Cavanaugh Lake (Lake Creek) near Oso, Wa. (S)	12168000	6.70	1950-51
Portage Creek near Arlington, Wa.	12169000	8.80	1950
Fish Creek near Arlington, Wa.	12169500	7.52	1950-54
Church Creek near Stanwood, Wa.	12170000	6.40	1950
SKAGIT RIVER BASIN			
Skagit River near Hope, British Columbia	12170500	357	1915-22;1935-55
Lightening Creek near Newhalem, Wa.	12171000	129	1944-48
Skagit River above Devils Creek near Newhalem, Wa.	12171500	655	1940-45
Big Beaver Creek near Newhalem, Wa.	12172000	63.2	1940-48;1963-69
Skagit River above Ruby Creek near Newhalem, Wa.	12172500	780	1929-40
Granite Creek near Newhalem, Wa.	12173000	71.0	1947-48
Ruby Creek below Panther Creek near Newhalem, Wa.	12173500	206	1948-56;1963-69
Ruby Creek near Newhalem, Wa.	12174000	210	1919-20;1928-49
Skagit River below Ruby Creek near Newhalem, Wa.	12174500	999	1919-30
Thunder Creek below McAllister Creek near Newhalem, Wa.	12175400	91.7	1958-62
Thunder Creek near Marblemount, Wa.	12176000	114	1919-30
Skagit River at Reflector Bar near Newhalem, Wa.	12177000	1,125	1909-22
Stetattle Creek near Newhalem, Wa.	12177500	22.0	1914-15;1933-83
Goodell Creek near Newhalem, Wa.	12178500	38.7	1943-44
Skagit River above Alma Creek, nr Marblemount, Wa.	12179000	1,274	1951-95
Alma Creek near Marblemount, Wa.	12179500	8.37	1943
Skagit River above Bacon Creek near Marblemount, Wa.	12179800	1,289	1977-83
Bacon Creek near Marblemount, Wa.	12180000	50.9	1943-50
Diobsud Creek near Marblemount, Wa.	12180500	25.4	1943-44
Marble Creek near Marblemount, Wa.	12181500	15.9	1943-44
Cascade River near Marblemount, Wa.	12182000	140	1909-13
Cascade River at Marblemount, Wa.	12182500	172	1929-79
Clark Creek at Marblemount, Wa.	12183000	1.42	1944-46
Jordan Creek at Marblemount, Wa.	12183500	12.0	1943-48
Rocky Creek near Marblemount, Wa.	12184000	10.0	1943-44
Upper Illabot Creek near Rockport, Wa.	12184200	27.0	1982-83
Illabot Creek near Rockport, Wa.	12184500	42.4	1943-45;1982-85
North Fork Sauk River near Barlow Pass, Wa.	12185000	76.4	1918-20
South Fork Sauk River near Barlow Pass, Wa.	12185500	33.1	1918-21;1929-31
Whitechuck River near Darrington, Wa. (S 1910-11)	12186500	77.9	1910-11;1919-22
Sauk River above Clear Creek near Darrington, Wa.	12187000	259	1910-11;1913
Sauk River at Darrington, Wa.	12187500	293	1914-26;1928-32
Suiattle River below Lime Creek near Darrington, Wa.	12188000	213	1921-22
Suiattle River above Big Creek near Darrington, Wa.	12188400	307	1971-80
Big Creek near Mansford, Wa.	12188500	21.0	1943-47
Suiattle River near Mansford, Wa.	12189000	335	1938-50
Jackman Creek near Concrete, Wa.	12190000	23.9	1943-47
Baker Lake near Concrete, Wa. (S)	12190500	119	1910-15
Swift Creek near Concrete, Wa.	12190710	36.4	1982-90
Park Creek at Upper Bridge near Concrete, Wa.	12190718	10.5	1982-90
Sandy Creek near Concrete, Wa.	12191000	10.8	1953-54
Baker River below Anderson Creek near Concrete, Wa.	12191500	211	1911-25;1928-32; 1955-59
Sulphur Creek near Concrete, Wa.	12191800	8.36	1963-74;1981-82
Bear Creek near Concrete, Wa.	12192000	10.0	1953-55
North Fork Bear Creek near Concrete, Wa.	12192500	20.2	1953-55
Bear Creek below Tributaries near Concrete, Wa.	12192600	14.4	1982-86
Thunder Creek near Concrete, Wa.	12192700	22.4	1983-94
Finney Creek near Concrete, Wa.	12194500	51.6	1943-48
Grandy Creek near Concrete, Wa.	12195000	18.9	1943-45
O'Toole Creek near Hamilton, Wa.	12195500	5.69	1943-45
Alder Creek near Hamilton, Wa.	12196000	10.7	1943-71
Skagit River near Hamilton, Wa.	12196150	2,870	1975-77
Day Creek below Day Lake near Lyman, Wa.	12196200	6.56	1963-71
Day Creek near Hamilton, Wa.	12196400	32.3	1962-69
Day Creek near Lyman, Wa.	12196500	34.2	1943-61
Jones Creek near Lyman, Wa.	12197000	7.80	1943-44
Childs Creek near Lyman, Wa.	12197020	2.40	1974-76



## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
SKAGIT RIVER BASIN--Continued			
Tank Creek near Lyman, Wa.	12197040	2.50	1974-80
Minkler Creek near Lyman, Wa.	12197110	5.00	1974-80
Gilligan Creek near Lyman, Wa.	12197500	6.31	1943-44
Black Creek near Minkler, Wa.	12197680	0.50	1975-80
Black Creek near Lyman, Wa.	12197690	0.50	1974-75
Wiseman Creek near Lyman, Wa.	12197700	3.00	1974-83
Cool (Coal) Creek near Sedro Wooley, Wa.	12198000	1.88	1948-50
Hansen Creek near Sedro Wooley, Wa.	12198500	9.66	1943-45
Skagit River near Sedro Wooley, Wa.	12199000	3,015	1908-24;1975-80
Nookachamps Creek near Mount Vernon, Wa.	12199500	22.2	1943-44
East Fork Nookachamps Creek near Big Lake, Wa.	12199800	3.56	1962-71
East Fork Nookachamps Creek near Clear Lake, Wa.	12200000	20.5	1943-50;1962-63
NORTHEASTERN PUGET SOUND RIVER BASINS			
Friday Creek near Burlington, Wa.	12201000	37.1	1943-49
Samish River near Burlington, Wa.	12201500	87.8	1943-71
Anderson Creek near Bellingham, Wa.	12201950	4.13	1968-70;1972
Austin Creek near Bellingham, Wa.	12202000	7.73	1948;1954;1968-70
Smith Creek near Bellingham, Wa.	12202050	5.12	1968-69
Olsen Creek near Bellingham, Wa.	12202300	3.78	1968-69
Whatcom Creek near Bellingham, Wa. (S 1910-14)	12203000	56.1	1911-12;1939-46; 1974-76
Whatcom Creek below Hatchery near Bellingham, Wa.	12203500	56.1	1946-57;1968-69
Squalicum Creek at Bellingham, Wa.	12204000	12.0	1948-49;1954-55
NOOKSACK RIVER BASIN			
Nooksack River at Excelsior, Wa.	12204500	95.7	1920-21
Nooksack (North Fork) River near Glacier, Wa. (S 1910)	12205500	193	1911;1934-38
Kendall Creek at Kendall, Wa.	12206000	24.0	1948-50
Kendall Creek at Mouth at Kendall, Wa.	12206500	29.2	1954-55
Coal Creek near Kendall, Wa.	12207000	4.57	1948-49;1954-55
North Fork Nooksack River near Deming, Wa.	12207200	282	1964-75
Middle Fork Nooksack River at Ranger Stn. near Deming, Wa. (S)	12207500	--	1910
Middle Fork Nooksack River near Deming, Wa. (S 1910-11)	12208000	73.3	1910-11;1920-21; 1934-35;1954-55; 1965-70
Skookum Creek near Wickersham, Wa.	12209500	23.1	1948-69
South Fork Nooksack River at Saxon Bridge, Wa.	12210000	129	1920-21;1933-34
Anderson Creek near Goshen, Wa.	12211000	12.9	1948;1954-55
Nooksack River near Lynden, Wa.	12211500	648	1945-67
Fishtrap Creek at Lynden, Wa.	12212000	22.3	1948-71
Bertrand Creek near Lynden, Wa.	12212500	40.3	1948;1954-55
Tenmile Creek near Laurel, Wa.	12212900	23.6	1968-72
Tenmile Creek near Ferndale, Wa.	12213000	22.7	1948;1954-55
NORTHEASTERN PUGET SOUND RIVER BASINS (Continued)			
California Creek near Custer, Wa.	12213500	6.85	1954-55
Dakota Creek near Blaine, Wa.	12214000	18.4	1948-55
Sumas River near Sumas, Wa.	12214500	33.0	1948-51;1954-55
Johnson Creek at Sumas, Wa.	12215000	23.0	1954-55
Sumas River near Huntington, B.C. (S 1935-52)	12215100	57.6	1960-78
Saar Creek near Sumas, Wa.	12215500	9.76	1948;1954-55
Chilliwack River (at Lake Outlet) near Vedder Crossing, B.C.	12215700	131	1961-78
Slesse Creek near Vedder Crossing, B.C.	12215900	62.7	1961-78
UPPER COLUMBIA RIVER BASIN			
Calispell Creek near Dalkena, Wa.	12396000	68.3	1950-73
Winchester Creek near Cusick, Wa.	12396100	16.8	1957
Smalle Creek near Cusick, Wa.	12396200	25.1	1957
Trimble Creek near Cusick, Wa.	12396300	3.50	1957
Sullivan Creek above Outlet Creek near Metaline Falls, Wa.	12396900	70.2	1959-72
Sullivan Creek near Metaline Falls, Wa.	12397500	122	1912-25
Sullivan Creek at Metaline Falls, Wa.	12398000	142	1954-68
Pend Oreille River below Z Canyon near Metaline Falls, Wa. (S 1908-10)	12398500	25,200	1909-10;1913-64
Salmo River near Salmo, B.C.	12398900	476	1961-78
Salmo (Salmon) River near Waneta, B.C.	12399000	500	1936-46
Deep Creek near Northport, Wa.	12399600	191	1972-75

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
UPPER COLUMBIA RIVER BASIN--Continued			
Big Sheep Creek (HD Sheep Cr.) near Rossland, B.C.	12399900	134	1961-78
Sheep Creek near Velvet, Wa.	12400000	171	1929-32
Sheep Creek near Northport, Wa.	12400500	225	1929-42
KETTLE RIVER BASIN			
Myers Creek near Myncaster, B.C.	12401000	85.7	1926-50
Curlew Lake near Malo, Wa. S)	12402000	65.9	1953-54
Curlew Creek near Malo, Wa.	12402500	66.8	1951-54
Curlew Creek near Curlew, Wa.	12403000	89.8	1917-21
Kettle River at Curlew, Wa. (S)	12403500	--	1911-12
Kettle River at Cascade, B.C.	12404000	3,550	1916-34
Kettle River at Boyds, Wa.	12405000	4,070	1914-16
UPPER COLUMBIA RIVER BASIN (Continued)			
Columbia River at Kettle Falls, Wa.	12405500	64,500	1913-41
COLVILLE RIVER BASIN			
Deer Lake near Loon Lake, Wa. (S)	12406000	18.2	1953-78
Loon Lake near Loon Lake, Wa. (E)	12406500	14.1	1950-89
Sheep Creek at Loon Lake, Wa.	12407000	37.9	1950-59
Sheep Creek at Springdale, Wa.	12407500	48.2	1953-72
Deer Creek near Valley, Wa.	12407520	36.0	1959-72
Jumpoff Joe Lake near Valley, Wa. (S)	12407530	2.35	1961-75
Waitts Lake near Valley, Wa. (S)	12407550	14.2	1961-75
Chewelah Creek at Chewelah, Wa.	12407700	94.1	1957-74
Colville River at Blue Creek, Wa.	12408000	428	1923-24;1960-66;1979
Lake Thomas near Tiger, Wa. (S)	12408210	12.7	1961-66
Little Pend Oreille River near Colville, Wa.	12408300	132	1958-75
Haller Creek near Arden, Wa.	12408420	37.0	1959-70
White Mud Lake near Colville, Wa. (S)	12408440	15.3	1961-66
Mill Creek below Forks near Colville, Wa.	12408450	67.9	1959
Mill Creek near Colville, Wa.	12408500	83.0	1939-72;1977-86
Mill Creek at Mouth near Colville, Wa.	12408700	146	1959-65
UPPER COLUMBIA RIVER BASIN (Franklin D. Roosevelt Lake)			
Hall Creek at (near) Inchelium, Wa.	12409500	161	1913-29;1972-73
Stranger Creek at Meteor, Wa.	12410000	50.9	1916-29
Stranger Creek at Inchelium, Wa.	12410500	80.2	1914-17
Harvey Creek near Cedonia, Wa.	12410700	29.9	1958
SPOKANE RIVER BASIN			
Spokane River above Liberty Bridge near Otis Orchards, Wa.	12419500	3,880	1929-83
Newman Lake near Newman Lake, Wa. (S)	12419800	28.6	1958-80
Liberty Lake at Liberty, Wa. (E)	12420000	13.3	1950-89
Spokane River at Greenacres, Wa.	12420500	4,150	1948-52
Spokane River at Trent, Wa.	12421000	4,200	1912-13
Spokane River below Trent Bridge near Spokane, Wa.	12421500	4,200	1948-54
Spokane River below Green Street at Spokane, Wa.	12422000	4,220	1949-52
Hangman (Latah) Creek at Tekoa, Wa.	12423000	130	1904-05
North Fork Hangman (NF Latah) Creek at Tekoa, Wa.	12423500	60.0	1904-05
Spokane River above 7 Mile Bridge near Spokane, Wa.	12424500	5,020	1949-52
Medical Lake at Medical Lake, Wa. (E)	12425000	1.35	1953-58
Deep Creek near Spokane, Wa.	12425500	76.6	1949-50
Spokane River below Nine-Mile Dam near Spokane, Wa.	12426000	5,200	1948-50
Little Spokane River at Scotia, Wa.	12426500	74.2	1948
Little Spokane River at Elk, Wa.	12427000	115	1948-71
Diamond Lake (W. Branch Little Spokane) near Newport, Wa. (S)	12427500	17.4	1953-78
Sacheen Lake near Newport, Wa. (S)	12428000	33.5	1954-75
Eloika Lake near Elk, Wa. (S)	12428500	101	1953-75
Little Spokane River at Milan, Wa.	12429000	274	1948
Little Spokane River at Chattaroy, Wa.	12429500	301	1948
Wethey Creek near Deer Park, Wa.	12430000	12.0	1948
Deep Creek at Colbert, Wa.	12430500	32.8	1948
Little Spokane River near Dartford, Wa. (S 1903-05)	12431500	698	1948-52
Little Spokane River at Norman's Ranch near Spokane, Wa. (S)	12431900	700	1911-12
Little Spokane River near Spokane, Wa.	12432000	701	1913
Chamokane Creek near Springdale, Wa.	12433100	99.9	1973-78
Spokane River below Little Falls near Long Lake, Wa.	12433500	6,220	1913-40

## WATER RESOURCES DATA FOR WASHINGTON, 1996

xxv

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
UPPER COLUMBIA RIVER BASIN (Franklin D. Roosevelt Lake)			
Sanpoil River above Thirteen Mile Creek near Republic, Wa.	12433890	263	1972-74
Lost Creek near Aeneas, Wa.	12434000	84.0	1921
West Fork Sanpoil River near Republic, Wa.	12434110	308	1972-74
Sanpoil River near Keller, Wa.	12434500	880	1952-55;1972-74
Sanpoil River at Keller, Wa.	12435000	928	1911-18
Nespelem Canal at Nespelem, Wa.	12437000	--	1921-29
Nespelem River at (near) Nespelem, Wa.	12437500	122	1911-29
Nespelem River below Millpond at Nespelem, Wa.	12437505	123	1972-74
Rufus Woods Lake at Bridgeport, Wa.	12437900	75,400	1955-62
OKANOGAN RIVER BASIN			
Okanagan River at Okanagan Falls, B.C.	12438500	2,650	1915-65
Okanagan River at Bridge Street at Oroville, Wa. (S,E)	12439150	3,133	1965-91
Tonasket River at Oroville, Wa.	12439300	60.1	1967-91
Okanagan River at Zosel Millpond at Oroville, Wa. (S,E)	12439400	3,195	1965-86
Sinlahekin Creek above Blue Lake near Loomis, Wa.	12440000	41.7	1924-30
Sinlahekin Creek at Blue Lake near Loomis, Wa.	12440500	42.9	1920
Sinlehekin Creek at Twin Bridge near Loomis, Wa.	12441000	75.5	1921-23
Sinlehekin Creek near Loomis, Wa.	12441500	86.0	1903-05
Toats Coulee Creek near Loomis, Wa.	12442000	130	1920-26;1957-70
Whitestone Irrigation Canal near Loomis, Wa.	12442200	--	1957-70
Sinlehekin Creek above Chopaka Creek near Loomis, Wa.	12442300	256	1957-66
Palmer Lake near Nighthawk, Wa. (E)	12442400	293	1956-68
Oroville-Tonasket Irrigation District Canal nr Oroville, Wa.	12443000	--	1916-28
Similkameen River near Oroville, Wa.	12443500	3,580	1911-28
Spectacle Lake near Loomis, Wa. (S)	12443800	17.2	1956-71
Whitestone Lake near Tonasket, Wa. (S)	12444000	52.3	1958-71
Whitestone Creek near Tonasket, Wa.	12444100	55.4	1959-72
Bonaparte Creek near Wauconda, Wa.	12444490	96.6	1968-73
Bonaparte Creek near Anglin, Wa.	12444550	110	1921
Aeneas Lake near Tonasket, Wa. (S)	12444700	32.4	1964-83
Johnson Creek near Riverside, Wa.	12445500	68.2	1903-08
Omak Creek near Omak, Wa.	12445900	119	1972-74;1976-79
No Name Creek near Source near Omak, Wa.	12445939	--	1976-78;1981-88
No Name Creek Diversion near Omak, Wa.	12445940	--	1976-88
No Name Creek below Diversion near Omak, Wa.	12445941	--	1976-88
No Name Creek Diversion Return near Omak, Wa.	12445942	--	1976-79
No Name Creek at Granite Lip near Omak, Wa.	12445944	--	1976-78;1981-88
Okanogan River at Okanogan, Wa.	12446000	7,900	1911-25
Salmon Creek near Concully (Okanogan), Wa.	12446500	121	1910-22
Salmon Creek near Okanogan (Malott), Wa. (S 1911-12)	12447000	150	1903-10
Okanogan River near Malott, Wa.	12447300	8,220	1958-67
METHOW RIVER BASIN			
Chewack Creek below Boulder Creek near Winthrop, Wa.	12447500	465	1920-21
Twisp River at Twisp, Wa. (S)	12449000	250	1911-13
Beaver Creek below South Fork near Twisp, Wa.	12449600	62.0	1960-78
Beaver Creek near Twisp, Wa.	12449700	68.1	1956-61
Alta Lake near Pateros, Wa. (S)	12450000	5.01	1954-75
Methow River at Pateros, Wa.	12450500	1,810	1903-20
LAKE CHELAN AND CHELAN RIVER BASIN			
Railroad Creek at Lucerne, Wa.	12451500	64.8	1911-13;1927-57
Safety Harbor Creek near Manson, Wa.	12451600	7.85	1961-69
Grade Creek near Manson, Wa.	12451620	8.45	1961-69
Gold Creek near Manson, Wa.	12451650	6.30	1961-69
Antilon Creek Feeder System Canal near Manson, Wa.	12451700	--	1958-69
ENTIAT RIVER BASIN			
Entiat River at Entiat, Wa.	12453000	419	1911-25;1951-58
MID-COLUMBIA RIVER BASIN			
Pine Canyon Creek near Waterville, Wa.	12453500	11.1	1945-47
WENATCHEE RIVER BASIN			
White (HD Wenatchee) River near Plain, Wa.	12454000	150	1911-14;1954-8
Wenatchee Lake near Plain, Wa. (E)	12454500	273	1932-71

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
WENATCHEE RIVER BASIN--Continued			
Wenatchee River below Wenatchee Lake, Wa.	12455000	273	1932-58
Nason Creek near Nason, Wa.	12455500	88.7	1911
Phelps Creek near Plain, Wa.	12456000	16.4	1927-31
Wenatchee River at Plain (Leavenworth), Wa.	12457000	591	1910-1979
Chiwaukum Creek near Chiwaukum, Wa.	12457500	49.6	1911
Icicle Creek above Snow Creek near Leavenworth, Wa.	12458000	193	1936-71
Icicle Creek near Leavenworth, Wa.	12458500	211	1911-15
Peshastin Creek at Blewett, Wa.	12459500	40.0	1911-12
Peshastin Creek below Ingall Creek near Leavenworth, Wa.	12460000	101	1911-12
Wenatchee Valley Canal at Dryden, Wa.	12460500	--	1911-17
Wenatchee River at Dryden (Cashmere), Wa.	12461000	1,155	1904-17
Mission Creek above Sand Creek near Cashmere, Wa.	12461400	39.8	1958-71
Sand Creek near Cashmere, Wa.	12461500	18.6	1954-56
Mission Creek at (near) Cashmere, Wa.	12462000	81.2	1954-59
Douglas Creek near Alstown, Wa.	12463000	99.9	1949-55;1963-68
Douglas Creek near Palisades, Wa.	12463500	206	1951-52
Douglas Creek at Palisades, Wa.	12464000	844	1954-55
MID-COLUMBIA RIVER BASIN--Continued			
Columbia River at Trinidad (Wenatchee) (Vernita), Wa. (S 1910)	12464500	90,500	1911,1913-63
Sand Hollw at CRS SW, near Vantage, Wa.	12464606	47	1993-95
West Medical Lake near Medical Lake, Wa. (S)	12464669	1.84	1964-75
Clear Lake near Medical Lake, Wa. (S)	12464670	9.51	1958-80
Crab Creek at Marcellus Road near Ritzville, Wa.	12464770	384	1994-95
Crab Creek above Sylvan Lake near Lamona, Wa.	12464780	542	1972-74
Coal Creek at Mohler, Wa.	12464800	64.7	1963-74
Sylvan Lake near Lamona, Wa.	12464809	675	1973-74
Crab Creek below Sylvan Lake near Odessa, Wa.	12464810	686	1972-74
Wilson Creek below Corbett Draw near Almira, Wa.	12465400	327	1969-71,1972-79; 1991-94
Wilson Creek at Wilson Creek, Wa.	12465500	427	1951-73
Crab Creek at Wilson Creek, Wa. (S)	12466000	1,765	1904
Crab Creek (Upper Crab) Creek at Adrain, Wa.	12466500	1,950	1910-12
Park Creek (Continuation of Grand Coulee) nr Coulee City, Wa.	12467500	400	1942-45
Park Lake near Coulee City, Wa. (E)	12468000	317	1938-68
Park Creek below Park Lake near Coulee City, Wa.	12468500	317	1945-68
Blue Lake near Coulee City, Wa. (E)	12469000	334	1938-68
Rocky Ford Creek near Ephrata, Wa.	12470500	458	1909-12;1942-91
Frenchman Hills Wasteway on SE C Rd,near Moses Lake, Wa.	12471090	202	1993-94
Farrier Coulee near Schrag, Wa.	12471270	42.0	1963-74
Lind Coulee Wasteway at State Route 17, near Warden, Wa.	12471400	703	1994-95
Crab Creek (Lower Crab Creek) near Warden, Wa.	12471500	4,470	1909-12;1943-66
DW 272A1 Drain near Royal Camp, Wa.	12472300	0.88	1977-81
DW 272A Drain near Royal Camp, Wa.	12472350	3.36	1977-81
Crab Creek near Smyrna, Wa.	12472500	4,500	1942-60
Columbia River near Julia, Wa. (S)	12473000	--	1905
Columbia River at Hanford, Wa. (S)	12473500	--	1910
PE 16.4 Wasteway near Mouth, near Hanford, Wa.	12473508	118	1987;1994
Columbia River at Ringold, Wa. (E)	12473510	--	1980-81
EL 68-D Wasteway near Othello, Wa.	12473740	121	1979;1994
YAKIMA RIVER BASIN			
Keechelus Lake near Martin, Wa.	12474000	55.8	1906-88
Yakima River near Martin, Wa.	12474500	54.7	1903-78
Cabin Creek near Easton, Wa.	12475000	31.7	1909-11
Kachess Lake near Easton, Wa.	12475500	63.6	1905-88
Kachess River near Easton, Wa.	12476000	63.6	1904-78
Yakima River at Easton, Wa.	12477000	188	1904-05;1910-15; 1941-50;1950-55
Big Creek near Cle Elum, Wa. (S)	12477500	--	1909
North Fork Cle Elum River at Galena, Wa. (S 1911)	12478000	--	1907;1911
Cle Elum River near Roslyn, Wa.	12479000	203	1904-78
Yakima River at Cle Elum, Wa.	12479500	495	1906-78;1987-90
Teanaway River below Forks near Cle Elum, Wa.	12480000	172	1911-12;1968-73
Teanaway River near Cle Elum, Wa.	12480500	200	1909-14;1947-52
Swauk Creek near Cle Elum, Wa.	12481000	87.8	1909-14
Cascade Canal near Ellensburg, Wa. (S 1905)	12481500	--	1905;1909-11
Taneum Creek near Thorp, Wa.	12482000	74.3	1909-12
West Kittitas Canal near Thorp, Wa.	12482500	--	1904-05;1909-11



## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
YAKIMA RIVER BASIN--Continued			
Ellensburg Water Co Canal near Ellensburg, Wa.	12483000	--	1904-05;1909-11
Manastash Creek near Ellensburg, Wa.	12483500	74.5	1909-14
Wilson Creek near Ellensburg, Wa.	12483600	13.6	1956-78
Naneum Creek near Ellensburg, Wa.	12483800	69.5	1957-78
Cooke Creek near Ellensburg, Wa.	12484300	18.6	1957-60
Wilson Creek at Thrall, Wa. (S)	12484490	382	1911
Roza Canal near Moxee City, Wa.	12485000	--	1942-78
Selah-Moxee Canal near Selah, Wa.	12485500	--	1904-05;1909-12
Wenas Creek near Selah, Wa. (S 1910-12)	12486000	192	1909-12
Taylor Canal near Selah, Wa. (S 1905)	12486500	--	1905;1909-12
Yakima River at Selah Gap near North Yakima, Wa. (S 1905)	12487000	2,130	1897-98;1904-05;1911-12
Bumping Lake near Nile, Wa.	12487500	117	1906;1909-88
Bumping River near Nile, Wa.	12488000	70.7	1906;1909-78
Naches River at Anderson Ranch near Nile, Wa.	12489000	392	1909-14
Naches River at Oak Flat near Nile, Wa.	12489500	641	1904-18
North Fork Tieton River below Clear Creek near Naches, Wa	12490500	61.5	1914-15
Rimrock Lake at Tieton Dam near Naches, Wa.	12491000	187	1925-88
Tieton River at Tieton Dam near Naches, Wa.	12491500	187	1908-14;1918-21;1925-78
Tieton Canal near Naches, Wa.	12492000	--	1910-60
Tieton River at Headworks T Canal near Naches, Wa.	12492500	239	1906-78
Tieton River above and below Oak Creek near Naches, Wa.	12493000	296	1902-13
Naches River below Tieton River near Naches, Wa.	12494000	941	1905;1908-79
Naches Canal Co (Gleed) Canal near Naches, Wa. (S 1905)	12494500	--	1904-05;1909-13
Yakima Valley Canal near Naches, Wa. (S 1905)	12495000	--	1904-05;1909-11
Naches-Cowiche Canal near North Yakima, Wa. (S 1905)	12495500	--	1904-05;1909-11
North Yakima Power Canal near North Yakima, Wa. (S 1905)	12496000	--	1904-05;1910
Schanno Canal near North Yakima, Wa. (S 1905)	12496500	--	1904-05;1909-11
North Yakima Power Waste at North Yakima, Wa.	12497000	--	1909-12
North Yakima Milling Co Waste at North Yakima, Wa.	12497500	--	1909-12
Old Union Canal near North Yakima, Wa. (S 1905)	12498000	--	1904-05;1909-11
Naches Avenue Union Canal at North Yakima, Wa.	12498500	--	1910
Naches River near North Yakima, Wa. (S 1893-95)	12499000	1,106	1893-1915;1987-90
Moxee Co Canals near North Yakima, Wa. (S 1905)	12499500	--	1904-05;1909-11
Fowler Canal near North Yakima, Wa. (S 1905;1909-11)	12500000	--	1904-04;1909-11
North Fork Ahtanum Creek near Tampico, Wa.	12500500	68.9	1907-78
South Fork Ahtanum Creek at Conrad Ranch near Tampico, Wa.	12501000	24.8	1915-78
South Fork Ahtanum Creek near Tampico, Wa. (S 1907)	12501500	28.5	1908-15
Ahtanum Creek at Narrows near Tampico, Wa.	12502000	119	1908-13;1960-68
Yakima River at Union Gap near Yakima, Wa.	12503000	3,652	1898-1914;1963-66
New Reservation Canal near Parker, Wa.	12503500	--	1904-78
Old Reservation Canal near Parker, Wa. (S 1905)	12504000	--	1904-78
Sunnyside Canal near Parker, Wa.	12504500	--	1904-78
Yakima River near Parker, Wa.	12505000	3,660	1908-78
Reservation Drain at Alfalfa, Wa.	12505500	--	1913-23
Toppenish Creek near Ft. Simcoe, Wa.	12506000	122	1909-24
Simcoe Creek below Spring Creek near Fort Simcoe, Wa.	12506500	81.5	1909-23
Toppenish Creek near White Swan, Wa. (S 1912)	12507000	409	1909-12
Toppenish Creek at Alfalfa, Wa.	12507500	625	1909-12
Satus Creek near Toppenish, Wa.	12508000	271	1909-13
Satus Creek below Dry Creek near Toppenish, Wa.	12508500	234	1913-24
Drain 61.0 above Drain 61.4 near Sunnyside, Wa.	12508755	3.27	1979-82
Drain 60.7 near Sunnyside, Wa.	12508769	0.92	1979-82
Drain 59.6 below 60.2 near Sunnyside, Wa.	12508775	0.68	1979-82
Drain 59.4 near Sunnyside, Wa.	12508779	--	1979-82
Sulphur Creek Wasteway near Sunnyside, Wa.	12508850	155	1976-77;1987-90
Yakima River near Mabton, Wa.	12509000	5,359	1911-14
Yakima River at Euclid Bridge near Grandview, Wa.	12509050	5,400	1987-90
Yakima River near Prosser, Wa.	12509500	5,453	1904-06;1913-33
Kiona Canal near Kiona, Wa. (S 1908-09)	12501000	--	1904-05;1908-11
Cold Creek azt Highway 24, near Priest Rapids Dam, Wa.	12510625	39.4	1991-95
Dry Creek at Highway 241, near Priest Rapids Dam, Wa.	12510650	57.9	1991-95
Dry Creek near Rattlesnake Spring, near Priest Rapids Dam, Wa.	12510655	--	1991-95
Kennewick Canal near Kiona, Wa. (S 1905)	12511000	--	1904-05;1910-11
Lower Yakima Canal near Kiona, Wa. (S 1905)	12511500	--	1905;1910-11
Yakima River near Richland, Wa. (S 1907-08)	12512000	6,120	1906-11
Providence Coulee at Cunningham, Wa.	12512500	27.8	1953-77
Esquatzel Coulee at Eltopia, Wa.	12513500	551	1953-79
Esquatzel Diversion Channel below Headworks, near Pasco, Wa.	12513650	798	1994
			1980-88

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
MID-COLUMBIA RIVER BASIN (Continued)			
Columbia River at Pasco, Wa. (S 1904-10;1979-80)	12514000	104,000	1904-10;1964-66;
GRANDE RONDE RIVER BASIN			
Grande Ronde River at Zindel, Wa.	13334000	3,950	1904-12
SNAKE RIVER BASIN			
Asotin Creek (at Shelmans Ranch) near Asotin, Wa.	13334500	156	1904-07;1910-12; 1928-60
Asotin Creek above Asotin, Wa. (S)	13335000	--	1904-06
Snake River near Clarkstown (at Riparia), Wa. (S 1935-48)	13343500	1,032	1900-72
Snake River below Lower Granite Dam, Wa.	13343600	103,000	1979-85
Meadow Creek near Central Ferry, Wa.	13343800	66.2	1963-74
Tucannon River near Pomeroy, Wa.	13344000	160	1913-15;1924-30
Tucannon River near Starbuck, Wa.	13344500	431	1915-17;1928-31; 1958-90
PALOUSE RIVER BASIN			
Palouse River at Palouse, Wa.	13345300	360	1973-80
Palouse River at Elberton, Wa. (S 1905)	13345500	406	1904;1905
Palouse River near Colfax, Wa.	13346000	491	1955-64
Palouse River at Colfax, Wa.	13346100	497	1955-73;1976-79
South Fork Palouse River above Paradise C near Pullman, Wa.	13346500	84.4	1934-40
Paradise Creek near Pullman, Wa.	13347000	34.5	1934-38
Dry Fork of South Fork Palouse River at Pullman, Wa.	13347500	7.28	1935-38
South Fork Palouse River at Pullman, Wa.	13348000	132	1934-42;1960-81
Missouri Flat Creek at Pullman, Wa.	13348500	27.1	1934-40;1960-79
Fourmile Creek at Shawnee, Wa.	13349000	71.6	1934-40
South Fork Palouse River at Colfax, Wa.	12349200	277	1994-94
Palouse River below South Fork, at Colfax, Wa.	12349210	796	1964-72;1976-95
Rebel Flat C at Winona, Wa.	12349320	73.2	1993-95
Philleo Ditch near Cheney, Wa.	12349325	14.7	1994-95
Pine Creek at Pine City, Wa.	13349400	302	1961-75
Pine Creek at Pine City Road, at Pine City, Wa.	13349410	306	1994
Rock Creek near Ewan (St. John), Wa.	13349500	523	1904-05;1914-17
Palouse River near Winona, Wa.	13350000	2,056	1915-17
Union Flat Creek near Colfax, Wa.	13350500	189	1953-71
Silver Lake at Medical Lake, Wa. (E)	13351300	19	1958-75
Williams Lake near Amber, Wa. (S)	13351500	23.4	1955-75
Sprague (Colville) Lake near Sprague, Wa. (E)	13351800	289	1958-80
Cow Creek near Keystone, Wa. (S)	13352000	117	1904-05
Cow Creek at Hooper, Wa.	13352500	679	1951-54;1962-70
WALLA WALLA RIVER BASIN			
Blue Creek near Walla Walla, Wa.	14013500	17	1940-71
Yellowhawk Creek at Walla Walla, Wa.	14014000	--	1941-52
Garrison Creek at Walla Walla, Wa.	14014500	--	1941-52
Walla Walla River at Whitman, Wa. (S)	14015500	--	1897-1899
Dry Creek near Walla Walla, Wa.	14016000	48.4	1949-67
East Fork Touchet River near Dayton, Wa.	14016500	102	1941-51;1956-64; 1966-68
East Fork Touchet River below Hatley Creek near Dayton, Wa.	14016610	106	1964-66
Touchet River at Bolles, Wa.	14017000	361	1924-29;1951-89
Touchet River near Touchet, Wa.	14017500	733	1941-55
Attalia Irrigation District Canal near Wallula, Wa.	14018000	--	1924-25
Walla Walla River near Wallula, Wa.	14019000	1,760	1924-25
LOWER COLUMBIA RIVER BASIN			
Alder Creek at Alderdale, Wa.	14034350	197	1962-68;1980-82
Rock Creek near Goldendale, Wa.	14036500	120	1912-13
Rock Creek near Roosevelt, Wa.	14036600	213	1962-68
Klickitat River BASIN			
Klickitat River above Pearl Creek near Glenwood, Wa.	14106000	131	1910;1916-17
Pearl Creek near Glenwood, Wa.	14106500	4	1916-17
Klickitat River Above West Fork near Glenwood, Wa.	14107000	151	1945-77
Swamp Creek near Glenwood, Wa.	14107500	11.2	1916-17
West Fork Klickitat River near Glenwood, Wa.	14108000	87	1910-11;1916-17; 1945-49;1953-55
Cunningham Creek near Glenwood, Wa.	14108500	16	1916-17

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
KLICKITAT RIVER BASIN			
Big Muddy Creek near Glenwood, Wa.	14109000	22.5	1916-18;1945-49
Cougar Creek near Glenwood, Wa.	14109500	3.8	1916-17
Klickitat River (above, below Big Muddy R) near Glenwood, Wa. (S 1905-08)	14110000	360	1905-09;1910-71;
Indian Ford Springs No 1 near Glenwood, Wa.	14110500	--	1947-48
Klickitat River at Hanson Cable near Klickitat, Wa. (S)	14111000	--	1908-09
Klickitat River below Glenwood, Wa.	14111500	747	1914-15
Buttler Creek near Goldendale, Wa.	14111700	11.6	1964-68
Little Klickitat River near Goldendale, Wa.	14112000	83.5	1911-12;1947-51; 1958-70
Spring Creek near Blockhouse, Wa.	14112300	2.75	1964-68
Mill Creek near Blockhouse, Wa.	14112400	26.90	1964-72
Little Klickitat River near Wahkiacus, Wa.	14112500	280	1945-81
Klickitat River near Pitt, Wa.	14113000	1,297	1909-12;1929-89
WHITE SALMON RIVER BASIN			
White Salmon River below Cascades Creek near Trout Lake, Wa.	14121300	32.4	1957-78
White Salmon River above Trout Lake Creek near Trout Lake, Wa.	14121400	64.9	1959-69
Trout Lake Creek near Trout Lake, Wa.	14121500	69.3	1909-12;1959-69
White Salmon River near Trout Lake, Wa.	14122000	185	1918;1929-31; 1957-67
White Salmon River at Splash Dam near Trout Lake, Wa.	14122500	240	1912-17
White Salmon River at B-Z Corner, Wa.	14122900	269	1958-65
White Salmon River at Husum, Wa.	14123000	294	1909-20;1930-41; 1957-62
Little White Salmon River near Willard, Wa.	14124000	39.2	1945-49
Little White Salmon River at Willard, Wa.	14124500	114	1904-06;1945-61
Little White Salmon River above Lapham Creek near Willard, Wa.	14125000	117	1949-64
Little White Salmon River near Cook, Wa.	14125500	134	1957-78
LOWER COLUMBIA RIVER BASIN (Continued)			
Falls Creek near Carson, Wa.	14126500	24.3	1945-49
Wind River above Trout Creek near Carson, Wa.	14127000	108	1945-69
Trout Creek near Carson, Wa.	14127500	30.3	1945-49
Panther Creek near Carson, Wa.	14128000	30.1	1945-53
Wind River near Carson, Wa.	14128500	225	1935-77
Columbia River at Washougal, Wa. (S 1990)	14129400	240,000	1972-81;1990-93
West Fork Washougal River near Washougal, Wa.	14143000	30.3	1951
Washougal River near Washougal, Wa.	14143500	108	1944-81
Little Washougal River near Washougal, Wa.	14144000	23.3	1951-56
Lacamas Creek at Proebstel, Wa.	14144500	22.5	1951
Columbia River at Vancouver, Wa.	14144700	241,000	1963-70
Salmon Creek near Battleground, Wa.	14212000	18.3	1944-75; 1988-89
Salmon Creek near Brush Prairie, Wa.	14212500	63.5	1941-42
Salmon Creek near Vancouver, Wa.	14213000	80.7	1951
LEWIS RIVER BASIN			
Lewis River near Trout Lake, Wa.	14213200	127	1959-72
Big Creek below Skookum Meadow near Trout Lake, Wa.	14213500	13.2	1927-31;1955-70
Rush Creek above Meadow Creek near Trout Lake, Wa.	14214000	5.87	1955-65
Rush Creek above Meadow Creek near Guler, Wa.	14214200	10.1	1929-30
Meadow Creek below Lone Butte Meadow near Trout Lake, Wa.	14214500	11.7	1927-31;1955-65
Rush Creek above Falls near Cougar, Wa.	14215000	26	1928-31;1956-74
Curly Creek near Cougar, Wa.	14215500	11.6	1955-70
Lewis River above Muddy River near Cougar, Wa.	14216000	227	1927-34;1955-70
Clearwater Creek near Mouth near Cougar, Wa.	14216300	33	1981-89
Muddy River above Clear Creek near Cougar, Wa.	14216350	84.1	1981-82
Pine Creek near Cougar, Wa.	14216800	22.4	1957-70
Pine Creek at Mouth near Cougar, Wa.	14216900	26	1982
Lewis River at Peterson Ranch near Cougar, Wa. (S 1910)	14217000	454	1909-10
Swift Creek near Cougar, Wa.	14217500	27.5	1924-34;1954-56
Swift Reservoir near Cougar, Wa.	14217600	481	1958-82
Lewis River near Cougar, Wa. (S 1910-12)	14218000	481	1910-12;1924-58
Canyon Creek near Amboy, Wa.	14219000	64.9	1922-34
Lewis River near Amboy, Wa.	14219500	665	1911-31
Chelatchie Creek at Amboy, Wa.	14221000	12.8	1951
Cedar Creek near Ariel, Wa.	14221500	40.8	1951-55;1961-69
East Fork Lewis River near Yacolt, Wa.	14222000	31.4	1951

xxx

## WATER RESOURCES DATA FOR WASHINGTON, 1996

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
KALAMA RIVER BASIN			
Kalama River near Cougar, Wa.	14222920	12.3	1969-70
Fossil Creek near Cougar, Wa.	14222930	8.21	1969-70
Dry Creek near Cougar, Wa.	14222950	3.29	1969-71
Merrill Lake near Cougar, Wa.	14222960	9.08	1969-71
Spring Creek near Cougar, Wa.	14222970	--	1969-71
Kalama River below Falls near Cougar, Wa.	14222980	37.4	1969-71;1980-82
Kalama River near Kalama, Wa.	14223000	179	1911-13;1916-33
Kalama River below Italian Creek near Kalama, Wa.	14223500	198	1947-75
COWLITZ RIVER BASIN			
Ohanapecosh River near Lewis, Wa.	14224000	101	1907-13
Clear Fork Cowlitz River near Packwood (Lewis), Wa.	14224500	56.5	1907-13;1930-43; 1950
Coal Creek at Mouth near Lewis, Wa. (S 1915)	14225000	10.5	1911-15
Packwood Lake near Packwood, Wa. (E)	14225400	19.2	1959-80
Lake Creek near Packwood, Wa.	14225500	19.2	1912-24;1930-43; 1950-54;1959-80
Lake Creek at Mouth near Packwood (Lewis), Wa.	14226000	26.5	1907-15;1962-77
Skate Creek near Packwood, Wa.	14227000	33.9	1950
Hager Creek near Lewis, Wa.	14227500	3.81	1912-14
North Fork Hager Creek near Lewis, Wa.	14228000	1.45	1912-14
Hall Creek near Packwood, Wa.	14228500	10.9	1947-50
Johnson Creek below West Fork near Lewis, Wa.	14229000	33.3	1912-14
Johnson Creek below Glacier Creek near Packwood, Wa.	14229500	42.8	1951-54
Johnson Creek near Packwood, Wa.	14230000	50	1907-14;1919-24; 1947-50
Silver Creek near Randle, Wa.	14230500	51.1	1950
Cowlitz River at Randle, Wa. (S 1912)	14231000	541	1911-12
Siler Creek near Randle, Wa.	14231500	10.1	1950
Niggerhead Creek near Randle, Wa.	14232000	66.3	1950
Tower Rock Spring near Randle, Wa.	14233000	--	1950-51
Cowlitz River near Randle, Wa.	14233400	1,030	1948-94
Cowlitz River near Kosmos, Wa.	14233500	1,040	1948-68
Rainy Creek near Kosmos, Wa.	14234000	17.9	1950-54
Landers Creek near Kosmos, Wa.	14234500	9.61	1950
Cowlitz River near (at) Mossyrock, Wa.	14235000	1,162	1912-17;1926-35; 1946-60
West Fork Tilton River near Morton, Wa.	14235500	16.4	1950-71
Tilton River at Morton, Wa.	14236000	70.2	1950
Cinnabar Creek near Cinebar, Wa.	14236400	4.55	1957-66
Tilton River near Cinebar, Wa.	14236500	156	1941-58
Klickitat Creek at Mossyrock, Wa.	14237000	3.29	1948-72
Winston Creek near Silver Creek, Wa.	14237500	37.8	1950-70
Mill Creek near Salkum, Wa.	14238500	20.9	1955-59
Cowlitz River at Toledo, Wa.	14238800	1,461	1977-78;1980-82
Salmon Creek near Toledo, Wa.	14239000	77.6	1949;1961-71
Olequa Creek at Winlock, Wa.	14239500	33.7	1949-50
Stillwater Creek near Vader, Wa.	14240000	25.9	1949-50
Coldwater Lake Canal near Spirit Lake, Wa.	14240352	36.2	1985-86
North Fork Toutle River at St. Helens, Wa.	14240500	124	1930-33
Green River above Beaver Creek, near Kid Valley, Wa.	14240800	129	1981-94
Green River near Toutle, Wa.	14241000	131	1947-50
North Fork Toutle River at Kid Valley, Wa.	14241100	284	1980-94
Coldspring Creek near Cougar, Wa.	14241200	5.47	1969-71
South Fork Toutle River above Herrington Creek nr Cougar, Wa.	14241465	34.4	1981
Silver Lake At Silver Lake, Wa.	14242000	41.5	1949-50;1953-75;
Toutle River near Silver Lake, Wa.	14242500	474	1909-12;1920-24; 1929-80
Toutle River at Highway 99 Bridge near Castle Rock, Wa.	14242690	511	1980-82
Delameter Creek near Castle Rock, Wa.	14243500	19.6	1949-69
Ostrander Creek near Kelso, Wa.	14244000	25.3	1949
Coweman River above Mulholland Creek near Kelso, Wa.	14244500	50.5	1951
Coweman River near Kelso, Wa.	14245000	119	1950-84
Cowlitz River at Longview, Wa. (S)	14245150	2,480	1984-90



## WATER RESOURCES DATA FOR WASHINGTON, 1996

xxxi

## DISCONTINUED SURFACE-WATER DISCHARGE OR STAGE-ONLY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Period of record (water years)
LOWER COLUMBIA RIVER BASIN (Continued)			
Columbia River at Mile 66.2 at Longview, Wa. (S)	14245300	256,700	1983-90
Germany Creek near Longview, Wa.	14245500	22.9	1949
Abernathy Creek near Longview, Wa.	14246000	20.3	1949-58
Mill Creek near Cathlamet, Wa.	14246500	28.3	1949-56
Elochoman River near Cathlamet, Wa.	14247500	65.8	1941-71
Skamokawa Creek near Skamokawa, Wa.	14248000	17.4	1949-50
Jim Crow Creek near Grays Harbor, Wa.	14248200	5.48	1964-74
Grays River above South Fork Grays River, Wa.	14249000	39.9	1956-75
Grays River below South Fork Grays River, Wa.	14249500	60.3	1956-60
Grays River near Grays River, Wa.	14250000	60.6	1949-51
West Fork Grays River near Grays River, Wa.	14250500	15.2	1949-69
Hull Creek At Grays River, Wa.	14251000	11.9	1949

## DISCONTINUED SURFACE-WATER QUALITY STATIONS

The following continuous-record surface-water water-quality stations (gaging stations) in Washington have been discontinued. Period of record for daily water-quality records collected and published as daily means, or monthly means for some periods, for the period of record, expressed in water years, are shown for each station. Information and data regarding any station may be obtained from the District Office at the address given on the back side of the title page of this report.

[Type of record: do (dissolved oxygen), ph (pH), sc (specific conductance), sed (sediment), t (temperature).]

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record
SOUTHWEST WASHINGTON RIVER BASIN				
Bear Branch (River) near Naselle, Wa.	12009500	11.7	t	1963-66
Naselle River near Naselle, Wa.	12010000	54.8	t	1963-73
North Nemah River near South Bend, Wa.	12011000	18.0	t	1970-71
Willapa River at Lebam, Wa.	12011500	41.4	t	1952-71
North River above Joe Creek, near Raymond, Wa.	12016600	188	t, sed	1965
North River near Raymond, Wa.	12017000	210	t	1963-73
CHEHALIS RIVER BASIN				
Skookumchuck River near Bucoda, Wa.	12026400	112	t, sed	1968-71
Chehalis River near Grand Mound, Wa.	12027500	895	t	1952-74
Chehalis River near Porter, Wa.	12031000	1,294	sc, pH, t, sed	1959-72
Cloquallum River (Creek) near Elma, Wa.	12032500	64.9	t	1972-73
Middle Fork Satsop River near Satsop, Wa.	12034500	56.7	t	1972-73
Wynoochee River near Grisdale, Wa.	12035400	41.3	t, sed	1966-67
Wynoochee River above Black Creek, near Montesano, Wa.	12037400	155	t	1970-86
WESTERN OLYMPIC MOUNTAIN RIVER BASIN				
Humptulips River near Humptulips, Wa.	12039000	130	t	1970-71
North Fork Quinault River near Amanda Park, Wa.	12039300	74.1	t	1965-79
Hoh River at U.S. Highway 101, near Forks, Wa.	12041200	253	t, sed	1971; 1978-80
EASTERN OLYMPIC MOUNTAIN RIVER BASIN				
Elwha River at McDonald Bridge, near Port Angeles, Wa.	12045500	269	t	1976-77
Dungeness River near Sequim, Wa.	12048000	156	t	1968-70
Dosewallips River near Brinnon, Wa.	12053000	93.5	t	1970-71
North Fork Skokomish River near Potlatch, Wa.	12059500	117	t	1965-82
South Fork Skokomish River near Hoodspert, Wa.	12059800	26.0	t	1965-71
South Fork Skokomish River near Potlatch, Wa.	12060000	63.4	t	1955-64
South Fork Skokomish River near Union, Wa.	12060500	76.3	t	1980-82
Vance Creek near Potlatch, Wa.	12061000	15.6	t	1955-57
Skokomish River near Potlatch, Wa.	12061500	227	t	1955-62; 1964-82
SOUTH WESTERN PUGET SOUND RIVER BASINS				
Purdy Creek near Union, Wa.	12062500	1.43	t	1955-60
Dewatto River near Dewatto, Wa.	12068500	18.4	t	1968-70
Deschutes River near Rainier, Wa.	12079000	89.8	t	1968-70
NISQUALLY RIVER BASIN				
Nisqually River near National, Wa.	12082500	133	t	1952-82
Nisqually River at La Grande, Wa.	12086500	292	t	1966-82
PUYALLUP RIVER BASIN				
Puyallup River near Orting, Wa.	12093500	172	sed	1955
South Prairie Creek at South Prairie, Wa.	12095000	79.5	t	1971
White River near Greenwater, Wa.	12096600	16.2	t	1965-68
White River Below Clearwater River near Buckley, Wa.	12097850	375	sed	1974-76
White River near Buckley, Wa.	12098500	401	t, sed	1955; 1971-73
Puyallup River at Puyallup, Wa.	12101500	948	t	1959-60; 1965-67
DUWAMISH (GREEN) RIVER BASIN				
Green River near Auburn, Wa.	12113000	399	t	1952-86
Green River at Tukwilla, Wa.	12113350	440	t, sed	1964-66
LAKE WASHINGTON (CEDAR) BASIN				
Cedar River near Landsburg, Wa.	12117500	121	t	1953-85
Issaquah Creek near Mouth, near Issaquah, Wa.	12121600	54.7	t	1971
Sammamish River near Woodinville, Wa.	12125200	157	t	1965-67
Bear Creek at Woodinville, Wa.	12125500	15.3	t	1971
Wallace River at Gold Bar, Wa.	12135000	19.0	t	1955-57; 1959-72

## WATER RESOURCES DATA FOR WASHINGTON, 1996

xxxiii

## DISCONTINUED SURFACE-WATER QUALITY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record
SNOHOMISH RIVER BASIN				
Skykomish River at Monroe, Wa.	12141100	834	t, sed	1967-69
Middle Fork Snoqualmie River near Tanner, Wa.	12141300	154	t	1979-80
North Fork Snoqualmie River near Snoqualmie Falls, Wa.	12142000	64.0	t	1979-80
South Fork Snoqualmie River abv Alice Creek, nr Garcia, Wa.	12143400	41.6	t	1979-80
Snoqualmie River near Carnation, Wa.	12149000	603	t, sed	1967-70
Snohomish River at Snohomish, Wa.	12155500	1,714	t	1961
EAST CENTRAL PUGET SOUND RIVER BASINS--Continued				
Mission Creek near Tulalip, Wa.	12157250	7.92	t	1975-76
Tulalip Creek at Tulalip, Wa.	12158040	15.4	t	1975-76
STILLAGUAMISH RIVER BASIN				
North Fork Stillaguamish River near Darrington, Wa.	12165500	82.2	t	1952-57
Pilchuck River near Bryant, Wa.	12168500	52.0	t	1952-72
SKAGIT RIVER BASIN				
Skagit River above Alma Creek, near Marblemount, Wa.	12179000	1,274	t	1953-83
Skagit River at Marblemount, Wa.	12181000	1,381	t	1986-93
Cascade River at Marblemount, Wa.	12182500	168	t	1952-64; 1966-73
Sauk River near Sauk, Wa.	12189500	714	t	1970-71
Skagit River near Hamilton, Wa.	12196150	2,870	t	1975-77
Childs Creek near Lyman, Wa.	12197020	2.4	t	1974-76
Tank Creek near Lyman, Wa.	12197040	2.50	t	1974-80
Minkler Creek near Lyman, Wa.	12197110	5.0	t	1974-80
Black Creek near Minkler, Wa.	12197680	0.5	t	1975-80
Black Creek near Lyman, Wa.	12197690	0.5	t	1974-75
Skagit River near Sedro Wooley, Wa.	12199000	3,015	t, do, ph, sc	1975-79
Skagit River near Mount Vernon, Wa.	12200500	3,093	t, sp	1962-70; 1974-82
NORTHEASTERN PUGET SOUND RIVER BASIN				
Samish River near Burlington, Wa.	12201500	87.8	t	1973-74
NOOKSACK RIVER BASIN				
Nooksack River at Deming, Wa.	12210500	584	sc, ph	1959-60
PEND OREILLE RIVER BASIN				
Pend Oreille River at Metaline Falls, Wa.	12398090	--	t	1949-50
Pend Oreille River at International Boundary	12398600	25,200	t, sp	1974-81
UPPER COLUMBIA RIVER BASIN				
Columbia River at International Boundary	12399500	59,700	t	1952-73
Columbia River at Northport, Wa.	12400520	--	t, sp	1974-81
COLVILLE RIVER BASIN				
Chewelah Creek at Chewelah, Wa.	12407700	94.1	t	1973-74
Mill Creek near Colville, Wa.	12408500	83.0	t	1973-74
Colville River at Kettle Falls, Wa.	12409000	1,007	t	1970-71
SPOKANE RIVER BASIN				
Spokane River above Liberty Bridge near Otis Orchards, Wa.	12419500	3,880	t, sp	1964-65
Little Spokane River at Dartford, Wa.	12431000	665	t	1968-70
Spokane River at Long Lake, Wa.	12433000	6,020	t, sc	1959-62; 1967-70; 1973-82
Chamokane Creek below Falls, near Longlake, Wa.	12433200	179	t	1984-90
UPPER COLUMBIA RIVER BASIN				
Sanpoil River near Keller, Wa.	12434500	880	t	1968-70
Columbia River at Grand Coulee Dam, Wa.	12436500	74,700	t, sc, ph	1951-58; 1974-79
OKANOGAN RIVER BASIN				
Okanogan River at Oroville, Wa.	12439500	3,210	t	1960; 1986-88
Similkameen River near Nighthawk, Wa.	12442500	3,550	t	1967-71; 1986-88
Okanogan River near Tonasket, Wa.	12445000	7,280	t	1986-88
Okanogan River at Malott, Wa.	12447200	8,100	t	1970-71

## DISCONTINUED SURFACE-WATER QUALITY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record
METHOW RIVER BASIN				
Methow River near Pateros, Wa.	12449950	1,772	t	1969-70
ENTIAT RIVER BASIN				
Entiat River near Ardenvoir, Wa.	12452800	203	t	1968-71
WENATCHEE RIVER BASIN				
White (HD Wenatchee) River near Plain, Wa.	12454000	150	t	1971
Nason Creek near Plain, Wa.	12455550	108	t	1973-74
MID-COLUMBIA RIVER BASIN				
Sand Hollow at CRS SW, near Vantage, Wa.	12464606	47	sc	1993-94
			temp	1993-95
Crab Creek at Marcellus road near Ritzville, Wa.	12464770	384	sc	1993-94
			temp	1993-95
Lind Coulee Wasteway at State Route 17, near Ritzville, Wa.	12471400	703	temp	1994-95
Crab Creek at Morgan Lake Road, near Othello, Wa.	12472000	--	temp	1994-95
DW 272A1 Drain near Royal Camp, Wa.	12472300	0.88	t, sed	1977-82
DW 272A Drain near Royal Camp, Wa.	12472350	3.36	t, sed	1977-82
Crab Creek near Beverly, Wa.	12472600	4,842	t	1959-62; 1968-69
Columbia River at Vernita Bridge, near Priest Rapids, Wa.	12472900	96,000	t	1974-81
EL 68 Wasteway near Othello, Wa.	12473740	--	t	1978-80
YAKIMA RIVER BASIN				
Yakima River near Martin, Wa.	12474500	54.7	t	1981-82
Kachess River near Easton, Wa.	12476000	63.6	t	1981-82
Yakima River at Cle Elum, Wa.	12479500	495	t	1981-82
Yakima River at Roza Dam, Wa.	12484900	1,802	t, sp	1966-71
Roza Canal below Sulphur Creek Wasteway nr Sunnyside, Wa.	12485012	--	t, sed, sc	1976-77
Bumping River near Nile, Wa.	12488000	70.7	t	1971; 1981-82
American River near Nile, Wa.	12488500	78.9	t	1969-71
Tieton River at Tieton Dam, near Naches, Wa.	12491500	187	t	1981-82
Yakima River above Ahtanum Creek, at Union Gap, Wa.	12500450	3,479	t	1981-82
Ahtanum Creek at Union Gap, Wa.	12502500	173	t	1981-82
Sunnyside Canal blw Sulphur Creek Wstwy, nr Sunnyside, Wa.	12504512	--	t, sed, sc	1976-77
Yakima River near Parker, Wa.	12505000	3,660	t, sp	1959-70
Toppenish Creek at Indian Church Road, near Granger, Wa.	12507508	--	t	1981-82
Satus Creek at Satus, Wa.	12508621	--	t	1981-82
Drain 61.0 above Drain 61.4 near Sunnyside, Wa.	12508755	3.27	t, sed	1979-82
Drain 60.7 near Sunnyside, Wa.	12508769	0.92	t, sed	1979-82
Drain 59.6 below 60.2, near Sunnyside, Wa.	12508775	0.68	t, sed	1979-82
Drain 59.4 near Sunnyside, Wa.	12508779	0.68	t, sed	1978-81
DID 18 Drain at Sunnyside, Wa.	12508790	14.7	t, sed, sc	1976-77
Black Canyon Creek at Waneta Road, nr Sunnyside, Wa.	12500820	35.8	t, sed, sc	1976-77
DID 9 Drain near Sunnyside, Wa.	12508830	27.1	t, sed, sc	1976-77
DID 3 Drain near Sunnyside, Wa.	12508840	18.8	t, sed, sc	1976-77
Sulphur Creek Wasteway near Sunnyside, Wa.	12508850	155	t, sed, sp	1981-82; 1976-77
				1987-90
Yakima River at Mabton, Wa.	12508990	5,359	t	1981-82
Yakima River at Kiona, Wa.	12510500	5,615	t, sed, sp	1953-82
SNAKE RIVER BASIN				
Snake River near Anatone, Wa.	13334300	92,960	t	1959-84; 1986-91
Snake River near Clarkstown (at Riparia), Wa.	13343500	103,200	t	1952-55; 1959-64
Tucannon River near Starbuck, Wa.	13344500	431	t, sed	1963-70
PALOUSE RIVER BASIN				
South Fork Palouse River at Colfax, Wa.	13349200	277	temp	1994-95
Rebel Flat Creek at Winona, Wa.	13349320	73.2	sed	1965; 1994
Pine Creek at Pine City, Wa.	13349400	302	t	1970-71
Pine Creek at Pine City Road, at Pine City, Wa.	13349410	306	temp	1994-95
			sed	1994
Palouse River at Hooper, Wa.	13351000	2,500	t, sed	1962-71
Snake River below Ice Harbor Dam, Wa.	13353000	108,500	t	1980
Snake River at Burbank, Wa.	13353200	108,800	t, sp	1973-81
WALLA WALLA RIVER BASIN				
Mill Creek below Blue Creek, near Walla Walla, Wa.	14013600	91	t, sed	1963-70
Touchet River at Bolles, Wa.	14017000	361	t	1970-71



## WATER RESOURCES DATA FOR WASHINGTON, 1996

xxxv

## DISCONTINUED SURFACE-WATER QUALITY STATIONS

Station name	Station number	Drainage area (mi <sup>2</sup> )	Type of record	Period of record
LOWER COLUMBIA RIVER BASIN				
Alder Creek at Alderdale, Wa.	14034350	196	t, sed	1963-68
Rock Creek near Roosevelt, Wa.	14036600	213	t, sed	1963-68
Klickitat River Basin				
Klickitat River near Pitt, Wa.	14113000	1,297	t	1950-70
WHITE SALMON RIVER BASIN				
White Salmon River near Underwood, Wa.	14123500	386	t	1968-69
LOWER COLUMBIA RIVER BASIN--Continued				
Wind River below Dry Creek near Carson, Wa.	14126600	79.0	t	1973-74
Columbia River at Vancouver, Wa.	14144700	241,000	t, sed	1964-70; 1972-80
LEWIS RIVER BASIN				
Clearwater Creek near Mouth near Cougar, Wa.	14216300	33	sed	1982-88
Muddy River below Clear Creek, near Cougar, Wa.	14216500	135	sed	1984-88
Yale Reservoir near Yale, Wa.	14218500	596	t, sed	1969-70
Lewis River at Ariel, Wa.	14220500	731	t	1961-63
East Fork Lewis River near Heisson, Wa.	14222500	125	t	1950-72
KALAMA RIVER BASIN				
Kalama River near Cougar, Wa.	14222920	12.3	t	1969-70
Fossil Creek near Cougar, Wa.	14222930	8.21	t	1969
Dry Creek near Cougar, Wa.	14222950	3.29	t, sed	1969-70
Merrill Lake near Cougar, Wa.	14222960	9.08	t, sed	1969-70
Kalama River below Falls near Cougar, Wa.	14222980	37.4	t	1970-71
Kalama River below Italian Creek near Kalama, Wa.	14223500	198	t	1955-72
Kalama River Above Spencer Creek, near Kalama, Wa.	14223600	202	t	1970-79
COWLITZ RIVER BASIN				
Cowlitz River at Packwood, Wa.	14226500	287	t	1971
Cispus River near Randle, Wa.	14232500	321	t	1950-72;
Cowlitz River near Randle, Wa.	14233400	1,030	t	1953-82
Cowlitz River near Kosmos, Wa.	14233500	1,042	t	1953-68
Rainy Creek near Kosmos, Wa.	14234000	17.9	t	1951-53
Cowlitz River below Mosseyrock Dam, Wa.	14234810	1,154	t	1970-82
West Fork Tilton River near Morton, Wa.	14235500	16.4	t	1951-59; 1961-71
Tilton River above Bear Canyon, near Cinebar, Wa.	14236200	141	t	1965-82
Winston Creek near Silver Creek, Wa.	14237500	37.8	t	1965-71
Cowlitz River below Mayfield Dam, Wa.	14238000	1,400	t	1950-82
North Fork Toutle River above Alder Cr nr Kid Valley, Wa.	14240490	-	t, sc	1990
North Fork Toutle River below Sed. Ret. near Kid Valley, Wa.	14240525	175	t, sc	1990-91
Green River above Beaver Creek, near Kid Valley, Wa.	14240800	129	sc, t, sed	1980-94
North Fork Toutle River at Kid Valley, Wa.	14241100	284	t, sc, sed	1980-94
Cold Spring Creek near Cougar, Wa.	14241200	5.47	t	1969-71
South Fork Toutle at Camp 12 near Toutle, Wa.	14241490	117	t, sed, sp	1981
South Fork Toutle River at Toutle, Wa.	14241500	120	sed	1981
Toutle River at Tower Road near Silver Lake, Wa.	14242580	496	t, sc	1990-91
Toutle River near Silver Lake, Wa.	14242500	474	t	1951-62; 1964-72
Toutle River at Highway 99 Bridge near Castle Rock, Wa.	14242690	512	t, sed, ph, sc	1980-82
Cowlitz River at Castle Rock, Wa.	14243000	2,238	t, sed	1950-73, 1980-85
Coweman River near Kelso, Wa.	14245000	125	t	1950-72
LOWER COLUMBIA RIVER BASIN--Continued				
Abernathy Creek near Longview, Wa.	14246000	20.3	t	1950; 1953-57
Mill Creek near Cathlamet, Wa.	14246500	28.3	t	1954
Elochoman River near Cathlamet, Wa.	14247500	65.8	t	195

THIS PAGE IS INTENTIONALLY BLANK

## INTRODUCTION

The Water Resources Division of the U.S. Geological Survey, in cooperation with State, local, and other Federal agencies, obtains a large amount of data pertaining to the water resources of Washington each water year. These data, accumulated during many water years, constitute a valuable data base for developing an improved understanding of the water resources of the State. To make these data readily available to interested parties outside the Geological Survey, the data are published annually in this report series entitled "Water Resources Data Washington."

This report includes records on both surface and ground water in the State. Specifically, it contains: (1) Discharge records for 225 stream-gaging stations, 29 partial-record or miscellaneous streamflow stations, and 3 crest-stage partial-record streamflow station; (2) stage only records for 2 gaging stations; (3) stage and (or) content records for 34 lakes and reservoirs; (4) water-quality records for 68 stream, canal and drain sites; (5) water-level records for 4 observation wells; and (6) water quality record for 1 observation well. Records included for stream stages and for ground-water levels are only a small fraction of those obtained during the water year.

This series of annual reports for Washington began with the 1961 water year with a report that contained only data relating to the quantities of surface water. For the 1964 water year, a similar report was introduced that contained only data relating to water quality. Beginning with the 1975 water year, the report format was changed to present, in one volume, data on quantities of surface water, quality of surface and ground water, and ground-water levels.

Prior to introduction of this series and for several water years concurrent with it, water-resources data for Washington were published in U.S. Geological Survey Water-Supply Papers. Data on stream discharge and stage and on lake or reservoir contents and stage, through September 1960, were published annually under the title "Surface-Water Supply of the United States, Parts 12, 13, and 14." For the 1961 through 1970 water years, the data were published in two 5-year reports. Data on chemical quality, temperature, and suspended sediment for the 1941 through 1970 water years were published annually under the title "Quality of Surface Waters of the United States," and water levels for the 1935 through 1974 water years were published under the title "Ground-Water Levels in the United States." These Water-Supply Papers may be consulted in the libraries of the principal cities of the United States, or if not out of print, may be purchased from the U.S. Geological Survey, Books and Open-File Reports, Federal Center, Building 41, Box 25425, Denver, CO 80225. For further ordering information, telephone (303) 236-7476.

Publications similar to this report are published annually by the Geological Survey for all states. These official Survey reports have an identification number consisting of the two-letter State abbreviation, the last two digits of the water year, and the volume number. For example, this report is identified as "U.S. Geological Survey Water-Data Report WA-96-1." For archiving and general distribution, the reports for 1971-74 water years also are identified as water-data reports. These water-data reports are for sale in paper copy or in microfiche by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. For further ordering information, the Customer Inquiries telephone number is (703) 487-4650.

Additional information, including current prices, for ordering specific reports may be obtained from the District Chief at the address given on back of title page or by telephone (206) 593-6510.

The USGS is continually updating the availability of its information on the World Wide Web. Current streamflow conditions (via satellite) for Washington and other water resource information can be found at the following Universal Resource Locator (URL): <http://www.dwater.wr.usgs.gov>. Nationwide information on water resources, including real-time and historic streamflow data, water-use data, publications and USGS program activities, can be found at URL: [http://](http://water.usgs.gov) 1  
water.usgs.gov.

## COOPERATION

The U.S. Geological Survey, in cooperation with State and local agencies within the State of Washington, have had joint-funding agreements for the systematic collection of surface-water, ground-water, and water-quality records since 1909. Organizations that supplied data are acknowledged in the station descriptions. Organizations that assisted in collecting data through joint-funding agreements with the Survey are:

Washington State Department of Ecology, Tom Fitzsimmons, director  
 Washington State Department of Fish and Wildlife, Robert Turner, director  
 Washington State Department of General Administration, Capitol Facilities, Cliff Ikerd  
 Washington State Department of Transportation, Sid Morrison, secretary  
 Chelan County, P.U.D. No. 1, W. D. Fields, director of power operations  
 Clallam County Department of Community Development, Bill White, director  
 Douglas County, P.U.D. No. 1, Eldon Landin, manager  
 King County, Department of Public Works, Paul Tanaka, director  
 Lewis County, Department of Public Works, Robert Berg, director  
 Pierce County, Department of Public Works, Doug Sutherland, county executive  
 Skagit County Public Works Department, Jan Keiser, director  
 Snohomish County Department of Public Works, G. E. Weed, director  
 Snohomish County, P.U.D. No. 1, Dick Johnson, district manager  
 Tacoma-Pierce County Health, Federico Cruz-Urbe, director of health  
 Thurston County Department of Water and Waste Management, Loretta Swanson, storm and surface water program manager  
 Whatcom County, Shirley Van Zanten, county executive  
 City of Bellevue, Department of Public Works, Storm and Surface Water Utility, Damon Diessner, director  
 City of Kent, William Wolinski, supervisor environmental engineering  
 City of Port Townsend, Robert Wheeler, public works director  
 City of Seattle, City Light Department, Ted Coates, deputy secretary, wholesale branch  
 City of Seattle, Seattle Water Department, Roberta Palm Bradley, superintendent  
 City of Tacoma, Department of Public Utilities, Mark Crisson, director  
 City of Tacoma, Department of Public Works, Sewer Utility Division, John Stetson, division manager  
 Hoh Tribal Council, Mary Leitka, chair  
 Lower Elwha Tribal Council, Frances G. Charles, tribal chair  
 Makah Indian Tribe, Hubert Markishtum, chair  
 Nisqually Indian Tribe, Michael Stepigin, chair  
 Quileute Tribal Council, Douglas Woodruff, Sr., chair  
 Quinault Business Committee, Pearl Capoean-Baller, tribal chair  
 U.S. Fish and Wildlife Service, Michael J. Spear, regional director  
 Yakama Tribal Council, Jerry Menninick, chair

Assistance in the form of funds or services in collecting records was given by the Corps of Engineers, U.S. Army; the U.S. Department of State; the Bonneville Power Administration, U.S. Department of Energy; the Bureau of Reclamation and the Bureau of Indian Affairs, U.S. Department of Interior.

The following organizations aided in collecting records for stations under Federal Energy Regulatory Commission licenses:

City of Seattle; Daishowa America Co., Ltd.; P.U.D. No. 1 of Chelan County, City of Tacoma Department of Public Utilities; P.U.D. No. 1 of Pend Oreille County; P.U.D. No. 1 of Grant County; P.U.D. No. 1 of Douglas County; Puget Sound Power and Light; Snohomish County P.U.D. No. 1; Cowlitz County P.U.D.; South Fork II, Inc.; Washington Water Power Company.



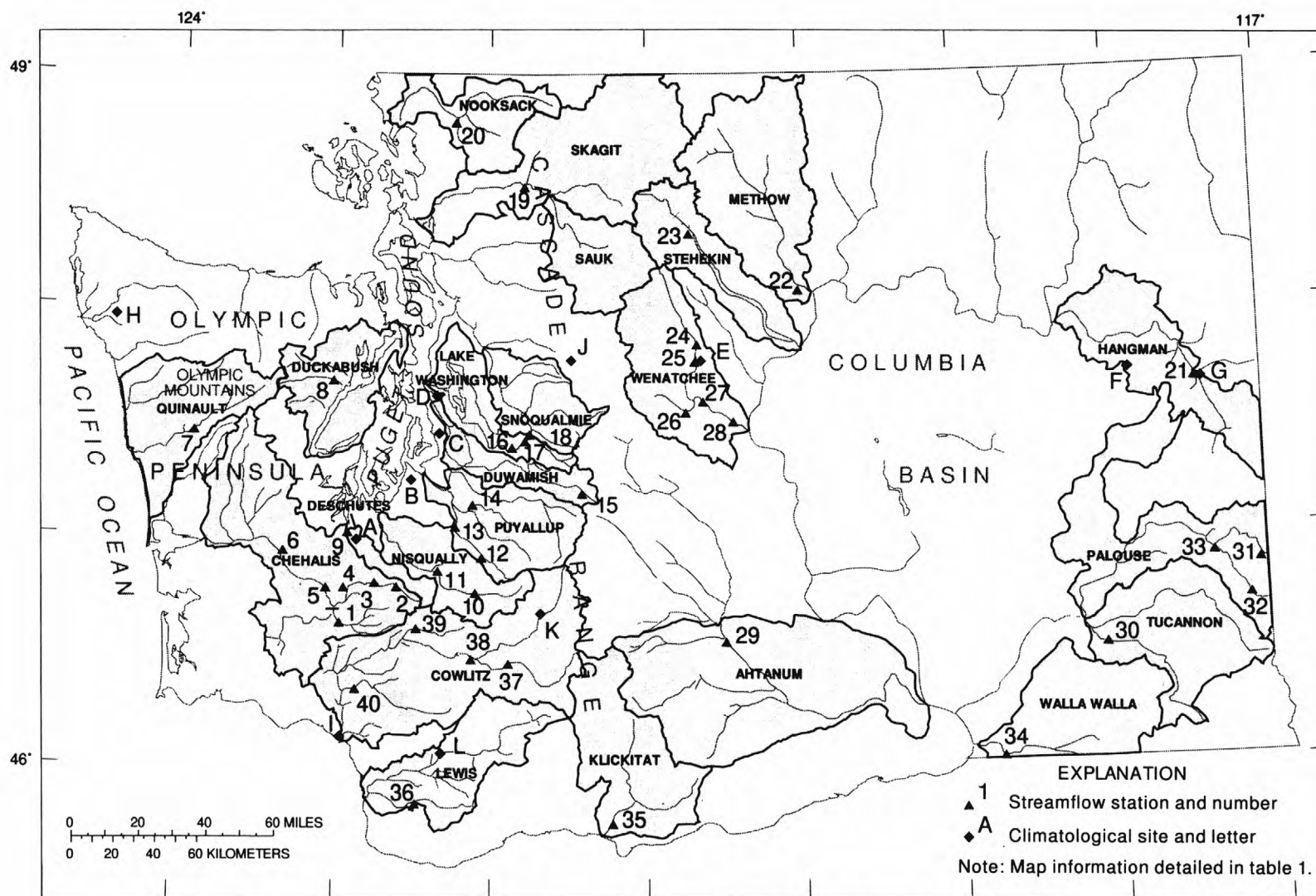
## SUMMARY OF HYDROLOGIC CONDITIONS

Surface Water

Precipitation and streamflow averaged above normal throughout Washington in the 1996 water year (Oct. 1995 to Sept. 1996). Overall, the year was one of the wettest recorded, and heavy precipitation produced floods in many parts of the State in November, December, January, February, April, and May. Floods in late November and early February were the most severe, producing peaks of record at many gaging stations. Snowpack in the mountains averaged above normal and helped produce average to above average flows throughout the summer at most gaging stations in the State. Average streamflows vary in the State depending on geography, topography, precipitation, and air temperature patterns.

A distinctively varied climate characterizes Washington (fig. 1, table 1) and results primarily from two features: (1) the Cascade Range and (2) the prevailing marine influence of the Pacific Ocean. The north-south trending Cascade Range divides Washington into two areas, the wet western part, and the dry eastern part. West of the Cascade Range, precipitation averages 70 inches, with about 30 to 40 inches in the Puget Sound Basin, where Olympia, Tacoma, and Seattle are located, to about 150-200 inches on the west slopes of the Olympic Mountains, where temperate rain forests thrive. The Cascade Range acts as a barrier to air masses moving across the State producing 100 to 150 inches of precipitation on the higher western slopes of the Cascades, leaving much less moisture in the clouds for eastern Washington. The eastern part of the State receives only from 7 to 30 inches of precipitation, with the driest part being the Columbia Basin, where sagebrush and grasses grow and irrigation is required for most crops. About two-thirds of the precipitation in Washington occurs from October to March, either as rain in the lowlands or as snow at higher altitudes. Occasionally during the winter, a Pacific storm, or series of storms, with mild temperatures and very heavy rain, locally called a "Pineapple Express", melts snow from high elevations, producing serious flooding in the lowlands. Heavy snowpack and glaciers in the Olympic Mountains and Cascade Range are the sources of water for many rivers in Washington, and become the primary source of flow during the relatively dry summer.

Annual runoff patterns in Washington vary widely because of the State's different topography and precipitation patterns in the State. Superimposing the hydrographs of the 1996 mean daily discharges on the median annual mean daily discharges, along with quartiles, for key stations in the State shows the extent of this variation (figs. 2-8). Representing the Olympic Peninsula, the annual average hydrograph for Quinault River at Quinault Lake (fig. 2) shows two peaks, one from November to January, resulting from heavy winter rainfall, and the other in May and June, resulting from spring snowmelt from higher altitudes. Greater variability exists in the winter peak due to the more variable nature of flood events during the period. The Chehalis River near Grand Mound annual average hydrograph (fig. 3) represents streamflow patterns in the southwestern lowlands of the State. Peak flows occur from November to March, coinciding with the typically heavy rainfall during winter. Flows gradually decrease through spring and summer due to the generally dry weather. In the Puget Sound Basin, represented by the hydrograph for Puyallup River near Orting (fig. 4), winter rainfall and spring snowmelt peaks both occur and are nearly equal. As on the Olympic Peninsula and the Puget Sound Basin, rivers draining the west slope of the Cascade Range also exhibit a double peak, as the Nooksack River at Deming annual average hydrograph (fig. 5) shows. In this case, the peak generated by runoff from the melting snowpack in May and June is slightly larger than that caused by winter rainfall and snowmelt during mid-winter thaws. Annual hydrographs for rivers draining the east side of the Cascades, such as the Wenatchee River at Plain (fig. 6) and the Methow River near Pateros (fig. 7), show peak runoff during snowmelt from April to July, with no winter peak. Most of the winter, river levels generally stay low because freezing weather maintains the snowpack; exceptions occur during periods when mild weather and heavy rain bring flooding. Farther south along the east side of the Cascades and into the western Columbia Basin, rainfall in winter as well as melting snow in spring affects streamflow, and the annual hydrograph shows a slow rise to peak from January to



**Figure 1.** Selected streamflow stations, climatological sites, and drainage basins in Washington State.

Table 1. Key for streamflow stations, climatological stations, and additional information for Washington State map on figure 1.

No./ or Letter on Fig. 1	USGS Station No.	USGS or Climatological Station Name	Notes
1	12025000	Newaukum River near Chehalis	flow data in table 3
2	12025700	Skookumchuck River near Vail	flow data in table 3
3	12026150	Skookumchuck River below Bloody Run Creek, near Centralia	flow data in table 3
4	12026400	Skookumchuck River near Bucoda	flow data in table 3
5	12027500	Chehalis River near Grand Mound	flow data in table 3; hydrograph on fig. 3
6	12031000	Chehalis River at Porter	flow data in table 3
7	12039500	Quinault River at Quinault Lake	hydrograph on fig. 2
8	12054000	Duckabush River near Brinnon	flow data in text
9	12080010	Deschutes River at E Street Bridge, at Tumwater	flow data in table 3
10	12082500	Nisqually River near National	flow data in table 3
11	12086500	Nisqually River at La Grande	flow data in table 3
12	12092000	Puyallup River near Electron	flow data in table 3
13	12093500	Puyallup River near Orting	flow data in table 3; hydrograph on fig. 4
14	12095000	South Prairie Creek at South Prairie	flow data in table 3
15	12103380	Green River above Twin Camp, near Lester	flow data in table 3
16	12116100	Canyon Creek near Cedar Falls	flow data in text
17	12117000	Taylor Creek near Selleck	flow data in table 3
18	12143900	Boxley Creek near Edgewick	flow data in text
19	12194000	Skagit River near Concrete	flow data in table 3
20	12210500	Nooksack River at Deming	flow data in table 2; hydrograph on fig. 5
21	12424000	Hangman Creek at Spokane	hydrograph on fig. 11
22	12449950	Methow River near Pateros	hydrograph on fig. 7
23	12451000	Stehekin River at Stehekin	flow data in table 2
24	12456500	Chiwawa River near Plain	flow data in table 2
25	12457000	Wenatchee River at Plain	flow data in table 2; hydrograph on fig. 6
26	12458000	Icicle Creek above Snow Creek, near Leavenworth	flow data in table 2
27	12459000	Wenatchee River at Peshastin	flow data in table 2

Table 1. Key for streamflow stations, climatological stations, and additional information for Washington State map on figure 1.

No./ or Letter on Fig. 1	USGS Station No.	USGS or Climatological Station Name	Notes
28	12462500	Wenatchee River at Monitor	flow data in table 2
29	12502500	Ahtanum Creek at Union Gap	hydrograph on fig. 9
30	13344500	Tucannon River near Starbuck	flow data in text
31	13345300	Palouse River at Palouse	flow data in table 3; discontinued station
32	13348000	South Fork Palouse River at Pullman	flow data in table 3; discontinued station
33	13349210	Palouse River below South Fork at Colfax	flow data in table 3
34	14018500	Walla Walla river near Touchet	hydrograph on fig. 10
35	14113000	Klickitat River near Pitt	flow data in table 3; hydrograph on fig. 8
36	14222500	East Fork Lewis River near Heisson	flow data in table 3
37	14232500	Cispus River near Randle	flow data in table 3
38	14233500	Cowlitz River near Kosmos	flow data in table 3
39	14236200	Tilton River above Bear Canyon Creek, near Cinebar	flow data in table 3
40	14242580	Toutle River at Tower Road, near Silver Lake	flow data in table 3
A	None	Olympia	climatological station
B	None	Tacoma	climatological station
C	None	SeaTac	climatological station
D	None	Seattle	climatological station
E	None	Plain	climatological station
F	None	Davenport	climatological station
G	None	Spokane	climatological station
H	None	Forks	climatological station
I	None	Longview	climatological station
J	None	Baring	climatological station
K	None	Packwood	climatological station
L	None	Cougar	climatological station

Note: Basin outlines shown on fig. 1 sometimes represent several watersheds in one basin. For example, the Ahtanum Creek Basin shows the Ahtanum Creek watershed above the marked gaging station along with the entire lower Yakima River watershed below the gage.



May, such as the hydrograph of the Klickitat River near Pitt (fig. 8). In the Columbia Basin, Ahtanum Creek at Union Gap's annual mean hydrograph (fig. 9) shows the interconnection between natural and man-made activities in most watersheds in the Basin. Irrigation return flows are mostly responsible for the gradual increase in discharge from August to January. During winter, rainfall combines with these return flows, exhibiting a gradual, but spiked, rise until April and May, when runoff from snowmelt generally produces the highest flows on average. The man-made interconnection with nature evidenced by return flows, along with winter rainfall and spring snowmelt, is also characteristic of southeastern Washington hydrographs, but the peak is more constant from November to May, as the Walla Walla River near Touchet shows (fig. 10). In eastern Washington highlands, represented by Hangman Creek at Spokane (fig. 11), the annual average hydrograph shows a late winter and early spring peak caused by a combination of runoff produced by rainfall and melting snow. Summers again are generally dry, and the hydrograph shows the lowest discharges in August and September.

#### Surface Water Conditions in 1996

The 1996 water year realized many periods of high water and flooding throughout Washington in a year of above normal precipitation. Baring, on the west slope of the Cascade Range, received over 150 inches of precipitation during the year, comparable to wetter places on the west side of the Olympic Mountains (National Oceanic and Atmospheric Administration, 1995). The wettest month was November, with some areas along the west slope of the Olympic Mountains and Cascade Range receiving over 30 inches of rain--Baring received almost 41 inches (National Oceanic and Atmospheric Administration, 1995). November, along with February, also experienced the worst flooding in the State. At some stations, November produced the highest peak, but for most, it was in February. The combination of heavy rainfall and high snowmelt in February produced record-setting peak discharges at many stations in the southern half of the State. The driest months were March, June, and July.

Streamflow in October rose above average in the western and southeastern parts of the State (fig. 12A). The heaviest rain and highest flows occurred October 9-11, with Forks on the Olympic Peninsula receiving almost 15 inches of rain, and Baring almost 18 inches (National Oceanic and Atmospheric Administration, 1995). Mean daily flows at the Quinault River at Quinault Lake station (fig. 2) rose from 1,100 cubic feet per second ( $\text{ft}^3/\text{s}$ ) to almost 6,000  $\text{ft}^3/\text{s}$  during this period. At the Nooksack River at Deming (fig. 5), flows rose from 1,500 to 12,000  $\text{ft}^3/\text{s}$  during this period.

Streamflows during November were above average throughout the State except for the northeast quarter, where they were average (fig. 12B). Flows approached or exceeded peaks of record for some stations due to very heavy rainfall from three series of storms (Nov. 5-8, 10-11, and 27-30). Several locations on the west side of the Olympic Mountains and Cascade Range received over 30 inches of rain during the month. About 10 inches of rain were recorded in the Puget Sound region. Peak streamflows on Nov. 29-30 approached peaks of record in the Snoqualmie, Sauk, upper Nooksack, and Cowlitz River Basins and exceeded instantaneous peaks of record at some stations in the Skagit, lower Nooksack, and Wenatchee River Basins (table 2).

In December and January, rains continued, but precipitation averaged only slightly above normal in the State. Several stations on the west side of the Olympics received over 20 inches of rainfall in December and again in January. Streamflows averaged above the mean throughout the State in December (fig. 12C) and ranged from normal to above normal in January (fig. 12D). Streamflow at several stations in small basins approached or exceeded instantaneous peaks of record in December--Canyon Creek near Cedar Falls (station 12116100, Dec. 4, 107  $\text{ft}^3/\text{s}$ , peak of record is 131  $\text{ft}^3/\text{s}$ ), Boxley Creek near Edgewick (station 12143900, Dec. 3, 260  $\text{ft}^3/\text{s}$ , new record), and Duckabush River near Brinnon (station 12054000, Dec. 12, 9,240  $\text{ft}^3/\text{s}$ , new record). Arctic air moved into the State on Jan. 27, producing some snow on Jan. 27-29, but brought clearer skies and extremely cold temperatures afterward. The air temperature at Davenport, near Spokane, reached -28 degrees Fahrenheit ( $^{\circ}\text{F}$ ) on Jan. 31 (National Oceanic and Atmospheric Administration, 1996). Hydrographs for all stations in the State dropped during this period (figs. 2-11) as freezing weather prevented snowmelt and, along with drier weather, reduced streamflows.

Table 2. Maximum stages and discharges during floods of November 29, 30, 1995 at selected U.S. Geological Survey gaging stations in Washington. Explanation: mi<sup>2</sup>, square miles; ft, feet; ft<sup>3</sup>/s, cubic feet per second; ND, not determined; HWM, High-water mark R, regulated; <, less than; >, greater than.

Station number	Stream and place of determination	Drainage area (mi <sup>2</sup> )	Period of record	Maximum prior to November 1995			Maximum during November 1995				
				Date	Stage (ft)	Discharge (ft <sup>3</sup> /s)	Date	Stage (ft)	Discharge		
									ft <sup>3</sup> /s	ft <sup>3</sup> /s/mi <sup>2</sup>	Recurrence interval (years)
Skagit River Basin											
12194000	Skagit River near Concrete	2,737	1925-	11-27-49	40.8	154,000	11-29	41.57	160,000	58.5	R
Nooksack River Basin											
12210500	Nooksack River at Deming	584	1935-	2-10-51	15.69	43,200	11-29	14.80	48,900	83.7	60
Chelan River Basin											
12451000	Stehekin River at Stehekin	321	1910-15, 1926-	5-29-48	29.00	18,900	11-29	29.58	21,000	65.4	200
Wenatchee River Basin											
12457000	Wenatchee River at Plain	591	1950-79, 1989-	11-25-90	14.39	33,200	11-30	14.97	36,100	61.1	500
12458000	Icicle Creek above Snow Creek near Leavenworth	193	1936-71, 1993-	5-28-48	13.93	11,600	11-29	16.04	19,800	103	>500
12459000	Wenatchee River at Peshastin	1,000	1929-	11-25-90	17.58	40,000	11-30	17.89	41,300	41.3	>200
12462500	Wenatchee River at Monitor	1,301	1897, 1962-	11-25-90	29.80	45,900	11-30	30.02	47,500	36.5	>100

The cold weather continued into early February, but was soon replaced by a warmer, very wet series of storms Feb. 5-9 that produced heavy rain, high rates of snowmelt, and record flooding throughout much of the State. Streamflows were above normal throughout Washington except for the northwest corner (fig. 12E). Very heavy rains on Feb. 5-9-- Cougar, 18 inches; Packwood, 12 inches; Baring, 15 inches; SeaTac, 6 inches; Plain, 6 inches (National Oceanic and Atmospheric Administration, 1996) on already saturated ground in western Washington, or on frozen ground in eastern Washington accompanied by snowmelt induced by the rain and warmer air (freezing levels above 6,000 feet) produced high flows at most stations in the State (figs. 2-11). On February 8-9, flows at many stations in the southern half of the State exceeded the peak flow of record (table 3). At a number of stations, such as in the Cowlitz Basin, peak February flows were just slightly higher than the near-record peak flows in late November. At many gaging stations in western Washington, the February flooding was the worst since November, 1990, when some stations in the Skagit and Nooksack River Basins in northern Washington recorded their peak discharges of record. At many eastern Washington stations, peak flows were below the peak of record, such as at Tucannon River near Starbuck (station 13344500, 5,580 ft<sup>3</sup>/s, on Feb. 9, peak of record 7,980 ft<sup>3</sup>/s on Dec. 22, 1964). At some stations where temperatures remained near freezing, only a little rise in streamflow was noted on Feb. 8-9 (Methow River near Pateros, fig. 7).

In contrast to February, weather in March was unusually dry and warm throughout Washington. Some parts of the coast received from 8 to 9 inches less rainfall than average. Temperatures reached 70°F at SeaTac and 74°F at Longview on March 18 and 19, respectively (National Oceanic and Atmospheric Administration, 1996). Streamflows were below normal to normal in the western third and southeastern section of the State and above normal in the central part (fig. 12F). Streams having their source mostly from precipitation showed significant drops in their annual hydrographs in March (Chehalis River near Grand Mound, Puyallup River near Orting, figs. 3-4), while those stations whose source is primarily snowmelt showed peaks in March (Wenatchee River at Plain, Methow River near Pateros, figs. 6-7).

April was wet throughout much of Washington and was reflected in above average streamflows for all the State except for the Cascades and east-central part of the State (fig. 13A). Several stations in the western Olympics and Cascades received from 15 to 20 inches of rain during the month, twice as much as they normally receive. The storm of April 22-24 brought up to 6 inches of rain to some locations and produced high flows throughout Washington (figs. 2-11). Flows at Hangman Creek at Spokane (fig. 11) rose from 200 to nearly 5,000 ft<sup>3</sup>/s during this period.

May streamflows varied throughout the State: southwest and eastern Washington streamflows averaged above normal, while the eastern Cascades streamflows were below normal (fig. 13B). Storms on May 13-14 and 22-23 produced 4 inches of rain at some stations in the western Cascades. Flows throughout the State rose during this period (figs. 2-11). Streams at some stations in eastern Washington were near their average peak for the year during May (Klickitat River near Pitt and Ahtanum Creek at Union Gap, figs. 8-9) and June (Wenatchee River at Plain and Methow River near Pateros, figs. 6-7).

Streamflows from June to September averaged about normal throughout much of the State, but some areas were above normal, and some below normal (figs. 13C-F). Warmer, drier weather during this period induced flows to gradually decrease at most stations in Washington. After high flows due to snowmelt in May and early June, stations in eastern Washington showed rapidly decreasing flows in June and July as the snowpack melted and disappeared (Wenatchee River at Plain, fig. 6; Methow River near Pateros, Fig. 7; Walla Walla River near Touchet, fig. 10). Locally heavy rains in August and September, especially on August 2-3 and September 14-17, produced higher flows at many stations (Quinalt River at Quinalt Lake, Chehalis River near Grand Mound, Puyallup River near Orting, Nooksack River at Deming, Wenatchee River at Plain, Methow River near Pateros (figs. 2-7)). Gradually increasing flows during the summer characterized several eastern Washington stations because of drainage returns from irrigation (Ahtanum Creek at Union Gap, fig. 7; Walla Walla River near Touchet, fig. 10).

#### REFERENCES CITED

- National Oceanic and Atmospheric Administration, 1995, Climatological data, Washington, October to December 1995, v. 99, no. 10-12: Asheville, NC, National Climatic Data Center, 32 p.
- \_\_\_\_\_, 1996, Climatological data, Washington, January to September 1996, v. 100, no. 1-9: Asheville, NC, National Climatic Data Center, 32 p.



Table 3. Maximum stages and discharges during floods of February 8, 9, 1996 at selected U.S. Geological Survey gaging stations in Washington.

Explanation: mi<sup>2</sup>, square miles; ft, feet; ft<sup>3</sup>/s, cubic feet per second; ND, not determined; HWM, High-water mark; R, regulated; <, less than; >, greater than.

Station number	Stream and place of determination	Drainage area (mi <sup>2</sup> )	Period of record	Maximum prior to February 1996			Maximum during February 1996				
				Date	Stage (ft)	Discharge (ft <sup>3</sup> /s)	Date	Stage (ft)	Discharge		
									ft <sup>3</sup> /s	ft <sup>3</sup> /s/mi <sup>2</sup>	Recurrence interval (years)
Chehalis River Basin											
12025000	Newaukum River near Chehalis	155	1930-31, 1943-81, 1983-	11-24-86	12.76	10,700	2-08	13.54	13,300	89.0	100
12025700	Skookumchuck River near Vail	40.0	1968-	1-20-72	10.93	6,900	2-08	11.24	9,020	208	75
12026150	Skookumchuck River below Bloody Run Cr near Centralia	65.9	1930-33, 1940-	1-09-90	12.56	7,800	2-08	13.41	9,020	137	R
12026400	Skookumchuck River near Bucoda	112	1968-	1-09-90	16.92	8,540	2-08	17.87	11,300	101	R
12027500	Chehalis River near Grand Mound	895	1929-	1-10-90	19.34	68,700	2-09	19.98	74,800	83.6	>100



Table 3. Maximum stages and discharges during floods of February 8, 9, 1996 at selected U.S. Geological Survey gaging stations in Washington.

Explanation: mi<sup>2</sup>, square miles; ft, feet; ft<sup>3</sup>/s, cubic feet per second; ND, not determined; HWM, High-water mark; R, regulated; <, less than; >, greater than.

Station number	Stream and place of determination	Drainage area (mi <sup>2</sup> )	Period of record	Maximum prior to February 1996			Maximum during February 1996				
				Date	Stage (ft)	Discharge (ft <sup>3</sup> /s)	Date	Stage (ft)	Discharge		
									ft <sup>3</sup> /s	ft <sup>3</sup> /s/mi <sup>2</sup>	Recurrence interval (years)
12031000	Chehalis River at Porter	1,294	1952-85, 1987-	1-11-90	24.52	60,400	2-09	25.22	80,700	62.4	200
Deschutes River Basin											
12080010	Deschutes River at E Street Bridge at Tum-water	162	1991-	4-06-91	32.32	8,850	2-09	34.17	10,700	66.0	ND
Nisqually River Basin											
12082500	Nisqually River near National	133	1943-	12-02-77	11.96	17,100	2-08	12.18	21,200	159	100
12086500	Nisqually River at La Grande	292	1907-11, 1920-31, 1944-	12-04-75	11.90	27,100	2-08	15.3 (HWM)	39,500	135	R
Puyallup River Basin											
12092000	Puyallup River near Electron	92.8	1909-33, 1945-49, 1958-	11-22-59	11.9	10,800	2-08	11.33	16,000	172	200

Table 3. Maximum stages and discharges during floods of February 8, 9, 1996 at selected U.S. Geological Survey gaging stations in Washington.

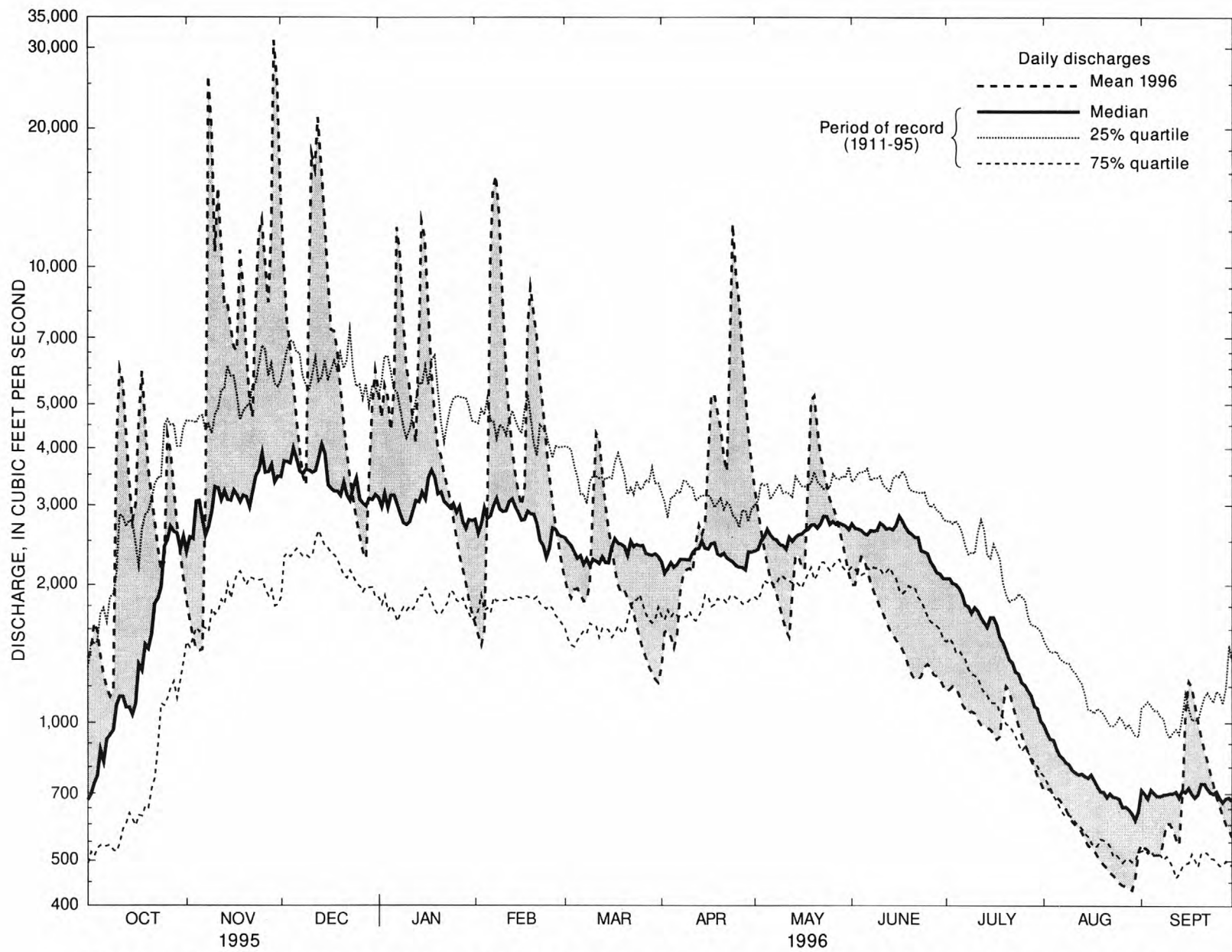
Explanation: mi<sup>2</sup>, square miles; ft, feet; ft<sup>3</sup>/s, cubic feet per second; ND, not determined; HWM, High-water mark; R, regulated; <, less than; >, greater than.

Station number	Stream and place of determination	Drainage area (mi <sup>2</sup> )	Period of record	Maximum prior to February 1996			Maximum during February 1996				
				Date	Stage (ft)	Discharge (ft <sup>3</sup> /s)	Date	Stage (ft)	Discharge		
									ft <sup>3</sup> /s	ft <sup>3</sup> /s/mi <sup>2</sup>	Recurrence interval (years)
12093500	Puyallup River near Orting	172	1932-	11-20-62	11.82	15,300	2-08	11.37	18,300	106	>100
12095000	South Prairie Creek at South Prairie	79.5	1950-71, 1988-	12-11-55	9.78	6,850	2-08	35.14	8,200	80.9	75
Duwamish River Basin											
12103380	Green River above Twin Camp near Lester	16.5	1993-	5-12-93	4.98	278	2-08	7.35	1,650	100	ND
Lake Washington Basin											
12117000	Taylor Creek near Selleck	17.2	1956-	1-29-65	5.78	2,730	2-08	5.53	3,130	182	50
Palouse River Basin											
13345300	Palouse River at Palouse	360	1973-80	1-16-74	16.08	11,300	2-09	18.13	14,200	39.4	ND
13348000	South Fork Palouse River at Pullman	132	1934-42, 1960-81	1-21-72	9.46	4,570	2-09	9.04	5,000	37.9	75

Table 3. Maximum stages and discharges during floods of February 8, 9, 1996 at selected U.S. Geological Survey gaging stations in Washington.

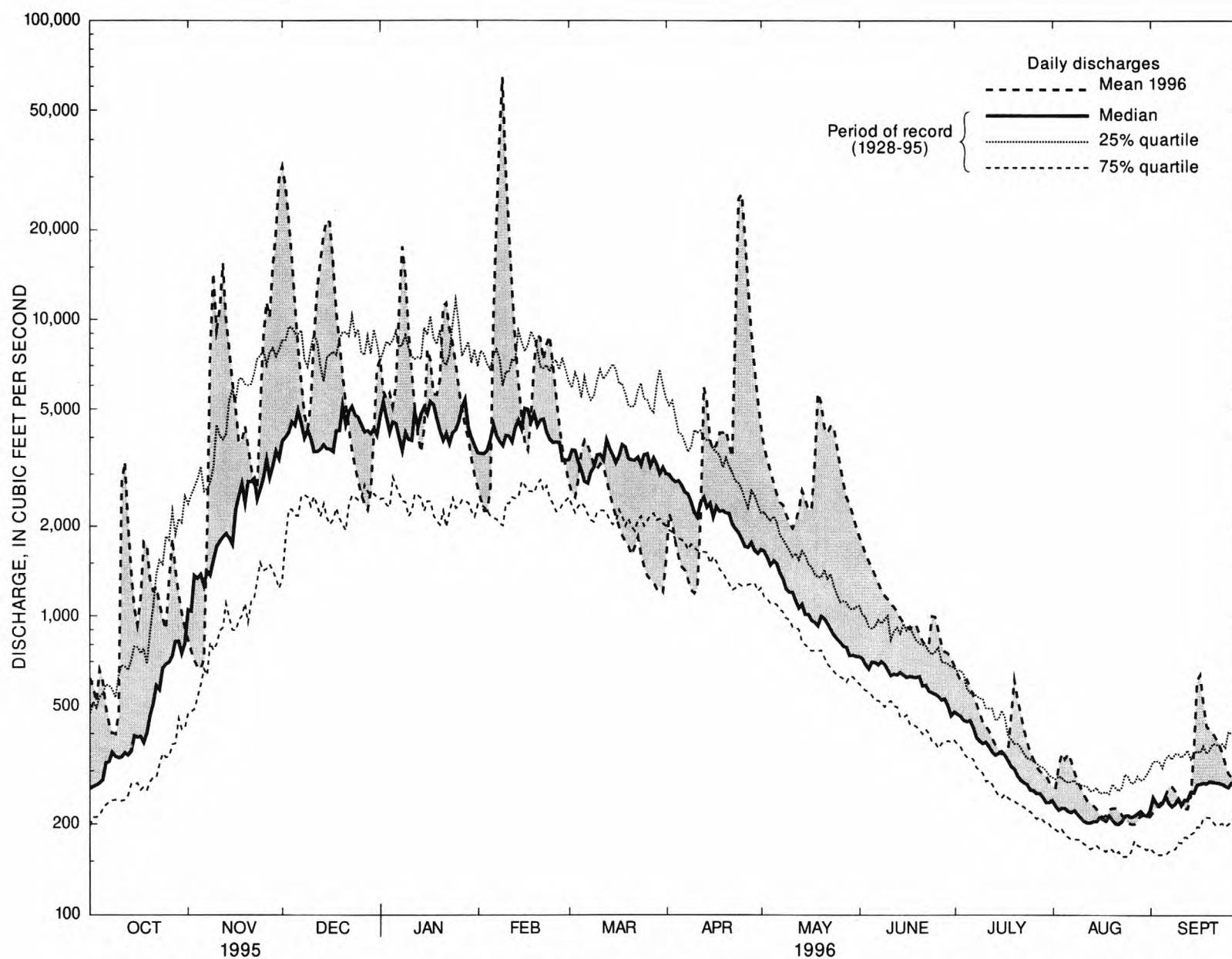
Explanation: mi<sup>2</sup>, square miles; ft, feet; ft<sup>3</sup>/s, cubic feet per second; ND, not determined; HWM, High-water mark; R, regulated; <, less than; >, greater than.

Station number	Stream and place of determination	Drainage area (mi <sup>2</sup> )	Period of record	Maximum prior to February 1996			Maximum during February 1996				
				Date	Stage (ft)	Discharge (ft <sup>3</sup> /s)	Date	Stage (ft)	Discharge		
									ft <sup>3</sup> /s	ft <sup>3</sup> /s/mi <sup>2</sup>	Recurrence interval (years)
13349210	Palouse River below South Fork at Colfax	796	1964-	2-03-63	18.73	16,800	2-09	21.70	23,900	30.0	200
Klickitat River Basin											
14113000	Klickitat River near Pitt	1,297	1929-	1-15-74	17.12	47,400	2-08	17.90	51,000	39.3	>100
Lewis River Basin											
14222500	East Fork Lewis River near Heisson	125	1930-	12-02-77	22.95	19,300	2-08	25.17 (HWM)	28,600	229	500
Cowlitz River Basin											
14232500	Cispus River near Randle	321	1911, 1930-	1-15-74	12.58	21,700	2-08	11.50	31,600	98.4	200
14233500	Cowlitz River near Kosmos (Lewis County PUD station)	1,040	1948-68 (USGS)	11-24-59	19.50	47,500	2-09	92.78	103,000 Lewis Co PUD	99.0	100
14236200	Tilton River above Bear Canyon Creek near Cinebar	141	1957-	12-02-77	17.00	22,500	2-08	17.90	27,100	192	75
14242580	Toutle River at Tower Road near Silver Lake	496	1982-	2-20-82	24.25	38,200	2-08	24.91	61,800	125	25

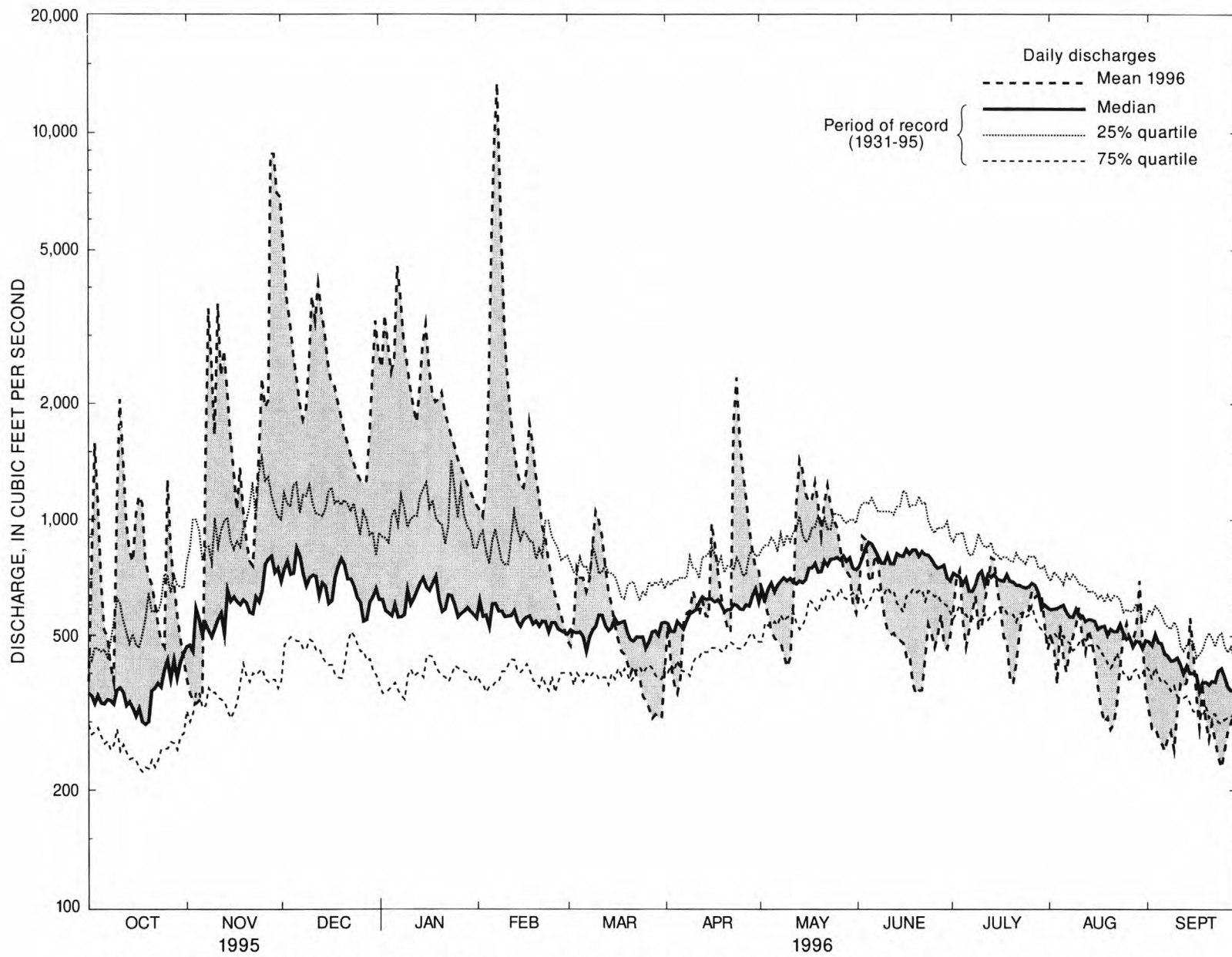


**Figure 2.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1911-95, for the Quinault River at Quinault Lake station (12039500), located in figure 1.

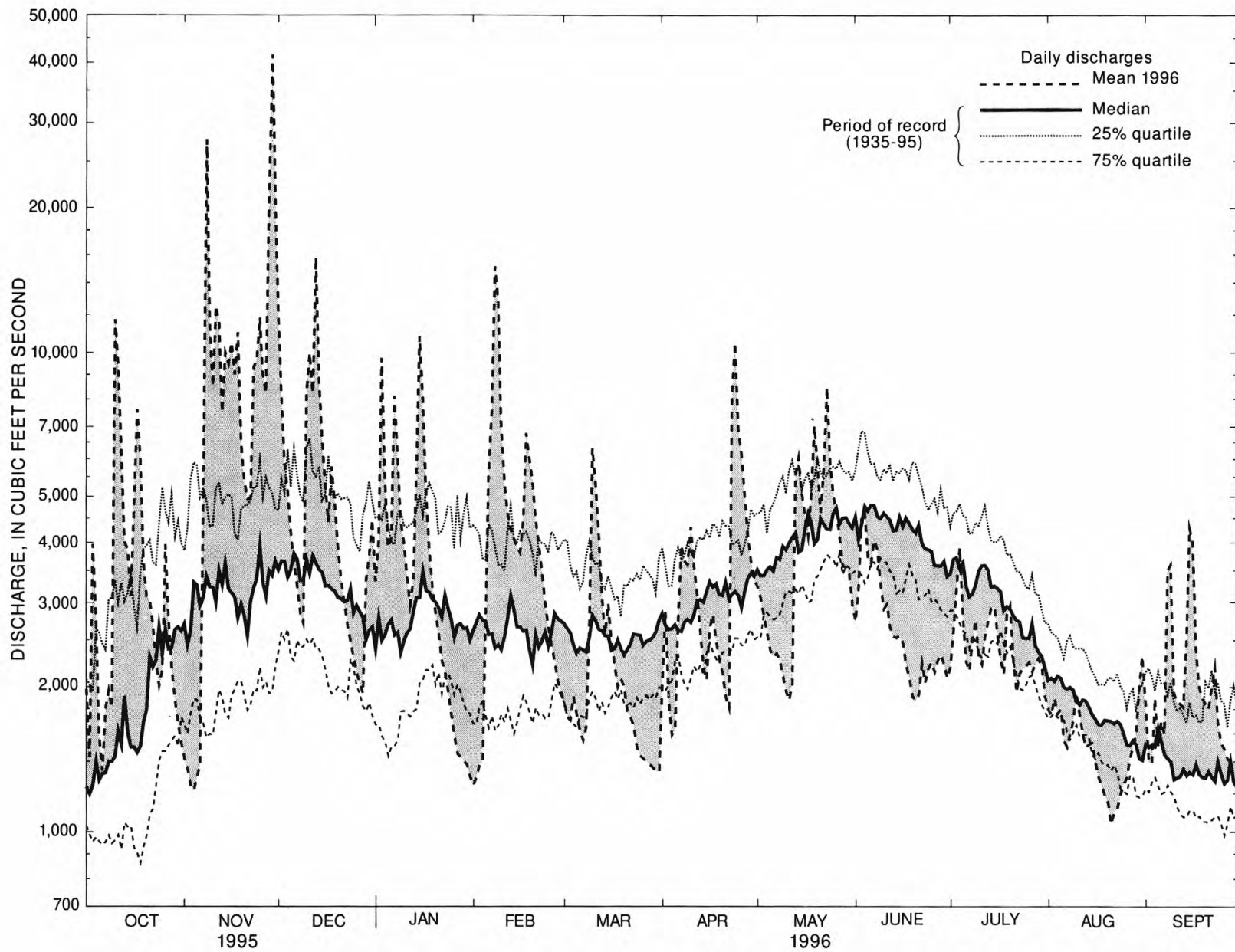




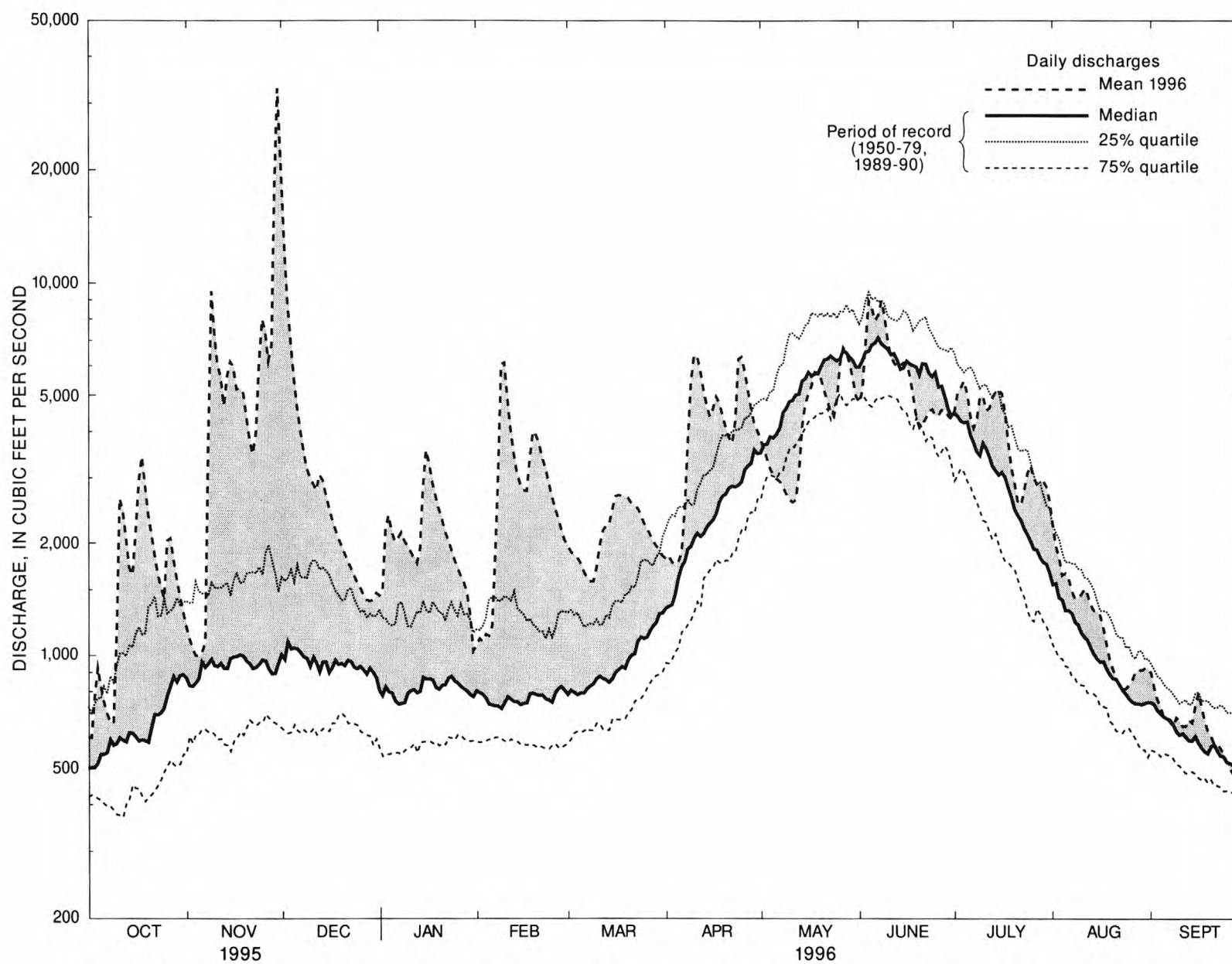
**Figure 3.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1928-95, for the Chehalis River near Grand Mound station (12027500), located in figure 1.



**Figure 4.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1931-95, for the Puyallup River near Orting station (12093500), located in figure 1.

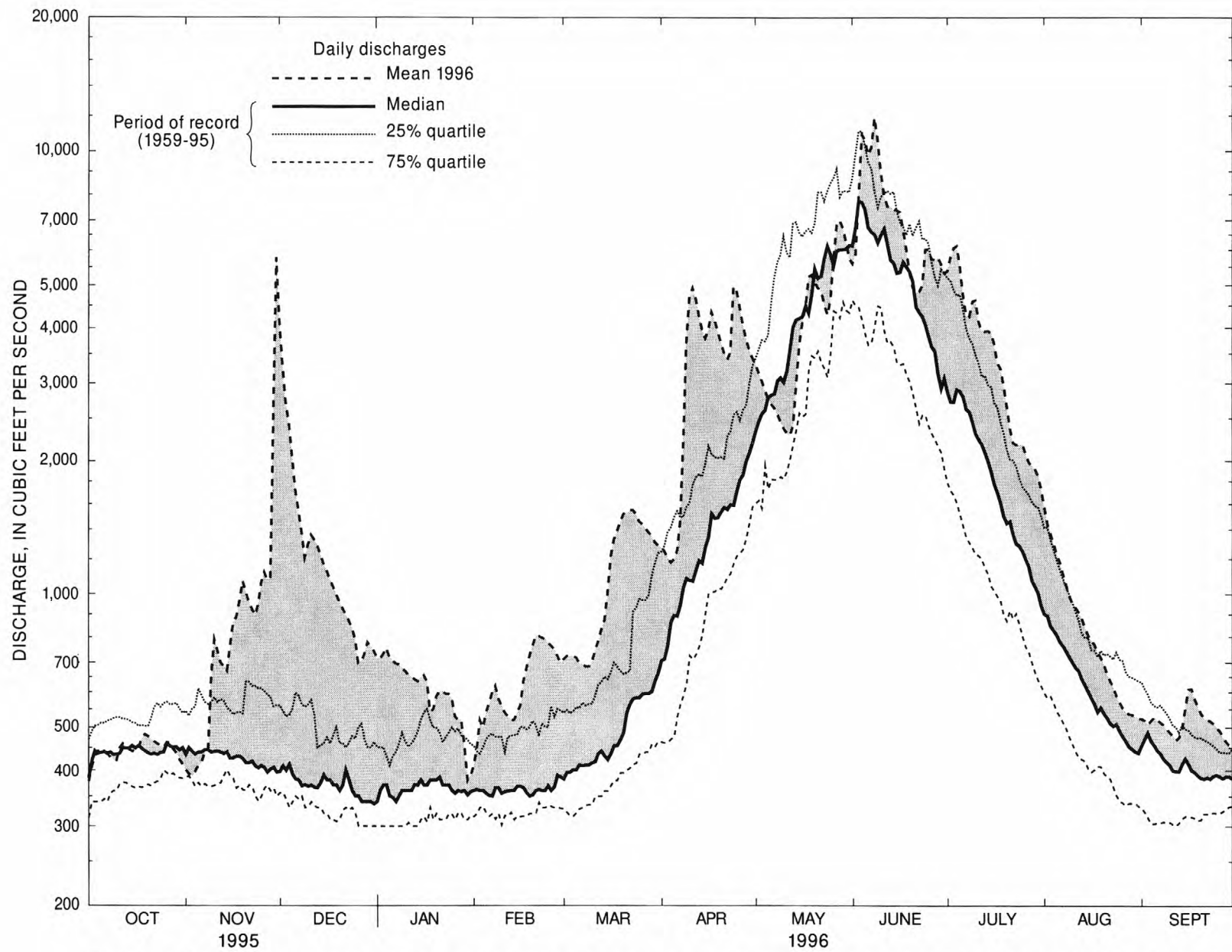


**Figure 5.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1935-95, for the Nooksack River at Deming station (12210500), located in figure 1.

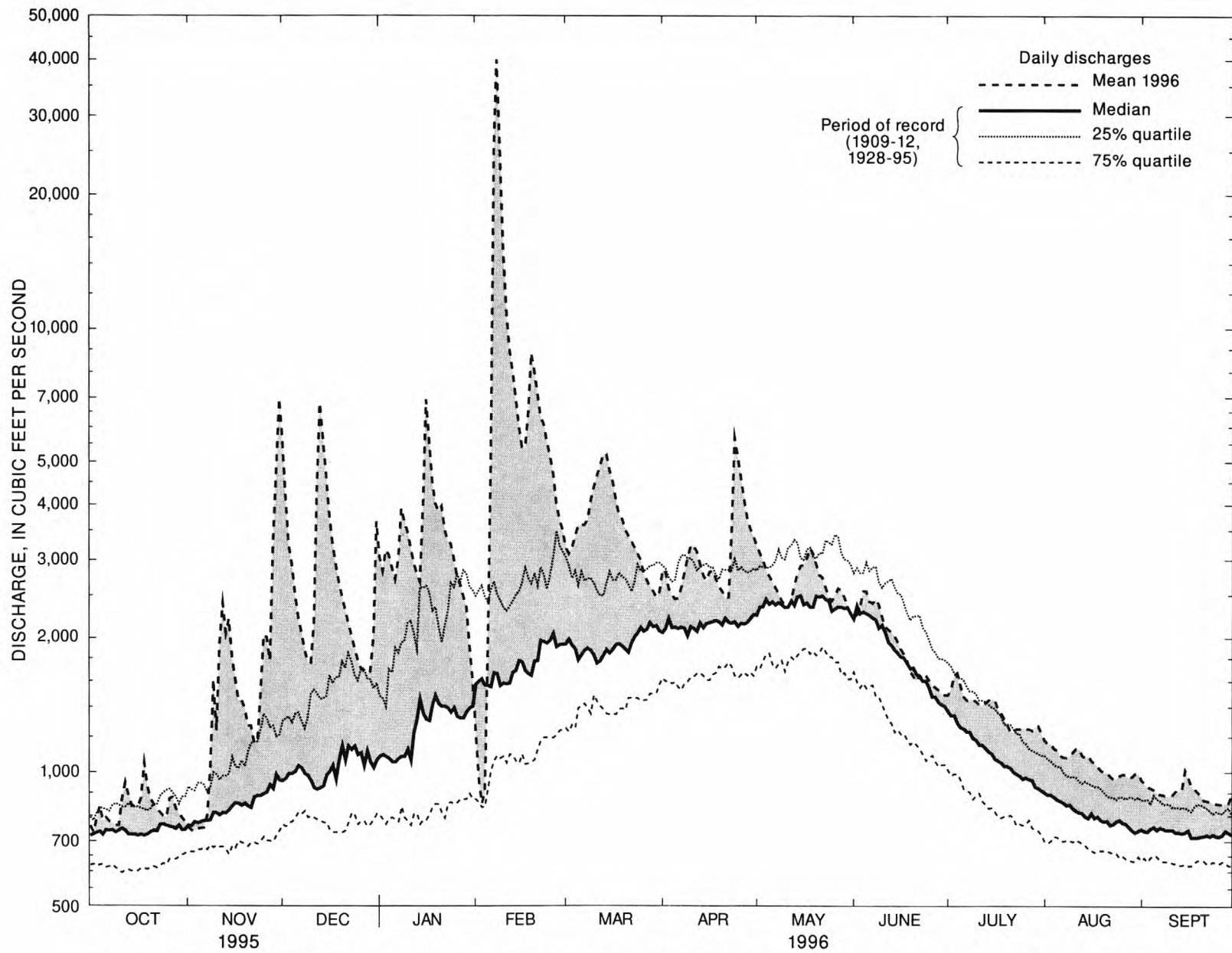


**Figure 6.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1950-79 and 1989-95, for the Wenatchee River at Plain station (12457000), located in figure 1.

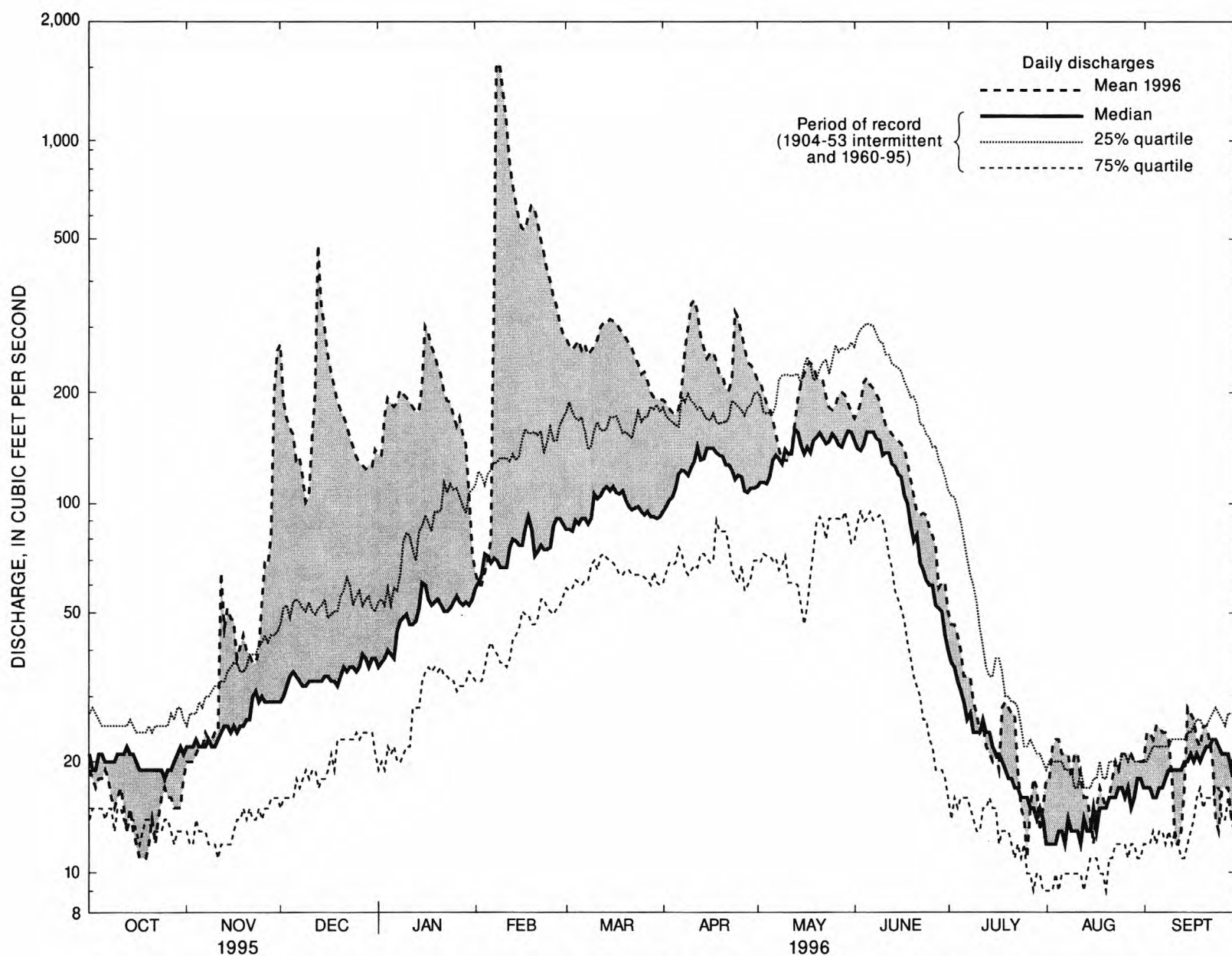




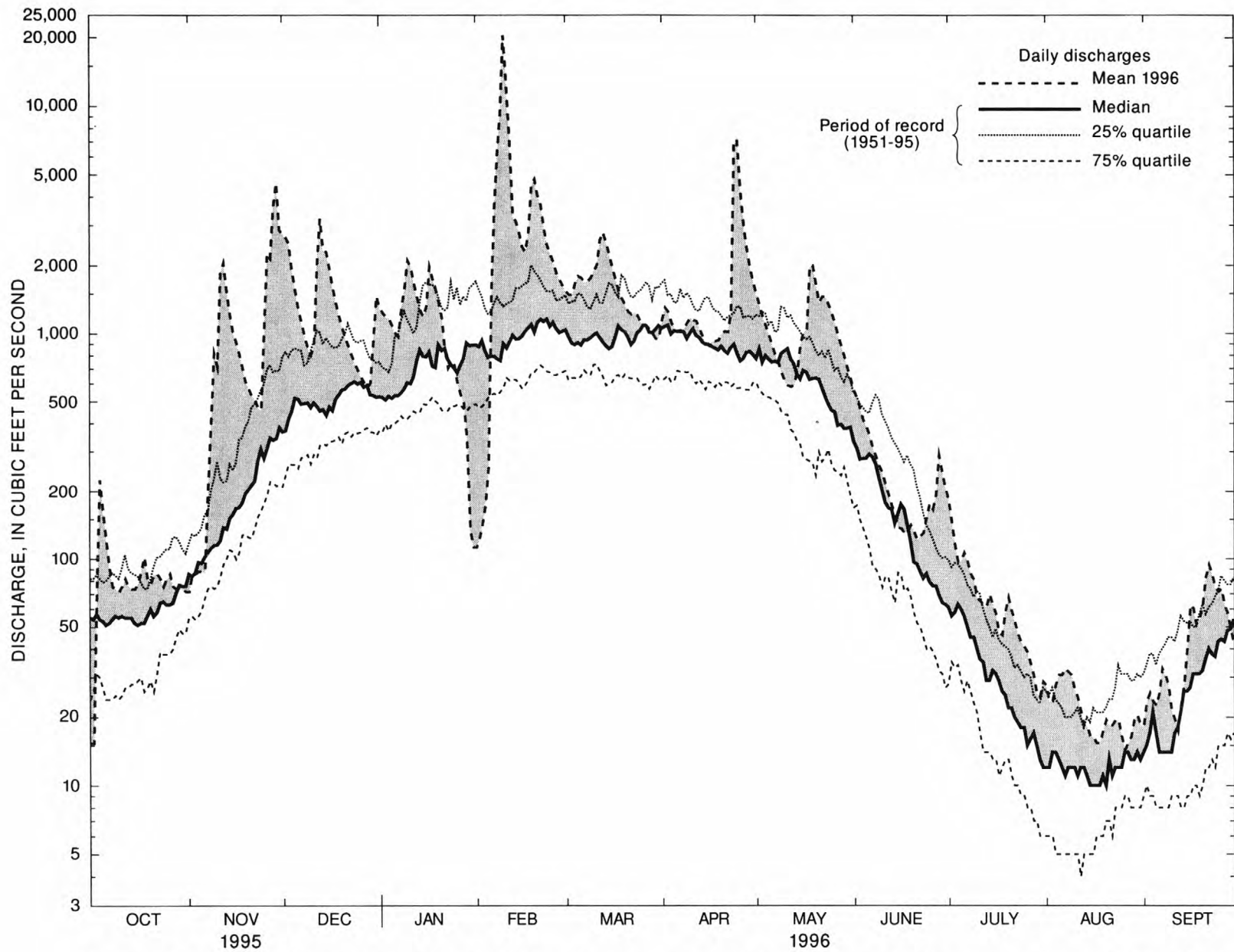
**Figure 7.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1959-95, for the Methow River near Pateros station (12449950), located in figure 1.



**Figure 8.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1909-12 and 1928-95, for the Klickitat River near Pitt station (14113000), located in figure 1.

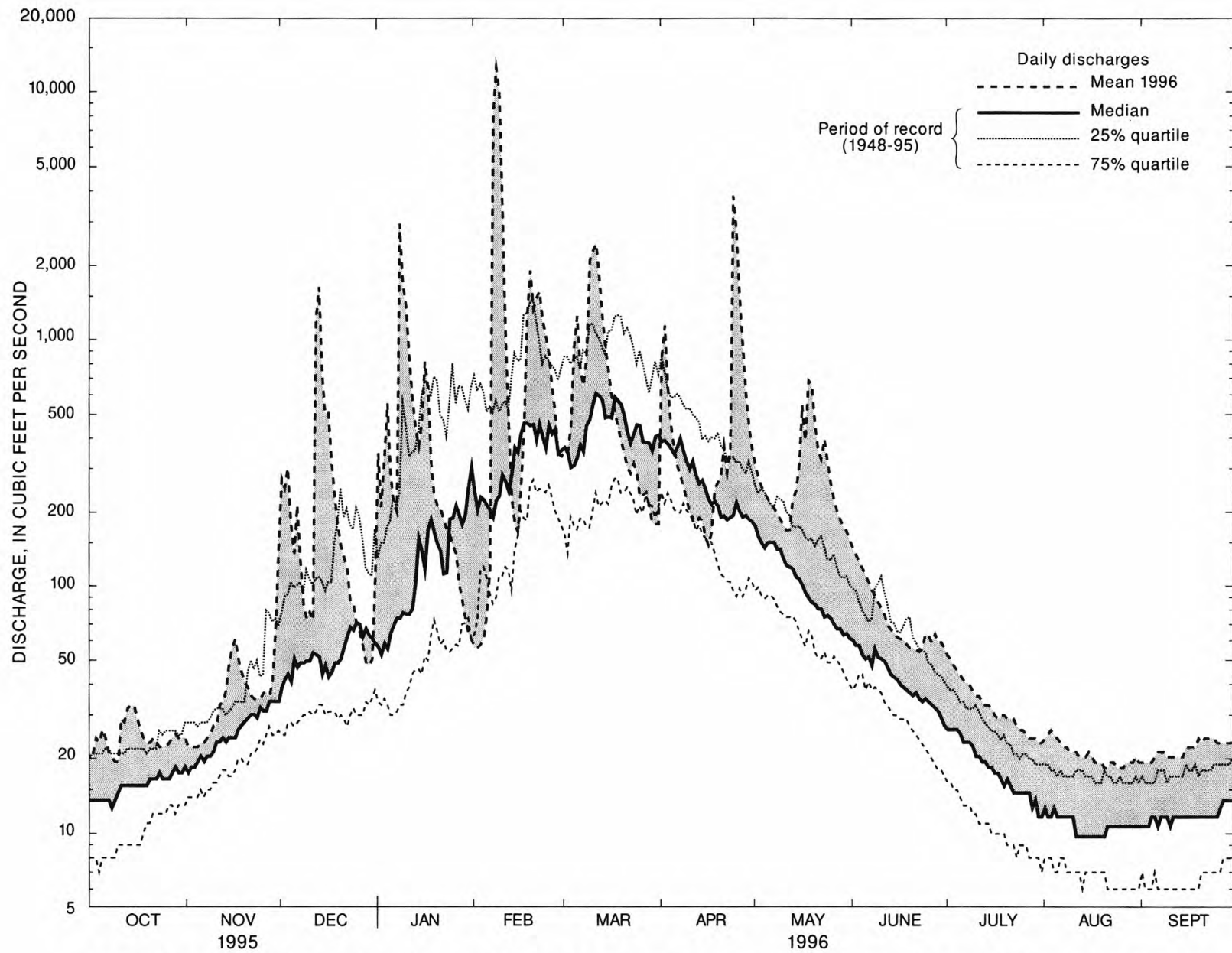


**Figure 9.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1904-53 intermittent and 1960-95, for the Ahtanum Creek at Union Gap station (12502500), located in figure 1.

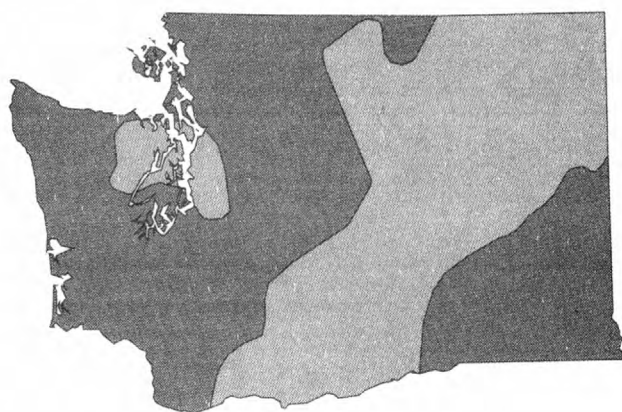


**Figure 10.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1951-95, for the Walla Walla River near Touchet station (14018500), located in figure 1.

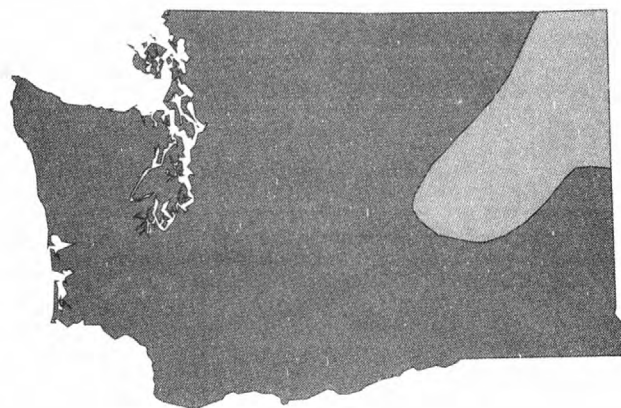




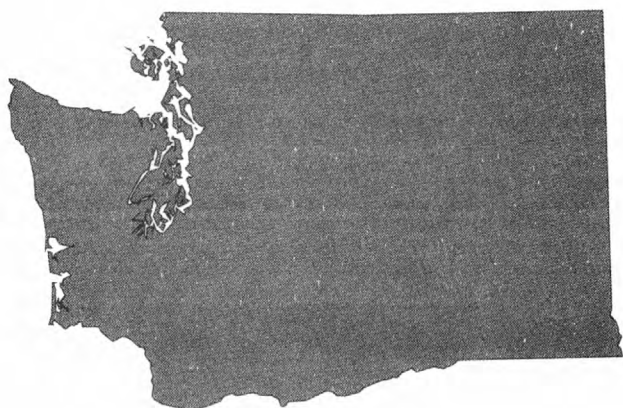
**Figure 11.** Daily discharges for water year 1996 and median and quartile discharges for the period of record, 1948-95, for the Hangman Creek at Spokane station (12424000), located in figure 1.



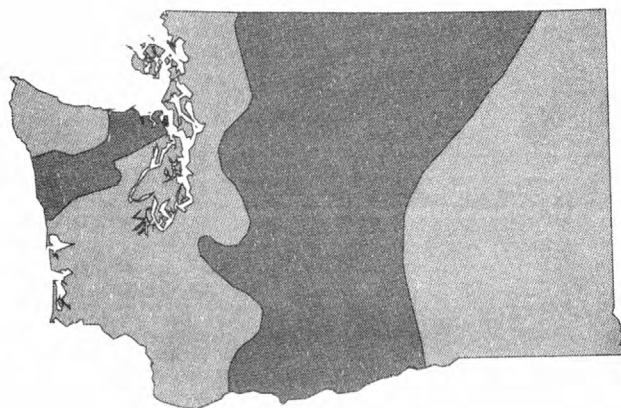
A. October 1995



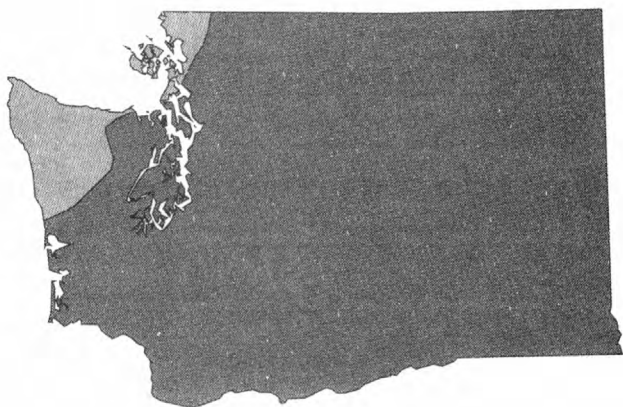
B. November 1995



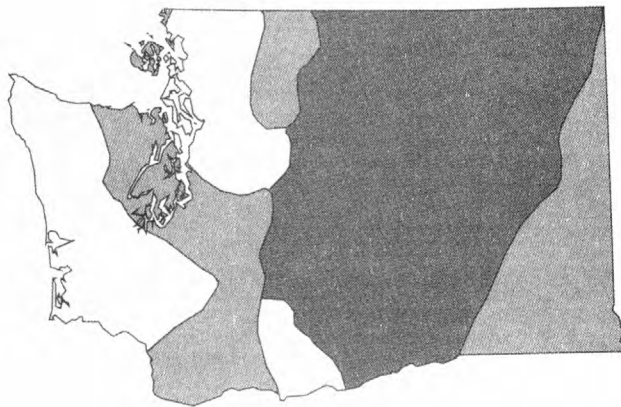
C. December 1995



D. January 1996



E. February 1996



F. March 1996



Below-normal streamflow

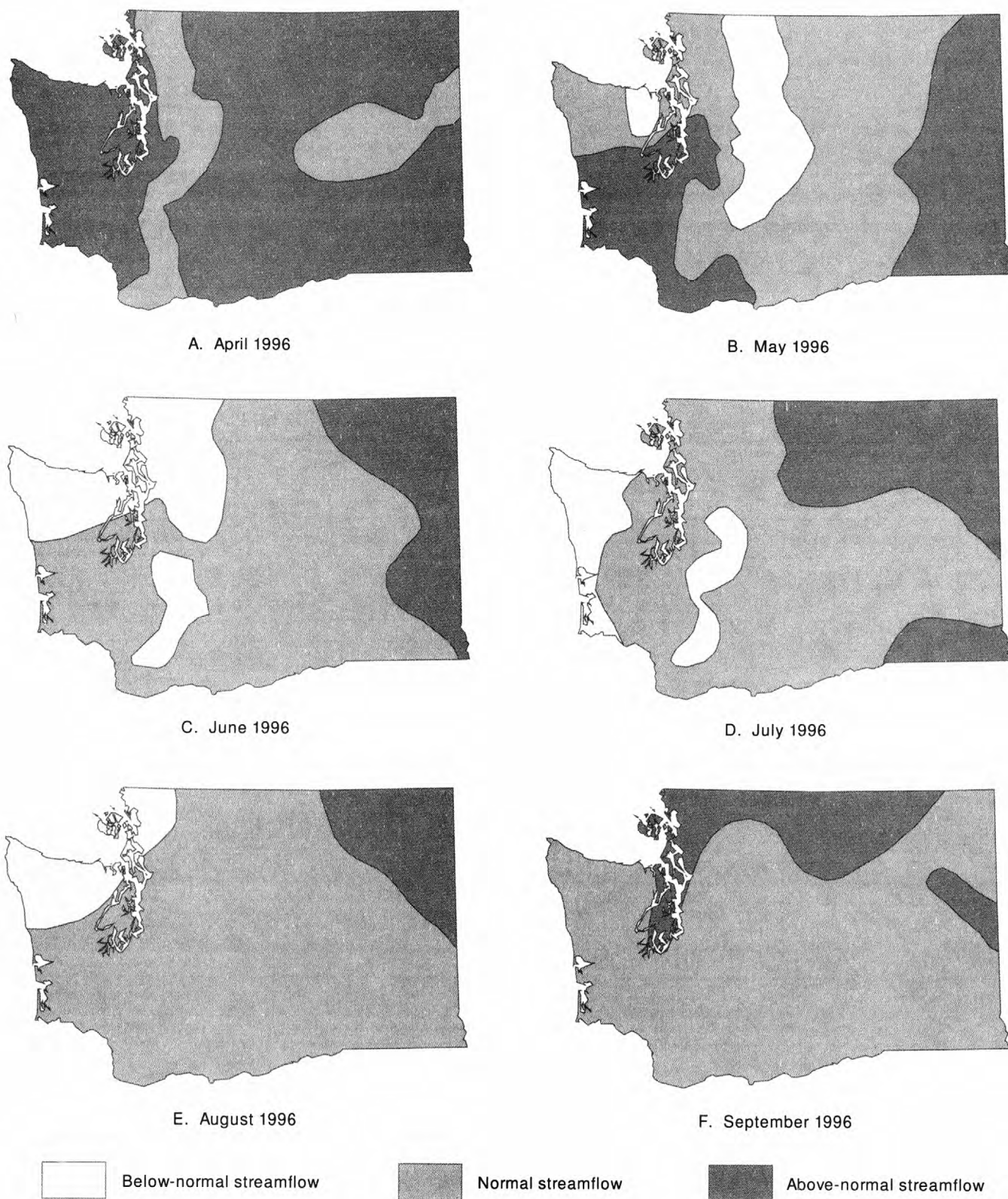


Normal streamflow



Above-normal streamflow

**Figure 12.** Monthly streamflow in Washington State, October 1995 to March 1996.



**Figure 13.** Monthly streamflow in Washington State, April to September 1996.

### Surface-Water Quality

The National Stream Quality Accounting Network (NASQAN) and Hydrologic Benchmark (HBM) Programs were established to assess the quality of the nation's water through systematic long-term measurements at specific key locations. Washington operates 5 long-term surface-water-quality stations throughout the state. These include 3 NASQAN stations (on the Snake River and upper and lower Columbia River basins), and one HBM station on Andrews Creek near Mazama. One surface-water-quality station is operated in the middle Columbia Basin on the main stem at Richland, Washington, as adjunct to one of the NASQAN stations.

Specific conductance generally has an inverse relation to streamflow. Specific conductance at the surface-water NASQAN and HBM stations ranged from an annual mean of about 40 microsiemens on Andrews Creek, the least mineralized of streams sampled, to an annual mean of 169 and 138 microsiemens at the sites sampled on the Snake and Columbia Rivers, respectively. The annual mean conductance for all NASQAN and HBM stations sampled was 125 microsiemens.

Like specific conductance, dissolved-solids concentration and streamflow generally have an inverse relation. The smallest concentrations of dissolved solids usually occur during the high flows of late fall and winter and early spring runoff when rainfall and snowmelt are the major sources of water. Dissolved solids are usually most concentrated in Washington during late summer and early fall, when base flow from ground-water sources is the dominant component of flow. The largest concentration of dissolved solids at the NASQAN stations was 195 mg/L in the Snake River at Burbank during December. The HBM station, Andrews Creek near Mazama, had the lowest concentration of dissolved solids (ranging from 23 to 34 mg/L).

Surface waters in Washington are generally classified as clear and carry only small amounts of sediment except where influenced by glaciers, unconsolidated volcanic deposits, or disturbed soils. Water flowing in the Columbia River and Andrews Creek are very low in sediment, usually less than 10 mg/L, and at times, there is no measurable sediment. The streams east of the Cascades that characteristically carry sediment concentrations greater than 10 mg/L are those that carry return flow from heavily irrigated and farmed lands in the semi-arid region. Samples from Snake River at Burbank had the highest sediment concentration with an annual mean of about 13 mg/L.

The NASQAN program sampled for pesticides during the 1996 water year. Samples from the Columbia River had detections of the herbicides DCPA and atrazine at Vernita Bridge and at Northport. Samples from Columbia River at Northport also had detections of three pesticides (p,p' DDE, molinate, and simazine). Concentrations of pesticides in the Columbia River ranged from at or near the limit of detection to a maximum of 0.011 ug/L of molinate. Metolachlor, DCPA, EPTC, atrazine, and triallate were detected in samples from Snake River at Burbank. The maximum concentration in samples from Snake River at Burbank was 0.034 ug/L of triallate. The herbicides, metachlor, EPTC, DCPA, and atrazine had concentrations ranging from at or near the limit of detection to a maximum of 0.008 ug/L.

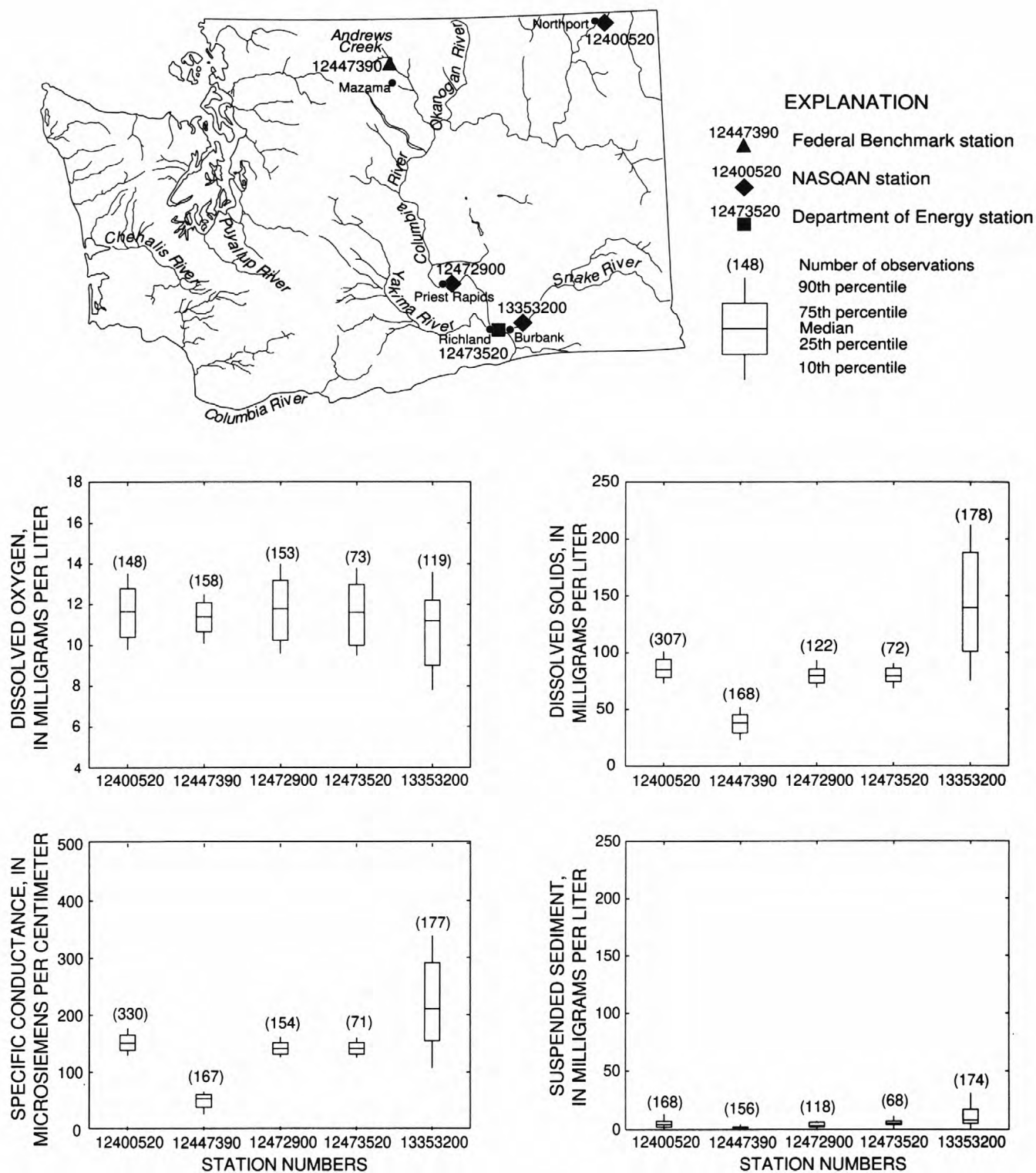
Bacteria carried by streams sampled by the NASQAN and HBM programs are usually in moderate concentrations, historically ranging from below ideal counts (<20 colonies/100 mL) at most stations to within the ideal range (20 to 60 colonies/100 mL for fecal coliform and 20 to 100 colonies/100 mL for fecal streptococci). Sampling for bacteria was discontinued at NASQAN and HBM stations at the end of the 1995 water year.



Minimum and maximum values for selected water-quality constituents and properties for water year 1996 and minimum, maximum, and median values for the period of record at 3 NASQAN stations, 1 Federal Benchmark and 1 Department of Energy station.

[ --, no data; <, less than]

Station numbers	Station	<u>Water year 1996</u>			<u>Period of record through water year 1996</u>			
		Number of samples	Mini-mum	Maxi-mum	Number of Samples	Mini-mum	Median	Maxi-mum
<u>Specific conductance, in microsiemens per centimeter</u>								
12400520	Columbia River at Northport	16	124	155	330	88	148	257
12447390	Andrews Creek nr Mazama	2	24	57	167	18	51	79
12472900	Columbia River at Vernita Br	4	131	141	154	109	138	190
12473520	Columbia River at Richland	4	130	141	71	113	138	164
13353200	Snake River at Burbank	16	87	328	177	74	207	397
<u>Dissolved solids, in milligrams per liter</u>								
12400520	Columbia River at Northport	15	63	86	307	61	85	158
12447390	Andrews Creek nr Mazama	2	20	41	168	12	38	68
12472900	Columbia River at Vernita Br	4	71	78	122	58	78	109
12473520	Columbia River at Richland	0	--	--	72	61	79	102
13353200	Snake River at Burbank	16	55	195	178	52	139	241
<u>Suspended sediment, in milligrams per liter</u>								
12400520	Columbia River at Northport	16	<0.5	26	168	<0.5	4	42
12447390	Andrews Creek nr Mazama	2	1	2	156	<0.5	1	8
12472900	Columbia River at Vernita Br	4	3	5	118	<0.5	3	50
12473520	Columbia River at Richland	4	2	6	68	2	5	54
13353200	Snake River at Burbank	15	2	38	174	1	8	222
<u>Dissolved oxygen, in milligrams per liter</u>								
12400520	Columbia River at Northport	16	9.5	14.8	148	5.0	11.7	14.8
12447390	Andrews Creek nr Mazama	2	11.5	11.1	158	9.0	11.4	14.2
12472900	Columbia River at Vernita Br	4	12.6	13.4	153	8.3	11.8	15.8
12473520	Columbia River at Richland	4	9.5	13.2	73	8.2	11.6	15.0
13353200	Snake River at Burbank	16	8.5	16.0	119	6.2	11.2	16.0
<u>Temperature, in degrees Celsius</u>								
12400520	Columbia River at Northport	16	2.0	17.5	202	0.0	8.5	19.0
12447390	Andrews Creek nr Mazama	2	3.0	3.5	168	0.0	2.5	10.0
12472900	Columbia River at Vernita Br	4	4.5	19.0	130	1.0	11.5	23.5
12473520	Columbia River at Richland	4	3.5	18.5	73	1.0	11.5	20.5
13353200	Snake River at Burbank	16	3.0	22.0	179	1.0	11.5	23.0
<u>Periods of record used for this table</u>								
12400520	Columbia River at Northport, WA.	(NASQAN)	Water years 1952, 1961-1971					
12447390	Andrews Creek near Mazama, WA.	(Federal Benchmark station)	Water years 1972-1996.					
12472900	Columbia River at Vernita Bridge, WA.	(NASQAN)	Water years 1975-1976, 1978					
12473520	Columbia River at Richland, WA.	(Department of Energy station)	Water years 1979-1996.					
13353200	Snake River at Burbank, WA.	(NASQAN)	Water years 1960, 1973-1996					



**Figure 14.** Location of 1996 water year NASQAN, Federal Benchmark and Department of Energy surface water-quality stations and selected water-quality constituents for period of record.

### Ground Water

In eastern Washington, water levels in an observation well near Spokane are generally representative of those in the Spokane River valley. For the 1996 water year, measured water levels in the Spokane well ranged between 1.69 to 4.63 feet above average during the periods October to November and June to July. Between January and May, water levels ranged from 4.46 to 7.68 feet above average. The greatest departure from average occurred during April when water levels rose to 7.68 feet above average. Water levels at the Spokane well never dropped below average. The ground-water levels in western Washington are generally not well defined due to the limited network of observation wells.

### SPECIAL NETWORKS AND PROGRAMS

Hydrologic Bench-Mark Network is a network of 50 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by human activities.

National Stream-Quality Accounting Network (NASQAN) monitors the water quality of large rivers within four of the Nation's largest river basins--the Mississippi, Columbia, Colorado, and Rio Grande. The network consists of 39 stations. Samples are collected with sufficient frequency that the flux of a wide range of constituents can be estimated. The objective of NASQAN is to characterize the water quality of these large rivers by measuring concentration and mass transport of a wide range of dissolved and suspended constituents, including nutrients, major ions, dissolved and sediment-bound heavy metals, common pesticides, and inorganic and organic forms of carbon. This information will be used (1) to describe the long-term trends and changes in concentration and transport of these constituents; (2) to test findings of the National Water-Quality Assessment Program (NAWQA); (3) to characterize processes unique to large-river systems such as storage and remobilization of sediments and associated contaminants; and (4) to refine existing estimates of off-continent transport of water, sediment, and chemicals for assessing human effects on the world's oceans and for determining global cycles of carbon, nutrients, and other chemicals.

The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) provides continuous measurement and assessment of the chemical climate of precipitation throughout the United States. As the lead federal agency, the USGS works together with over 100 organizations to accomplish the following objectives; (1) Provide a long-term, spatial and temporal record of atmospheric deposition generated from a network of 191 precipitation chemistry monitoring sites. (2) Provide the mechanism to evaluate the effectiveness of the significant reduction in SO<sub>2</sub> emissions that began in 1995 as implementation of the Clean Air Act Amendments (CAAA) occurred. (3) Provide the scientific basis and nationwide evaluation mechanism for implementation of the Phase II CAAA emission reductions for SO<sub>2</sub> and NO<sub>x</sub> scheduled to begin in 2000.

Data from the network, as well as information about individual sites, are available through the world wide web at:

<http://nadp.nrel.colostate.edu/NADP>

The National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey is a long-term program with goals to describe the status and trends of water-quality conditions for a large, representative part of the Nation's ground- and surface-water resources; provide an improved understanding of the primary natural and human factors affecting these observed conditions and trends; and provide information that supports development and evaluation of management, regulatory, and monitoring decisions by other agencies.

Assessment activities are being conducted in 53 study units (major watersheds and aquifer systems) that represent a wide range of environmental settings nationwide and that account for a large percentage of the Nation's water use. A wide array of chemical constituents will be measured in ground water, surface water, streambed sediments, and fish tissues. The coordinated application of comparative hydrologic studies at a wide

range of spatial and temporal scales will provide information for decision making by water-resources managers and a foundation for aggregation and comparison of findings to address water-quality issues of regional and national interest.

Communication and coordination between USGS personnel and other local, State, and federal interests are critical components of the NAWQA Program. Each study unit has a local liaison committee consisting of representatives from key federal, State, and local water resources agencies, Indian nations, and universities in the study unit. Liaison committees typically meet semiannually to discuss their information needs, monitoring plans and progress, desired information products, and opportunities to collaborate efforts among the agencies.

Additional information about the NAWQA Program is available through the world wide web at:

[http://wwwrvares.er.usgs.gov/nawqa/nawqa\\_home.html](http://wwwrvares.er.usgs.gov/nawqa/nawqa_home.html)

#### EXPLANATION OF THE RECORDS

The surface-water and ground-water records published in this report are for the 1996 water year that began October 1, 1995, and ended September 30, 1996. A calendar of the water year is provided on the inside of the front cover. The records contain streamflow data, stage and content data for lakes and reservoirs, water-quality data for surface water, and ground-water-level data. The following sections of the introductory text are presented to provide users with a more detailed explanation of how the hydrologic data published in this report were collected, analyzed, computed, and arranged for presentation.

##### Station Identification Numbers

Each data station, whether streamsite or well, in this report is assigned a unique identification number. This number is unique in that it applies specifically to a given station and to no other. The number usually is assigned when a station is first established and is retained for that station indefinitely. The systems used by the U.S. Geological Survey to assign identification numbers for surface-water stations and for ground-water well sites differ, but both are based on geographic location. The "downstream order" system is used for regular surface-water stations and the "latitude-longitude" system is used for wells and, in Washington, for surface-water stations where only miscellaneous measurements are made.

##### Downstream Order System

Since October 1, 1950, the order of listing hydrologic-station records in Survey reports is in a downstream direction along the main stream. All stations on a tributary entering upstream from a mainstream station are listed before that station. A station on a tributary that enters between two mainstream stations is listed between them. A similar order is followed in listing stations on first rank, second rank, and other ranks of tributaries. The rank of any tributary with respect to the stream to which it is immediately tributary is indicated by an indentation in the "List of Stations" in the front of this report. Each indentation represents one rank. This downstream order and system of indentation show which stations are on tributaries between any two stations and the rank of the tributary on which each station is situated.

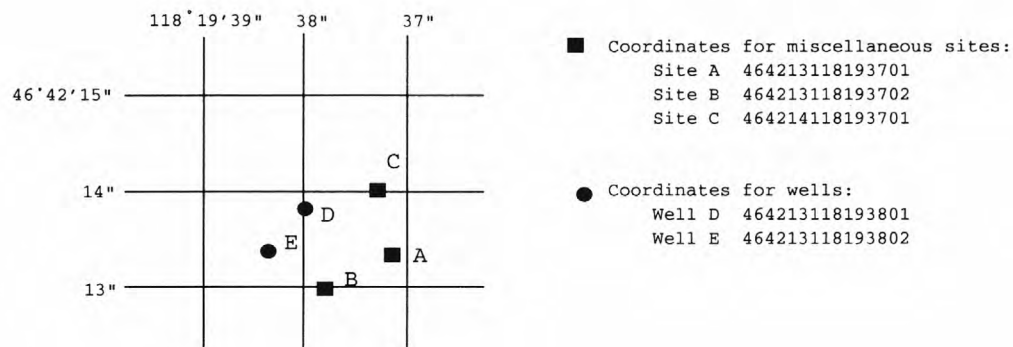
The station-identification number is assigned according to downstream order. In assigning station numbers, no distinction is made between partial-record stations and other stations; therefore, the station number for a partial-record station indicates downstream-order position in a list made up of both types of stations. Gaps are left in the series of numbers to allow for new stations that may be established; hence, the numbers are not consecutive. The complete eight-digit number for each station, such as 12020000, which appears just to the left of the station name, includes the two-digit Part number "12" plus the six-digit downstream-order number "020000." The Part number designates the major river basin; for example, part "12" refers to the Pacific slope



basins in Washington and upper Columbia River basin.

#### Latitude-Longitude System

The identification numbers for wells and miscellaneous surface-water sites are assigned according to the grid system of latitude and longitude (figure 2). The number consists of 15 digits. The first six digits denote the degrees, minutes, and seconds of latitude, the next seven digits denote degrees, minutes, and seconds of longitude, and the last two digits (assigned sequentially) identify the wells or other sites within a one-second grid. This site-identification number, once assigned, is a pure number, and has no locational significance. In the rare instance where the initial determination of latitude and longitude are found to be in error, the station will retain its initial identification number; however, its true latitude and longitude will be listed in the LOCATION paragraph of the station description.

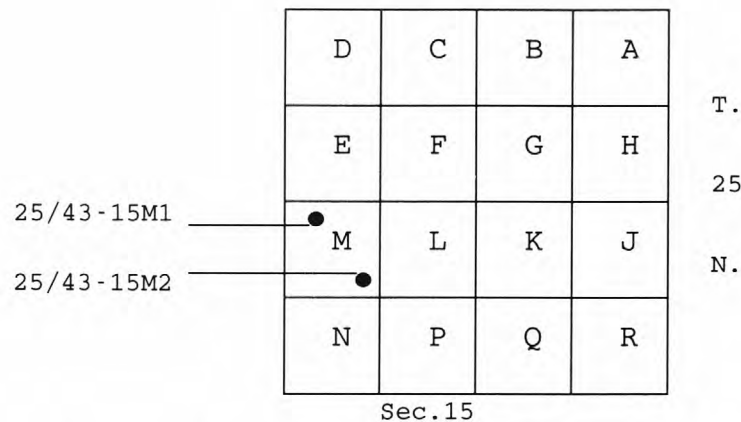


**Figure 15.** System for numbering wells and miscellaneous sites (latitude and longitude).

#### Local Identifier Well-Numbering System

In addition to the latitude-longitude based site identification number, wells in the State of Washington are assigned local well numbers. These numbers are based on and show locations of wells according to the rectangular system for subdivision of public land, indicating township, range, section, and 40-acre tract within the section. For example, in the well number 25/43E-15M1, the part preceding the hyphen indicates successively the township and range (T.25 N., R.43 E.) north and east of the Willamette base line and meridian. (Because all townships in Washington are north of the Willamette base line, the letter "N", indicating north is omitted; and because most of the State is east of the Willamette meridian, the letter "E" is sometimes omitted for those ranges east of the Willamette meridian, but "W" is always included when the range lies west of the Willamette meridian). The first number following the hyphen indicates the section (sec.15) and the letter (M) given the 40-acre subdivision of the section as shown in figure 2. The last number (1) is the serial number of the well in that particular 40-acre tract. Thus, the first well recorded in NW 1/4 SW 1/4 sec.15, T.25 N., R.43 E., would have the number 25/43-15M1, and the second well would have the number 25/43E-15M2. See figure 3.

R. 43 E.



**Figure 16.** Local identifier well numbering system.

#### Records of Stage and Water Discharge

Records of stage and water discharge may be complete or partial. Complete records of discharge are those obtained using a continuous stage-recording device through which either instantaneous or mean daily discharges may be computed for any time, or any period of time, during the period of record. Complete records of lake or reservoir content, similarly, are those for which stage or content may be computed or estimated with reasonable accuracy for any time, or period of time. They may be obtained using a continuous stage-recording device, but need not be. Because daily mean discharges and end-of-day contents commonly are published for such stations, they are referred to as "daily stations."

By contrast, partial records are obtained through discrete measurements without using a continuous stage-recording device and pertain only to a few flow characteristics, or perhaps only one. The nature of the partial record is indicated by table titles such as "Crest-stage partial records," or "Low-flow partial records." Records of miscellaneous discharge measurements or of measurements from special studies, such as low-flow seepage studies, may be considered as partial records, but they are presented separately in this report. Location of all complete-record and crest-stage partial-record stations for which data are given in this report are shown in figures 5a and 5b.

#### Data Collection and Computation

The data obtained at a complete-record gaging station on a stream or canal consist of a continuous record of stage, individual measurements of discharge throughout a range of stages, and notations regarding factors that may affect the relations between stage and discharge. These data, together with supplemental information, such as weather records, are used to compute daily discharges. The data obtained at a complete-record gaging station on a lake or reservoir consist of a record of stage and of notations regarding factors that may affect the relation between stage and lake content. These data are used with stage-area and stage-capacity curves or tables to compute water-surface areas and lake storage.

Continuous records of stage are obtained with satellite telemetry data collection platforms that transmit data at selected time intervals via satellite to a direct readout ground station, with digital recorders that punch stage values on paper tapes at selected time intervals, or with analog recorders that trace continuous graphs of stage. Measurements of discharge are made with current meters using methods adapted by the

Geological Survey as a result of experience accumulated since 1880. These methods are described in standard textbooks, in Water-Supply Paper 2175, and in U.S. Geological Survey Techniques of Water-Resources Investigations (TWRI), Book 3, Chapter A6. These methods are described in standard textbooks, Water-Supply Paper 2175, and The U.S. Geological Survey Techniques of Water-Resources Investigations (TWRI's), Book 3, Chapters A1 through A19 and Book 8, Chapters A2 and B2. The methods are consistent with The American Society for Testing and Materials (ASTM) standards and generally follow the standards of the International Organization for Standards (ISO).

In computing discharge records, results of individual measurements are plotted against the corresponding stages, and stage-discharge relation curves are then constructed. From these curves, rating tables indicating the approximate discharge for any stage within the range of the measurements are prepared. If it is necessary to define extremes of discharge outside the range of the current-meter measurements, the curves are extended using: (1) logarithmic plotting; (2) velocity-area studies; (3) results of indirect measurements of peak discharge, such as slope-area or contracted-opening measurements, and computations of flow-over-dams or weirs; or (4) step-backwater techniques.

Daily mean discharges are computed by applying the daily mean stages (gage heights) to the stage-discharge curves or tables. If the stage-discharge relation is subject to change because of frequent or continual change in the physical features that form the control, the daily mean discharge is determined by the shifting-control method, in which correction factors based on the individual discharge measurements and notes of the personnel making the measurements are applied to the gage heights before the discharges are determined from the curves or tables. This shifting-control method also is used if the stage-discharge relation is changed temporarily because of aquatic growth or debris on the control. For some stations, formation of ice in the winter may so obscure the stage-discharge relations that daily mean discharges must be estimated from other information such as temperature and precipitation records, notes of observations, and records for other stations in the same or nearby basins for comparable periods.

At some stream-gaging stations the stage-discharge relation is affected by the backwater from reservoirs, tributary streams, or other sources. This necessitates the use of the slope method in which the slope or fall in a reach of the stream is a factor in computing discharge. The slope or fall is obtained by means of an auxiliary gage set at some distance from the base gage. At some gaging stations, acoustic velocity meter (AVM) systems are used to compute discharge. The AVM system measures the stream's velocity at one or more paths in the cross section. Coefficients are developed to relate this path velocity to the mean velocity in the cross section. Because the AVM sensors are fixed in position, the adjustment coefficients generally vary with stage. Cross-sectional area curves are developed to relate stage, recorded as noted above, to cross section area. Discharge is computed by multiplying path velocity by the appropriate stage related coefficient and area.

In computing records of lake or reservoir contents, it is necessary to have information available from surveys, curves, or tables that define the relation of stage and content. The application of stage to the stage-content curves or tables gives the contents from which daily, monthly, or yearly changes then are determined. If the stage-content relation changes because of deposition of sediment in a lake or reservoir, periodic resurveys may be necessary to redefine the relation. Discharges over lake or reservoir spillways are computed from stage-discharge relations much as other stream discharges are computed.

For some gaging stations there are periods when no gage-height record is obtained, or the validity of the recorded gage height is so questionable that it cannot be used to compute daily discharge or contents. This happens when the data collection platform or recorder stops or otherwise fails to operate properly, intakes are plugged, the float is frozen in the well, or for various other reasons. For such periods, the daily discharges are estimated from the recorded range in stage, previous or following record, discharge measurements, weather records, and comparison with other station records from the same

or nearby basins. Likewise, daily contents may be estimated from operator's logs, previous or following record, inflow-outflow studies, and other information. Information explaining how estimated daily-discharge values are identified in station records is included in the next two sections, "Data Presentation" (REMARKS paragraph) and "Identifying Estimated Daily Discharge."

#### Data Presentation

Streamflow data in this report are presented in a new format that is considerably different from the format in data reports prior to the 1991 water year. The major changes are that statistical characteristics of discharge now appear in tabular summaries following the water-year data table and less information is provided in the text or station manuscript above the table. These changes represent the results of a pilot program to reformat the annual water-data report to meet current user needs and data preferences.

The records published for each continuous-record surface-water discharge station (gaging station) now consist of four parts, the manuscript or station description; the data table of daily mean values of discharge for the current water year with summary data; a tabular statistical summary of monthly mean flow data for a designated period, by water year; and a summary statistics table that includes statistical data of annual and daily flows as well as data pertaining to annual runoff, 7-day low-flow minimums, and flow duration. Summary statistics were not included for certain sites where these data would be misleading. Contact the District Office for information concerning summary statistics for these sites.

#### Station manuscript

The manuscript provides, under various headings, descriptive information, such as station location; period of record; historical extremes outside the period of record; record accuracy; and other remarks pertinent to station operation and regulation. The following information, as appropriate, is provided with each continuous record of discharge or lake content. Comments to follow clarify information presented under the various headings of the station description.

LOCATION.--Information on locations is obtained from the most accurate maps available. The location of the gage with respect to the cultural and physical features in the vicinity and with respect to the reference place mentioned in the station name is given. River mileages are based on information developed by the Hydraulics and Hydrology Committee of the Pacific Northwest River Basins Commission.

DRAINAGE AREA.--Drainage areas are measured using the most accurate maps available. Because the type of maps available varies from one drainage basin to another, the accuracy of drainage areas likewise varies. Drainage areas are updated as better maps become available.

PERIOD OF RECORD.--This indicates the period for which there are published records for the station or for an equivalent station. An equivalent station is one that was in operation at a time that the present station was not, and whose location was such that records from it can reasonably be considered equivalent with records from the present station.

REVISED RECORDS.--Published records, because of new information, occasionally are found to be incorrect, and revisions are printed in later reports. Listed under this heading are all the reports in which revisions have been published for the station and the water years to which the revisions apply. If a revision did not include daily, monthly, or annual figures of discharge, that fact is noted after the year dates as follows: "(M)" means the instantaneous maximum discharge was revised; "(m)" the instantaneous minimum was revised; and "(P)" the peak discharges were revised. If the drainage area has been revised, the report in which the most recently revised figure was first published is given.

GAGE.--The type of gage in current use, the datum of the current gage referred to sea level (see "DEFINITION OF TERMS"), and a condensed history of the types, location,



and datums of previous gages are given under this heading.

REMARKS.--All periods of estimated daily-discharge record will either be identified by date in this paragraph of the station description for water-discharge stations or flagged in the daily-discharge table. (See next section, "Identifying Estimated Daily Discharge.") If a remarks statement is used to identify estimated record, the paragraph will begin with this information presented as the first entry. The paragraph is also used to present information relative to the accuracy of the records, special methods of computation, conditions that affect natural flow at the station and, possibly, other pertinent items. For reservoir stations, information is given on the dam forming the reservoir, the capacity, outlet works and spillway, and purpose and use of the reservoir.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

AVERAGE DISCHARGE.--The discharge value given is the arithmetic average of the water-year mean discharges. Average discharge is computed only for stations having at least 5 water years of complete record; water years with incomplete record are not included in the computation. The mean-discharge value that uses all published data may differ from that given in the summary statistics data, which is based only on computer-stored data. The summary data does not include values of monthly or yearly data that were determined by various methods for the series of Water-Supply Papers entitled "Compilation of Records of Surface Water of the United States". The average-discharge value is not computed for stations where diversions, storage or other water-use practices cause the value to be meaningless. If water projects that significantly alter flow at a station are put into use after the station has been in operation for a period of years, the new average is computed as soon as 5 water years of record have accumulated after the project began.

EXTREMES FOR PERIOD OF RECORD.--Extremes may include maximum and minimum stages and maximum and minimum discharges or content. Unless otherwise qualified, the maximum discharge or content is the instantaneous maximum corresponding to the highest stage that occurred. The highest stage may have been obtained from a data collection platform, graphic or digital recorder, a crest-stage gage, or by direct observation of a nonrecording gage. If the maximum stage did not occur on the same day as the maximum discharge or content, it is given separately. Similarly, the minimum is the instantaneous minimum discharge, unless otherwise qualified, and was determined and is reported in the same manner as the maximum.

EXTREMES OUTSIDE PERIOD OF RECORD.--Included here is information concerning major floods or unusually low flows that occurred outside the stated period of record. The information may or may not have been obtained by the U.S. Geological Survey.

EXTREMES FOR CURRENT YEAR.--Extremes given here are similar to those for the period of record, except the peak discharge listing may include secondary peaks. For stations meeting certain criteria, all peak discharges and stages occurring during the water year and greater than a selected base discharge are presented under this heading. The peaks greater than the base discharge, excluding the highest one, are referred to as secondary peaks. Peak discharges are not published for canals, ditches, drains, or streams for which the peaks are subject to substantial control by man. The time of occurrence for peaks is expressed in 24-hour local standard time. For example, 12:30 a.m. is 0030, and 1:30 p.m. is 1330. The minimum for the current water year appears below the table of peak data.

REVISIONS.--If a critical error in published records is discovered, a revision is included in the first report published following discovery of the error.

Although rare, occasionally the records of a discontinued gaging station may need revision. Because, for these stations, there would be no current or, possibly, future station manuscript published to document the revision in a "Revised Records" entry, users of data for these stations who obtained the record from previously published data reports may wish to contact the Washington office (address given on the back of the title page of this report) to determine if the published records were ever revised after the station

was discontinued. Of course, if the data were obtained by computer retrieval, the data would be current and there would be no need to check because any published revision of data is always accompanied by revision of the corresponding data in computer storage.

Manuscript information for lake or reservoir stations differs from that for stream stations in the nature of the "Remarks" and in the inclusion of a skeleton stage-capacity table when daily contents are given.

#### Data table of daily mean values

The daily table of discharge records for stream-gaging stations gives mean discharge for each day of the water year. In the monthly summary for the table, the line headed "TOTAL" gives the sum of the daily figures for each month. The line headed "MEAN" gives the average flow in cubic feet per second during the month. The lines headed "MAX" and "MIN" give the maximum and minimum daily mean discharges, respectively, for the month. Discharge for the month also is usually expressed in cubic feet per second per square mile (line headed "CFSM"), or in inches (line headed "IN."), or in acre-feet (line headed "AC-FT"). Figures for cubic feet per second per square mile and runoff in inches are omitted if there is extensive regulation or diversion or if the drainage area includes large noncontributing areas. At some stations monthly and (or) yearly observed discharges are adjusted for reservoir storage or diversion, or diversion data or reservoir contents are given. These figures are identified by a symbol and corresponding footnote.

#### Statistics of monthly mean data

A tabular summary of the mean (line headed "MEAN"), maximum (line headed "MAX"), and minimum (line headed "MIN") of monthly mean flows for each month for a designated period is provided below the mean values table. The water years of the first occurrence of the maximum and minimum monthly flows are provided immediately below those figures. The designated period will be expressed as "FOR WATER YEAR\_\_\_\_-\_\_\_\_, BY WATER YEAR (WY)", and will list the first and last water years of the range of years selected from the PERIOD OF RECORD paragraph in the station manuscript. It will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript.

#### Summary statistics

A table titled "SUMMARY STATISTICS" follows the statistics of monthly mean data tabulation. This table consists of four columns, with the first column containing the line headings of the statistics being reported. The table provides a statistical summary of yearly and daily flows, not only for the current water year but also for the previous calendar year and for a designated period, as appropriate. The designated period selected, "WATER YEARS\_\_\_\_-\_\_\_\_", will consist of all of the station record within the specified water years, inclusive, including complete months of record for partial water years, if any, and may coincide with the period of record for the station. The water years for which the statistics are computed will be consecutive, unless a break in the station record is indicated in the manuscript. All of the calculations for the statistical characteristics designated ANNUAL (See line headings below), except for the "ANNUAL 7-DAY MINIMUM" statistic, are calculated for the designated period using complete water years. The other statistical characteristics may be calculated using partial water years.

The date or water year, as appropriate, of the first occurrence of each statistic reporting extreme values of discharge is provided adjacent to the statistic. Repeated occurrences may be noted in the REMARKS paragraph of the manuscript or in footnotes. Because the designated period may not be the same as the station period of record published in the manuscript, occasionally the dates of occurrence listed for the daily extremes in the designated-period column may not be within the selected water years

listed in the heading. When this occurs, it will be noted in the REMARKS paragraph or in footnotes. Selected streamflow duration curve statistics and runoff data are also given. Runoff data may be omitted if there is extensive regulation or diversion of flow in the drainage basin.

The following summary statistics data, as appropriate, are provided with each continuous record of discharge. Comments to follow clarify information presented under the various line headings of the summary statistics table.

ANNUAL TOTAL.--The sum of the daily mean values of discharge for the year. At some stations the annual total discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes.

ANNUAL MEAN.--The arithmetic mean of the individual daily mean discharges for the year noted or for the designated period. At some stations the yearly mean discharge is adjusted for reservoir storage or diversion. The adjusted figures are identified by a symbol and corresponding footnotes. At least 5 complete years of record must be available before this statistic is published for the designated period.

HIGHEST ANNUAL MEAN.--The maximum annual mean discharge occurring for the designated period.

LOWEST ANNUAL MEAN.--The minimum annual mean discharge occurring for the designated period.

HIGHEST DAILY MEAN.--The maximum daily mean discharge for the year or for the designated period.

LOWEST DAILY MEAN.--The minimum daily mean discharge for the year or for the designated period.

ANNUAL 7-DAY MINIMUM.--The lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses of annual 7-day minimum flows use a climatic year (April 1 - March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

ANNUAL RUNOFF.--Indicates the total quantity of water in runoff for a drainage area for the year. Data reports may use any of the following units of measurement in presenting annual runoff data:

Acre-foot (AC-FT) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equal to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Cubic feet per second per square mile (CFSM) is the average number of cubic feet of water flowing per second from each square mile area drained, assuming the runoff is distributed uniformly in time and area.

Inches (INCHES) indicates the depth to which the drainage area would be covered if all of the runoff for a given time period were uniformly distributed on it.

10 PERCENT EXCEEDS.--The discharge that is exceeded 10 percent of the time for the designated period.

50 PERCENT EXCEEDS.--The discharge that is exceeded 50 percent of the time for the designated period.

90 PERCENT EXCEEDS.--The discharge that is exceeded 90 percent of the time for the designated period.

Data collected at partial-record stations follow the information for continuous-record sites. Data for partial-record discharge stations are presented in



two tables. The first is a table of annual maximum stage and discharge at crest-stage stations, and the second is a table of discharge measurements at low-flow partial-record stations. The tables of partial-record stations are followed by a listing of discharge measurements made at sites other than continuous-record or partial-record stations. These measurements are generally made in times of drought or flood to give better areal coverage to those events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

#### Identifying Estimated Daily Discharge

Estimated daily-discharge values published in the water-discharge tables of annual state data reports are identified either by flagging individual daily values with the letter symbol "e" and printing a table footnote, "e Estimated," or by listing the dates of the estimated record in the REMARKS paragraph of the station description.

#### Accuracy of the Records

The accuracy of streamflow records depends primarily on: (1) The stability of the stage-discharge relation or, if the control is unstable, the frequency of discharge measurements, and (2) the accuracy of measurements of stage, measurements of discharge, and interpretation of records.

The accuracy attributed to the records is indicated under the "REMARKS" paragraph. "Excellent" means that about 95 percent of the daily discharges are within 5 percent of the true; "good," within 10 percent; and "fair," within 15 percent. Records that do not meet the criteria mentioned, are rated "poor." Different accuracies may be attributed to different parts of a given record.

Daily mean discharges in this report are given to the nearest hundredth of a cubic foot per second for values less than 1 ft<sup>3</sup>/s; the nearest tenth between 1.0 and 10 ft<sup>3</sup>/s; whole numbers between 10 and 1,000 ft<sup>3</sup>/s; and 3 significant figures for more than 1,000 ft<sup>3</sup>/s. The number of significant figures used is based solely on the magnitude of the discharge value. The same rounding rules apply to discharges listed for partial-record stations and miscellaneous sites.

Discharge at many stations, as indicated by the monthly mean, may not reflect natural runoff because of the effects of diversion, consumption, regulation by storage, increase or decrease in evaporation, or other factors. For such stations, figures of cubic feet per second per square mile and of runoff, in inches, are not published unless satisfactory adjustments can be made for diversions, changes in contents of reservoirs, or other changes incident to use and control. Evaporation from a reservoir is not included in the adjustments for changes in reservoir contents, unless it is so stated. Even at those stations where adjustments are made, large errors in computed runoff may occur if adjustments or losses are large in comparison with the observed discharge.

#### Other Records Available

Monthly records for several ungaged sites are given in a separate section following the gaged sites. The accuracy of records for ungaged sites is generally lower than that for gaged sites, depending on the precision of the computation method and the accuracy of data used in the computations.

For most gaging stations, unpublished, detailed information, on file in the Washington office, includes discharge measurements, gage-height records, and rating tables. Many gaging-station records in Washington through 1979 have been analyzed to determine several statistical summaries: (1) The number of days in each year that the daily discharge was between selected limits (duration tables); (2) the lowest mean discharge for selected numbers of consecutive days in each year; and (3) the highest mean discharge for selected numbers of consecutive days in each year.

Other Federal and State agencies have collected discharge data at other sites in Washington during the current water year. Although these records have not been published



by the U.S. Geological Survey, the National Water Data Exchange, NAWDEX, Water Resources Division, U.S. Geological Survey, National Center, Reston, VA 22092, maintains an index of these sites and will furnish information about them.

#### Records of Surface-Water Quality

Records of surface-water quality ordinarily are obtained at or near stream-gaging stations because interpretation of records of surface-water quality nearly always requires corresponding discharge data. Records of surface-water quality in this report may involve a variety of types of data and measurement frequencies.

#### Classification of Records

Water-quality data for surface-water sites are grouped into one of three classifications. A continuing-record station is a site where data are collected on a regularly scheduled basis. Frequency may be one or more times daily, weekly, monthly, or quarterly. A partial-record station is a site where limited water-quality data are collected systematically over a period of years. Frequency of sampling is usually less than quarterly. A miscellaneous sampling site is a location other than a continuing or partial-record station, where random samples are collected to give better areal coverage to define water-quality conditions in the river basin.

A careful distinction needs to be made between "continuing records" as used in this report and "continuous recordings," which refers to a continuous graph or a series of discrete values punched at short intervals on a paper tape or obtained via data collection platform. Some records of water quality, such as temperature and specific conductance, may be obtained through continuous recordings; however, because of costs, most data are obtained only monthly or less frequently. Locations of stations for which records on the quality of surface water appear in this report are shown in figures 6a and 6b.

#### Arrangement of Records

Water-quality records collected at a surface-water daily record station are published immediately following that record, regardless of the frequency of sample collection. Station number and name are the same for both records. Where a surface-water daily record station is not available or where the water quality differs significantly from that at the nearby surface-water station, the continuing water-quality record is published with its own station number and name in the regular downstream-order sequence. Water-quality data for partial-record stations and for miscellaneous sampling sites appear in separate tables following the table of discharge measurements at miscellaneous sites.

#### On-site Measurement and Sample Collection

In obtaining water-quality data, it is important that the data obtained represent the in situ quality of the water. To assure this, certain measurements, such as water temperature, pH, and dissolved oxygen, need to be made onsite when the samples are taken. To assure that measurements made in the laboratory also represent the in situ water, carefully prescribed procedures need to be followed in collecting the samples, treating the samples to prevent changes in quality pending analysis, and shipping the samples to the laboratory. Procedures for onsite measurements and for collecting, treating, and shipping samples are detailed in the TWRI Book 1, Chapter D2; Book 3, Chapter C2; Book 5, Chapter A1, A3, and A4. These references are listed in the PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS section of this report. These methods are consistent with ASTM standards and generally follow ISO standards. Also, detailed information on collecting, treating, and shipping samples may be obtained from the Geological Survey, Water Resources Division office in Tacoma, Washington.

One sample can define adequately the water quality at a given time if the mixture of solutes throughout the stream cross section is homogeneous. However, the concentration of solutes at different locations in the cross section may vary widely with different rates of water discharge, depending on the source of material and the turbulence and mixing of the stream. Some streams must be sampled through several vertical sections

to obtain a representative sample needed for an accurate mean concentration and for use in calculating load. All samples obtained for the National Stream Quality Accounting Network (see "DEFINITION OF TERMS") are obtained from at least five verticals. Whether samples are obtained from the centroid of flow or from several verticals, depends on flow conditions and other factors which must be evaluated by the collector.

Chemical-quality data published in this report are considered to be the most representative values available for the stations listed. The values reported represent water-quality conditions at the time of sampling as much as possible, consistent with available sampling techniques and methods of analysis. In the rare case where an apparent inconsistency exists between a reported pH value and the relative abundance of carbon dioxide species (carbonate and bicarbonate), the inconsistency is the result of a slight uptake of carbon dioxide from the air by the sample between measurement of pH in the field and determination of carbonate and bicarbonate in the laboratory.

For chemical-quality stations equipped with digital monitors, the records consist of daily maximum, minimum, and mean values for each constituent measured and are based upon hourly punches beginning at 0100 hours and ending at 2400 hours for the day of record. More detailed records (hourly values) may be obtained from the U.S. Geological Survey office whose address is given on the back of the title page of this report.

#### Water Temperature

Water temperatures are measured at most of the water-quality stations. In addition, water temperatures are taken at time of discharge measurements for water-discharge stations. For stations where water temperatures are taken manually once or twice daily, the water temperatures are taken at about the same time each day. Large streams have a small diurnal temperature change; shallow streams may have a daily range of several degrees and may follow closely the changes in air temperature. Some streams may be affected by waste-heat discharges.

At stations where recording instruments are used, maximum, minimum, and mean temperatures for each day are published. Water temperatures measured at the time of water-discharge measurements are on file in the Washington office.

#### Sediment

Suspended-sediment concentrations are determined from samples collected by one of the standard sampling techniques discussed in TWRI, Book 3, Chapter C2, "Field methods for measurement of fluvial sediment," 1985 revision. Samples are obtained using standard depth- or point-integrating samplers, or by means of an approved pumping sampler. Mean concentrations for the sampled cross section are in turn determined from these samples.

During periods of rapidly changing flow or rapidly changing suspended-sediment concentration, samples may have been collected more frequently (twice daily or, in some instances, hourly). The published sediment discharges for days of rapidly changing flow or concentration were computed by the subdivided-day method (time-discharge weighted average). Therefore, for those days when the published sediment discharge value differs from the value computed as the product of discharge times mean concentration times 0.0027, the reader can assume that the sediment discharge for that day was computed by the subdivided-day method. For periods when no samples were collected, daily discharges of suspended sediment were estimated on the basis of water discharge, sediment concentrations observed immediately before and after the periods, and suspended-sediment loads for other periods of similar discharge. Methods used in the computation of sediment records are described in the TWRI Book 3, Chapters C1 and C3. These methods are consistent with ASTM standards and generally follow ISO standards.

At other stations, suspended-sediment samples were collected periodically. Although data collected periodically may represent conditions only at the time of observations, such data are useful in establishing seasonal relations between quality and streamflow and in predicting long-term sediment-discharge characteristics of the stream.

In addition to the records of suspended-sediment discharge, periodic measurements of particle-size distributions for the suspended-sediment, bed-load, and bed-material samples are included for stations where samples were obtained to measure this parameter.

#### Laboratory Measurements

Sediment samples, samples for indicator bacteria, and daily samples for specific conductance are analyzed locally. All other samples are analyzed in the Geological Survey laboratory in Arvada, Colorado. Methods used to analyze samples and to compute sediment records are given in the TWRI Book 5, Chapter C1. Methods used by the Geological Survey laboratories are given in the TWRI Book 1, Chapter D2; Book 3, Chapter C2; Book 5, Chapters A1, A3, A4, and A5. These methods are consistent with ASTM standards and generally follow ISO standards.

In March 1989, the National Water-Quality Laboratory discovered a bias in the turbidimetric method for sulfate analysis, indicating that values below 75 mg/L have a median positive bias of 2 mg/L above the true value for the period between 1982 and 1989. Sulfate values in this report have not been corrected for this bias.

#### Data Presentation

For continuing-record stations, information pertinent to the history of station operation is provided in descriptive headings preceding the tabular data. These descriptive headings give details regarding location, drainage area, period of record, type of data available, instrumentation, general remarks, cooperation, and extremes for parameters currently measured daily. Tables of chemical, physical, biological, radiochemical data, and so forth, obtained at a frequency less than daily are presented first. Tables of "daily values" of specific conductance, pH, water temperature, dissolved oxygen, and suspended sediment then follow in sequence.

In the descriptive headings, if the location is identical to that of the discharge gaging station, neither the LOCATION nor the DRAINAGE AREA statements are repeated. The following information, as appropriate, is provided with each continuous-record station. Comments that follow clarify information presented under the various headings of the station description.

LOCATION.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

DRAINAGE AREA.--See Data Presentation under "Records of Stage and Water Discharge;" same comments apply.

PERIOD OF RECORD.--This indicates the periods for which there are published water-quality records for the station. The periods are shown separately for records of parameters measured daily or continuously and those measured less than daily. For those measured daily or continuously, periods of record are given for the parameters individually.

INSTRUMENTATION.--Information on instrumentation is given only if a water-quality monitor, sediment pumping sampler, or other sampling device is in operation at a station.

REMARKS.--Remarks provide added information pertinent to the collection, analysis, or computation of the records.

COOPERATION.--Records provided by a cooperating organization or obtained for the Geological Survey by a cooperating organization are identified here.

EXTREMES.--Maximums and minimums are given only for parameters measured daily or more frequently. None are given for parameters measured weekly or less frequently, because the true maximums or minimums may not have been sampled. Extremes, when given, are provided for both the period of record and for the current water year.

REVISIONS.--If errors in published water-quality records are discovered after



publication, appropriate updates are made to the Water-Quality File in the U.S. Geological Survey's computerized data system, WATSTORE, and subsequently by monthly transfer of update transactions to the U.S. Environmental Protection Agency's STORET system. Because the usual volume of updates makes it impractical to document individual changes in the State data-report series or elsewhere, potential users of U.S. Geological Survey water-quality data are encouraged to obtain all required data from the appropriate computer file.

The surface-water-quality records for partial-record stations and miscellaneous sampling sites are published in separate tables following the table of discharge measurements at miscellaneous sites. No descriptive statements are given for these records. Each station is published with its own station number and name in the regular downstream-order sequence.

#### Remark Codes

The following remark codes may appear with the water-quality data in this report:

<u>PRINTED OUTPUT</u>	<u>REMARK</u>
E	Estimated value
<	Actual value is known to be less than the value shown
>	Actual value is known to be greater than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
*	Laboratory value

#### Records of Ground-Water Levels

Water-level data from only a few of the many observation wells in Washington are given in this report.

Ground-water records obtained through cooperative efforts of many Federal, State, and local agencies for several thousand observation wells throughout Washington are not included in this report. These records may be placed in computer storage, published in reports, or kept in files. Information about the availability of ground-water data may be obtained from the District Chief, Washington District, U.S. Geological Survey, 1201 Pacific Avenue, Suite 600, Tacoma, Washington 98402.

#### Data Collection and Computation

Measurements of water levels are made in many types of wells under varying conditions, but the methods of measurement are standardized to the extent possible. The equipment and measuring techniques used at each observation well ensure that measurements at each well are of consistent accuracy and reliability.

Tables of water-level data are presented by counties arranged in alphabetical order. The prime identification number for a given well is the 15-digit number that appears in the upper left corner of the table. The secondary identification number is the local well number, an alphanumeric number, derived from the township-range location of the well.

Water-level records are obtained from direct measurements with a steel or electrical tape or from the graph or punched tape of a water-stage recorder. The water-level measurements in this report are given in feet with reference to land-surface datum (lsd). Land-surface datum is a datum plane that is approximately at land surface at each well. If known, the elevation of the land-surface datum is given in the well description.

Water levels are reported to as many significant figures as can be justified by the



local conditions. For example, in a measurement of a depth to water of several hundred feet, the error of determining the absolute value of the total depth to water may be a few tenths of a foot, whereas the error in determining the net change of water level between successive measurements may be only a hundredth or a few hundredths of a foot. For lesser depths to water, the accuracy is greater. Accordingly, most measurements are reported to a hundredth of a foot, but some are given to a tenth of a foot or a larger unit.

#### Data Presentation

Each well record consists of two parts, the station description and the data table of water levels observed during the water year. The description of the well is presented first through use of descriptive headings preceding the tabular data. The comments to follow clarify information presented under the various headings.

**LOCATION.**--This paragraph follows the well-identification number and reports the latitude and longitude (given in degrees, minutes, and seconds); a landline location designation; the hydrologic unit number; the distance and direction from a geographic point of reference; and the owner's name.

**AQUIFER.**--This entry designates by name (if a name exists) and geologic age the aquifer(s) open to the well.

**WELL CHARACTERISTICS.**--This entry describes the well in terms of depth, diameter, casing depth and (or) screened interval, method of construction, use, and additional information such as casing breaks, collapsed screen, and other changes since construction.

**INSTRUMENTATION.**--This paragraph provides information on both the frequency of measurement and the collection method used, allowing the user to better evaluate the reported water-level extremes by knowing whether they are based on weekly, monthly, or some other frequency of measurement.

**DATUM.**--This entry describes the land-surface elevation at the well. The elevation of the land-surface datum is described in feet above (or below) sea level; it is reported with a precision depending on the method of determination.

**REMARKS.**--This entry describes factors that may influence the water level in a well or the measurement of the water level. It should identify wells that also are water-quality observation wells, and may be used to acknowledge the assistance of local (non-Survey) observers.

**PERIOD OF RECORD.**--This entry indicates the period for which there are published records for the well. It reports the month and year of the start of publication of water-level records by the U.S. Geological Survey and the words "to current year" if the records are to be continued into the following year. Periods for which water-level records are available, but are not published by the Geological Survey, may be noted.

**EXTREMES FOR PERIOD OF RECORD.**--This entry contains the highest and lowest water levels of the period of published record, with respect to land-surface datum, and the dates of their occurrence.

A table of water levels follows the station description for each well. Water levels are reported in feet below land-surface datum and all taped measurements of water level are listed. For wells equipped with a recorder, only abbreviated tables are published; generally, only water-level lows are listed for every fifth day and at the end of the month (eom). The highest and lowest water levels of the water year and their dates of occurrence are shown on a line below the abbreviated table. Because all values are not published for wells with recorders, the extremes may be values that are not listed in the table. Missing records are indicated by dashes in place of the water level.

#### ACCESS TO WATSTORE DATA

The U.S. Geological Survey is the principal Federal water-data agency and, as such, collects and disseminates about 70 percent of the water data currently being used by

numerous State, local, private, and other federal agencies to develop and manage our water resources. As part of the Geological Survey's program of releasing water data to the public, a large-scale computerized system has been developed for the storage and retrieval of water data collected through its activities. The National WATER Data STORage and REtrieval System (WATSTORE) was established in 1972 to provide an effective and efficient means for the processing and maintenance of water data collected through the activities of the U.S. Geological Survey and to facilitate release of the data to the public. A variety of useful products, ranging from data tables to complex statistical analyses such as Log Pearson Type III, can be produced using WATSTORE. The system resides on the central computer facilities of the U.S. Geological Survey at its National Center in Reston, Virginia, and consists of related files and data bases.

- \* Station Header File - Contains descriptive information on more than 440,000 sites throughout the United States and its territories where the U.S. Geological Survey collects or has collected data.
- \* Daily Values File - Contains more than 220 million daily values of stream flows, stages, reservoir contents, water temperatures, specific conductances, sediment concentrations, sediment discharges, and ground-water levels.
- \* Peak Flow File - Contains approximately 500,000 maximum (peak) streamflow and gage-height values at surface-water sites.
- \* Water Quality File - Contains approximately 2 million analyses of water samples that describe the chemical, physical, biological, and radio-chemical characteristics of both surface and ground water.
- \* Ground-Water Site Inventory Data Base - Contains inventory data for more than 900,000 wells, springs, and other sources of ground water. The data includes site location, geohydrologic characteristics, well-construction history, and one-time field measurements such as water temperature.

In 1976, the U.S. Geological Survey opened WATSTORE to the public for direct access. The signing of a Memorandum of Agreement with the Survey is required to obtain direct access to WATSTORE. The system can be accessed either synchronously or asynchronously. The requestor will be expected to pay all computer costs he/she incurs. Direct access may be obtained by contacting:

U.S. Geological Survey  
National Water Data Exchange  
421 USGS National Center  
Reston, Virginia 22092

In addition to providing direct access to WATSTORE, data can be provided in various machine-readable formats on magnetic tape or 5-1/4 inch floppy disk and on CD-ROM discs. For the 1990-93 water years, all water-data reports are available on Compact Disc - Read Only Memory (CD-ROM).

#### DEFINITION OF TERMS

Terms related to streamflow, water-quality, and other hydrologic data, as used in this report, are defined below. See also table for converting English units to International System (SI) Units on the inside of the back cover.

Acre-foot (AC-FT, acre-ft) is the quantity of water required to cover 1 acre to a depth of 1 foot and is equal to 43,560 cubic feet or about 326,000 gallons or 1,233 cubic meters.

Adenosine triphosphate (ATP) is an organic, phosphate-rich, compound important in the transfer of energy in organisms. Its central role in living cells makes it an excellent indicator of the presence of living material in water. A measure of ATP therefore provides a sensitive and rapid estimate of biomass. ATP is reported in micrograms per liter of the original water sample.

Algae are mostly aquatic single-celled, colonial, or multicelled plants, containing

chlorophyll and lacking roots, stems, and leaves.

Algal growth potential (AGP) is the maximum algal dry weight biomass that can be produced in a natural water sample under standardized laboratory conditions. The growth potential is the algal biomass present at stationary phase and is expressed as milligrams dry weight of algae produced per liter of sample.

Aquifer is a geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield significant quantities of water to wells and springs.

Artesian means confined and is used to describe a well in which the water level stands above the top of the aquifer tapped by the well. A flowing artesian well is one in which the water level is above the land surface.

Bacteria are microscopic unicellular organisms, typically spherical, rodlike, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials; for example, by decomposing organic matter into a form available for reuse by plants.

Total coliform bacteria are a particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35°C. In the laboratory these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C plus or minus 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 milliliters (mL) of sample.

Fecal coliform bacteria are bacteria that are present in the intestine or feces of warmblooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all organisms that produce blue colonies with 24 hours when incubated at 44.5°C plus or minus 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Fecal streptococcal bacteria are bacteria found also in the intestine of warmblooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms which produce red or pink colonies within 48 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as number of colonies per 100 mL of sample.

Base flow. See Base runoff.

Base runoff refers to sustained or fair weather runoff. In most streams, base runoff is composed largely of ground-water effluent. (Langbein and others, 1947, p. 6.) The term base flow is often used in the same sense as base runoff. However, the distinction is the same as that between streamflow and runoff. When the concept in the terms base flow and base runoff is that of the natural flow in a stream, base runoff is the logical term.

Bed material is the sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Biochemical oxygen demand (BOD) is a measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by micro-organisms, such as bacteria.

Biomass is the amount of living matter present at any given time, expressed as the mass per unit area or volume of habitat.

Ash mass is the mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of



500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in grams per cubic meter ( $\text{g/m}^3$ ), and periphyton and benthic organisms in grams per square meter ( $\text{g/m}^2$ ).

Dry mass refers to the mass of residue present after drying in an oven at 105°C for zooplankton and periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass.

Organic mass or volatile mass of the living substance is the difference between the dry mass and the ash mass and represents the actual mass of the living matter. The organic mass is expressed in the same units as for ash and dry mass.

Wet mass is the mass of living matter plus contained water.

Bottom material: See Bed material.

Cells/volume refers to the number of cells of any organism which is counted by using a microscope and grid or counting cell. Many planktonic organisms are multicelled and are counted according to the number of contained cells per sample, usually milliliters (mL) or liters (L).

Chemical oxygen demand (COD) is a measure of the chemically oxidizable material in the water, and furnishes an approximation of the amount of organic and reducing material present. The determined value may correlate with natural water color or with carbonaceous organic pollution from sewage or industrial wastes.

Chlorophyll refers to the green pigments of plants. Chlorophyll a and b are the two most common green pigments in plants.

Color unit is produced by one milligram per liter of platinum in the form of the chloroplatinate ion. Color is expressed in units of the platinum-cobalt scale.

Contents is the volume of water in a reservoir or lake. Unless otherwise indicated, volume is computed on the basis of a level pool and does not include bank storage.

Control designates a feature downstream from the gage that determines the stage-discharge relation at the gage. This feature may be a natural constriction of the channel, an artificial structure, or a uniform cross section over a long reach of the channel.

Control structure as used in this report is a structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of salt water.

Cubic foot per second ( $\text{ft}^3/\text{s}$ ) is the rate of discharge representing a volume of 1 cubic foot passing a given point during 1 second and is equivalent to 7.48 gallons per second or 448.8 gallons per minute or 0.02832 cubic meters per second.

Cubic foot per second-day [ $(\text{ft}^3/\text{s})/\text{d}$ ] is the volume of water represented by a flow of 1 cubic foot per second for 24 hours. It is equivalent to 86,400 cubic feet, approximately 1.9835 acre-feet, about 646,000 gallons, or 2,445 cubic meters.

Cubic feet per second per square mile [ $(\text{ft}^3/\text{s})/\text{mi}^2$ ] is the average number of cubic feet of water flowing per second from each square mile of area drained, assuming that the runoff is distributed uniformly in time and area.

Discharge is the volume of water (or more broadly, volume of fluid plus suspended sediment) that passes a given point within a given period of time.

Mean discharge (MEAN) is the arithmetic mean of individual daily mean discharges during a specific period.

Instantaneous discharge is the discharge at a particular instant of time.

Annual 7-day minimum is the lowest mean discharge for 7 consecutive days for a calendar year or a water year. Note that most low-flow frequency analyses



of annual 7-day minimum flows use a climatic year (April 1 - March 31). The date shown in the summary statistics table is the initial date of the 7-day period. (This value should not be confused with the 7-day 10-year low-flow statistic.)

Dissolved refers to that material in a representative water sample which passes through a 0.45-um membrane filter. This is a convenient operational definition used by Federal agencies that collect water data. Determinations of "dissolved" constituents are made on subsamples of the filtrate.

Dissolved-solids concentration of water is determined either analytically by the "residue-on-evaporation" method, or mathematically by totaling the concentrations of individual constituents reported in a comprehensive chemical analysis. During the analytical determination of dissolved solids, the bicarbonate (generally a major dissolved component of water) is converted to carbonate. Therefore, in the mathematical calculation of dissolved-solids concentration, the bicarbonate value, in milligrams per liter, is multiplied by 0.492 to reflect the change.

Drainage area of a stream at a specified location is that area, measured in a horizontal plane, enclosed by a topographic divide from which direct surface runoff from precipitation normally drains by gravity into the stream above the specified point. Figures of drainage area given herein include all closed basins, or noncontributing areas, within the area unless otherwise noted.

Drainage basin is a part of the surface of the earth that is occupied by a drainage system, which consists of a surface stream or a body of impounded surface water together with all tributary surface streams and bodies of impounded surface water.

Gage height (G.H.) is the water-surface elevation referred to some arbitrary gage datum. Gage height is often used interchangeably with the more general term "stage," although gage height is more appropriate when used with a reading on a gage.

Gaging station is a particular site on a stream, canal, lake, or reservoir where systematic observations of hydrologic data are obtained.

Hardness of water is a physical-chemical characteristic that is commonly recognized by the increased quantity of soap required to produce lather. It is computed as the sum of equivalents of polyvalent cations and is expressed as the equivalent concentration of calcium carbonate ( $\text{CaCO}_3$ ).

Hydrologic Bench-Mark Network is a network of more than 50 sites in small drainage basins around the country whose purpose is to provide consistent data on the hydrology, including water quality, and related factors in representative undeveloped watersheds nationwide, and to provide analyses on a continuing basis to compare and contrast conditions observed in basins more obviously affected by the activities of man.

Hydrologic unit is a geographic area representing part or all of a surface drainage basin or distinct hydrologic feature as delineated by the Office of Water Data Coordination on the State Hydrologic Unit Maps; each hydrologic unit is identified by an eight-digit number.

Land-surface datum (lsd) is a datum plane that is approximately at land surface at each ground-water observation well.

Measuring point (MP) is an arbitrary permanent reference point from which the distance to the water surface in a well is measured to obtain the water level.

Metamorphic stage refers to the stage of development that an organism exhibits during its transformation from an immature form to an adult form. This developmental process exists for most insects, and the degree of difference from the immature stage to the adult form varies from relatively slight to pronounced, with many intermediates. Examples of metamorphic stages of insects are egg-larva-adult or egg-nymph-adult.

Methylene blue active substances (MBAS) are apparent detergents. The determination depends on the formation of a blue color when methylene blue dye reacts with synthetic anionic detergent compounds.

Micrograms per gram ( $\mu\text{g/g}$ ) is a unit expressing the concentration of a chemical constituent as the mass (micrograms) of the element per unit mass (gram) of material analysed.

Micrograms per liter ( $\mu\text{g/L}$ ) is a unit expressing the concentration of chemical constituents in solution as mass (micrograms) of solute per unit volume (liter) of water. One thousand micrograms per liter is equivalent to one milligram per liter.

Milligrams per liter (MG/L, mg/L) is a unit for expressing the concentration of chemical constituents in solution. Milligrams per liter represents the mass of solute per unit volume (liter) of water. Concentration of suspended sediment also is expressed in mg/L and is based on the mass of dry sediment per liter of water-sediment mixture.

National Geodetic Vertical Datum of 1929 (NGVD of 1929) is a geodetic datum derived from a general adjustment of the first order level nets of both the United States and Canada. It was formerly called "Sea Level Datum of 1929" or "mean sea level" in this series of reports. Although the datum was derived from the average sea level over a period of many years at 26 tide stations along the Atlantic, Gulf of Mexico, and Pacific Coasts, it does not necessarily represent local mean sea level at any particular place.

National Stream Quality Accounting Network (NASQAN) is a nationwide data-collection network designed by the U.S. Geological Survey to meet many of the information needs of government agencies and other groups involved in national or regional water-quality planning and management. The several hundred sites in NASQAN are generally located at the downstream ends of hydrologic accounting units designated by the U.S. Geological Survey office of Water Data Coordination in consultation with the Water Resources Council. The objective of NASQAN is to obtain information on the quality and quantity of water moving within and from the United States through a systematic and uniform process of data collection, summarization, analysis, and reporting. The design of the network is intended to provide data for (1) description of the areal variability of water quality in the Nation's rivers through analysis of data from this and other programs, (2) detection of changes or trends with time in the pattern of occurrence of water-quality characteristics, and (3) a nationally consistent data base useful for water-quality assessment and hydrologic research.

National Trends Network (NTN) is a 150-station network for sampling atmospheric deposition in the United States. The purpose of the network is to determine the variability, both in location and in time, of the composition of atmospheric deposition, which includes snow, rain, dust particles, aerosols, and gases. The core from which the NTN was built was the already-existing deposition-monitoring network of the National Atmospheric Deposition Program (NADP).

National Water-Quality Assessment (NAWQA) Program is being conducted by the U.S. Geological Survey to provide a nationally consistent description of current water-quality conditions and to define long-term trends (or lack of trends) in water quality. It was funded by Congress in 1986. The Yakima River basin was selected as one of seven pilot project areas in the Nation. A fully implemented national program is now underway to assess a large number of river basins and aquifer systems--each treated as a separate study unit. The national perspective is obtained by aggregating results from the study units to answer regional- and national-scale questions about current conditions, trends, and factors that affect water quality. The Yakima River NAWQA Program includes three years of intensive sampling: (1) monthly and high-flow samplings (April 1987 to March 1990) from seven fixed-location stations, and (2) several synoptic samplings--as many as 110 sites sampled within a short time period during selected hydrologic conditions. The three years of intensive sampling will be followed by six years with minimal sampling; the nine-year cycle is then repeated. Issues and concerns of the NAWQA Program include: salinity, sedimentation and erosion, eutrophication, toxicity from trace elements and organic compounds, sanitary quality, and health of aquatic biota.

Organism is any living entity.

Organism count/area refers to the number of organisms collected and enumerated in

a sample and adjusted to the number per unit area habitat, usually square meter ( $m^2$ ), acre, or hectare. Periphyton, benthic organisms, and macrophytes are expressed in these terms.

Organism count/volume refers to the number of organisms collected and enumerated in a sample and adjusted to the number per sample volume usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.

Total organism count is the total number of organisms collected and enumerated in any particular sample.

Parameter code is a 5-digit number used in the U.S. Geological Survey computerized data system, WATSTORE, to uniquely identify a specific constituent. The codes used in WATSTORE are the same as those used in the U.S. Environmental Protection Agency data system, STORET. The Environmental Protection Agency assigns and approves all requests for new codes.

Partial-record station is a particular site where limited streamflow and (or) water-quality data are collected systematically over a period of years for use in hydrologic analyses.

Particle size is the diameter, in millimeters (mm), of a particle determined by either sieve or sedimentation methods. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle-size classification used in this report agrees with the recommendation made by the American Geophysical Union Subcommittee on Sediment Terminology. The classification is as follows:

<u>Classification</u>	<u>Size (mm)</u>	<u>Method of analysis</u>
Clay	0.00024 - 0.004	Sedimentation
Silt	.004 - .062	Sedimentation
Sand	.062 - 2.0	Sedimentation or sieve
Gravel	2.0 - 64.0	Sieve

The particle-size distributions given in this report are not necessarily representative of all particles in transport in the stream. Most of the organic matter is removed and the sample is subjected to mechanical and chemical dispersion before analysis in distilled water. Chemical dispersion is not used for native-water analysis.

Percent composition is a unit for expressing the ratio of a particular part of a sample or population to the total sample or population in terms of types, numbers, mass, or volume.

Periphyton is the assemblage of microorganisms attached to and living upon submerged solid surfaces. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms.

Pesticides are chemical compounds used to control undesirable organisms. Major categories of pesticides include insecticides, miticides, fungicides, herbicides, and rodenticides.

Picocurie (PC, pCi) is one trillionth ( $1 \times 10^{-12}$ ) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields  $3.7 \times 10^{10}$  radioactive disintegrations per second. A picocurie yields 2.22 disintegrations per minute (dpm).

Plankton is the community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers.



Phytoplankton is the plant part of the plankton. They are usually microscopic and their movement is subject to the water currents. Phytoplankton growth is dependent upon solar radiation and nutrient substances. Because they are able to incorporate as well as release materials to the surrounding water, the phytoplankton have a profound effect upon the quality of the water. They are the primary food producers in the aquatic environment, and are commonly known as algae.

Blue-green algae are a group of phytoplankton organisms having a blue pigment, in addition to the green pigment called chlorophyll. Blue-green algae often cause nuisance conditions in water.

Diatoms are the unicellular or colonial algae having a siliceous shell. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Green algae have chlorophyll pigments similar in color to those of higher green plants. Some forms produce algae mats or floating "moss" in lakes. Their concentrations are expressed as number of cells per milliliter (cells/mL) of sample.

Zooplankton is the animal part of the plankton. Zooplankton are capable of extensive movements within the water column and are often large enough to be seen with the unaided eye. Zooplankton are secondary consumers feeding upon bacteria, phytoplankton, and detritus. Because they are the grazers in the aquatic environment, the zooplankton are a vital part of the aquatic food web. The zooplankton community is dominated by small crustaceans and rotifers.

Primary productivity is a measure of the rate at which new organic matter is formed and accumulated through photosynthetic and chemosynthetic activity of producer organisms (chiefly, green plants). The rate of primary production is estimated by measuring the amount of oxygen released (oxygen method) or the amount of carbon assimilated by the plants (carbon method).

Milligrams of carbon per area or volume per unit time [ $\text{mg C}/(\text{m}^2 \cdot \text{time})$ ] for periphyton and macrophytes and [ $\text{mg C}/(\text{m}^3 \cdot \text{time})$ ] for phytoplankton are units for expressing primary productivity. They define the amount of carbon dioxide consumed as measured by radioactive carbon (carbon 14). The carbon 14 method is of greater sensitivity than the oxygen light and dark bottle method, and is preferred for use in unenriched waters. Unit time may be either the hour or day, depending on the incubation period.

Milligrams of oxygen per area or volume per unit time [ $\text{mg O}/(\text{m}^2 \cdot \text{time})$ ] for periphyton and macrophytes and [ $\text{mg O}/(\text{m}^3 \cdot \text{time})$ ] for phytoplankton are the units for expressing primary productivity. They define production and respiration rates as estimated from changes in the measured dissolved-oxygen concentration. The oxygen light and dark bottle method is preferred if the rate of primary production is sufficient for accurate measurements to be made within 24 hours. Unit time may be either the hour or day, depending on the incubation period.

Radiochemical program is a network of regularly sampled water-quality stations where samples are collected to be analyzed for radioisotopes. The streams that are sampled represent major drainage basins in the conterminous United States.

Recoverable from bottom material is the amount of a given constituent that is in solution after a representative sample of bottom material has been digested by a method (usually using an acid or mixture of acids) that results in dissolution of readily soluble substances. Complete dissolution of all bottom material is not achieved by the digestion treatment and thus the determination represents less than the total amount (that is, less than 95 percent) of the constituent in the sample. To achieve comparability of analytical data, equivalent digestion procedures would be required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.



Return period is the average time interval between occurrences of a hydrological event of a given or greater magnitude, usually expressed in years. May also be called recurrence interval.

Runoff in inches (IN, in) shows the depth to which the drainage area would be covered if all the runoff for a given time period were uniformly distributed on it.

Sea level, in this report, refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)--a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

Sediment is solid material that originates mostly from disintegrated rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material such as humus. The quantity, characteristics, and cause of the occurrence of sediment in streams are influenced by environmental factors. Some major factors are degree of slope, length of slope, soil characteristics, land usage, and quantity and intensity of precipitation.

Bed load is the sediment that is transported in a stream by rolling, sliding, or skipping along the bed very close to the bed surface. In this report, bed load is considered to consist of particles in transit within 0.25 ft of the streambed.

Bed load discharge (tons per day) is the quantity of bed load measured by dry weight that moves past a section as bed load in a given time.

Suspended sediment is the sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.

Suspended-sediment concentration is the velocity-weighted concentration of suspended sediment in the sampled zone (from the water surface to a point approximately 0.3 ft above the bed) expressed as milligrams of dry sediment per liter of water-sediment mixture (mg/L).

Mean concentration is the time-weighted concentration of suspended sediment passing a stream section during a 24-hour day.

Suspended-sediment discharge (tons/day) is the rate at which dry mass of sediment passes a section of a stream or is the quantity of sediment, as measured by dry mass or volume, that passes a section in a given time. It is calculated in units of tons per day as follows: concentration (mg/L) x discharge (ft<sup>3</sup>/s) x 0.0027.

Suspended-sediment load is a general term that refers to material in suspension. It is not synonymous with either discharge or concentration.

Total-sediment discharge (tons/day) is the sum of the suspended-sediment discharge and the bed-load discharge. It is the total quantity of sediment, as measured by dry mass or volume, that passes a section during a given time.

Total-sediment load or total load is a term which refers to the total sediment (bed load plus suspended-sediment load) that is in transport. It is not synonymous with total-sediment discharge.

7-day 10-year low flow (7 Q10) is the discharge at the 10-year recurrence interval taken from a frequency curve of annual values of the lowest mean discharge for 7 consecutive days (the 7-day low flow).

Sodium-adsorption-ratio (SAR) is the expression of relative activity of sodium ions in exchange reactions within soil and is an index of sodium or alkali hazard to the soil. Waters range in respect to sodium hazard from those which can be used for irrigation on almost all soils to those which are generally unsatisfactory for irrigation.

Solute is any substance that is dissolved in water.

Specific conductance is a measure of the ability of a water to conduct an electrical current. It is expressed in microsiemens per centimeter at 25°C. Specific conductance is related to the type and concentration of ions in solution and can be used for

approximating the dissolved-solids content of the water. Commonly, the concentration of dissolved solids (in milligrams per liter) is about 65 percent of the specific conductance (in microsiemens). This relation is not constant from stream to stream, and it may vary in the same source with changes in the composition of the water.

Stage-discharge relation is the relation between gage height (stage) and the volume of water, per unit of time, flowing in a channel.

Streamflow is the discharge that occurs in a natural channel. Although the term "discharge" can be applied to the flow of a canal, the word "streamflow" uniquely describes the discharge in a surface stream course. The term "streamflow" is more general than "runoff" as streamflow may be applied to discharge whether or not it is affected by diversion or regulation.

Substrate is the physical surface upon which an organism lives.

Natural substrate refers to any naturally occurring emersed or submersed solid surface, such as a rock or tree, upon which an organism lives.

Artificial substrate is a device which is purposely placed in a stream or lake for colonization of organisms. The artificial substrate simplifies the community structure by standardizing the substrate from which each sample is taken. Examples of artificial substrates are basket samplers (made of wire cages filled with clean streamside rocks) and multiplate samplers (made of hardboard) for benthic organism collection, and plexiglass strips for periphyton.

Surface area of a lake is that area outlined on the latest U.S. Geological Survey topographic map as the boundary of the lake and measured by a planimeter in acres. In localities not covered by topographic maps, the areas are computed from the best maps available at the time planimetered. All areas shown are those for the stage when the planimetered map was made.

Surficial bed material is the part (0.1 to 0.2 ft) of the bed material that is sampled using U.S. Series Bed-Material Samplers.

Suspended (as used in tables of chemical analyses) refers to the amount (concentration) of undissolved material in a water-sediment mixture. It is associated with the material retained on a 0.45-um filter.

Suspended, recoverable is the amount of a given constituent that is in solution after the part of a representative water-suspended sediment sample that is retained on a 0.45-um membrane filter has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all the particulate matter is not achieved by the digestion treatment and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses because different digestion procedures are likely to produce different analytical results.

Determinations of "suspended, recoverable" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total recoverable concentrations of the constituent.

Suspended, total is the total amount of a given constituent in the part of a representative water-suspended sediment sample that is retained on a 0.45-um membrane filter. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent determined. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to determine when the results should be reported as "suspended, total."

Determinations of "suspended, total" constituents are made either by analyzing portions of the material collected on the filter or, more commonly, by difference, based on determinations of (1) dissolved and (2) total concentrations of the constituent.

Taxonomy is the division of biology concerned with the classification and naming of organisms. The classification of organisms is based upon a hierarchical scheme beginning with Kingdom and ending with Species at the base. The higher the classification level, the fewer features the organisms have in common. For example, the taxonomy of a particular mayfly, Hexagenia limbata, is the following:

Kingdom.....	Animal
Phylum.....	Arthropoda
Class.....	Insecta
Order.....	Ephemeroptera
Family.....	Ephemeridae
Genus.....	<u>Hexagenia</u>
Species.....	<u>Hexagenia limbata</u>

Thermograph is an instrument that continuously records variations of temperature on a chart. The more general term "temperature recorder" is used in the table headings and refers to any instrument that records temperature whether on a chart, a tape, or any other medium.

Time-weighted average is computed by multiplying the number of days in the sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the total number of days. A time-weighted average represents the composition of water that would be contained in a vessel or reservoir that had received equal quantities of water from the stream each day for the year.

Tons per acre-foot indicates the dry mass of dissolved solids in 1 acre-foot of water. It is computed by multiplying the concentration of the constituent, in milligrams per liter, by 0.00136.

Tons per day (T/DAY) is the quantity of a substance in solution or suspension that passes a stream section during a 24-hour period.

Total is the total amount of a given constituent in a representative water-suspended sample, regardless of the constituent's physical or chemical form. This term is used only when the analytical procedure assures measurement of at least 95 percent of the constituent present in both the dissolved and suspended phases of the sample. A knowledge of the expected form of the constituent in the sample, as well as the analytical methodology used, is required to judge when the results should be reported as "total." (Note that the word "total" does double duty here, indicating both that the sample consists of a water-suspended sediment mixture and that the analytical method determined all of the constituent in the sample.)

Total discharge is the total quantity of any individual constituent, as measured by dry mass or volume, that passes through a stream cross section per unit of time. This term needs to be qualified, such as "total sediment discharge," "total chloride discharge," and so on.

Total, recoverable is the amount of a given constituent that is in solution after a representative water-suspended sediment sample has been digested by a method (usually using a dilute acid solution) that results in dissolution of only readily soluble substances. Complete dissolution of all particulate matter is not achieved by the digestion treatment, and thus the determination represents something less than the "total" amount (that is, less than 95 percent) of the constituent present in the dissolved and suspended phases of the sample. To achieve comparability of analytical data, equivalent digestion procedures are required of all laboratories performing such analyses, because different digestion procedures are likely to produce different analytical results.

Tritium Network is a network of stations which has been established to provide baseline information on the occurrence of tritium in the Nation's surface waters. In addition to the surface-water stations in the network, tritium data are also obtained at a number of precipitation stations. The purpose of the precipitation stations is to provide an estimate sufficient for hydrologic studies of the tritium input to the United States.

Water year in Geological Survey reports dealing with surface-water supply is the 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends and which includes 9 of the 12 months. Thus, the year ending September 30, 1980, is called the "1980 water year."

WDR is used as an abbreviation for "Water-Data Report" in the REVISED RECORDS paragraph to refer to State annual hydrologic-data reports (WRD was used as an abbreviation for "Water-Resources Data" in reports published prior to 1976).

Weighted average is used in this report to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

WSP is used as an abbreviation for "Water-Supply Paper" in references to previously published reports. Water year in Geological Survey reports dealing with surface-water supply is the



## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

The U.S. Geological Survey publishes a series of manuals describing procedures for planning and conducting specialized work in water-resources investigations. The material is grouped under major subject headings called books and is further divided into sections and chapters. For example, Section A of Book 3 (Applications of Hydraulics) pertains to surface water. The chapter, the unit of publication, is limited to a narrow field of subject matter. This format permits flexibility in revision and publication as the need arises.

The reports listed below are for sale by the U.S. Geological Survey, Branch of Information Services, Box 25286, Federal Center, Denver, Colorado 80225 (authorized agent of the Superintendent of Documents, Government Printing Office). Prepayment is required. Remittance should be sent by check or money order payable to the U.S. Geological Survey. Prices are not included because they are subject to change. Current prices can be obtained by writing to the above address. When ordering or inquiring about prices for any of these publications, please give the title, book number, chapter number, and "U.S. Geological Survey Techniques of Water-Resources Investigations."

1-D1. Water temperature--influential factors, field measurement, and data presentation, by H. H. Stevens, Jr., J. F. Ficke, and G. F. Smoot: USGS--TWRI Book 1, Chapter D1. 1975. 65 pages.

1-D2. Guidelines for collection and field analysis of ground-water samples for selected unstable constituents, by W. W. Wood: USGS--TWRI Book 1, Chapter D2. 1976. 24 pages.

2-D1. Application of surface geophysics to ground-water investigations, by A. A. R. Zohdy, G. P. Eaton, and D. R. Mabey: USGS--TWRI Book 2, Chapter D1. 1974. 116 pages.

2-D2. Application of seismic-refraction techniques to hydrologic studies, by F. P. Haeni: USGS--TWRI Book 2, Chapter D2. 1988. 86 pages.

2-E1. Application of borehole geophysics to water-resources investigations, by W. S. Keys and L.M. MacCary: USGS--TWRI Book 2, Chapter E1. 1971. 126 pages.

2-E2. Borehole geophysics applied to ground-water investigations, by W. S. Keys: USGS--TWRI Book 2, Chapter E2. 1990. 150 pages.

2-F1. Application of drilling, coring, and sampling techniques to test holes and wells, by Eugene Shuter and W. E. Teasdale: USGS--TWRI Book 2, Chapter F1. 1989. 97 pages.

3-A1. General field and office procedures for indirect discharge measurements, by M. A. Benson and Tate Dalrymple: USGS--TWRI Book 3, Chapter A1. 1967. 30 pages.

3-A2. Measurement of peak discharge by the slope-area method, by Tate Dalrymple and M. A. Benson: USGS--TWRI Book 3, Chapter A2. 1967. 12 pages.

3-A3. Measurement of peak discharge at culverts by indirect methods, by G. L. Bodhaine: USGS--TWRI Book 3, Chapter A3. 1968. 60 pages.

3-A4. Measurement of peak discharge at width contractions by indirect methods, by H. F. Matthai: USGS--TWRI Book 3, Chapter A4. 1967. 44 pages.

3-A5. Measurement of peak discharge at dams by indirect methods, by Harry Hulsing: USGS--TWRI Book 3. Chapter A5. 1967. 29 pages.

3-A6. General procedure for gaging streams, by R. W. Carter and Jacob Davidian: USGS--TWRI Book 3, Chapter A6. 1968. 13 pages.

3-A7. Stage measurement at gaging stations, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A7. 1968. 28 pages.

3-A8. Discharge measurements at gaging stations, by T. J. Buchanan and W. P. Somers: USGS--TWRI Book 3, Chapter A8. 1969. 65 pages.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

3-A9. Measurement of time of travel in streams by dye tracing, by F. A. Kilpatrick and J. F. Wilson, Jr.: USGS--TWRI Book 3, Chapter A9. 1989. 27 pages.

3-A10. Discharge ratings at gaging stations, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A10. 1984. 59 pages.

3-A11. Measurement of discharge by the moving-boat method, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 3, Chapter A11. 1969. 22 pages.

3-A12. Fluorometric procedures for dye tracing, Revised, by J. F. Wilson, Jr., E. D. Cobb, and F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A12. 1986. 34 pages.

3-A13. Computation of continuous records of streamflow, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A13. 1983. 53 pages.

3-A14. Use of flumes in measuring discharge, by F. A. Kilpatrick and V. R. Schneider: USGS--TWRI Book 3, Chapter A14. 1983. 46 pages.

3-A15. Computation of water-surface profiles in open channels, by Jacob Davidian: USGS--TWRI Book 3, Chapter A15. 1984. 48 pages.

3-A16. Measurement of discharge using tracers, by F. A. Kilpatrick and E. D. Cobb: USGS--TWRI Book 3, Chapter A16. 1985. 52 pages.

3-A17. Acoustic velocity meter systems, by Antonius Laenen: USGS--TWRI Book 3, Chapter A17. 1985. 38 pages.

3-A18. Determination of stream reaeration coefficients by use of tracers, by F. A. Kilpatrick, R. E. Rathbun, Nobuhiro Yotsukura, G. W. Parker, and L. L. DeLong: USGS--TWRI Book 3, Chapter A18. 1989. 52 pages.

3-A19. Levels at streamflow gaging stations, by E. J. Kennedy: USGS--TWRI Book 3, Chapter A19. 1990. 31 pages.

3-A20. Simulation of soluble waste transport and buildup in surface waters using tracers, by F. A. Kilpatrick: USGS--TWRI Book 3, Chapter A20. 1993. 38 pages.

3-A21. Stream-gaging cableways, by C. Russell Wagner: USGS--TWRI book 3, Chapter A21. 1995. 56 pages.

3-B1. Aquifer-test design, observation, and data analysis, by R. W. Stallman: USGS--TWRI Book 3, Chapter B1. 1971. 26 pages.

3-B2. Introduction to ground-water hydraulics, a programmed text for self-instruction, by G. D. Bennett: USGS--TWRI Book 3, Chapter B2. 1976. 172 pages.

3-B3. Type curves for selected problems of flow to wells in confined aquifers, by J. E. Reed: USGS--TWRI Book 3, Chapter B3. 1980. 106 pages.

3-B4. Regression modeling of ground-water flow, by R. L. Cooley and R. L. Naff: USGS--TWRI Book 3, Chapter B4. 1990. 232 pages.

3-B4. Supplement 1. Regression modeling of ground-water flow - Modifications to the computer code for nonlinear regression solution of steady-state ground-water flow problems, by R. L. Cooley: USGS--TWRI Book 3, Chapter B4. 1993. 8 pages.

3-B5. Definition of boundary and initial conditions in the analysis of saturated ground-water flow systems--An introduction, by O. L. Franke, T. E. Reilly, and G. D. Bennett: USGS--TWRI Book 3, Chapter B5. 1987. 15 pages.

3-B6. The principle of superposition and its application in ground-water hydraulics, by T. E. Reilly, O. L. Franke, and G. D. Bennett: USGS--TWRI Book 3, Chapter B6. 1987. 28 pages.

3-B7. Analytical solutions for one-, two-, and three-dimensional solute transport in ground-water systems with uniform flow, by E. J. Wexler: USGS--TWRI Book 3, Chapter B7. 1992. 190 pages.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

- 3-C1. Fluvial sediment concepts, by H. P. Guy: USGS--TWRI Book 3, Chapter C1. 1970. 55 pages.
- 3-C2. Field methods for measurement of fluvial sediment, by H. P. Guy and V. W. Norman: USGS--TWRI Book 3, Chapter C2. 1970. 59 pages.
- 3-C3. Computation of fluvial-sediment discharge, by George Porterfield: USGS--TWRI Book 3, Chapter C3. 1972. 66 pages.
- 4-A1. Some statistical tools in hydrology, by H. C. Riggs: USGS--TWRI Book 4, Chapter A1. 1968. 39 pages.
- 4-A2. Frequency curves, by H. C. Riggs: USGS--TWRI Book 4, Chapter A2. 1968. 15 pages.
- 4-B1. Low-flow investigations, by H. C. Riggs: USGS--TWRI Book 4, Chapter B1. 1972. 18 pages.
- 4-B2. Storage analyses for water supply, by H. C. Riggs and C. H. Hardison: USGS--TWRI Book 4, Chapter B2. 1973. 20 pages.
- 4-B3. Regional analyses of streamflow characteristics, by H. C. Riggs: USGS--TWRI Book 4, Chapter B3. 1973. 15 pages.
- 4-D1. Computation of rate and volume of stream depletion by wells, by C. T. Jenkins: USGS--TWRI Book 4, Chapter D1. 1970. 17 pages.
- 5-A1. Methods for determination of inorganic substances in water and fluvial sediments, by M.J. Fishman and L. C. Friedman, editors: USGS--TWRI Book 5, Chapter A1. 1989. 545 pages.
- 5-A2. Determination of minor elements in water by emission spectroscopy, by P. R. Barnett and E. C. Mallory, Jr.: USGS--TWRI Book 5, Chapter A2. 1971. 31 pages.
- 5-A3. Methods for the determination of organic substances in water and fluvial sediments, edited by R. L. Wershaw, M. J. Fishman, R. R. Grabbe, and L. E. Lowe: USGS--TWRI Book 5, Chapter A3. 1987. 80 pages.
- 5-A4. Methods for collection and analysis of aquatic biological and microbiological samples, by L. J. Britton and P. E. Greeson, editors: USGS--TWRI Book 5, Chapter A4. 1989. 363 pages.
- 5-A5. Methods for determination of radioactive substances in water and fluvial sediments, by L.L. Thatcher, V. J. Janzer, and K. W. Edwards: USGS--TWRI Book 5, Chapter A5. 1977. 95 pages.
- 5-A6. Quality assurance practices for the chemical and biological analyses of water and fluvial sediments, by L. C. Friedman and D. E. Erdmann: USGS--TWRI Book 5, Chapter A6. 1982. 181 pages.
- 5-C1. Laboratory theory and methods for sediment analysis, by H. P. Guy: USGS--TWRI Book 5, Chapter C1. 1969. 58 pages.
- 6-A1. A modular three-dimensional finite-difference ground-water flow model, by M. G. McDonald and A. W. Harbaugh: USGS--TWRI Book 6, Chapter A1. 1988. 586 pages.
- 6-A2. Documentation of a computer program to simulate aquifer-system compaction using the modular finite-difference ground-water flow model, by S. A. Leake and D. E. Prudic: USGS--TWRI Book 6, Chapter A2. 1991. 68 pages.
- 6-A3. A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 1: Model Description and User's Manual, by L. J. Torak: USGS--TWRI Book 6, Chapter A3. 1993. 136 pages.
- 6-A4. A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 2: Derivation of finite-element equations and comparisons with analytical solutions, by R. L. Cooley: USGS--TWRI Book 6, Chapter A4. 1992. 108 pages.

## PUBLICATIONS ON TECHNIQUES OF WATER-RESOURCES INVESTIGATIONS

6-A5. A modular finite-element model (MODFE) for areal and axisymmetric ground-water-flow problems, Part 3: Design philosophy and programming details, by L. J. Torak: USGS--TWRI Book 6, Chapter A5, 1993. 243 pages.

6-A6. A coupled surface-water and ground-water flow model (MODBRANCH) for simulation of stream-aquifer interaction, by Eric D. Swain and Eliezer J. Wexler. 1995. 125 pages.

7-C1. Finite difference model for aquifer simulation in two dimensions with results of numerical experiments, by P. C. Trescott, G. F. Pinder, and S. P. Larson: USGS--TWRI Book 7, Chapter C1. 1976. 116 pages.

7-C2. Computer model of two-dimensional solute transport and dispersion in ground water, by L. F. Konikow and J. D. Bredehoeft: USGS--TWRI Book 7, Chapter C2. 1978. 90 pages.

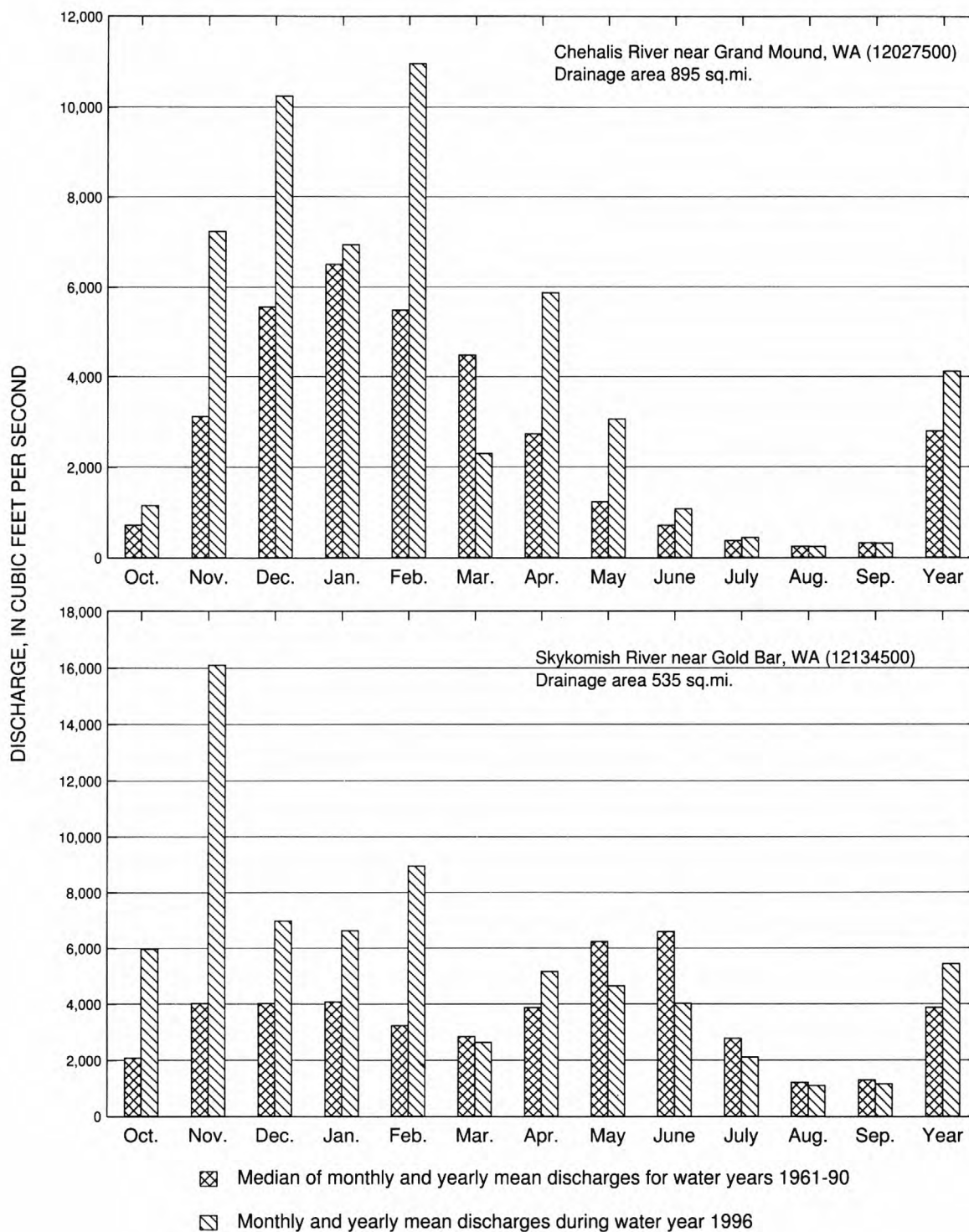
7-C3. A model for simulation of flow in singular and interconnected channels, by R. W. Schaffranek, R. A. Baltzer, and D. E. Goldberg: USGS--TWRI Book 7, Chapter C3. 1981. 110 pages.

8-A1. Methods of measuring water levels in deep wells, by M. S. Garber and F. C. Koopman: USGS--TWRI Book 8, Chapter A1. 1968. 23 pages.

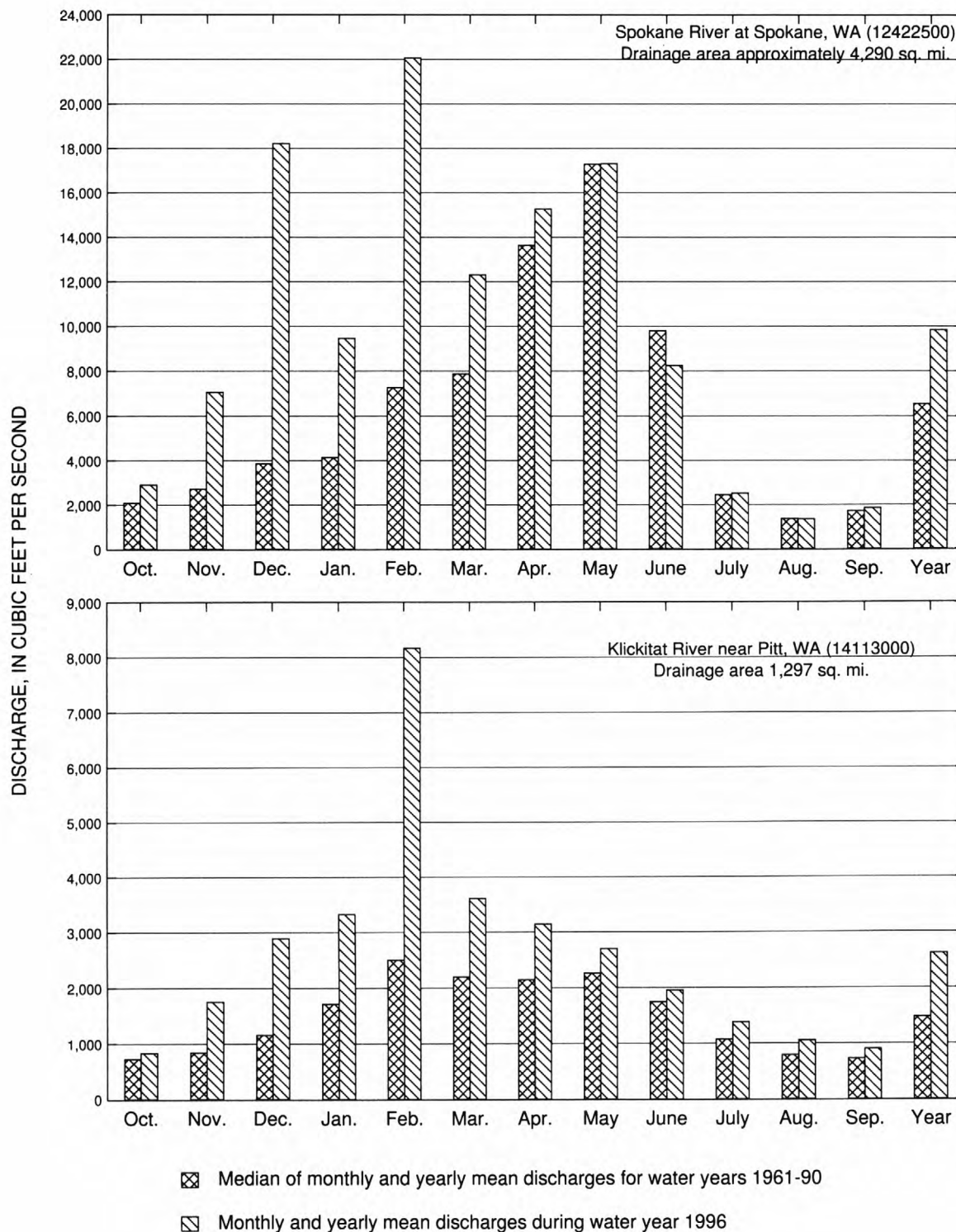
8-A2. Installation and service manual for U.S. Geological Survey manometers, by J. D. Craig: USGS--TWRI Book 8, Chapter A2. 1983. 57 pages.

8-B2. Calibration and maintenance of vertical-axis type current meters, by G. F. Smoot and C. E. Novak: USGS--TWRI Book 8, Chapter B2. 1968. 15 pages.





**Figure 17.** Discharge during 1996 water year compared with median discharge for period 1961-90 for two representative gaging stations in Western Washington.



**Figure 18.** Discharge during 1996 water year compared with median discharge for period 1961-90 for two representative gaging stations in Eastern Washington.

THIS PAGE IS INTENTIONALLY BLANK

## SURFACE-WATER RECORDS

## Remark Codes

The following remark codes may appear with the water-quality data in this section:

PRINTED OUTPUT	REMARK
E	Estimated value
<	Actual value is known to be less than the value shown
>	Actual value is known to be greater than the value shown
K	Results based on colony count outside the acceptance range (non-ideal colony count)
*	Laboratory value

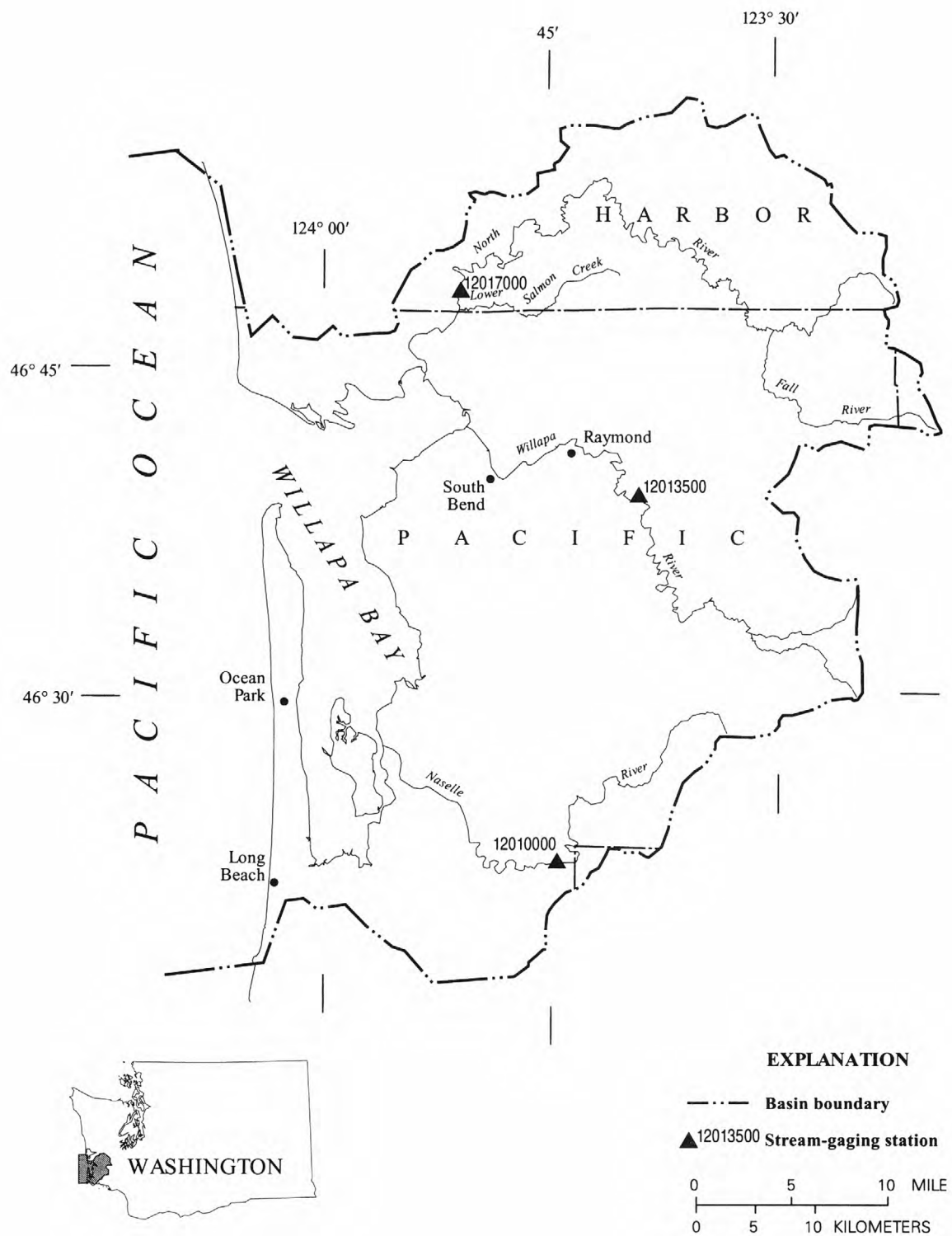
## Dissolved Trace-Element Concentrations

NOTE.--Traditionally, dissolved trace-element concentrations have been reported at the microgram per liter ( $\mu\text{g/L}$ ) level. Recent evidence, mostly from large rivers, indicates that actual dissolved-phase concentrations for a number of trace elements are within the range of 10's to 100's of nanograms per liter ( $\text{ng/L}$ ). Data above the  $\mu\text{g/L}$  level should be viewed with caution. Such data may actually represent elevated environmental concentrations from natural or human causes; however, these data could reflect contamination introduced during sampling, processing, or analysis. To confidently produce dissolved trace-element data with insignificant contamination, the U.S. Geological Survey began using new trace-element protocols at some stations in water year 1994.

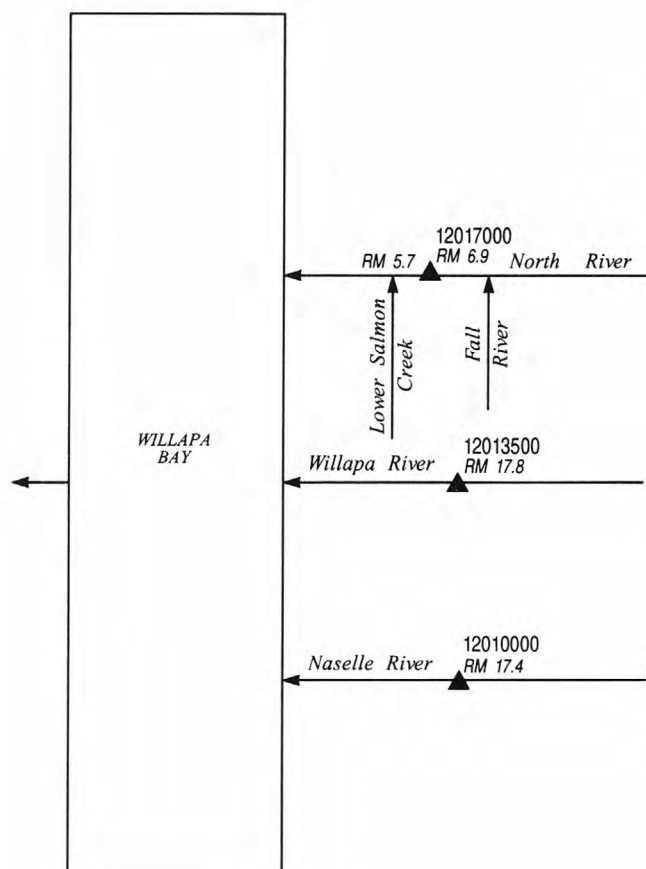
## Change in National Trends Network Procedures

NOTE.--Sample handling procedures at all National Trends Network stations were changed substantially on January 11, 1994, in order to reduce contamination from the sample shipping container. The data for samples before and after that date are different and not directly comparable. A tabular summary of the differences based on a special intercomparison study, is available from the NADP/NTN Coordination Office, Colorado State University, Fort Collins, CO 80523 (Telephone: 303 491-5643).





**Figure 19.** Location of surface-water and water-quality stations in the Naselle and Willapa River Basins.



#### EXPLANATION

- ▲ 12010000 Stream-gaging station
- ▼ 12119000 Water-quality data collection site
- ▲ 12396000 Crest-stage gaging station
- RM 17.4 River mile
- Stream—Arrow shows direction of flow
- Tunnel or pipe—Arrow shows direction of flow

**Figure 20.** Schematic diagram showing surface-water stations in the Naselle and Willapa River Basins.

## NASELLE RIVER BASIN

12010000 NASELLE RIVER NEAR NASELLE, WA

LOCATION.--Lat 46°22'27", long 123°44'32", in SW 1/4 SW 1/4 sec.1, T.10 N., R.9 W., Pacific County, Hydrologic Unit 17100106, on right bank 0.2 mi upstream from county highway bridge, 2.2 mi upstream from Salmon Creek, 3.4 mi east of Naselle, and at mile 17.4.

DRAINAGE AREA.--54.8 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1929 to current year.

REVISED RECORDS.--WSP 1216: Drainage area. WSP 1316: 1930(M), 1932-40(M), 1945-46(M).

GAGE.--Water-stage recorder. Elevation of gage is 24 ft above sea level, by barometer. Prior to Jan. 11, 1957, nonrecording gage and crest-stage gage at site 1,350 ft downstream at present datum. Jan. 11, 1957, to Dec. 31, 1961, nonrecording gage and crest-stage gage at site 1,200 ft downstream at present datum.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station. Chemical analyses October 1965 to September 1970, January to September 1973, November 1975 to June 1980. Water temperatures August 1963 to September 1973. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--67 years (water years 1930-96), 426 ft<sup>3</sup>/s, 105.53 in/yr, 308,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 18.45 ft, from rating curve extended above 5,500 ft<sup>3</sup>/s; minimum discharge, 18 ft<sup>3</sup>/s Aug. 30, 31, Sept. 1, 1970, Sept. 3, 1982.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	0800	4,650	11.91	Feb. 6	2045	5,070	12.39
Nov. 28	0345	5,980	13.39	Feb. 8	0845	*7,800	*15.24
Nov. 29	1115	7,260	14.71	Apr. 23	1700	5,080	12.41
Jan. 7	0745	6,590	14.03				

Minimum discharge, 28 ft<sup>3</sup>/s Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	197	262	2320	763	404	324	214	412	182	65	40	31
2	197	231	1630	640	384	305	220	362	169	63	59	30
3	334	207	1200	812	366	292	183	334	158	63	54	34
4	259	197	1110	749	362	289	164	295	155	68	47	39
5	186	206	888	705	696	285	151	263	144	62	56	36
6	148	205	741	1810	2880	283	149	235	134	58	49	42
7	126	619	629	5020	4470	279	137	224	126	56	44	36
8	126	2160	542	2380	6890	273	127	206	120	54	41	36
9	123	1580	571	1310	3270	265	122	186	124	53	39	37
10	858	1210	948	907	1560	356	123	174	114	52	38	33
11	1130	3470	2310	716	1000	415	184	171	107	51	38	31
12	789	1790	1920	604	739	386	607	163	102	50	39	31
13	517	1300	2490	536	594	344	632	184	97	48	37	33
14	416	1140	2490	544	489	311	464	169	93	46	36	67
15	333	995	2260	812	416	287	394	155	91	46	35	94
16	383	833	1430	896	352	261	378	143	88	46	35	95
17	848	701	1020	734	427	241	484	193	89	48	36	57
18	873	744	883	642	725	222	578	603	99	82	35	45
19	603	644	733	682	835	213	652	588	85	99	34	50
20	521	557	639	902	976	202	600	471	79	67	34	42
21	484	481	569	1280	1010	184	533	402	75	59	34	40
22	425	566	500	1110	862	201	757	423	75	53	33	42
23	367	935	445	930	1030	173	3610	407	90	50	32	37
24	324	1570	397	843	836	159	2730	384	89	47	31	34
25	486	1810	365	741	675	148	1620	346	92	46	30	32
26	968	1330	336	667	561	140	1280	310	80	45	31	31
27	641	1920	305	600	479	137	953	279	74	44	32	30
28	507	4730	283	556	407	129	731	262	76	43	32	29
29	415	6100	536	512	363	134	586	234	72	43	31	29
30	349	3590	753	459	---	124	485	214	67	41	32	28
31	301	---	938	429	---	141	---	195	---	40	35	---
TOTAL	14234	42083	32181	30291	34058	7503	19848	8987	3146	1688	1179	1231
MEAN	459	1403	1038	977	1174	242	662	290	105	54.5	38.0	41.0
MAX	1130	6100	2490	5020	6890	415	3610	603	182	99	59	95
MIN	123	197	283	429	352	124	122	143	67	40	30	28
AC-FT	28230	83470	63830	60080	67550	14880	39370	17830	6240	3350	2340	2440
CFSM	8.38	25.6	18.9	17.8	21.4	4.42	12.1	5.29	1.91	.99	.69	.75
IN.	9.66	28.57	21.85	20.56	23.12	5.09	13.47	6.10	2.14	1.15	.80	.84

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

MEAN	274	712	915	855	806	609	403	207	137	76.6	51.0	83.0
MAX	796	1539	2530	1969	1587	1217	858	448	343	250	123	455
(WY)	1948	1984	1934	1953	1961	1950	1937	1948	1968	1983	1968	1978
MIN	20.9	37.3	245	215	191	153	120	82.0	54.9	33.8	22.3	28.7
(WY)	1988	1937	1977	1985	1993	1992	1939	1956	1982	1970	1970	1967

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1929 - 1996
ANNUAL TOTAL	183107	196429	
ANNUAL MEAN	502	537	426
HIGHEST ANNUAL MEAN			611
LOWEST ANNUAL MEAN			226
HIGHEST DAILY MEAN	6100	Nov 29	10400
LOWEST DAILY MEAN	29	Sep 22	18
ANNUAL SEVEN-DAY MINIMUM	30	Sep 19	19
ANNUAL RUNOFF (AC-FT)	363200	389600	308300
ANNUAL RUNOFF (CFSM)	9.15	9.79	7.77
ANNUAL RUNOFF (INCHES)	124.30	133.34	105.53
10 PERCENT EXCEEDS	1290	1160	1040
50 PERCENT EXCEEDS	270	279	215
90 PERCENT EXCEEDS	35	37	39

## WILLAPA RIVER BASIN

12013500 WILLAPA RIVER NEAR WILLAPA, WA

LOCATION.--Lat 46°39'04", long 123°39'05", in SW 1/4 SW 1/4 sec.35, T.14 N., R.8 W. Pacific County, Hydrologic Unit 17100106, on right bank 2,150 ft downstream from Mill Creek, 1.8 mi southeast of Willapa, and at mile 17.8.

DRAINAGE AREA.--130 mi<sup>2</sup>.

PERIOD OF RECORD.--August to October 1947, July 1948 to December 1954, water years 1955-56, 1958-59 (annual maximum), April 1961 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 3.57 ft above sea level. Aug. 26 to Oct. 16, 1947, water-stage recorder at site 2,060 ft upstream at different datum. July 28, 1948, to Dec. 2, 1954, water-stage recorder, water years 1955-56, 1958-59, nonrecording gage, and Apr. 1, 1961, to Apr. 14, 1974, water-stage recorder at site 2,000 ft upstream at datum 2.12 ft higher.

REMARKS.--No estimated daily discharges. Records good. Some diversion for domestic use and irrigation upstream from station. No regulation. U.S. Geological Survey satellite telemeter at station. Chemical analyses October 1965 to September 1986.

AVERAGE DISCHARGE.--41 years (water years 1949-1954, 1962-1996), 627 ft<sup>3</sup>/s, 65.53 in/yr, 454,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,800 ft<sup>3</sup>/s Dec. 20, 1994, from rating curve extended above 8,000 ft<sup>3</sup>/s, gage height, 27.28 ft; minimum discharge, 13 ft<sup>3</sup>/s Aug. 20, 1967; minimum gage height, 2.87 ft Aug. 18-21, 23-25, 31, Sept. 1, 1970, site and datum then in use.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1700	6,160	16.81	Dec. 14	1700	5,050	15.12
Nov. 11	1000	6,580	17.43	Jan. 7	1300	7,050	18.10
Nov. 28	0700	6,290	17.01	Feb. 8	1700	*11,000	*23.21
Nov. 29	2000	9,240	21.04	Apr. 23	2300	10,100	22.12
Dec. 13	0300	6,230	16.92				

Minimum discharge, 23 ft<sup>3</sup>/s Aug. 25, gage height, 3.05 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	211	289	4030	1170	634	607	296	710	315	86	37	30
2	152	261	2990	969	579	550	363	628	292	82	42	28
3	194	240	2140	1150	538	546	290	576	270	83	54	34
4	185	226	1920	1050	556	555	263	521	254	95	45	43
5	137	236	1470	991	1240	546	245	471	240	86	49	39
6	112	246	1190	1700	4320	514	237	423	219	75	48	38
7	98	974	987	5630	6950	477	228	409	205	69	42	37
8	92	4100	833	3400	9880	457	213	385	194	66	38	35
9	96	2850	910	2030	6210	428	203	347	189	64	34	34
10	771	1850	1280	1470	2810	502	200	323	183	60	33	33
11	1190	5040	3880	1160	1790	521	239	321	174	58	32	31
12	768	2620	3420	959	1320	482	954	321	164	56	32	31
13	502	1840	4930	818	1040	443	1170	358	153	53	31	32
14	368	1480	4090	770	856	411	820	346	145	50	30	46
15	290	1250	3670	1240	726	389	666	318	138	56	28	115
16	377	1050	2370	1450	634	360	626	293	134	54	29	119
17	611	900	1740	1170	727	341	828	348	134	56	29	77
18	778	1090	1500	1030	1240	321	969	894	141	74	30	60
19	531	1010	1180	1160	1470	317	1090	1060	127	122	29	56
20	462	878	992	1570	1820	305	998	846	117	97	29	52
21	468	762	847	2330	1940	287	852	726	109	81	30	49
22	438	744	734	1970	1660	311	891	781	108	73	29	50
23	372	1000	645	1760	2200	283	5820	780	127	63	27	48
24	324	1570	577	1600	1800	263	6210	737	133	59	26	43
25	359	2440	521	1400	1410	247	2890	644	146	55	25	41
26	1030	1950	479	1260	1140	237	2260	569	120	52	27	39
27	648	2380	444	1100	941	232	1680	505	106	49	27	37
28	522	5310	421	1010	795	228	1280	462	106	40	29	36
29	434	7540	619	888	685	228	1020	415	100	40	29	36
30	371	5850	914	771	---	220	838	377	92	39	27	37
31	325	---	1460	693	---	213	---	345	---	38	29	---
TOTAL	13216	57976	53183	45669	57911	11821	34639	16239	4935	2031	1026	1386
MEAN	426	1933	1716	1473	1997	381	1155	524	164	65.5	33.1	46.2
MAX	1190	7540	4930	5630	9880	607	6210	1060	315	122	54	119
MIN	92	226	421	693	538	213	200	293	92	38	25	28
AC-FT	26210	115000	105500	90580	114900	23450	68710	32210	9790	4030	2040	2750
CFSM	3.28	14.9	13.2	11.3	15.4	2.93	8.88	4.03	1.27	.50	.25	.36
IN.	3.78	16.59	15.22	13.07	16.57	3.38	9.91	4.65	1.41	.58	.29	.40

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1996, BY WATER YEAR (WY)

MEAN	264	969	1449	1388	1271	951	615	299	162	75.0	46.9	74.5
MAX	793	2270	2844	3115	2523	1847	1312	600	486	203	117	378
(WY)	1976	1984	1995	1953	1954	1950	1991	1984	1968	1983	1968	1978
MIN	25.6	65.1	240	213	284	253	284	139	59.8	34.5	20.4	24.9
(WY)	1988	1994	1977	1977	1993	1992	1949	1994	1992	1992	1992	1967

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1947 - 1996
ANNUAL TOTAL	267577	300032	
ANNUAL MEAN	733	820	627
HIGHEST ANNUAL MEAN			963
LOWEST ANNUAL MEAN			294
HIGHEST DAILY MEAN	7540	Nov 29	12800
LOWEST DAILY MEAN	25	Sep 3	14
ANNUAL SEVEN-DAY MINIMUM	27	Sep 19	16
ANNUAL RUNOFF (AC-FT)	530700	595100	454300
ANNUAL RUNOFF (CFSM)	5.64	6.31	4.82
ANNUAL RUNOFF (INCHES)	76.57	85.86	65.53
10 PERCENT EXCEEDS	2020	1870	1570
50 PERCENT EXCEEDS	405	381	289
90 PERCENT EXCEEDS	36	37	36



12017000 NORTH RIVER NEAR RAYMOND, WA

LOCATION.--Lat 46°48'27", long 123°50'58", in SE 1/4 SW 1/4 sec.6, T.15 N., R.9 W., Grays Harbor County, Hydrologic Unit 17100106, on left bank 1.2 mi upstream from lower Salmon Creek, 10 mi northwest of Raymond, and at mile 6.9.

DRAINAGE AREA.--219 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1927 to September 1977, June 1995 to current year.

REVISED RECORDS.--WSP 792: 1934. WSP 832: 1935-36. WSP 1286: 1952.

GAGE.--Water-stage recorder. Elevation of gage is 7.39 ft above sea level (Western Washington Electric Light and Power Co. benchmark). Prior to June 1995 recording gage at site 130 ft downstream of present site.

REMARKS.--No estimated daily discharges. Records good except those below 50 ft<sup>3</sup>/s, which are fair. No regulation or diversions upstream from station. Chemical analysis October 1972 to September 1973. Water temperatures July 1963 to September 1973.

AVERAGE DISCHARGE.--51 years (water years 1928-77, 1996), 970 ft<sup>3</sup>/s, 60.19 in/yr, 702,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft<sup>3</sup>/s Dec. 10, 1933, gage height, 15.8 ft, present datum from flood marks due to dam failure, from rating curve extended above 9,400 ft<sup>3</sup>/s; minimum discharge, 21 ft<sup>3</sup>/s Aug. 24, 1951, gage height, 1.01 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 12	0400	5,980	7.34	Jan. 8	0330	6,730	7.77
Nov. 29	1930	9,800	9.40	Feb. 9	1400	*14,900	*11.77
Dec. 13	2215	5,240	6.89	Apr. 24	1630	5,930	7.31

Minimum discharge, 43 ft<sup>3</sup>/s Aug. 26-28, gage height, 1.37 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	196	481	8090	2480	870	871	430	1160	493	159	66	47
2	252	428	5320	1970	796	788	466	1000	462	150	76	46
3	235	384	3990	2060	733	751	446	903	432	146	76	63
4	238	358	3200	2130	753	798	389	821	407	146	96	60
5	239	361	2510	1910	1070	794	363	744	398	151	94	63
6	167	386	1980	2440	2810	795	376	683	375	142	87	74
7	134	1280	1590	5550	6390	743	403	637	344	129	95	67
8	131	3530	1320	6490	12800	738	395	613	324	121	83	71
9	141	4490	1280	4260	14300	711	361	561	310	115	72	66
10	1070	3360	1740	2600	8530	789	348	518	305	111	66	61
11	2700	5090	3270	1940	3500	860	392	495	299	107	63	61
12	1890	5720	4170	1550	2300	856	641	491	280	102	61	57
13	1040	3640	5020	1320	1750	785	1430	524	266	98	57	70
14	700	2920	4890	1350	1400	727	1410	576	250	95	56	160
15	537	2600	4190	1830	1170	685	1060	514	238	90	54	167
16	507	2210	3250	2540	1020	640	952	457	226	86	51	185
17	837	1760	2520	2180	1040	596	1020	459	216	85	49	185
18	1170	1560	2410	1700	1500	563	1120	767	213	98	48	177
19	942	1530	2060	1590	1770	544	1120	1350	217	121	50	144
20	721	1310	1720	1800	1930	543	1070	1260	205	160	50	114
21	692	1140	1450	2950	2230	517	957	1020	192	151	51	111
22	666	1070	1240	3030	2110	509	1060	981	183	123	49	100
23	584	1210	1070	2560	2400	525	3250	989	200	110	49	97
24	515	1970	943	2420	2560	480	5700	944	226	98	48	95
25	657	2520	842	2270	2120	440	5000	855	258	89	45	84
26	1510	2550	764	1970	1690	412	3800	764	260	82	44	76
27	1600	2810	710	1660	1370	403	2970	692	212	77	43	70
28	1030	5480	698	1440	1150	391	2230	636	188	73	45	65
29	783	8670	994	1290	991	380	1730	622	183	71	47	63
30	643	9200	1670	1100	---	379	1380	590	171	69	50	61
31	547	---	2290	961	---	372	---	531	---	68	51	---
TOTAL	23074	80018	77191	71341	83053	19385	42269	23157	8333	3423	1872	2760
MEAN	744	2667	2490	2301	2864	625	1409	747	278	110	60.4	92.0
MAX	2700	9200	8090	6490	14300	871	5700	1350	493	160	96	185
MIN	131	358	698	961	733	372	348	457	171	68	43	46
AC-FT	45770	158700	153100	141500	164700	38450	83840	45930	16530	6790	3710	5470
CFSM	3.40	12.2	11.4	10.5	13.1	2.86	6.43	3.41	1.27	.50	.28	.42
IN.	3.92	13.59	13.11	12.12	14.11	3.29	7.18	3.93	1.42	.58	.32	.47

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1996, BY WATER YEAR (WY)

	506	1424	2203	2182	1869	1468	964	467	258	125	82.4	133
MEAN	506	1424	2203	2182	1869	1468	964	467	258	125	82.4	133
MAX	1469	3201	9450	4649	3766	3024	2109	1127	741	263	179	505
(WY)	1932	1938	1934	1953	1961	1972	1931	1948	1968	1974	1968	1959
MIN	42.4	65.3	560	584	640	486	282	210	115	54.5	31.3	33.5
(WY)	1953	1937	1977	1977	1973	1941	1941	1956	1951	1951	1951	1938

SUMMARY STATISTICS

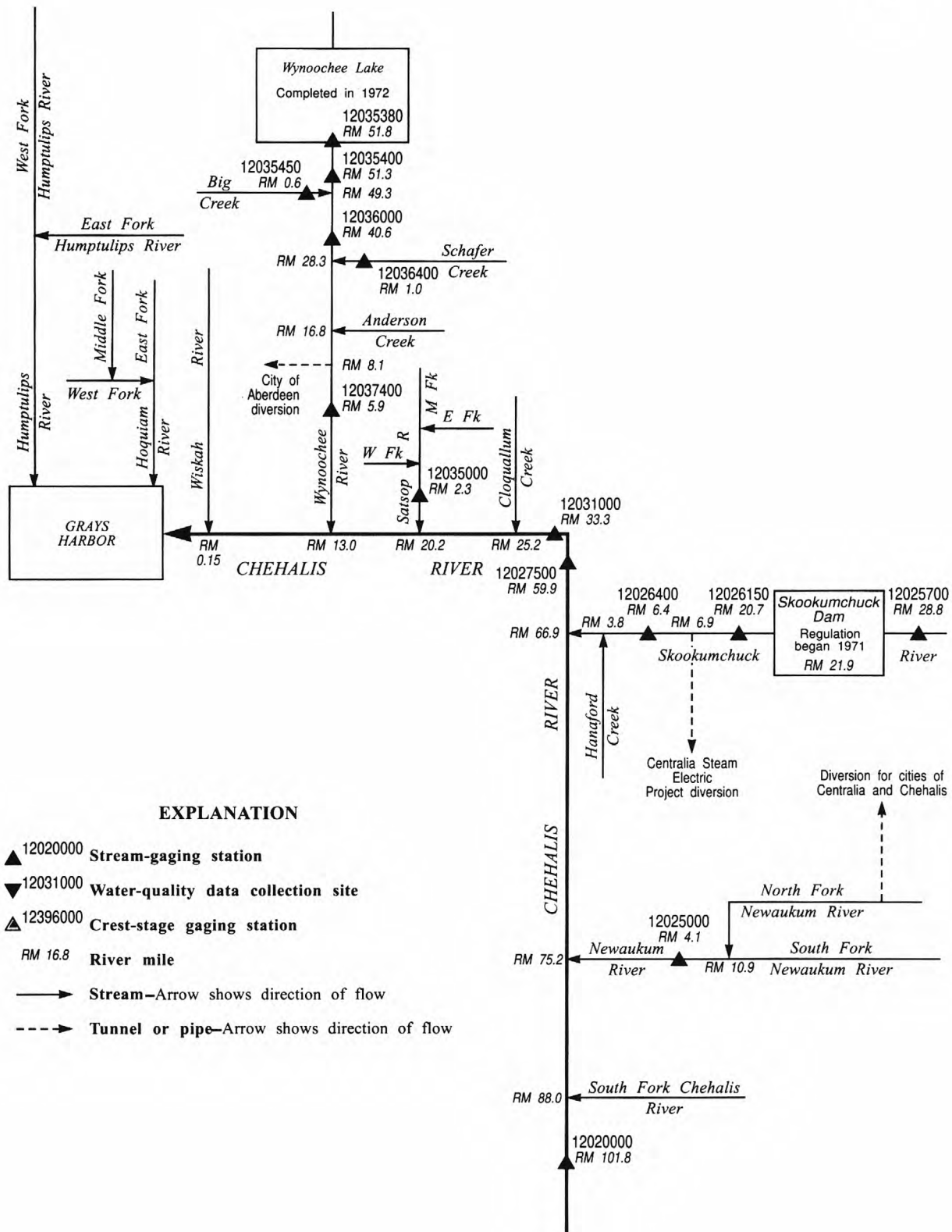
FOR 1996 WATER YEAR

WATER YEARS 1928 - 1996

ANNUAL TOTAL	435876	
ANNUAL MEAN	1191	970
HIGHEST ANNUAL MEAN		1610
LOWEST ANNUAL MEAN		491
HIGHEST DAILY MEAN	14300	25500
LOWEST DAILY MEAN	43	22
ANNUAL SEVEN-DAY MINIMUM	46	23
ANNUAL RUNOFF (AC-FT)	864600	702900
ANNUAL RUNOFF (CFSM)	5.44	4.43
ANNUAL RUNOFF (INCHES)	74.04	60.19
10 PERCENT EXCEEDS	2810	2510
50 PERCENT EXCEEDS	638	471
90 PERCENT EXCEEDS	68	66



**Figure 21.** Location of surface-water stations in the Chehalis River Basin.



**Figure 22.** Schematic diagram showing surface-water stations in the Chehalis River Basin.

## 12020000 CHEHALIS RIVER NEAR DOTY, WA

LOCATION.--Lat 46°37'03", long 123°16'35", in NE 1/4 NW 1/4 sec.14, T.13 N., R.5 W., Lewis County, Hydrologic Unit 17100103, on right bank 1.3 mi south of Doty, 1.6 mi upstream from Elk Creek, 3.4 mi north of Pe Ell, and at mile 101.8.

DRAINAGE AREA.--113 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1939 to current year.

REVISED RECORDS.--WSP 1316: 1943(M). WSP 1446: 1946(M). WDR-WA-72-1: 1945(M).

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 302.1 ft above sea level (river-profile survey). Prior to Oct. 1, 1961, nonrecording gage and crest-stage gage at site 50 ft upstream at same datum. Oct. 1, 1961 to Sept. 15, 1995, water-stage recorder at site 150 ft upstream at same datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station. Chemical analyses July 1959 to September 1970, sediment records October 1961 to December 1964 (partial-record station).

AVERAGE DISCHARGE.--57 years (water years 1940-96), 567 ft<sup>3</sup>/s, 68.18 in/yr, 410,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,900 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 20.37 ft, from rating curve extended above 8,000 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 18.36 ft; minimum discharge, 16 ft<sup>3</sup>/s Aug. 31, Sept. 3, 4, 7, 8, 1992.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1115	8,210	10.59	Feb. 8	1330	*28,900	*20.37
Nov. 29	1615	10,400	12.24	Apr. 23	1815	23,500	18.60
Feb. 6	2100	10,900	12.51				

Minimum discharge, 24 ft<sup>3</sup>/s Aug. 25, 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e170	193	3990	1230	425	e460	e350	631	275	87	46	30
2	e125	177	2800	928	384	e440	e410	552	257	84	58	27
3	e195	163	2030	1110	360	e500	337	494	238	83	70	31
4	e195	158	1900	1010	392	e650	290	442	226	93	56	36
5	e150	173	1420	916	1600	e700	258	396	214	81	63	36
6	e130	201	1100	1490	6690	e850	240	357	196	74	57	45
7	e100	1100	884	4950	7250	e750	223	343	183	70	50	42
8	e90	5680	729	2830	19200	e660	204	314	170	69	43	36
9	e90	2570	784	1710	6690	e610	190	285	164	66	39	35
10	e250	1490	1140	1220	3340	e600	185	262	158	65	37	32
11	e1030	4270	3150	942	e2200	e640	219	261	151	64	35	31
12	703	2080	3170	775	e1550	e580	949	251	143	61	36	30
13	430	1470	5270	659	e1150	e520	1310	280	135	58	32	31
14	307	1310	4630	613	e940	e470	866	269	128	55	31	52
15	239	1060	4050	1310	e760	e420	648	248	124	53	28	113
16	274	862	2480	1690	e680	e390	607	229	122	51	28	120
17	394	737	1720	1140	e780	e360	898	301	122	55	28	78
18	573	1040	1430	909	e1000	e340	985	811	136	69	28	56
19	392	999	1160	874	e1750	e330	1060	1140	122	136	29	55
20	325	811	936	1370	e1500	e310	1030	876	113	113	e29	49
21	331	660	771	2250	e1250	e300	863	697	108	96	e29	43
22	309	610	653	1780	e1100	e370	933	662	106	83	e28	43
23	269	882	561	1470	e1500	e350	11100	664	121	75	27	38
24	237	1750	491	1290	e1200	e300	5490	613	125	70	25	34
25	232	2600	437	1090	e930	e270	2610	539	126	63	24	31
26	592	2010	395	922	e760	e255	2010	471	110	59	25	28
27	418	2280	365	797	e660	e250	1490	416	102	56	28	28
28	334	4210	350	704	e540	e240	1140	381	105	54	29	29
29	278	8020	598	603	e520	e245	904	354	98	54	28	29
30	241	5210	1000	523	---	e240	741	320	93	49	28	31
31	214	---	1690	468	---	e250	---	297	---	47	32	---
TOTAL	9617	54776	52084	39573	67101	13650	38540	14156	4471	2193	1126	1299
MEAN	310	1826	1680	1277	2314	440	1285	457	149	70.7	36.3	43.3
MAX	1030	8020	5270	4950	19200	850	11100	1140	275	136	70	120
MIN	90	158	350	468	360	240	185	229	93	47	24	27
AC-FT	19080	108600	103300	78490	133100	27070	76440	28080	8870	4350	2230	2580
CFSM	2.75	16.2	14.9	11.3	20.5	3.90	11.4	4.04	1.32	.63	.32	.38
IN.	3.17	18.03	17.15	13.03	22.09	4.49	12.69	4.66	1.47	.72	.37	.43

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1996, BY WATER YEAR (WY)

	MEAN	272	902	1226	1202	1168	873	588	272	144	70.6	46.3	76.4
MAX	891	2131	2486	2888	2354	1870	1285	700	390	183	124	357	
(WY)	1948	1956	1995	1953	1954	1956	1996	1948	1968	1983	1968	1959	
MIN	20.5	57.6	217	176	278	216	207	125	62.8	33.9	23.6	25.3	
(WY)	1988	1994	1977	1977	1993	1992	1941	1994	1992	1951	1951	1952	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1940 - 1996
ANNUAL TOTAL	245482	298586	
ANNUAL MEAN	673	816	567
HIGHEST ANNUAL MEAN			911
LOWEST ANNUAL MEAN			259
HIGHEST DAILY MEAN	8020	Nov 29	19200
LOWEST DAILY MEAN	19	Sep 24	24
ANNUAL SEVEN-DAY MINIMUM	22	Sep 18	27
ANNUAL RUNOFF (AC-FT)	486900	592200	410800
ANNUAL RUNOFF (CFSM)	5.95	7.22	5.02
ANNUAL RUNOFF (INCHES)	80.81	98.30	68.18
10 PERCENT EXCEEDS	1800	1730	1430
50 PERCENT EXCEEDS	322	338	259
90 PERCENT EXCEEDS	29	36	37

e Estimated



## 12025000 NEWAUKUM RIVER NEAR CHEHALIS, WA

LOCATION---Lat 46°37'13", long 122°56'38", in SW 1/4 SW 1/4 sec.9, T.13 N., R.2 W., Lewis County, Hydrologic Unit 17100103, on left bank at highway bridge 3.0 mi southeast of Chehalis, and at mile 4.1.

DRAINAGE AREA--155 mi<sup>2</sup>.

PERIOD OF RECORD--March 1929 to September 1931, July 1942 to September 1981, October 1982 to current year.

REVISED RECORDS--WSP 1012: 1943. WSP 1316: 1929-30(M), 1960(M). WSP 1716: Drainage area. WSP 1932: 1931(M), 1945-49, 1954(M), 1956(P), 1958(M), 1959-60.

GAGE--Water-stage recorder. Elevation of gage is 190 ft above sea level, from topographic map. Prior to Oct. 1, 1929, nonrecording gage at same site at datum 1.0 ft higher. Oct. 1, 1929, to July 5, 1962, nonrecording gage and crest-stage gage at same site and datum.

REMARKS--Records fair. Cities of Chehalis and Centralia divert about 4 ft<sup>3</sup>/s from North Fork Newaukum River for municipal use. No regulation upstream from station.

AVERAGE DISCHARGE--55 years (water years, 1930-31, 1943-81, 1983-96), 493 ft<sup>3</sup>/s, 42.23 in/yr, 357,300 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD--Maximum discharge, 13,300 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 13.54 ft; maximum gage height, 13.62 ft Dec. 9, 1953; minimum discharge, 12 ft<sup>3</sup>/s Sept. 13, 14, 1949, Aug. 29, 1967.

EXTREMES FOR CURRENT YEAR--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	2300	4,020	8.10	Dec. 15	0100	4,590	8.76
Nov. 11	1500	5,170	9.44	Feb. 8	1230	*13,300	*13.54
Nov. 30	0100	7,720	11.95	Apr. 23	2100	6,100	10.01

Minimum discharge, 42 ft<sup>3</sup>/s Aug. 30, 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	144	170	6050	e1300	431	481	565	617	292	100	55	44
2	95	154	4210	e1000	392	449	583	547	268	96	63	43
3	157	141	2760	e1200	362	476	466	518	248	94	99	45
4	159	134	2360	e1100	407	601	395	477	231	107	74	47
5	109	141	1620	e990	1050	824	345	431	220	96	81	49
6	89	166	1220	e1600	3660	915	326	395	204	89	74	61
7	77	1150	978	e4500	6230	816	311	384	193	84	65	56
8	70	2460	807	e2900	10200	728	279	385	182	80	60	50
9	74	2580	934	e1750	7060	650	258	341	173	78	56	47
10	135	1350	1040	1250	3130	624	284	314	169	77	54	45
11	886	3780	1780	962	1950	676	338	308	160	74	54	44
12	709	2460	1990	802	1400	623	736	341	154	71	53	44
13	384	1760	3000	684	1100	553	1220	396	147	68	52	45
14	260	1510	3540	692	909	495	825	499	142	66	50	55
15	192	1160	3630	1360	775	453	640	442	136	64	49	129
16	216	1010	2090	2010	676	415	851	428	131	64	48	146
17	296	799	1460	1320	766	387	843	513	134	67	48	97
18	589	868	1480	1000	1030	362	750	744	162	84	49	73
19	372	755	1180	1120	1880	351	728	839	138	143	49	74
20	297	627	941	1490	1660	332	706	721	124	116	49	83
21	315	539	789	2360	1360	309	626	627	117	91	49	74
22	294	490	670	1550	1090	399	673	770	116	79	47	77
23	243	548	581	1420	1630	372	4110	985	131	72	46	67
24	209	1110	514	1380	1260	319	3510	857	243	68	44	60
25	192	2370	460	1120	959	287	1930	661	184	65	44	56
26	437	2450	420	942	795	271	1680	537	144	62	45	54
27	389	2380	396	810	683	265	1290	458	125	59	45	52
28	309	4880	395	726	598	253	1010	415	125	58	47	50
29	254	5990	617	648	529	243	833	407	117	59	46	50
30	216	6500	1080	540	---	253	699	361	107	57	43	50
31	189	---	e1750	474	---	243	---	324	---	56	44	---
TOTAL	8357	50432	50742	41000	53972	14425	27810	16042	5017	2444	1682	1867
MEAN	270	1681	1637	1323	1861	465	927	517	167	78.8	54.3	62.2
MAX	886	6500	6050	4500	10200	915	4110	985	292	143	99	146
MIN	70	134	395	474	362	243	258	308	107	56	43	43
AC-FT	16580	100000	100600	81320	107100	28610	55160	31820	9950	4850	3340	3700
CFSM	1.74	10.8	10.6	8.53	12.0	3.00	5.98	3.34	1.08	.51	.35	.40
IN.	2.01	12.10	12.18	9.84	12.95	3.46	6.67	3.85	1.20	.59	.40	.45

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

MEAN	177	717	1023	1056	991	753	550	291	181	88.8	53.9	68.9
MAX	613	1717	2081	2169	1875	1609	1052	680	464	307	159	243
(WY)	1956	1956	1976	1953	1961	1972	1991	1960	1981	1983	1968	1968
MIN	25.5	47.6	194	192	262	280	281	130	66.3	36.1	21.5	27.9
(WY)	1988	1930	1977	1977	1977	1992	1973	1947	1992	1951	1951	1987

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1929 - 1996
ANNUAL TOTAL	219036	273790	
ANNUAL MEAN	600	748	493
HIGHEST ANNUAL MEAN			748
LOWEST ANNUAL MEAN			244
HIGHEST DAILY MEAN	6500	10200	10200
LOWEST DAILY MEAN	32	43	14
ANNUAL SEVEN-DAY MINIMUM	35	45	15
ANNUAL RUNOFF (AC-FT)	434500	543100	357300
ANNUAL RUNOFF (CFSM)	3.87	4.83	3.18
ANNUAL RUNOFF (INCHES)	52.57	65.71	43.23
10 PERCENT EXCEEDS	1380	1750	1180
50 PERCENT EXCEEDS	339	386	253
90 PERCENT EXCEEDS	46	54	44

e Estimated

## CHEHALIS RIVER BASIN

12025700 SKOOKUMCHUCK RIVER NEAR VAIL, WA

LOCATION.--Lat 46°46'22", long 122°35'34", in SW 1/4 NW 1/4 sec.20, T.15 N., R.2 E., Thurston County, Hydrologic Unit 17100103, on right bank about 150 ft downstream from logging bridge, 0.4 mi downstream from Hospital Creek, 5.8 mi southeast of Vail, and at mile 28.8.

DRAINAGE AREA.--40.0 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1967 to current year.

REVISED RECORDS.--WDR WA-75-1: 1974.

GAGE.--Water-stage recorder. Elevation of gage is 710 ft above sea level, from topographic map.

REMARKS.--No estimated daily estimates. Records good. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--29 years (water years 1968-96), 195 ft<sup>3</sup>/s, 66.32 in/yr, 141,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,350 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 11.24 ft; minimum discharge, 13 ft<sup>3</sup>/s Oct. 29, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,250 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1400	1,980	7.37	Jan. 7	1000	1,680	7.05
Nov. 11	0600	1,580	6.94	Feb. 6	2000	4,290	9.18
Nov. 29	1700	3,420	8.59	Feb. 8	1345	*8,350	*11.24
Dec. 14	1800	1,860	7.25	Apr. 23	1600	1,830	7.22

Minimum discharge, 19 ft<sup>3</sup>/s Sept. 11, 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	56	76	1720	340	128	168	292	227	112	47	29	21
2	44	70	1220	292	121	163	296	201	104	46	40	21
3	75	65	825	529	116	214	223	181	99	46	34	22
4	60	64	667	502	160	314	180	165	95	47	32	22
5	47	70	498	411	754	345	155	149	90	43	34	23
6	41	76	382	447	2290	355	144	138	86	42	31	25
7	37	554	310	1340	2430	323	130	138	83	41	29	22
8	37	1250	260	887	5550	319	121	127	80	40	28	21
9	36	769	261	560	1790	295	117	118	77	39	27	21
10	201	452	334	403	915	268	124	112	74	38	27	20
11	452	1130	654	316	614	284	190	113	71	37	26	20
12	271	652	614	264	456	255	405	112	69	37	26	20
13	159	512	1190	228	366	225	463	151	67	36	25	22
14	115	442	1450	231	307	198	351	150	64	35	25	34
15	92	386	1180	511	265	178	299	143	63	34	24	56
16	136	334	706	675	233	163	372	138	61	34	24	53
17	173	282	496	442	253	150	408	192	64	35	24	36
18	193	272	404	339	428	140	374	297	65	52	25	31
19	142	239	330	319	679	137	362	384	59	60	24	33
20	121	213	281	439	618	126	331	318	57	45	24	30
21	122	188	244	551	515	121	285	259	55	40	23	30
22	103	172	215	418	413	127	276	279	54	37	23	29
23	92	226	192	340	373	117	1260	286	76	36	23	26
24	83	408	175	292	313	110	1010	251	73	34	22	24
25	100	812	161	249	268	103	714	219	61	33	22	23
26	191	675	147	217	235	100	643	189	56	32	22	22
27	152	623	136	196	212	99	490	167	54	32	23	22
28	126	1090	131	178	191	94	380	153	55	31	22	22
29	107	2530	218	159	177	100	310	140	51	31	22	22
30	94	1840	307	144	---	95	261	128	49	30	22	21
31	84	---	404	135	---	120	---	119	---	30	22	---
TOTAL	3742	16472	16112	12354	21170	5806	10966	5744	2124	1200	804	794
MEAN	121	549	520	399	730	187	366	185	70.8	38.7	25.9	26.5
MAX	452	2530	1720	1340	5550	355	1260	384	112	60	40	56
MIN	36	64	131	135	116	94	117	112	49	30	22	20
AC-FT	7420	32670	31960	24500	41990	11520	21750	11390	4210	2380	1590	1570
CFSM	3.02	13.7	13.0	9.96	18.2	4.68	9.14	4.63	1.77	.97	.65	.66
IN.	3.48	15.32	14.98	11.49	19.69	5.40	10.20	5.34	1.98	1.12	.75	.74

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1996, BY WATER YEAR (WY)

	MEAN	83.2	278	381	379	358	294	236	134	91.4	47.6	31.9	39.5
MAX	209	622	697	756	730	621	454	261	187	122	71.2	95.7	
(WY)	1976	1984	1976	1971	1996	1972	1991	1984	1981	1983	1968	1968	
MIN	14.6	37.4	78.4	68.6	92.5	90.9	112	65.1	33.3	27.1	19.3	18.6	
(WY)	1988	1994	1977	1977	1977	1992	1973	1994	1992	1992	1992	1987	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1968 - 1996
ANNUAL TOTAL	79213	97288	
ANNUAL MEAN	217	266	195
HIGHEST ANNUAL MEAN			286
LOWEST ANNUAL MEAN			103
HIGHEST DAILY MEAN	2530	Nov 29	5550
LOWEST DAILY MEAN	17	Sep 23	14
ANNUAL SEVEN-DAY MINIMUM	18	Sep 18	21
ANNUAL RUNOFF (AC-FT)	157100	193000	141400
ANNUAL RUNOFF (CFSM)	5.43	6.65	4.88
ANNUAL RUNOFF (INCHES)	73.67	90.48	66.32
10 PERCENT EXCEEDS	561	576	447
50 PERCENT EXCEEDS	130	139	113
90 PERCENT EXCEEDS	24	25	26

## 12026150 SKOOKUMCHUCK RIVER BELOW BLOODY RUN CREEK, NEAR CENTRALIA, WA

LOCATION.--Lat 46°47'25", long 122°44'03", in NW 1/4 NW 1/4 sec.18, T.15 N., R.1 E., Thurston County, Hydrologic Unit 17100103, on right bank 0.7 mi downstream from Bloody Run Creek, 1.2 mi downstream from Skookumchuck Dam, 12 mi northeast of Centralia, and at mile 20.7.

DRAINAGE AREA.--65.9 mi<sup>2</sup>. Prior to August 1969, 61.7 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1929 to November 1933, October 1939 to current year. Monthly discharge only for some periods, published in WSP 1316 and 1736. Published as "near Centralia" (12026000) prior to August 1969.

GAGE.--Water-stage recorder. Datum of gage is 317.34 ft above sea level. Apr. 1, 1929, to Sept. 30, 1931, and Feb. 1, 1932, to Dec. 6, 1933, nonrecording gage at site 1.1 mi upstream at different datum. Oct. 9, 1939, to July 31, 1969, at site 1.3 mi upstream at datum 301.04 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by Skookumchuck Dam since January 1971. No diversions upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--61 years (water years 1930-33, 1940-96), 251 ft<sup>3</sup>/s, 181,800 acre-ft/yr, unadjusted.  
25 years (water years 1972-96), 253 ft<sup>3</sup>/s, 183,000 acre-ft/yr, regulated period.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,020 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 13.41 ft, result of flow over dam computation, provided by Pacific Power & Light; minimum discharge, 12 ft<sup>3</sup>/s May 28, 1970, caused by pumping during dam construction.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	2215	3,960	11.48	Feb. 8	1500	*9,020	*13.41
Dec. 14	2245	2,280	10.16	Apr. 23	2245	2,630	10.50

Minimum discharge, 90 ft<sup>3</sup>/s Aug. 3, 4, 10, 20.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	141	132	2710	357	312	190	198	329	164	148	96	e123
2	138	130	2010	353	303	187	360	274	148	142	100	e127
3	141	129	1370	364	297	190	339	247	141	136	102	e127
4	141	129	1090	380	292	242	270	225	130	135	103	e127
5	139	129	830	389	305	380	224	200	116	128	108	e127
6	138	130	648	404	1110	432	201	174	112	125	106	e127
7	138	162	552	1160	3420	411	179	165	111	124	106	e125
8	138	196	524	1390	e6600	382	160	160	110	125	107	e123
9	138	172	520	858	4210	367	145	160	110	116	108	e123
10	151	156	511	606	1820	344	145	149	114	112	105	e110
11	162	231	534	466	1080	333	167	140	122	112	102	e114
12	152	179	703	397	726	322	367	137	128	114	102	e114
13	150	171	1430	376	542	285	679	162	127	114	104	108
14	148	177	1870	369	417	250	582	218	127	114	104	114
15	e148	180	1900	396	331	228	456	206	129	114	99	114
16	e152	174	1140	740	292	201	499	203	129	113	98	116
17	e152	170	775	665	280	189	546	228	135	113	98	118
18	152	189	618	495	349	173	544	364	143	115	98	118
19	152	180	521	451	716	168	498	544	141	116	97	118
20	135	171	474	486	864	158	467	514	141	114	97	121
21	132	166	445	728	772	148	406	434	141	114	95	121
22	132	177	416	646	604	155	362	401	141	114	96	118
23	132	195	402	522	581	155	1430	442	142	114	98	118
24	132	211	392	440	506	143	2060	402	141	114	98	116
25	133	409	382	394	405	133	1290	346	152	114	98	118
26	139	923	372	374	337	127	1140	295	150	114	98	118
27	137	839	355	365	286	133	869	243	153	114	98	118
28	134	1220	340	356	233	127	628	207	154	114	106	118
29	134	2770	328	344	209	121	485	198	151	114	e110	116
30	132	2940	338	331	---	120	391	178	150	114	121	116
31	132	---	355	321	---	118	---	168	---	114	e118	---
TOTAL	4375	13137	24855	15923	28199	6912	16087	8113	4053	3684	3176	3571
MEAN	141	438	802	514	972	223	536	262	135	119	102	119
MAX	162	2940	2710	1390	6600	432	2060	544	164	148	121	127
MIN	132	129	328	321	209	118	145	137	110	112	95	108
AC-FT	8680	26060	49300	31580	55930	13710	31910	16090	8040	7310	6300	7080

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1996, BY WATER YEAR (WY)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	141	231	448	465	456	356	300	178	133	102	95.0	136													
MAX	192	552	1100	910	972	829	590	365	254	127	114	167													
(WY)	1979	1984	1978	1974	1996	1972	1991	1984	1990	1983	1972	1983													
MIN	111	87.6	95.8	92.6	62.5	88.0	145	109	85.4	81.7	78.9	115													
(WY)	1993	1988	1977	1977	1977	1977	1973	1989	1989	1992	1985	1975													

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1972 - 1996
ANNUAL TOTAL	107802	132085	
ANNUAL MEAN	295	361	253
HIGHEST ANNUAL MEAN			386
LOWEST ANNUAL MEAN			119
HIGHEST DAILY MEAN	2940	Nov 30	6600
LOWEST DAILY MEAN	78	Aug 16	52
ANNUAL SEVEN-DAY MINIMUM	82	Aug 23	53
ANNUAL RUNOFF (AC-FT)	213800	262000	183000
10 PERCENT EXCEEDS	530	686	484
50 PERCENT EXCEEDS	163	165	146
90 PERCENT EXCEEDS	96	112	94

e Estimated

## CHEHALIS RIVER BASIN

12026400 SKOOKUMCHUCK RIVER NEAR BUCODA, WA

LOCATION.--Lat 46°46'20", long 122°55'23", in SW 1/4 NW 1/4 sec.22, T.15 N., R.2 W., Thurston County, Hydrologic Unit 17100103, on left bank 100 ft downstream from bridge on State Highway 507, 3.3 mi southwest of Bucoda, and at mile 6.4.

DRAINAGE AREA.--112 mi<sup>2</sup>.

PERIOD OF RECORD.--December 1967 to current year.

GAGE.--Water-stage recorder. Datum of gage is 198.19 ft above sea level. Prior to Oct. 1, 1992, at datum 0.41 ft higher.

REMARKS.--No estimated daily discharges. Records fair. Flow regulated by Skookumchuck Dam since January 1971. An average of 30 ft<sup>3</sup>/s is diverted at point 0.5 mi upstream for consumptive use at Centralia Steam Electric Project. During peak demand months, up to 54 ft<sup>3</sup>/s may be diverted for periods of one day or less. Other minor diversions for domestic use and irrigation upstream from station. Water temperatures October 1968 to September 1971; sediment records July 1968 to September 1971. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--25 years (water years 1972-96), 344 ft<sup>3</sup>/s, 249,600 acre-ft/yr, regulated.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,300 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 17.87 ft, present datum; minimum discharge, 21 ft<sup>3</sup>/s Aug. 15, 16, 18, 19, 20, 1970, gage height, 3.85 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,750 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	0900	5,200	15.71	Feb. 8	1900	*11,300	*17.87
Dec. 15	0800	3,290	12.51	Apr. 24	0700	4,690	13.55

Minimum discharge, 72 ft<sup>3</sup>/s Aug. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	126	121	3780	703	457	371	188	590	229	150	101	92
2	124	119	3180	630	439	342	322	570	215	146	93	99
3	126	116	2150	627	425	329	342	513	194	142	99	102
4	124	114	1610	645	425	342	288	466	185	140	91	102
5	123	114	1230	649	491	449	246	421	171	135	89	101
6	122	115	923	749	1180	554	225	378	156	132	85	102
7	122	280	772	1580	5480	541	206	341	148	132	94	102
8	122	546	774	2340	8560	498	186	322	144	127	85	104
9	122	626	766	1470	8240	470	168	296	140	119	79	103
10	138	341	775	1050	3380	465	166	277	136	111	83	100
11	217	931	983	803	1570	467	179	260	141	117	78	93
12	188	704	1210	661	1070	463	313	251	143	114	73	95
13	165	504	1870	595	892	426	679	289	142	110	73	94
14	156	483	2480	579	858	379	629	341	140	117	81	101
15	150	442	3040	669	842	346	494	328	137	114	89	107
16	155	415	1890	1120	776	309	532	294	135	120	89	106
17	163	377	1260	1090	735	281	553	294	138	124	90	107
18	163	381	1040	852	737	261	551	415	150	113	88	108
19	154	380	879	822	935	245	516	684	148	117	91	111
20	143	355	769	913	1090	235	500	656	147	115	89	119
21	134	330	707	1330	1040	223	442	551	145	116	86	119
22	136	311	637	1160	892	231	410	506	145	118	83	117
23	131	321	589	953	904	233	1550	552	149	115	80	116
24	128	422	570	807	892	215	4040	534	180	113	82	116
25	127	811	556	694	767	199	1960	471	167	109	89	110
26	145	1310	527	619	654	189	1560	423	157	109	88	109
27	147	1290	492	586	569	181	1180	371	153	108	81	115
28	136	1610	473	564	486	172	880	317	161	109	78	112
29	130	3030	492	540	423	155	716	289	156	109	77	109
30	127	4730	624	503	---	152	613	267	152	106	91	109
31	124	---	754	477	---	147	---	248	---	106	91	---
TOTAL	4368	21629	37802	26780	45209	9870	20634	12515	4704	3713	2666	3180
MEAN	141	721	1219	864	1559	318	688	404	157	120	86.0	106
MAX	217	4730	3780	2340	8560	554	4040	684	229	150	101	119
MIN	122	114	473	477	423	147	166	248	135	106	73	92
AC-FT	8660	42900	74980	53120	89670	19580	40930	24820	9330	7360	5290	6310

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1996, BY WATER YEAR (WY)

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	142	347	668	682	680	524	418	225	157	101	82.7	127													
MAX	205	846	1539	1351	1559	1446	970	461	331	156	121	180													
(WY)	1982	1984	1978	1972	1996	1972	1991	1984	1990	1983	1972	1978													
MIN	92.3	66.4	105	95.0	85.7	154	180	118	78.5	62.7	56.3	94.9													
(WY)	1993	1988	1977	1977	1977	1992	1973	1994	1979	1992	1985	1992													

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1972	1996
ANNUAL TOTAL	148405	193070		
ANNUAL MEAN	407	528	344	
HIGHEST ANNUAL MEAN			571	1972
LOWEST ANNUAL MEAN			148	1977
HIGHEST DAILY MEAN	4730	8560	8560	Feb 8 1996
LOWEST DAILY MEAN	62	73	46	Sep 3 1973
ANNUAL SEVEN-DAY MINIMUM	65	79	50	Aug 24 1989
ANNUAL RUNOFF (AC-FT)	294400	383000	249600	
10 PERCENT EXCEEDS	870	1060	736	
50 PERCENT EXCEEDS	231	260	167	
90 PERCENT EXCEEDS	84	101	86	



## 12027500 CHEHALIS RIVER NEAR GRAND MOUND, WA

LOCATION.--Lat 46°46'34", long 123°02'04", in NE 1/4 NE 1/4 sec.22, T.15 N., R.3 W., Thurston County, Hydrologic Unit 17100103, on left bank at downstream side of highway bridge at Meadows, 1.5 mi southwest of Grand Mound, 7.0 mi downstream from Skookumchuck River, and at mile 59.9.

DRAINAGE AREA.--895 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1928 to current year.

REVISED RECORDS.--WSP 1216: Drainage area. WSP 1286: 1929-30(M), 1931, 1932-34(M).

GAGE.--Water-stage recorder. Datum of gage is 123.65 ft above sea level. Prior to Oct. 3, 1934, nonrecording gage at present site at datum 3.0 ft higher.

REMARKS.--No estimated daily discharges. Records good. Minor effect from regulation on Skookumchuck River by Skookumchuck Dam since January 1971. Up to 54 ft<sup>3</sup>/s of Skookumchuck River is consumptively used at Centralia steam generating plant. Many small diversions for irrigation and domestic use upstream from station, including about 4 ft<sup>3</sup>/s for municipal water supply for Centralia and Chehalis. Water temperatures March 1952 to September 1974. Miscellaneous suspended sediment data published for water years 1962-64. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--68 years (water years 1929-96), 2,782 ft<sup>3</sup>/s, 42.24 in/yr, 2,016,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 74,800 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 19.98 ft; minimum discharge, 82 ft<sup>3</sup>/s Aug. 30, 1967.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 12	0600	16,700	13.14	Jan. 8	1100	18,100	13.57
Nov. 30	2300	35,200	16.88	Feb. 9	0800	*74,800	19.98
Dec. 15	2300	22,500	14.80	Apr. 24	2200	31,600	16.42

Minimum discharge, 200 ft<sup>3</sup>/s Aug. 26, 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	614	828	32400	7320	2680	2810	1540	4380	1860	680	269	212
2	576	760	27900	5740	2450	2570	2200	3730	1740	639	265	219
3	512	708	21700	5390	2250	2500	2040	3360	1620	607	313	226
4	656	670	16000	5640	2250	2850	1760	3090	1530	604	345	233
5	602	660	11300	5070	2700	3600	1570	2810	1450	611	330	241
6	492	714	8090	5940	10200	3900	1460	2580	1370	577	344	250
7	433	1960	6140	10600	20500	3740	1420	2410	1290	540	326	267
8	403	7770	4770	17500	40800	3490	1320	2360	1220	507	300	267
9	400	14300	4270	14000	64200	3210	1220	2190	1170	471	278	258
10	468	9240	5230	9270	32800	3110	1190	2060	1140	441	265	246
11	2810	10900	8530	6670	20100	3240	1240	1970	1100	425	251	233
12	3290	15400	12700	5060	13000	3180	2160	2080	1070	411	240	225
13	2080	10100	15700	4020	8420	2860	5900	2280	1030	387	236	225
14	1420	7950	19300	3550	6170	2570	5280	2640	984	369	231	249
15	1070	6180	21500	4270	4710	2350	3890	2470	947	357	225	360
16	932	5000	21100	7890	3790	2150	3620	2270	921	344	216	605
17	1150	3830	15400	7270	3600	1990	3770	2300	902	350	211	632
18	1770	3900	10600	5590	4720	1860	4140	3320	927	357	214	511
19	1720	4350	8330	5560	7110	1770	4140	5630	936	462	224	425
20	1330	3740	6540	6250	8830	1710	4210	5240	873	610	226	415
21	1220	3160	5240	11000	8620	1600	3790	4320	823	530	226	405
22	1250	2720	4240	11300	7280	1700	3430	4120	794	471	223	388
23	1110	2700	3570	9320	8190	1840	9750	4350	792	418	215	373
24	984	4950	3140	8280	8740	1600	25200	4350	996	377	209	347
25	902	8650	2820	7080	7040	1460	26200	3710	992	348	202	319
26	1320	11400	2550	5870	5530	1360	19200	3210	895	331	200	296
27	1820	10200	2370	4940	4430	1320	13200	2820	799	312	200	287
28	1440	15000	2270	4330	3660	1290	8980	2510	757	301	203	286
29	1190	19800	2630	3930	3170	1230	6850	2380	747	295	215	274
30	1030	29500	4170	3340	--	1240	5390	2190	720	291	210	271
31	911	--	6830	2960	--	1200	--	2010	--	277	211	--
TOTAL	35905	217040	317330	214950	317940	71300	176060	95140	32395	13700	7623	9545
MEAN	1158	7235	10240	6934	10960	2300	5869	3069	1080	442	246	318
MAX	3290	29500	32400	17500	64200	3900	26200	5630	1860	680	345	632
MIN	400	660	2270	2960	2250	1200	1190	1970	720	277	200	212
AC-FT	71220	430500	629400	426400	630600	141400	349200	188700	64260	27170	15120	18930
CFSM	1.29	8.08	11.4	7.75	12.2	2.57	6.56	3.43	1.21	.49	.27	.36
IN.	1.49	9.02	13.19	8.93	13.21	2.96	7.32	3.95	1.35	.57	.32	.40

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

MEAN	898	3774	6196	6270	5860	4445	2992	1373	802	376	238	335
MAX	2635	9697	19280	13900	11490	9477	6787	3496	2482	934	570	1289
(WY)	1956	1956	1934	1971	1961	1972	1937	1948	1936	1983	1968	1978
MIN	125	221	884	860	1201	1354	1086	549	352	174	118	117
(WY)	1953	1937	1977	1977	1977	1992	1939	1939	1992	1970	1967	1967

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1929 - 1996

ANNUAL TOTAL	1245721	1508928	
ANNUAL MEAN	3413	4123	
HIGHEST ANNUAL MEAN			2782
LOWEST ANNUAL MEAN			4444
HIGHEST DAILY MEAN			1122
LOWEST DAILY MEAN			1977
ANNUAL SEVEN-DAY MINIMUM	32400	Dec 1	64200
ANNUAL RUNOFF (AC-FT)	207	Aug 30	200
ANNUAL RUNOFF (CFSM)	215	Aug 25	206
ANNUAL RUNOFF (INCHES)	2471000		2993000
10 PERCENT EXCEEDS	9170		10100
50 PERCENT EXCEEDS	1860		2020
90 PERCENT EXCEEDS	257		267

## 12031000 CHEHALIS RIVER AT PORTER, WA

LOCATION.--Lat 46°56'17", long 123°18'45", on north line of NE 1/4 sec.28, T.17 N., R.5 W., Grays Harbor County, Hydrologic Unit 17100103, at downstream end of left bank bridge pier, 30 ft downstream from Porter Creek, 0.1 mi west of Porter, and at mile 33.3.

DRAINAGE AREA.--1,294 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1952 to September 1972, water years 1973-75 (annual maximum), May 1975 to September 1985, October 1985 to September 1986 (monthly means only), October 1986 to current year. Daily routed values for October 1985 to September 1986 are available in the files of the U.S. Geological Survey.

REVISED RECORDS.--WSP 1716: Drainage area. WSP 1932: 1954, 1956, 1960(M).

GAGE.--Water-stage recorder. Datum of gage is 23.64 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Minor effect from regulation on Skookumchuck River by Skookumchuck Dam since January 1971. Up to 54 ft<sup>3</sup>/s of Skookumchuck River is consumptively used at Centralia steam generating plant. Many small diversions for irrigation and domestic use upstream from station, including about 4 ft<sup>3</sup>/s for municipal water supply for Centralia and Chehalis. U.S. Geological Survey satellite telemeter at station. Suspended sediment October 1961 to September 1971. Water temperatures July 1959 to September 1960, October 1961 to July 1972. Chemical analyses July 1959 to September 1973, October 1974 to September 1994.

AVERAGE DISCHARGE.--41 years (water years 1953-72, 1976-96), 4,021 ft<sup>3</sup>/s, 42.22 in/yr, 2,913,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 80,700 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 25.22 ft; minimum, 164 ft<sup>3</sup>/s Oct. 17, 1952, gage height, 2.25 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Dec. 28, 1937, reached a stage of 24.7 ft, from levels by Grays Harbor County. Flood of December 1933 reached a stage of 23.13 ft, from river profile by Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 20,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 1	2200	35,800	22.39	Feb. 9	1400	*80,700	*25.22
Dec. 16	2400	24,600	20.63	Apr. 25	2000	29,800	21.56
Jan. 9	1000	21,000	19.87				

Minimum discharge, 323 ft<sup>3</sup>/s Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	629	1120	31500	10100	4740	4980	2280	6750	2430	e1000	e380	332
2	694	1020	33200	8920	4330	4540	2970	5660	2280	e920	e370	332
3	687	935	29300	8160	3980	4370	3080	4940	2150	e860	e420	351
4	654	879	25000	8300	3890	4540	2760	4440	2020	e860	e470	364
5	720	875	20200	7850	4380	5200	2520	3970	1920	e850	e500	362
6	609	922	14600	8470	10000	5700	2390	3570	1820	e840	e500	368
7	523	1970	10500	13600	10500	5720	2340	3290	1720	e800	e490	374
8	476	6980	8190	18800	31700	5450	2220	3130	1630	e740	e466	385
9	456	12500	7090	20500	55000	5150	2090	2930	1570	e680	e436	382
10	1210	13400	7610	17100	39100	5010	2010	2730	1520	e650	e412	362
11	2260	13600	10100	11900	31600	5260	2040	2590	1470	e620	395	350
12	3890	16700	14600	8960	24100	5310	2690	2620	1420	e580	e384	341
13	2890	16300	18200	7340	17600	4900	5960	2940	1370	e540	370	344
14	2030	12300	20600	6520	12100	4490	7270	3190	1320	e500	361	387
15	1540	9610	22900	6940	9170	4100	5780	3100	1270	e480	357	515
16	1300	7780	23900	9820	7440	3770	5070	2840	1250	e470	349	614
17	1440	6400	23200	10900	6710	3500	5160	2800	1230	e470	346	743
18	1810	5730	19000	9110	7510	3280	5520	3630	e1270	e520	345	680
19	2260	6120	13900	8210	9250	3130	5610	5870	e1300	e700	351	598
20	1860	5660	10700	8960	11100	3010	5650	6380	e1250	e840	356	538
21	1630	4910	8600	12600	11900	2860	5370	5520	e1200	e800	355	537
22	1570	4270	7200	15500	11100	2840	4990	5210	e1130	e660	350	513
23	1490	4240	6200	14600	10700	3040	11000	5300	e1100	e600	343	490
24	1320	6030	5450	12900	12200	2800	22200	5360	e1300	e520	335	470
25	1250	8870	4860	11500	11100	2590	27300	4820	e1400	e490	327	445
26	1650	12200	4380	9710	9130	2440	27300	4150	e1300	e460	330	420
27	2260	13100	4020	8330	7560	2350	22700	3630	e1200	e440	332	403
28	2030	15400	3820	7370	6430	2280	16500	3250	e1100	e420	332	399
29	1670	21300	4290	6730	5600	2220	11400	3010	e1060	e400	334	394
30	1430	25900	5990	5940	---	2180	8520	2830	e1030	e390	332	385
31	1250	---	8490	5240	---	2150	---	2610	---	e385	335	---
TOTAL	45488	257021	427590	320880	400720	119160	232690	123060	44030	19485	11763	13178
MEAN	1467	8567	13790	10350	13820	3844	7756	3970	1468	629	379	439
MAX	3890	25900	33200	20500	55000	5720	27300	6750	2430	1000	500	743
MIN	456	875	3820	5240	3890	2150	2010	2590	1030	385	327	332
AC-FT	90230	509800	848100	636500	794800	236400	461500	244100	87330	38650	23330	26140
CFSM	1.13	6.62	10.7	8.00	10.7	2.97	5.99	3.07	1.13	.49	.29	.34
IN.	1.31	7.39	12.29	9.22	11.52	3.43	6.69	3.54	1.27	.56	.34	.38

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1996, BY WATER YEAR (WY)

MEAN	1217	5134	8662	9185	8446	6404	4509	2109	1176	598	400	529
MAX	3117	12770	17710	19050	16380	12920	9130	4202	2456	1295	838	1879
(WY)	1956	1956	1978	1971	1961	1972	1991	1984	1968	1983	1968	1978
MIN	196	376	1273	1360	1711	2314	2025	1024	528	350	223	199
(WY)	1953	1953	1977	1977	1977	1992	1977	1994	1992	1992	1967	1952

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1952 - 1996
ANNUAL TOTAL	1717728	2015065	
ANNUAL MEAN	4706	5506	4021
HIGHEST ANNUAL MEAN			6064
LOWEST ANNUAL MEAN			1646
HIGHEST DAILY MEAN	33200	55000	55000
LOWEST DAILY MEAN	257	327	166
ANNUAL SEVEN-DAY MINIMUM	271	332	169
ANNUAL RUNOFF (AC-FT)	3407000	3997000	2913000
ANNUAL RUNOFF (CFSM)	3.64	4.25	3.11
ANNUAL RUNOFF (INCHES)	49.38	57.93	42.22
10 PERCENT EXCEEDS	13300	13700	10300
50 PERCENT EXCEEDS	2740	2840	1930
90 PERCENT EXCEEDS	374	385	366

e Estimated

## 12035000 SATSOP RIVER NEAR SATSOP, WA

LOCATION.--Lat 47°00'03", long 123°29'37", in NE 1/4 SE 1/4 sec.36, T.18 N., R.7 W., Grays Harbor County, Hydrologic Unit 17100104, in west pier of bridge on old U.S. Highway 410, 0.6 mi west of Satsop, and 2.3 mi upstream from mouth.

DRAINAGE AREA.--299 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1929 to current year.

REVISED RECORDS.--WSP 1286: 1930-35(M), 1937(M). WSP 1716: Drainage area. WSP 1932: 1945, 1949(M), 1951(M), 1956-57(M), 1959(M).

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to Mar. 19, 1938, nonrecording gage at site 60 ft upstream at datum 20.9 ft higher.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station. Chemical analyses July 1960 to September 1971, October 1974 to September 1975, October 1976 to June 1980; sediment records November 1961 to June 1965 (partial-record station). U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--67 years (water years 1930-96), 2,014 ft<sup>3</sup>/s, 91.53 in/yr, 1,459,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,600 ft<sup>3</sup>/s Dec. 20, 1994, elevation, 37.28 ft; maximum elevation, 38.9 ft Jan. 22, 1935, from floodmarks, present datum; minimum discharge, 147 ft<sup>3</sup>/s Aug. 31, Sept. 1, 2, 1994; minimum elevation, 21.66 ft, present datum, Sept. 3-6, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in November 1909 reached a stage of 37.1 ft, from high-water mark, at railroad bridge 300 ft downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Elevation (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Elevation (ft)
Nov. 8	1600	20,700	32.24	Dec. 13	0700	16,400	31.19
Nov. 11	1100	17,800	31.56	Jan. 7	1500	21,600	32.45
Nov. 29	1900	*30,800	*34.27	Feb. 8	1800	26,800	33.52
Dec. 11	1100	16,300	31.18	Apr. 23	2400	19,200	31.93

Minimum discharge, 263 ft<sup>3</sup>/s Aug. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1120	1210	8940	4810	1950	1980	1090	2570	853	435	323	287
2	893	1090	7040	4060	1820	1860	1250	2300	818	428	356	275
3	947	1000	5890	4740	1720	1810	1120	2100	779	427	376	290
4	765	958	6390	4130	1960	1870	1050	1940	762	425	344	294
5	639	986	5280	3600	3790	1840	1000	1770	738	412	341	284
6	559	985	4340	5560	12600	1700	1050	1620	703	405	329	292
7	536	2350	3730	18700	19400	1640	1130	1540	677	399	318	292
8	510	15100	3270	11000	24300	1760	1050	1460	654	392	311	304
9	517	7720	3220	6530	16600	1730	1010	1360	643	385	307	317
10	4280	4480	5800	5040	11600	2170	992	1280	628	380	303	298
11	5010	12700	13700	4360	6680	2660	1010	1240	614	375	302	282
12	3710	6680	10600	3760	4620	2420	1820	1210	598	371	304	274
13	2390	4990	14100	3460	3690	2100	2620	1540	579	366	299	278
14	1790	5340	12200	6110	3130	1880	2150	1340	563	360	294	416
15	1430	4720	11100	10200	2760	1710	1880	1210	550	355	289	883
16	1450	4070	7610	8830	2500	1580	2020	1140	537	351	288	742
17	3120	3490	6240	5710	2680	1470	2730	1230	537	353	287	598
18	4180	4240	7590	4410	5110	1380	3050	2150	541	371	285	482
19	2640	3550	6340	3950	5270	1350	3180	2820	527	451	284	446
20	2120	2960	4940	4310	5270	1360	3500	2320	509	479	283	408
21	1840	2560	4100	5690	5330	1290	2950	2000	497	425	281	383
22	1570	2520	3540	4910	4300	1300	2960	1840	490	392	277	365
23	1380	5670	3100	4610	4540	1240	11300	1650	512	375	274	347
24	1240	7650	2760	4400	4010	1170	13500	1490	542	362	273	332
25	1520	7080	2480	3810	3430	1110	7600	1340	516	354	270	323
26	4330	5520	2270	3350	2980	1070	7580	1220	488	346	270	314
27	2840	5320	2120	3000	2660	1050	5460	1130	472	341	271	308
28	2200	8020	2100	2750	2370	1020	4190	1060	471	336	273	302
29	1810	26200	5280	2480	2160	1000	3430	1030	457	335	269	297
30	1550	16900	6290	2240	---	971	2920	955	444	329	271	295
31	1360	---	6190	2080	---	959	---	899	---	324	298	---
TOTAL	60246	176059	188550	162590	169230	48450	96592	48754	17699	11839	9250	11008
MEAN	1943	5869	6082	5245	5836	1563	3220	1573	590	382	298	367
MAX	5010	26200	14100	18700	24300	2660	13500	2820	853	479	376	883
MIN	510	958	2100	2080	1720	959	992	899	444	324	269	274
AC-FT	119500	349200	374000	322500	335700	96100	191600	96700	35110	23480	18350	21830
CFSM	6.50	19.6	20.3	17.5	19.5	5.23	10.8	5.26	1.97	1.28	1.00	1.23
IN.	7.50	21.90	23.46	20.23	21.05	6.03	12.02	6.07	2.20	1.47	1.15	1.37

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

	MEAN	1123	2960	4204	4086	3820	2951	2101	1135	690	448	326	430
MAX	3814	6887	9553	9598	8050	6229	4038	2696	1393	1133	574	1791	
(WY)	1976	1991	1995	1953	1961	1972	1937	1948	1931	1983	1964	1978	
MIN	201	268	1361	1127	1148	1155	898	643	407	287	198	208	
(WY)	1988	1937	1986	1949	1993	1992	1942	1994	1992	1951	1994	1938	

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1929 - 1996

ANNUAL TOTAL	950524	1000267	
ANNUAL MEAN	2604	2733	2014
HIGHEST ANNUAL MEAN			2908
LOWEST ANNUAL MEAN			1199
HIGHEST DAILY MEAN	27600	Feb 19	26200
LOWEST DAILY MEAN	224	Sep 23	269
ANNUAL SEVEN-DAY MINIMUM	230	Sep 19	271
ANNUAL RUNOFF (AC-FT)	1885000		1984000
ANNUAL RUNOFF (CFSM)	8.71		9.14
ANNUAL RUNOFF (INCHES)	118.26		124.45
10 PERCENT EXCEEDS	6230		4710
50 PERCENT EXCEEDS	1520		1140
90 PERCENT EXCEEDS	284		282

## CHEHALIS RIVER BASIN

12035380 WYNOOCHEE LAKE NEAR GRIDDALE, WA

LOCATION.--Lat 47°23'08", long 123°36'16", in NE 1/4 NW 1/4 sec.20, T.22 N., R.7 W., Grays Harbor County, Hydrologic Unit 17100104, Olympic National Forest, in monolith No. 6, near center line axis of Wynoochee Dam on Wynoochee River, 2.0 mi north of Grisdale, at river mile 51.8.

DRAINAGE AREA.--41.0 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1972 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level (levels by Corps of Engineers). Prior to May 22, 1973, staff gage on upstream face of dam.

REMARKS.--Reservoir is formed by concrete gravity-type dam with gate-type spillway; construction began in 1969; completed in 1972. Usable capacity, 67,288 acre-ft below elevation 690 ft, sluice invert level, and 800 ft, full pool elevation. Dead storage, 2,117 acre-ft below elevation 690 ft. Figures given herein represent total contents. Water is used for flood control, water supply, and recreation. Tacoma Public Utilities satellite telemeter at station.

COOPERATION.--Daily elevations at 2400 hours, and capacity table furnished by Corps of Engineers, and by Tacoma Public Utilities.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 70,078 acre-ft July 13, 1983, elevation, 800.60 ft; minimum contents observed, 4,227 acre-ft Oct. 19, 1992, elevation, 701.04 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 69,394 acre-ft May 2, elevation, 799.99 ft; minimum contents, 33,913 acre-ft Oct. 1, elevation, 761.94 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	761.94	33,913	--
Oct. 31.....	768.31	38,892	+4,979
Nov. 30.....	776.84	46,096	+7,204
Dec. 31.....	767.05	37,882	-8,214
CAL YR 1995.....	--	--	-6,298
Jan. 31.....	766.98	37,826	-56
Feb. 29.....	773.93	43,561	+5,735
Mar. 31.....	775.83	45,206	+1,645
Apr. 30.....	799.35	68,676	+23,470
May 31.....	799.28	68,598	-78
June 30.....	793.87	62,698	-5,900
July 31.....	784.41	53,108	-9,590
Aug. 31.....	773.99	43,612	-9,496
Sep. 30.....	762.70	34,491	-9,121
WTR YR 1996.....	--	--	+578



## CHEHALIS RIVER BASIN

79

## 12035400 WYNOOCHEE RIVER NEAR GRIDDALE, WA

LOCATION.--Lat 47°22'50", long 123°36'31", in NW 1/4 SW 1/4 sec.20, T.22 N., R.7 W., Grays Harbor County, Hydrologic Unit 17100104, Olympic National Forest, on right bank 0.5 mi downstream from Wynoochee Dam, 1.7 mi north of Griddale, 1.7 mi downstream from Scatter Creek, and at mile 51.3.

DRAINAGE AREA.--41.3 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1965 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 630 ft above sea level, from topographic map. Prior to Nov. 3, 1967, at site 1,500 ft upstream at different datum.

REMARKS.--No estimated daily discharges. Records good. Since August 1972, flow regulated by Wynoochee Lake (station 12035380) for flood control, during summer months to augment the natural river flow, and for the water supply for the city of Aberdeen. Some regulation from 1969 to August 1972 due to dam construction. No diversion upstream from station. Tacoma Public Utilities satellite telemeter at station.

AVERAGE DISCHARGE.--31 years (water years 1966-96), 516 ft<sup>3</sup>/s, 169.67 in/yr, 373,800 acre-ft/yr, adjusted for storage in Wynoochee Lake since October 1972.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,800 ft<sup>3</sup>/s Dec. 12, 1966, gage height, about 18.0 ft, from graph based on gage readings, site and datum then in use; minimum discharge, 0.9 ft<sup>3</sup>/s Sept. 10, 12, 1974, gage height, 0.06 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,270 ft<sup>3</sup>/s Nov. 29, gage height, 6.91 ft; minimum discharge, 180 ft<sup>3</sup>/s Mar. 24; minimum daily discharge, 196 ft<sup>3</sup>/s Apr. 11, 13, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	232	325	1840	662	329	330	202	225	227	313	203	220
2	216	216	1300	790	330	330	200	388	227	335	203	220
3	231	216	1250	1180	330	330	199	663	226	348	203	220
4	221	216	1250	765	330	330	199	665	223	348	203	220
5	220	216	1240	606	700	330	199	657	225	356	203	220
6	220	216	1240	946	1350	399	199	447	227	361	203	220
7	220	752	1240	1240	2510	357	199	235	227	368	203	222
8	220	4010	1260	1250	1230	341	199	227	227	351	203	226
9	220	2630	1070	1250	1250	579	199	227	227	278	203	234
10	229	1460	1260	1250	1250	1230	197	227	224	293	218	234
11	353	2320	2570	1260	1250	1070	196	227	223	221	223	240
12	990	1600	2510	1260	1250	557	198	227	224	209	223	249
13	731	1260	3280	1260	1250	475	196	227	227	206	223	250
14	282	1260	3450	1550	1250	237	196	227	227	206	223	453
15	208	1260	2050	3160	855	255	223	227	241	207	223	539
16	643	1250	1260	1850	501	366	223	227	247	208	223	366
17	1140	1250	1300	1250	1030	319	223	252	247	199	223	271
18	1110	1770	1750	1250	2310	286	226	1210	249	199	223	247
19	538	1250	1300	1250	1530	338	227	1120	249	199	223	315
20	475	1250	1260	1160	1580	367	227	789	249	200	223	309
21	352	1250	1260	832	1160	335	227	589	253	199	223	309
22	339	1250	1270	636	749	235	229	518	261	200	223	301
23	339	2540	1280	508	717	231	2020	407	302	213	223	296
24	339	2380	1200	486	705	205	2060	408	304	203	223	296
25	902	1610	861	414	516	206	1060	409	304	203	223	296
26	1090	1360	489	397	466	206	709	409	304	203	223	296
27	681	1720	417	321	335	206	476	405	304	204	223	296
28	433	2750	583	321	391	206	233	228	304	206	223	296
29	433	2270	1170	321	330	204	223	223	302	205	223	296
30	433	5510	1160	321	---	198	226	223	300	206	223	299
31	433	---	1140	324	---	201	---	225	---	206	221	---
TOTAL	14473	47367	44510	30070	27784	11259	11590	12738	7581	7653	6726	8456
MEAN	467	1579	1436	970	958	363	386	411	253	247	217	282
MAX	1140	5510	3450	3160	2510	1230	2060	1210	304	368	223	539
MIN	208	216	417	321	329	198	196	223	223	199	203	220
AC-FT	28710	93950	88290	59640	55110	22330	22990	25270	15040	15180	13340	16770
MEAN†	548	1701	1302	969	1057	390	781	410	154	91	62	129
CFSM†	13.26	41.19	31.53	23.46	25.60	9.44	18.91	9.92	3.72	2.20	1.51	3.11
IN.†	15.30	45.94	36.36	27.05	27.62	10.89	21.09	11.44	4.15	2.54	1.74	3.47
AC-FT†	33690	101200	80080	59580	60840	23980	46460	25190	9140	5590	3840	7650

CAL YR 1995 TOTAL 238382 MEAN 653 MAX 5510 MIN 199 AC-FT 472800 MEAN† 644 CFSM† 15.60 IN.† 211.79 AC-FT† 466500  
WTR YR 1996 TOTAL 230207 MEAN 629 MAX 5510 MIN 196 AC-FT 456600 MEAN† 630 CFSM† 15.25 IN.† 207.57 AC-FT† 457200

† Adjusted for change in contents in Wynoochee Lake.

12035450 BIG CREEK NEAR GRIDDALE, WA

LOCATION.--Lat 47°22'28", long 123°38'08", in SE 1/4 SE 1/4 sec.24, T.22 N., R.8 W., Grays Harbor County, Hydrologic Unit 17100104, Olympic National Forest, on left bank 280 ft upstream from road bridge, 1.5 mi northwest of Grisdale, and 0.6 mi upstream from mouth.

DRAINAGE AREA.--9.57 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1972 to September 1996 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 600 ft above sea level, from topographic map. Prior to Oct. 1, 1990, at a site 300 ft upstream, at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair and those above 900 ft<sup>3</sup>/s, which are poor. No regulation or diversion upstream from station. Tacoma Public Utilities satellite telemeter at station.

AVERAGE DISCHARGE.--24 years (water years 1973-96), 112 ft<sup>3</sup>/s, 159.21 in/yr, 81,240 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,680 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 7.44 ft, from rating curve extended above 1,000 ft<sup>3</sup>/s; maximum gage height, 8.02 ft Feb. 18, 1995; minimum discharge, 7.2 ft<sup>3</sup>/s Oct. 14, 18-25, 27-29, 1987, Oct. 9, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,100 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	0800	2,000	7.36	Nov. 28	2230	*2,580	*7.69
Nov. 11	0215	1,330	6.87	Dec. 12	2315	1,580	7.07
Nov. 23	1330	1,840	7.26				

Minimum discharge, 9.7 ft<sup>3</sup>/s Aug. 22, 29, 30, Sept. 4, 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e55	53	295	172	e60	e65	58	95	41	16	12	11
2	e70	48	233	181	e55	e60	60	83	39	16	14	10
3	e60	44	218	246	e55	e60	51	74	37	16	12	10
4	e45	44	240	169	e70	e60	48	67	35	16	12	9.9
5	44	46	171	148	e300	e55	45	61	33	15	12	11
6	40	46	137	499	e600	e50	55	56	32	15	12	11
7	36	533	114	684	e750	e50	66	53	31	15	12	12
8	38	1160	98	359	e1000	e55	56	50	30	15	11	18
9	69	259	175	221	e450	e55	53	46	29	14	11	16
10	457	244	557	e190	e250	e80	50	43	28	14	11	13
11	323	585	687	e145	e150	e90	67	41	27	14	11	12
12	178	215	594	e110	e110	129	207	43	27	14	11	12
13	111	208	688	e140	e90	98	148	54	26	14	11	15
14	84	221	615	e480	e80	83	101	47	24	14	11	59
15	71	222	510	e520	e70	74	92	42	24	13	10	79
16	98	177	304	e350	e65	68	148	40	23	13	10	78
17	393	241	293	e220	e110	62	225	54	23	13	10	42
18	182	388	396	e165	e190	58	217	174	23	19	10	32
19	115	189	246	e150	e180	57	243	200	22	29	10	28
20	92	142	179	e210	e215	58	203	136	20	23	10	25
21	86	119	149	e300	e210	53	151	103	20	18	10	23
22	73	174	127	e220	e195	52	261	94	19	17	10	21
23	65	825	108	e200	e215	49	675	91	22	16	10	20
24	58	378	93	e180	e190	46	497	83	20	15	10	19
25	228	343	84	e150	e130	44	409	73	19	14	10	18
26	220	253	77	e130	e110	42	345	65	19	14	10	17
27	118	291	71	e110	e90	40	225	59	18	14	10	17
28	90	927	103	e90	e80	38	169	55	18	13	10	16
29	74	1230	329	e80	e75	38	136	51	18	13	9.9	15
30	65	463	267	e70	---	36	112	47	17	13	13	15
31	58	---	293	e65	---	40	---	44	---	12	13	---
TOTAL	3696	10068	8451	6954	6145	1845	5173	2224	764	477	338.9	684.9
MEAN	119	336	273	224	212	59.5	172	71.7	25.5	15.4	10.9	22.8
MAX	457	1230	688	684	1000	129	675	200	41	29	14	79
MIN	36	44	71	65	55	36	45	40	17	12	9.9	9.9
AC-FT	7330	19970	16760	13790	12190	3660	10260	4410	1520	946	672	1360
CFSM	12.5	35.1	28.5	23.4	22.1	6.22	18.0	7.50	2.66	1.61	1.14	2.39
IN.	14.37	39.14	32.85	27.03	23.89	7.17	20.11	8.65	2.97	1.85	1.32	2.66

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1972 - 1996, BY WATER YEAR (WY)

	MEAN	75.7	210	232	193	203	150	109	63.5	41.0	26.5	19.2	31.1
MAX	240	458	445	353	379	313	172	120	80.7	85.7	76.2	104	
(WY)	1976	1991	1980	1992	1982	1974	1996	1984	1990	1983	1991	1978	
MIN	8.43	53.1	76.8	51.7	58.9	46.1	50.2	29.8	17.4	13.8	10.3	9.30	
(WY)	1988	1994	1986	1985	1993	1992	1973	1980	1980	1975	1985	1987	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1972 - 1996
ANNUAL TOTAL	47907	46820.8	
ANNUAL MEAN	131	128	112
HIGHEST ANNUAL MEAN			174
LOWEST ANNUAL MEAN			73.7
HIGHEST DAILY MEAN	1230	Nov 29	2080
LOWEST DAILY MEAN	11	Aug 5	7.2
ANNUAL SEVEN-DAY MINIMUM	12	Jul 30	7.3
ANNUAL RUNOFF (AC-FT)	95020	92870	81240
ANNUAL RUNOFF (CFSM)	13.7	13.4	11.7
ANNUAL RUNOFF (INCHES)	186.22	182.00	159.21
10 PERCENT EXCEEDS	327	301	261
50 PERCENT EXCEEDS	63	60	56
90 PERCENT EXCEEDS	13	12	13

e Estimated

## CHEHALIS RIVER BASIN

81

## 12036000 WYNOOCHEE RIVER ABOVE SAVE CREEK, NEAR ABERDEEN, WA

LOCATION.--Lat 47°17'57", long 123°39'07", in NE 1/4 NE 1/4 sec.23, T.21 N., R.8 W., Grays Harbor County, Hydrologic Unit 17100104, on right bank 0.8 mi upstream from Save Creek, 2.5 mi downstream from Oxbow Dam Site, 11.0 mi downstream from Wynoochee Dam, 23.5 mi northeast of city hall in Aberdeen, and at mile 40.6.

DRAINAGE AREA.--74.1 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1925 to current year. Published as "at Oxbow, near Aberdeen" 1925-52, where drainage area was 70.7 mi<sup>2</sup>. Records published for both sites October 1951 to October 1952.

REVISED RECORDS.--WSP 1346: 1952. WSP 1736: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 401 ft above sea level (stadia traverse). Prior to Nov. 7, 1925, nonrecording gage at site 2.3 mi upstream at different datum. Nov. 7, 1925, to Sept. 3, 1947, water-stage recorder at site 1.5 mi upstream at datum 444.0 ft above sea level (levels by city of Aberdeen). Sept. 4, 1947, to Oct. 13, 1952, water-stage recorder at site 2.5 mi upstream at datum about 91 ft higher. Oct. 5, 1951, to Sept. 30, 1976, water-stage recorder on left bank at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Since August 1972, flow regulated by Wynoochee Lake (station 12035380) for flood control, during summer months to augment the natural river flow, and for the water supply for the city of Aberdeen. Some regulation from August 1969 to September 1972 due to dam construction. No diversions upstream from station. Tacoma Public Utilities satellite telemeter at station.

AVERAGE DISCHARGE.--71 years (water years 1926-96), 824 ft<sup>3</sup>/s, 151.01 in/yr, 597,000 acre-ft/yr, adjusted for storage in Wynoochee Lake since October 1972.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 23,600 ft<sup>3</sup>/s Dec. 9, 1956, gage height, 16.95 ft, from rating curve extended above 9,000 ft<sup>3</sup>/s, minimum discharge, 57 ft<sup>3</sup>/s Sept. 3-5, 1972, gage height, 4.43 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,900 ft<sup>3</sup>/s Nov. 28, gage height, 12.90 ft; minimum discharge, 265 ft<sup>3</sup>/s Aug. 9, 10; minimum daily discharge, 269 ft<sup>3</sup>/s Aug. 7-9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	457	537	3270	1240	544	591	389	570	384	388	275	283
2	448	390	2240	1290	534	579	386	639	378	411	283	283
3	444	378	2090	1980	534	593	366	922	373	425	272	285
4	390	378	2130	1340	613	612	356	901	371	423	272	281
5	364	384	1930	1080	1920	593	348	883	364	428	273	280
6	358	379	1820	2220	3330	627	381	676	361	438	270	279
7	349	1670	1750	3350	4690	604	393	481	357	442	269	291
8	353	e7200	1720	2320	3970	602	372	435	351	438	269	313
9	385	4290	1670	2020	2590	783	364	422	350	356	269	314
10	1300	2300	2810	1930	2130	1700	354	411	347	375	277	307
11	1140	e4750	4850	1880	1950	1680	383	405	345	312	288	309
12	1580	2640	4540	1780	1840	948	735	405	341	293	286	316
13	1170	2120	5190	1850	1770	775	629	431	337	291	285	331
14	569	2150	5610	3100	1730	536	513	407	334	290	285	554
15	433	2100	3860	5300	1320	478	511	396	342	290	283	733
16	834	1960	2370	3210	813	584	591	388	351	293	284	550
17	2140	2010	2210	2020	1410	526	765	423	353	282	283	377
18	1830	2850	2950	1860	3330	483	802	1550	358	303	283	317
19	914	1900	2200	1770	2460	519	861	1670	348	321	283	385
20	784	1770	1940	1740	2600	560	816	1160	345	305	283	368
21	632	1720	1830	1410	2070	516	683	874	344	291	283	364
22	569	1850	1760	1110	1420	440	895	806	351	287	283	357
23	546	4260	1730	925	1330	409	3620	675	400	294	283	347
24	527	4050	1650	924	1210	378	3860	643	399	283	283	347
25	1400	2790	1180	802	932	372	2260	622	392	283	283	345
26	1940	2270	816	752	844	365	1740	605	388	283	283	343
27	1130	2640	668	635	674	361	1200	590	389	283	283	343
28	732	e6000	829	613	680	355	814	442	385	282	283	343
29	678	e6520	2150	581	614	354	682	406	382	280	281	343
30	650	e11900	2000	559	---	340	617	396	380	281	297	342
31	629	---	2090	548	---	355	---	387	---	278	291	---
TOTAL	25675	86156	73853	52139	49852	18618	26686	20021	10900	10229	8705	10630
MEAN	828	2872	2382	1682	1719	601	890	646	363	330	281	354
MAX	2140	11900	5610	5300	4690	1700	3860	1670	400	442	297	733
MIN	349	378	668	548	534	340	348	387	334	278	269	279
AC-FT	50930	170900	146500	103400	98880	36930	52930	39710	21620	20290	17270	21080
MEAN†	909	2994	2249	1680	1818	627	1284	644	264	174	126	201
CFSM†	12.29	40.46	30.39	22.70	24.57	8.48	17.36	8.71	3.57	2.35	1.71	2.72
IN.†	14.17	45.13	35.04	26.17	26.50	9.78	19.36	10.04	3.98	2.71	1.97	3.03
AC-FT†	55910	178100	138300	103300	104600	38580	76400	39630	15720	10700	7770	11960

CAL YR 1995 TOTAL 403473 MEAN 1105 MAX 11900 MIN 242 AC-FT 800300 MEAN† 1097 CFSM† 14.82 IN.† 201.81 AC-FT† 794000  
WTR YR 1996 TOTAL 393464 MEAN 1075 MAX 11900 MIN 269 AC-FT 780400 MEAN† 1076 CFSM† 14.54 IN.† 197.89 AC-FT† 781000

e Estimated

† Adjusted for change in contents in Wynoochee Lake.

## 12036400 SCHAFER CREEK NEAR GRIDDALE, WA

LOCATION.--Lat 47°12'16", long 123°36'50", in NE 1/4 SW 1/4 sec.24, T.20 N., R.8 W., Grays Harbor County, Hydrologic Unit 17100104, on left bank, 9.1 mi south of Grisdale, and 1.0 mi upstream from mouth.

DRAINAGE AREA.--12.1 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1986 to September 1996 (discontinued).

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 280 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--10 years (water years 1987-96), 75.7 ft<sup>3</sup>/s, 85.00 in/yr, 54,840 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,640 ft<sup>3</sup>/s Dec. 10, 1993, gage height, 10.53 ft, from rating curve extended above 700 ft<sup>3</sup>/s; minimum discharge, 2.9 ft<sup>3</sup>/s Sept. 28, 30, Oct. 15, 20, 28, 29, 1987, gage height, 3.23 ft.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1100	1,070	7.94	Jan. 7	0800	941	7.60
Nov. 11	0400	1,060	7.91	Feb. 6	1900	839	7.30
Nov. 29	0200	*1,450	*8.84	Feb. 8	0900	1,120	8.08
Dec. 11	0200	832	7.28	Feb. 8	0900	(a)	8.56
Dec. 12	2300	800	7.19				

Minimum daily discharge, 6.0 ft<sup>3</sup>/s on many days during August and September.

(a) From crest-stage gage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	48	272	177	52	55	37	69	30	9.9	e7.0	e7.0
2	48	43	210	173	48	50	31	61	28	9.9	e8.0	e6.0
3	42	39	190	202	47	51	27	55	27	9.4	e7.0	e6.0
4	33	40	222	164	66	50	26	49	26	9.2	e7.0	e6.0
5	28	44	159	143	192	46	25	44	24	8.8	e7.0	e6.0
6	26	43	121	382	528	41	37	40	23	8.3	e7.0	e6.0
7	26	219	98	716	627	42	38	39	22	8.2	e7.0	e7.0
8	25	817	82	325	889	46	32	36	20	7.7	e7.0	e10
9	28	310	119	202	342	46	31	33	20	7.7	e6.0	e9.0
10	254	248	332	148	194	70	30	30	19	7.7	e6.0	e8.0
11	222	654	640	116	131	78	37	29	19	7.2	e6.0	e7.0
12	148	280	465	96	101	71	87	31	17	7.2	e6.0	e7.0
13	93	244	567	127	83	62	108	43	17	6.7	e6.0	e8.0
14	66	264	472	418	70	56	87	32	16	6.7	e6.0	e30
15	51	223	374	466	62	50	82	28	15	e7.0	e6.0	e45
16	59	164	278	297	56	45	90	26	15	e7.0	e6.0	e45
17	260	143	256	184	98	42	114	40	14	e7.0	e6.0	e25
18	192	163	307	135	163	39	145	76	15	e10	e6.0	e19
19	111	122	226	126	151	40	170	82	14	e15	e6.0	e15
20	86	97	159	187	184	42	167	75	13	e13	e6.0	e14
21	74	80	121	262	180	38	130	71	13	e11	e6.0	e13
22	55	115	98	190	163	41	200	68	12	e10	e6.0	e12
23	47	282	83	179	184	37	573	62	15	e9.0	e6.0	e11
24	41	312	71	158	145	33	396	56	14	e9.0	e6.0	e10
25	166	273	62	130	113	30	309	51	13	e8.0	e6.0	e10
26	242	213	56	109	93	29	266	47	12	e8.0	e6.0	e10
27	138	283	53	94	78	29	178	43	12	e8.0	e6.0	e9.0
28	98	597	85	83	68	27	125	41	12	e7.0	e6.0	e9.0
29	77	1190	334	71	62	26	98	40	11	e7.0	e6.0	e9.0
30	64	488	295	62	---	25	80	36	10	e7.0	e7.0	e9.0
31	55	---	256	57	---	26	---	33	---	e7.0	e7.0	---
TOTAL	2892	8038	7063	6179	5170	1363	3756	1466	518	264.6	197.0	388.0
MEAN	93.3	268	228	199	178	44.0	125	47.3	17.3	8.54	6.35	12.9
MAX	260	1190	640	716	889	78	573	82	30	15	8.0	45
MIN	25	39	53	57	47	25	25	26	10	6.7	6.0	6.0
AC-FT	5740	15940	14010	12260	10250	2700	7450	2910	1030	525	391	770
CFSM	7.71	22.1	18.8	16.5	14.7	3.63	10.3	3.91	1.43	.71	.53	1.07
IN.	8.89	24.71	21.71	19.00	15.89	4.19	11.55	4.51	1.59	.81	.61	1.19

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1996, BY WATER YEAR (WY)

	MEAN	MAX	(WY)	MIN	(WY)
1987	32.3	93.3	1996	4.16	1988
1988	160	285	1991	22.8	1994
1989	165	308	1995	91.0	1989
1990	161	230	1992	83.6	1988
1991	141	227	1991	27.7	1993
1992	92.4	127	1994	28.5	1992
1993	78.4	125	1996	30.7	1990
1994	33.0	57.6	1988	16.1	1989
1995	22.3	43.9	1990	9.46	1992
1996	11.0	20.2	1989	6.58	1992
	8.21	17.9	1991	4.60	1992
	8.77	18.4	1991	4.61	1987

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1987 - 1996

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1987 - 1996
ANNUAL TOTAL	34853.3	37294.6	
ANNUAL MEAN	95.5	102	75.7
HIGHEST ANNUAL MEAN			102
LOWEST ANNUAL MEAN			54.8
HIGHEST DAILY MEAN	1190	Nov 29	1840
LOWEST DAILY MEAN	4.9	Aug 4	3.2
ANNUAL SEVEN-DAY MINIMUM	5.2	Jul 30	3.6
ANNUAL RUNOFF (AC-FT)	69130	73970	54840
ANNUAL RUNOFF (CFSM)	7.89	8.42	6.26
ANNUAL RUNOFF (INCHES)	107.15	114.66	85.00
10 PERCENT EXCEEDS	255	265	188
50 PERCENT EXCEEDS	44	45	32
90 PERCENT EXCEEDS	6.4	7.0	6.0

e Estimated



## CHEHALIS RIVER BASIN

83

12037400 WYNOOCHEE RIVER ABOVE BLACK CREEK, NEAR MONTESANO, WA

LOCATION.--Lat 47°00'42", long 123°39'15", in SE 1/4 SE 1/4 sec.27. T.18 N., R.8 W., Grays Harbor County, Hydrologic Unit 17100104, on left bank 2,000 ft upstream from Black Creek, 3.5 mi northwest of Montesano, and at mile 5.9.

DRAINAGE AREA.--155 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 40 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records good. City of Aberdeen diverted about 80 ft<sup>3</sup>/s for municipal supply at intake 2.2 mi upstream. Other small diversions for irrigation and domestic use. Since August 1972, flow regulated by Wynoochee Dam, 45.7 mi upstream, for flood control, during summer months to augment the natural river flow, and for the water supply for the city of Aberdeen. Some regulation from 1969 to August 1972 due to dam construction. Sediment records October 1961 to June 1965. Water temperatures October 1969 to September 1986. Tacoma Public Utilities satellite telemeter at station.

AVERAGE DISCHARGE.--16 years (water years 1957-72), 1,316 ft<sup>3</sup>/s, 953,600 acre-ft/yr, unregulated.  
24 years (water years 1973-96), 1,221 ft<sup>3</sup>/s, 884,400 acre-feet/yr, regulated.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 25,500 ft<sup>3</sup>/s Jan. 19, 1968; maximum gage height, 20.54 ft Dec. 10, 1956; minimum discharge, 3.0 ft<sup>3</sup>/s part or all of each day Aug. 26-30, 1967, gage height, 2.86 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 17,700 ft<sup>3</sup>/s Nov. 29, gage height, 16.11 ft; minimum discharge, 152 ft<sup>3</sup>/s Aug. 9-11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

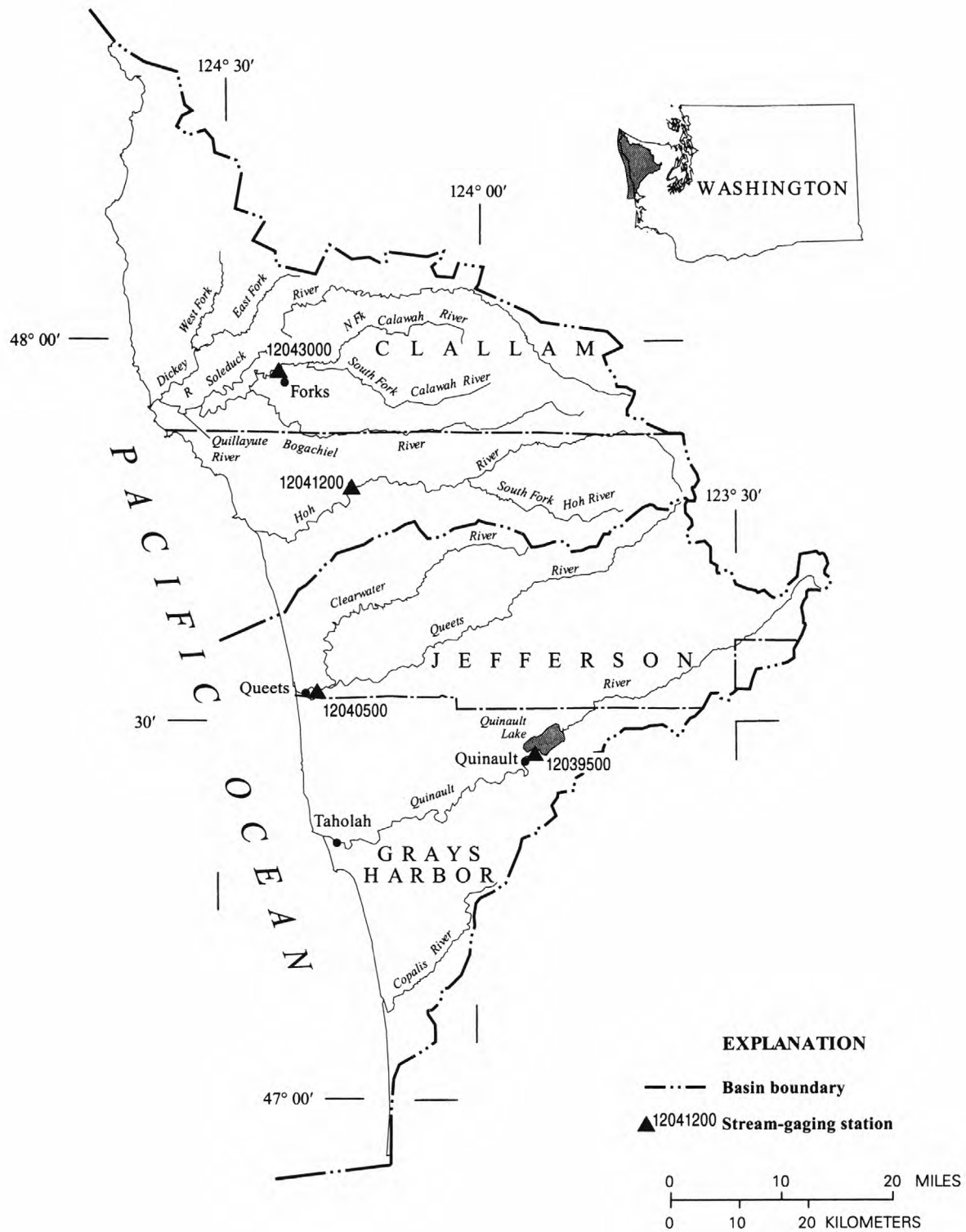
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	658	931	6640	2570	803	939	444	1050	434	347	164	166
2	535	736	4030	2120	759	884	466	930	416	358	199	160
3	582	623	3390	2990	727	867	414	1160	396	368	188	178
4	482	598	3650	2570	853	878	391	1200	390	377	171	170
5	393	634	3120	2050	1540	847	370	1150	374	367	171	166
6	352	635	2750	3130	5500	782	426	1010	355	357	164	170
7	344	1610	2510	8660	8950	821	497	807	341	357	161	176
8	340	8710	2340	5480	12000	815	452	633	327	362	157	201
9	345	8230	2370	3700	6300	810	425	563	326	330	154	211
10	2030	3840	3670	3100	4060	1640	413	522	317	284	152	195
11	2490	9220	7720	2800	3230	2180	424	504	310	281	163	188
12	2370	5300	7420	2540	2790	1560	844	495	299	235	170	190
13	2020	3840	8600	2490	2520	1160	1280	654	289	214	166	202
14	1300	3900	8850	4220	2330	965	1020	557	282	204	162	331
15	912	3530	6890	7350	2120	729	898	503	277	197	161	737
16	877	3180	4440	6130	1370	717	963	471	286	194	161	636
17	2550	2920	3710	3560	1480	711	1200	520	295	195	161	411
18	3240	3740	4580	2940	3880	642	1400	1260	306	210	161	293
19	1980	2980	3810	2760	3770	617	1540	2200	295	260	161	274
20	1470	2560	3110	3070	3570	685	1650	1720	289	253	161	285
21	1250	2360	2750	3360	3600	635	1410	1350	288	222	160	275
22	1040	2420	2500	2610	2670	647	1450	1200	289	202	158	269
23	941	3910	2320	2220	2630	537	5030	1050	333	193	155	251
24	886	6920	2190	2050	2330	480	7990	913	374	193	155	242
25	1330	4570	1780	1740	1930	430	4440	843	366	182	156	238
26	3900	3920	1400	1520	1580	412	3840	789	351	179	158	233
27	2320	3930	1070	1290	1320	399	2710	745	345	175	160	229
28	1590	6980	1000	1140	1110	384	1940	666	347	173	161	229
29	1270	14100	3060	1010	1060	380	1450	545	338	173	157	225
30	1120	12600	3580	915	---	361	1210	492	330	168	164	225
31	1020	---	3480	850	---	356	---	457	---	166	184	---
TOTAL	41937	129427	118730	92935	86782	24270	46987	26959	9965	7776	5076	7756
MEAN	1353	4314	3830	2998	2992	783	1566	870	332	251	164	259
MAX	3900	14100	8850	8660	12000	2180	7990	2200	434	377	199	737
MIN	340	598	1000	850	727	356	370	457	277	166	152	160
AC-FT	83180	256700	235500	184300	172100	48140	93200	53470	19770	15420	10070	15380

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1973 - 1996, BY WATER YEAR (WY)

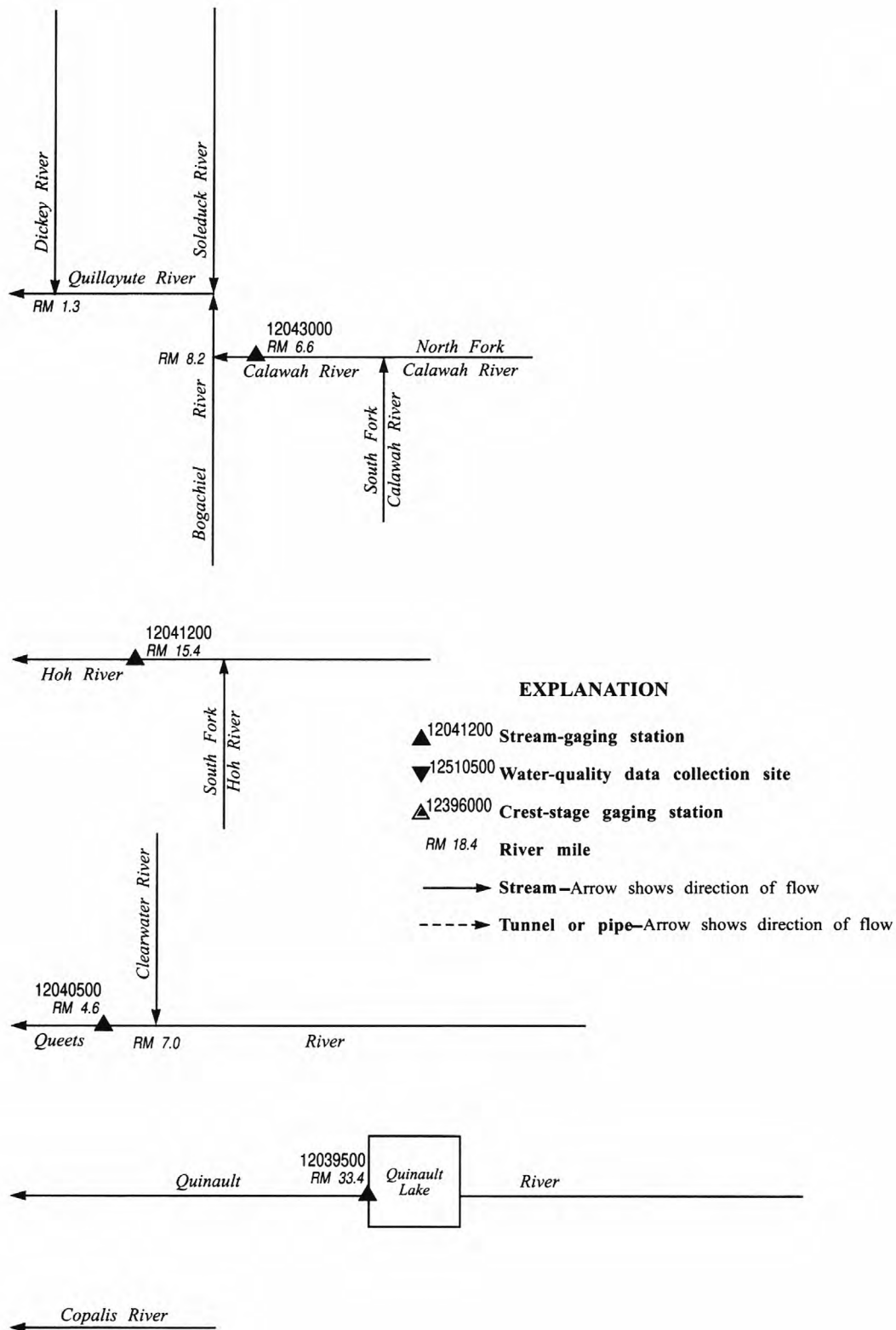
	MEAN	758	2224	2679	2239	2235	1503	996	672	499	338	229	340
MAX	2967	4951	5122	3712	4109	2911	1791	1322	1030	766	399	1287	
(WY)	1976	1991	1995	1974	1982	1974	1974	1984	1974	1974	1991	1978	
MIN	143	294	788	602	579	539	497	333	245	183	164	148	
(WY)	1988	1994	1986	1985	1993	1992	1973	1994	1979	1995	1996	1993	

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1973 - 1996

ANNUAL TOTAL	592179	598600	
ANNUAL MEAN	1622	1636	1221
HIGHEST ANNUAL MEAN			1871
LOWEST ANNUAL MEAN			749
HIGHEST DAILY MEAN	14100	Nov 29	18800
LOWEST DAILY MEAN	149	Aug 4	108
ANNUAL SEVEN-DAY MINIMUM	153	Jul 30	119
ANNUAL RUNOFF (AC-FT)	1175000	1187000	884400
10 PERCENT EXCEEDS	3860	3890	2900
50 PERCENT EXCEEDS	736	796	620
90 PERCENT EXCEEDS	180	173	194



**Figure 23.** Location of surface-water stations in the Quinault, Queets, Hoh and Quillayute River Basins.



**Figure 24.** Schematic diagram showing surface-water stations in the Quinault, Queets, Hoh and Quillayute River Basins.

## 12039500 QUINULT RIVER AT QUINULT LAKE, WA

LOCATION.--Lat 47°27'28", long 123°53'17", in SW 1/4 NE 1/4 sec.25, T.23 N., R.10 W., Grays Harbor County, Hydrologic Unit 17100102, Quinault Indian Reservation, on left bank at outlet of Quinault Lake, 50 ft downstream from Olympic Highway bridge on U.S. Highway 101, 2.0 mi southwest of Quinault, and at mile 33.4.

DRAINAGE AREA.--264 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1911 to current year. Monthly discharge for some months during the 1923-25, 1933 water years, published in WSP 1316.

REVISED RECORDS.--WSP 442: Drainage area. WSP 1286: 1915-16(M), 1934, 1936-39(M). WSP 1316: 1923, 1925, 1933. WSP 1635: 1917.

GAGE.--Water-stage recorder. Datum of gage is 178.39 ft above sea level (National Geodetic Survey levels of April 1977). Prior to Sept. 30, 1916, nonrecording gages at sites within 4 mi northeast of present site, at different datum. Oct. 1, 1916, to May 2, 1935, water-stage recorder at site 300 ft downstream from present site at datum 0.36 ft higher than present datum.

REMARKS.--No estimated daily discharges. Records good. Flow affected by natural storage in Quinault Lake. No diversions upstream from station. Chemical analyses July 1959 to June 1960, October 1962 to September 1970 (partial-record station), October 1971 to September 1974. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--85 years (1912-96 water years), 2,836 ft<sup>3</sup>/s, 145.88 in/yr, 2,055,000 acre-ft/yr, includes monthly data published in WSP 1316.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,200 ft<sup>3</sup>/s Nov. 4, 1955, gage height, 20.51 ft; minimum daily discharge, 250 ft<sup>3</sup>/s Oct. 29, 30, 1987.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in November 1909 reached a stage of approximately 22 ft, present datum, discharge, 52,600 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1500	32,300	15.78	Jan. 7	1900	12,900	9.70
Nov. 11	1100	16,400	10.92	Jan. 15	1700	13,500	9.91
Nov. 25	0900	12,900	9.70	Feb. 8	1600	16,100	10.82
Nov. 29	1600	*34,800	*16.49	Apr. 24	0700	12,900	9.70
Dec. 13	1000	22,000	12.70				

Minimum discharge, 413 ft<sup>3</sup>/s Aug. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1360	1810	14600	5260	1610	2010	1300	3200	1970	1150	699	535
2	1410	1640	9920	4600	1520	1900	1550	2870	1970	1160	706	524
3	1620	1510	7470	5410	1450	1840	1560	2600	2130	1180	700	520
4	1560	1420	6580	5100	1560	1920	1510	2370	2270	1170	687	505
5	1380	1410	5520	4310	3010	1930	1430	2180	2240	1130	676	506
6	1250	1420	4590	5290	9810	1870	1530	2030	2110	1080	667	506
7	1170	3150	3910	12000	14500	1810	1890	1950	1990	1050	651	507
8	1120	25600	3410	10600	15500	1820	2070	1870	1900	1030	636	544
9	1160	19700	3260	7550	12800	1990	2120	1760	1830	1040	615	591
10	4040	10600	8880	5980	8360	3030	2140	1650	1750	1030	598	592
11	5890	14600	17400	5340	5920	4240	2100	1560	1700	998	588	576
12	5510	11000	16100	4570	4620	4100	2430	1510	1630	972	580	548
13	4250	8110	20800	4060	3910	3470	2660	1880	1570	963	567	534
14	3330	8180	16500	6890	3450	2950	2540	2270	1530	959	547	678
15	2720	7250	12800	12400	3150	2610	2680	2280	1490	949	531	1030
16	2960	6580	9360	11400	2940	2360	3850	2150	1460	930	524	1210
17	4520	6430	7160	7870	3230	2130	5160	2130	1420	903	517	1180
18	5810	10700	7120	5750	7180	1960	5150	3320	1370	918	503	1080
19	4490	8920	6490	4610	8890	1890	4740	5020	1300	1060	491	990
20	3550	6530	5360	3950	7840	1910	4370	5130	1250	1180	482	920
21	3090	5110	4490	3790	6990	1840	3780	4350	1220	1150	474	858
22	2720	4610	3860	3450	5620	1780	3500	3800	1220	1080	464	812
23	2370	8150	3390	3250	4750	1700	6680	3550	1240	1020	457	765
24	2110	11600	3030	3030	4000	1590	12200	3270	1300	965	449	721
25	2210	12500	2740	2740	3410	1500	9530	3040	1320	923	440	678
26	4220	10200	2500	2490	2980	1420	8230	2930	1290	883	435	646
27	3880	8220	2320	2270	2660	1360	6560	2790	1250	847	433	617
28	3200	11700	2250	2120	2390	1300	5200	2600	1240	813	429	591
29	2670	30600	3410	1980	2170	1260	4250	2430	1220	784	425	575
30	2290	24800	4860	1820	---	1220	3630	2250	1180	750	452	555
31	2020	---	5840	1700	---	1200	---	2080	---	725	515	---
TOTAL	89880	284050	225920	161580	156220	63910	116340	82820	47360	30792	16938	20894
MEAN	2899	9468	7288	5212	5387	2062	3878	2672	1579	993	546	696
MAX	5890	30600	20800	12400	15500	4240	12200	5130	2270	1180	706	1210
MIN	1120	1410	2250	1700	1450	1200	1300	1510	1160	725	425	505
AC-FT	178300	563400	448100	320500	309900	126800	230800	164300	93940	61080	33600	41440
CFSM	11.0	35.9	27.6	19.7	20.4	7.81	14.7	10.1	5.98	3.76	2.07	2.64
IN.	12.66	40.03	31.83	22.77	22.01	9.01	16.39	11.67	6.67	4.34	2.39	2.94

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1996, BY WATER YEAR (WY)

MEAN	2281	4154	4872	4211	3825	2913	2667	2821	2726	1779	921	1001
MAX	6703	11220	10390	11390	8244	7752	4484	4575	5116	3658	1975	3573
(WY)	1922	1991	1980	1953	1961	1972	1943	1948	1956	1974	1971	1920
MIN	266	410	1676	1177	673	1162	1182	1635	982	585	422	368
(WY)	1988	1937	1986	1937	1929	1912	1912	1920	1992	1926	1944	1987

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1912 - 1996

ANNUAL TOTAL	1341224	1296704	2840
ANNUAL MEAN	3675	3543	3981
HIGHEST ANNUAL MEAN			1785
LOWEST ANNUAL MEAN			1930
HIGHEST DAILY MEAN	30600	Nov 29	41200
LOWEST DAILY MEAN	399	Sep 25	250
ANNUAL SEVEN-DAY MINIMUM	411	Sep 20	254
ANNUAL RUNOFF (AC-FT)	2660000	2572000	2057000
ANNUAL RUNOFF (CFSM)	13.9	13.4	10.8
ANNUAL RUNOFF (INCHES)	188.99	182.72	146.16
10 PERCENT EXCEEDS	8160	8190	5440
50 PERCENT EXCEEDS	2230	2110	2150
90 PERCENT EXCEEDS	692	592	653



QUEETS RIVER BASIN

87

12040500 QUEETS RIVER NEAR CLEARWATER, WA

LOCATION.--Lat 47°32'17", long 124°18'52", in NE 1/4 SW 1/4 sec.36, T.24 N., R.13 W., Jefferson County, Hydrologic Unit 17100102, Quinalt Indian Reservation, on right bank 2.4 mi downstream from mouth of Clearwater River, 0.8 mi east of Queets, and at mile 4.6.

DRAINAGE AREA.--445 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1930 to November 1949, water years 1950-67 (annual maximum), April 1974 to current year.

REVISED RECORDS.--WSP 1316: 1931-49(m).

GAGE.--Water-stage recorder. Datum of gage is 14.5 ft above sea level (river-profile survey). Sept. 15, 1930, to Jan. 22, 1935, at datum 4.0 ft higher.

REMARKS.--No estimated daily discharges. Records good. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station. Chemical analyses October 1977 to September 1993.

AVERAGE DISCHARGE.--41 years (water years 1931-49, 1975-96), 4,277 ft<sup>3</sup>/s, 130.58 in/yr, 3,098,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 130,400 ft<sup>3</sup>/s Jan. 22, 1935, gage height, 27.0 ft, from floodmarks, present datum; minimum discharge, 300 ft<sup>3</sup>/s Oct. 21-25, 29, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 42,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1300	86,700	22.95	Nov. 29	0300	*89,200	*23.21
Nov. 11	0600	60,700	19.95	Dec. 13	0300	51,500	18.82
Nov. 23	1700	47,800	18.22	Jan. 14	2400	46,500	18.03

Minimum discharge, 427 ft<sup>3</sup>/s Aug. 24-26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	*JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2310	2260	15500	6180	2170	2480	1900	3810	1930	1010	686	696
2	2670	2030	11200	5400	2030	2320	3030	3370	2110	1030	686	557
3	3350	1860	8800	10200	1910	2220	2050	3060	2190	1060	752	497
4	2190	1820	10200	7490	2930	2890	1940	2750	2160	1060	686	472
5	1630	2430	7040	5640	13300	2910	1720	2540	2060	994	690	477
6	1420	2660	5980	15200	23500	2620	2850	2320	1830	931	723	570
7	1500	18500	4890	23900	25100	2460	4380	2260	1700	894	664	560
8	1870	70500	4160	12700	29500	2550	3430	2260	1620	904	625	691
9	2670	20500	4910	8950	16100	2730	2800	2060	1550	957	610	1010
10	22700	11900	27800	7570	9060	5260	2820	1890	1520	916	600	771
11	11900	33500	30600	7430	6480	6990	2600	1790	1630	864	587	639
12	7840	13700	20100	5790	4960	5000	6100	1750	1550	858	578	566
13	5170	10900	34600	5840	4280	3660	5690	2410	1430	872	561	530
14	3890	17300	21200	34600	3770	2980	4420	2550	1370	889	539	1520
15	3110	13200	15700	36200	3200	2630	4850	2140	1330	897	523	2610
16	5370	10200	10300	19500	2980	2340	7050	1890	1290	876	516	1960
17	14500	13100	7910	11300	4400	2110	9330	1670	1250	826	503	1320
18	9110	23500	9040	7960	14900	1940	8050	5770	1210	822	487	1020
19	5210	11000	7620	6650	11400	1990	6870	6750	1140	1200	469	939
20	4500	7520	5880	6240	11800	2460	6370	5450	1090	1390	454	897
21	5030	5900	4770	7570	11400	2190	4700	4570	1080	1140	448	861
22	3980	6590	4000	6170	7720	2070	4840	4240	1080	975	441	886
23	3230	28300	3440	6100	7660	1910	16900	4950	1110	898	435	857
24	2850	18800	3010	5670	5940	1630	18600	4250	1300	865	429	755
25	9180	17800	2620	4710	4730	1500	13300	3620	1340	846	427	684
26	14000	12200	2400	4160	3920	1280	13300	3260	1190	815	428	641
27	6330	13200	2230	3630	3280	1450	9000	2910	1090	789	437	613
28	4480	37300	2160	2810	2920	1380	6800	2620	1090	770	445	597
29	3540	75900	6690	2460	2720	1330	5420	2470	1080	749	438	574
30	2960	27500	8240	2600	--	1350	4440	2230	1040	725	461	555
31	2570	--	9010	2360	--	1290	--	2050	--	705	752	--
TOTAL	171060	531870	312000	292980	244060	77920	185550	95660	43360	28527	17080	25325
MEAN	5518	17730	10060	9451	8416	2514	6185	3086	1445	920	551	844
MAX	22700	75900	34600	36200	29500	6990	18600	6750	2190	1390	752	2610
MIN	1420	1820	2160	2360	1910	1280	1720	1670	1040	705	427	472
AC-FT	339300	1055000	618900	581100	484100	154600	368000	189700	86000	56580	33880	50230
CFSM	12.4	39.8	22.6	21.2	18.9	5.65	13.9	6.93	3.25	2.07	1.24	1.90
IN.	14.30	44.46	26.08	24.49	20.40	6.51	15.51	8.00	3.62	2.38	1.43	2.12

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1996, BY WATER YEAR (WY)

MEAN	3362	7409	8131	7275	6861	5150	4138	3136	2370	1550	1002	1353
MAX	10050	20100	18140	23500	12770	8349	7093	6263	4509	4327	4396	4330
(WY)	1976	1991	1980	1935	1982	1932	1937	1948	1936	1983	1991	1978
MIN	348	754	2435	1787	1818	1876	2082	1765	980	682	469	439
(WY)	1988	1937	1986	1937	1993	1992	1975	1931	1992	1992	1938	1993

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1931 - 1996
ANNUAL TOTAL	2043647	2025392	
ANNUAL MEAN	5599	5534	4277
HIGHEST ANNUAL MEAN			6196
LOWEST ANNUAL MEAN			2872
HIGHEST DAILY MEAN	75900	Nov 29	79100
LOWEST DAILY MEAN	413	Sep 24	300
ANNUAL SEVEN-DAY MINIMUM	436	Sep 20	303
ANNUAL RUNOFF (AC-FT)	4054000	4017000	3098000
ANNUAL RUNOFF (CFSM)	12.6	12.4	9.61
ANNUAL RUNOFF (INCHES)	170.84	169.31	130.58
10 PERCENT EXCEEDS	13200	13300	9160
50 PERCENT EXCEEDS	2630	2600	2490
90 PERCENT EXCEEDS	711	640	710

## HOH RIVER BASIN

12041200 HOH RIVER AT U.S. HIGHWAY 101, NEAR FORKS, WA

LOCATION.--Lat 47°48'25", long 124°14'59", in NE 1/4 NE 1/4 sec.33, T.27 N., R.12 W., Jefferson County, Hydrologic Unit 17100101, on left bank 250 ft downstream from U.S. Highway 101, 1.0 mi downstream from Hell Roaring Creek, 11.5 mi southeast of Forks, and at mile 15.4.

DRAINAGE AREA.--253 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 163.64 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station. Chemical analyses July 1960 to September 1961, November 1961 to September 1970 (partial-record station), October 1971 to September 1974. Prior to November 1961, published as Hoh River near Forks (Spruce). Water temperatures November 1970 to April 1971.

AVERAGE DISCHARGE.--36 years (water years 1961-96), 2,512 ft<sup>3</sup>/s, 134.91 in/yr, 1,820,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 54,500 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 19.61 ft from rating curve extended above 34,000 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 17.74 ft; minimum discharge, 249 ft<sup>3</sup>/s Oct. 23, 1987, gage height, 2.13 ft.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	unknown	unknown	unknown	Dec. 11	0900	17,400	10.90
Nov. 29	Unknown	*47,600	*18.23	Dec. 13	0300	20,900	11.92
Dec. 10	1600	18,100	11.12	Jan. 6	2200	17,100	10.82

Minimum discharge, 564 ft<sup>3</sup>/s Sept. 26, 27.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e1900	e1650	e17000	3000	1240	1480	e1100	2230	1590	1280	e1160	979
2	e2200	e1450	e8800	3110	1190	1420	1430	2060	1960	1360	e1120	837
3	e2700	e1300	e6200	4560	1160	1480	1160	1940	2290	1520	e1240	750
4	e2100	e1280	e6800	3600	1720	1900	e1150	1800	2260	1470	e1090	690
5	e1600	e1520	e5200	2920	6360	1680	e1080	1720	1980	1270	e1120	669
6	e1200	e1800	3310	7530	9580	1560	1940	1620	1800	1180	e1240	785
7	e1300	e5500	2900	9370	10800	1500	2560	1640	1760	1170	e1000	792
8	e1600	e30000	2600	5390	11500	1550	2090	1590	1690	1270	e950	1190
9	e2100	e12000	3070	4300	7100	1910	1910	1480	1580	1400	e910	1120
10	e13300	e7100	13800	3950	4430	3580	1920	1390	1510	1250	e880	848
11	e7600	e13000	13500	3620	3360	3510	1740	1330	1550	1210	e850	783
12	e4700	e8000	9450	2950	2840	2500	2610	1420	1450	1250	e810	828
13	e3200	e6200	14300	3100	2530	2020	2130	2260	1400	1320	e780	833
14	e2400	e9800	9390	9130	2290	1770	2230	2230	1400	1450	e750	1570
15	e2000	e7300	7280	11900	2140	1680	2750	1920	1360	1530	e730	1860
16	e5000	e6000	5350	6760	2050	1540	3850	1710	1340	1420	e710	1350
17	e9400	e10000	4410	4370	2900	1420	4130	1740	1270	1220	e700	1130
18	e6200	e13800	4880	3380	7280	1330	3240	3520	1220	1180	e680	940
19	e3900	e8800	3920	2930	5090	1460	2790	4300	1170	1350	e670	835
20	e3000	e5300	3180	2860	4700	1630	2350	3310	1160	1310	e660	825
21	e3600	e4100	2750	2880	4120	1410	2020	2680	1170	1190	659	784
22	e2900	e3400	2450	2500	3240	1340	2100	2580	1190	1170	648	829
23	e2300	e10500	2220	2650	3010	1250	6670	2780	1230	1200	671	745
24	e2100	e12500	2050	2370	2430	1190	7980	2460	1450	1310	704	632
25	e3700	e11300	1910	2140	2120	e1000	5990	2300	1430	1350	765	593
26	e8600	e10800	1780	1970	1940	e840	5510	2280	1260	1270	880	566
27	e4300	e9100	1700	1840	1820	e840	2100	2100	1280	1270	920	615
28	e2900	e19000	1710	1740	1670	e820	3350	1940	1280	1260	891	677
29	e2350	e39000	3300	1660	1560	e780	2780	1800	1280	1230	888	714
30	e2000	e30000	3490	1400	---	e800	2460	1690	1230	1260	1190	637
31	e1850	---	4430	1290	---	e780	---	1600	---	1160	1290	---
TOTAL	114000	301500	173130	121170	112170	47970	86820	65420	44540	40080	27556	26433
MEAN	3677	10050	5585	3909	3868	1547	2894	2110	1485	1293	889	881
MAX	13300	39000	17000	11900	11500	3580	7980	4300	2290	1530	1290	1860
MIN	1200	1280	1700	1290	1160	780	1080	1330	1160	1160	648	566
AC-FT	226100	598000	343400	240300	222500	95150	172200	129800	88350	79500	54660	52430
CFSM	14.5	39.7	22.1	15.4	15.3	6.12	11.4	8.34	5.87	5.11	3.51	3.48
IN.	16.76	44.33	25.46	17.82	16.49	7.05	12.77	9.62	6.55	5.89	4.05	3.89

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1996, BY WATER YEAR (WY)

MEAN	2093	3939	4145	3716	3433	2624	2121	2010	2058	1664	1224	1178
MAX	5602	10690	8701	6780	6214	5697	3248	2891	3117	2806	2557	2266
(WY)	1968	1991	1980	1974	1982	1972	1981	1986	1964	1983	1991	1969
MIN	381	1022	1282	992	1121	1261	925	1531	1285	1012	760	603
(WY)	1988	1994	1986	1979	1993	1992	1975	1995	1992	1992	1994	1993

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1961 - 1996
ANNUAL TOTAL	1186451	1160789	
ANNUAL MEAN	3251	3172	2512
HIGHEST ANNUAL MEAN			3429
LOWEST ANNUAL MEAN			1645
HIGHEST DAILY MEAN	39000	Nov 29	39000
LOWEST DAILY MEAN	530	Sep 24	566
ANNUAL SEVEN-DAY MINIMUM	566	Sep 19	633
ANNUAL RUNOFF (AC-FT)	2353000	2302000	1820000
ANNUAL RUNOFF (CFSM)	12.8	12.5	9.93
ANNUAL RUNOFF (INCHES)	174.45	170.68	134.91
10 PERCENT EXCEEDS	7420	7290	4600
50 PERCENT EXCEEDS	1780	1800	1780
90 PERCENT EXCEEDS	959	832	872

e Estimated

## 12043000 CALAWAH RIVER NEAR FORKS, WA

LOCATION.--Lat 47°57'37", long 124°23'30", in NW 1/4 SW 1/4 sec.4, T.28 N., R.13 W., Clallam County, Hydrologic Unit 17100101, on left bank 30 ft downstream from U.S. Highway 101 bridge, 0.8 mi northwest of Forks, and at mile 6.6.

DRAINAGE AREA.--129 mi<sup>2</sup>.

PERIOD OF RECORD.--November 1897 to December 1901, October to December 1975 (discharge measurements and peak discharges), January 1976 to September 1980, March 1984 to current year. Monthly and peak discharge only, November 1897 and August 1898, published in WSP 1316. Published as Calowa River at Forks, November 1897 to December 1899; as Calowa River near Forks, 1900; and as Kalawa River near Forks, 1901.

REVISED RECORDS.--WSP 1316: 1898-1902. WSP 1736: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 201.58 ft above sea level. November 1897 to December 1901, nonrecording gage at same site but at different datum; October to December 1975, nonrecording gage and crest-stage gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. No regulation or diversion upstream from station. Chemical analyses October 1976 to September 1978.

AVERAGE DISCHARGE.--19 years (water years 1899-1901, 1977-80, 1985-96), 994 ft<sup>3</sup>/s, 104.69 in/yr, 720,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 34,500 ft<sup>3</sup>/s Nov. 23, 1990, gage height, 20.58 ft, from rating curve extended above 10,000 ft<sup>3</sup>/s on basis of step-backwater analysis; minimum discharge, 15 ft<sup>3</sup>/s Sept. 28, 1899.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 10,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	unknown	unknown	unknown	Nov. 29	unknown	*22,500	*a17.04

Minimum discharge, 61 ft<sup>3</sup>/s Aug. 29, 30.  
a From crest-stage gage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	220	e620	e4000	e960	e410	665	e390	e750	443	197	100	95
2	210	e550	e3300	e1000	e390	640	e490	e700	465	193	128	77
3	403	e490	e2800	e1150	e370	613	e430	e650	407	194	119	75
4	283	e490	e2200	e1200	e440	e580	e400	e620	409	192	107	76
5	214	e560	e1700	e1000	e620	e620	e390	e590	387	183	120	77
6	197	e570	e1400	e1300	e2100	e590	e850	e560	360	175	111	89
7	272	e2000	e1250	e2500	e3000	e600	e1200	e560	342	169	100	84
8	e450	e13000	e1100	e1800	e3900	545	e900	e530	327	164	95	157
9	e940	e5500	e1300	e1450	e2000	694	e760	e500	329	161	91	145
10	e3500	e3600	e2000	e1350	e1200	1200	e720	e480	326	156	87	98
11	e2500	e6600	e3200	e1150	e1000	e960	e720	e450	363	152	87	85
12	e1600	e4000	e2400	e980	e850	e850	e900	e460	314	147	91	79
13	e1200	e3500	e2600	e1000	e760	e740	e850	e490	297	143	84	80
14	e900	e4400	e2200	e1050	e720	e660	e740	e540	283	138	81	222
15	e800	e3600	e1850	e2800	e670	e600	e860	e700	274	135	78	262
16	e1500	e3300	e1600	e1700	e650	e550	e1100	e1000	266	131	78	201
17	e3000	e3000	e1450	e1180	e800	e500	e1300	e1100	260	140	77	175
18	e2000	e4000	e1500	e1050	e1700	e470	e1200	e1300	258	153	75	144
19	e1400	e2800	e1200	e970	e2400	e460	e1100	e1550	244	222	74	151
20	e1300	e2000	e1000	e940	e1950	e490	e950	e1500	235	206	73	148
21	e1400	e1500	e900	e950	e1700	e500	e840	e1340	228	162	72	170
22	e1100	e1400	e780	e840	e1500	e490	e1000	1220	223	145	71	177
23	e940	e4900	e720	e880	e1300	e450	e1800	1220	243	135	68	152
24	e840	e4300	e670	e760	e1150	e430	e2500	1080	267	127	67	134
25	e2000	e3600	e640	e680	e1100	e400	e2300	909	293	122	66	120
26	e2600	e3200	e590	e630	e1030	e370	e2100	780	238	117	65	111
27	e1600	e3600	e560	e600	e960	e350	e1600	683	224	113	65	104
28	e1200	e6500	e570	e570	e820	e320	e1100	611	222	109	64	98
29	e950	e15000	e660	e480	707	e310	e980	553	212	107	62	93
30	e800	e5500	e1100	e460	---	e300	e860	510	203	104	133	90
31	e700	---	e1250	e430	---	e320	---	471	---	102	148	---
TOTAL	37019	114080	48490	33810	36207	17267	31330	24407	8942	4694	2737	3769
MEAN	1194	3803	1564	1091	1249	557	1044	787	298	151	88.3	126
MAX	3500	15000	4000	2800	3900	1200	2500	1550	465	222	148	262
MIN	197	490	560	430	370	300	390	450	203	102	62	75
AC-FT	73430	226300	96180	67060	71820	34250	62140	48410	17740	9310	5430	7480
CFSM	9.26	29.5	12.1	8.45	9.68	4.32	8.10	6.10	2.31	1.17	.68	.97
IN.	10.68	32.90	13.98	9.75	10.44	4.98	9.03	7.04	2.58	1.35	.79	1.09

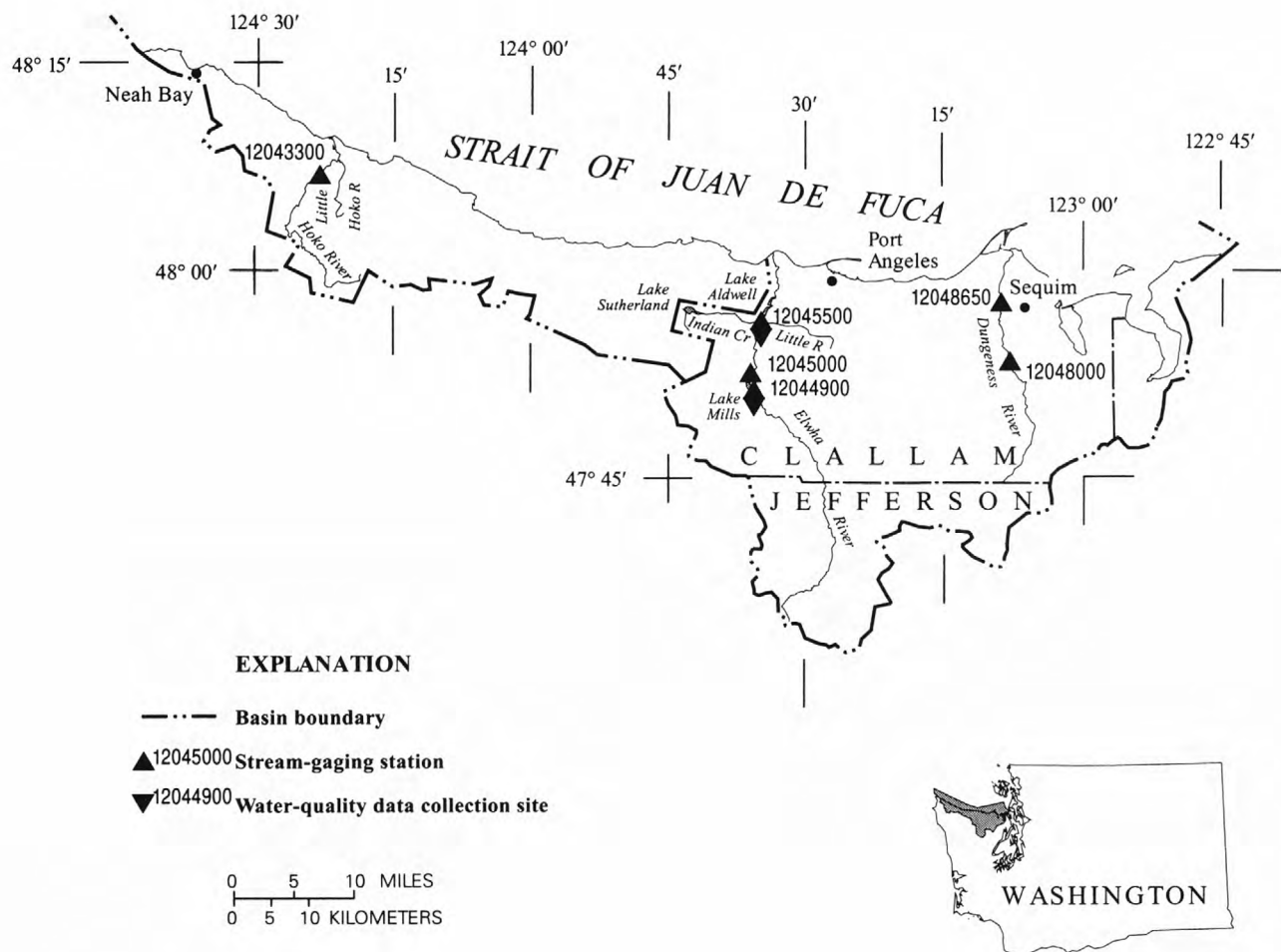
## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1898 - 1996, BY WATER YEAR (WY)

	1898	1942	2068	1722	1804	1340	997	639	416	194	160	205
MEAN	652	1942	2068	1722	1804	1340	997	639	416	194	160	205
MAX	1814	4706	4395	3100	3294	2400	1529	1161	1128	460	766	812
(WY)	1901	1991	1980	1992	1991	1900	1993	1984	1900	1900	1991	1978
MIN	49.3	439	585	476	405	419	554	258	124	95.9	63.9	65.3
(WY)	1988	1994	1986	1979	1993	1992	1990	1995	1995	1995	1992	1899

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1898 - 1996

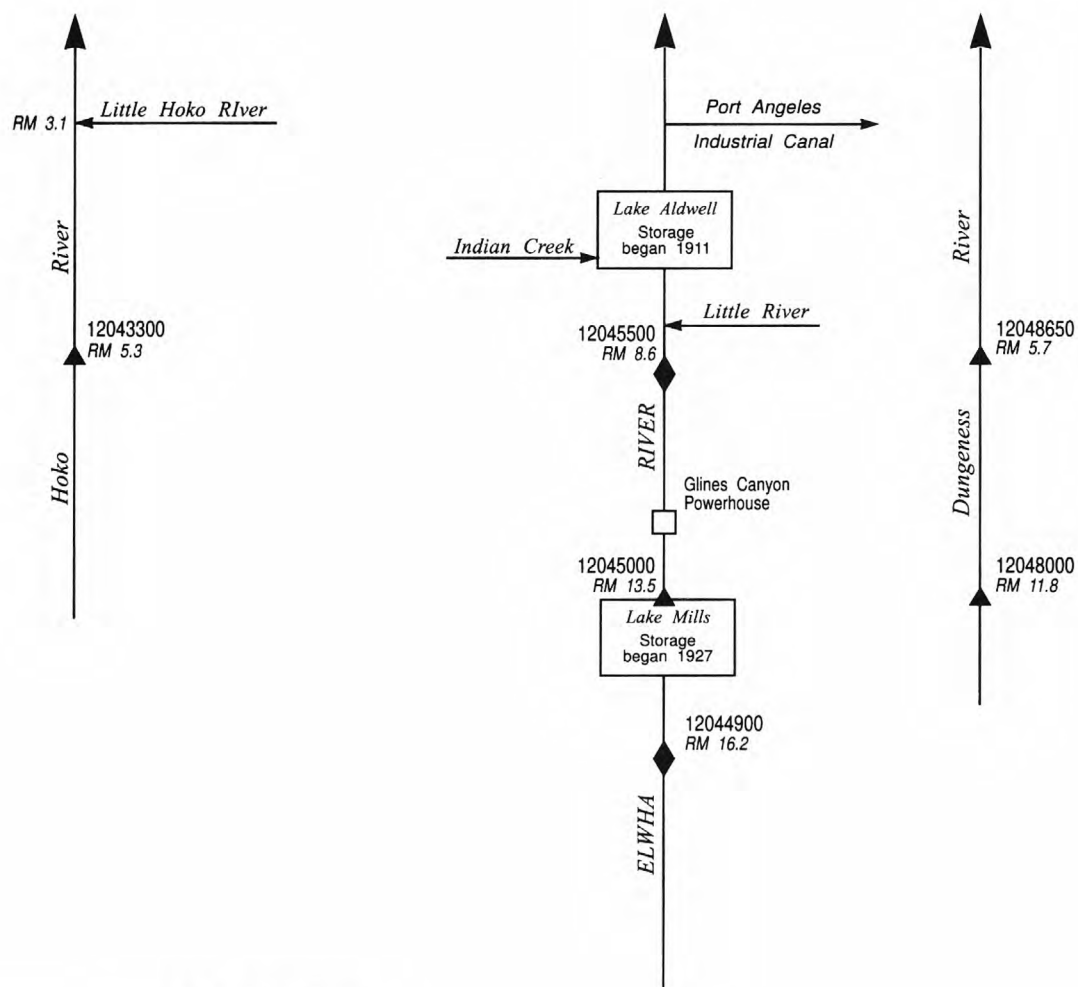
	1995 CALENDAR YEAR	1996 WATER YEAR	1898 - 1996
ANNUAL TOTAL	430832	362752	994
ANNUAL MEAN	1180	991	1466
HIGHEST ANNUAL MEAN			1991
LOWEST ANNUAL MEAN			665
HIGHEST DAILY MEAN	15000	15000	22900
LOWEST DAILY MEAN	64	62	15
ANNUAL SEVEN-DAY MINIMUM	68	65	26
ANNUAL RUNOFF (AC-FT)	854600	719500	720100
ANNUAL RUNOFF (CFSM)	9.15	7.68	7.71
ANNUAL RUNOFF (INCHES)	124.24	104.61	104.69
10 PERCENT EXCEEDS	3220	2330	2290
50 PERCENT EXCEEDS	588	595	525
90 PERCENT EXCEEDS	85	99	95

e Estimated



**Figure 25.** Location of surface-water and water-quality stations in the Hoko, Elwha and Dungeness River Basins.





#### EXPLANATION

- ▲ 12045000 Stream-gaging station
- ▼ 12044900 Water-quality data collection site
- ▲ 12396000 Crest-stage gaging station
- RM 16.2 River mile
- Stream—Arrow shows direction of flow
- Tunnel or pipe—Arrow shows direction of flow

**Figure 26.** Schematic diagram showing surface-water and water-quality stations in the Hoko, Elwha and Dungeness River Basins.

## HOKO RIVER BASIN

12043300 HOKO RIVER NEAR SEKI, WA

LOCATION.--Lat 48°14'30", long 124°22'57", in NE 1/4 SW 1/4 sec.28, T.32 N., R.13 W., Clallam County, Hydrologic Unit 17110021, on right bank 2.2 mi upstream from Little Hoko River, 4.0 mi southwest of Sekiu and at mile 5.3.

DRAINAGE AREA.--51.2 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1962 to September 1974, water years 1976-78 (annual maximum), June 1983 to September 1995 (seasonal records), October 1995 to September 1996.

GAGE.--Water-stage recorder. Elevation of gage is 50 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--13 years (water years 1963-74, 1996), 408 ft<sup>3</sup>/s, 108.39 in/yr, 295,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,100 ft<sup>3</sup>/s Dec. 25, 1972, gage height, 14.17 ft, from rating curve extended above 2,100 ft<sup>3</sup>/s, on basis of slope-area measurement at gage height, 12.49 ft; minimum discharge, 11 ft<sup>3</sup>/s Oct. 1-13, 21-24, 1987, Aug. 29, 30, 1992.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 12,700 ft<sup>3</sup>/s Nov. 28, gage height, 13.40 ft; minimum daily discharge, 15 ft<sup>3</sup>/s, Aug. 28, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	207	1520	e300	e192	222	263	264	143	e46	e24	e22
2	120	186	1210	e310	e188	205	263	237	130	e46	e25	e18
3	165	168	956	e320	e182	213	218	218	129	e46	e29	e17
4	105	168	897	e460	e260	277	199	199	116	e46	e27	e18
5	78	191	649	e350	e560	235	226	196	109	e43	e25	e18
6	71	194	466	e740	e1200	226	638	188	e100	e42	e28	e22
7	76	3030	e370	e1400	e1500	239	524	169	e94	e40	e25	e21
8	118	7390	e390	e800	e1780	244	368	158	e87	e39	e24	e33
9	178	2020	e430	e560	e1300	235	316	151	e86	e37	e22	e32
10	1580	1220	e950	e510	e880	267	303	146	e85	e36	e21	e27
11	930	3170	e1700	e470	e600	355	295	172	e95	e36	e20	e21
12	594	1520	e1550	e370	e400	307	406	155	e81	e34	e21	e19
13	386	1180	e1600	e390	e320	262	317	140	e72	e33	e22	e19
14	312	1510	e1450	e900	e280	232	297	134	e66	e32	e19	e40
15	262	1320	e1080	e1550	e265	216	389	260	e65	e32	e19	e47
16	517	1100	e780	e1200	e255	195	501	384	e63	e31	e18	e43
17	1260	1020	e600	e750	e350	183	540	424	e61	e33	e18	e35
18	797	1390	e690	e520	e800	169	480	327	e60	e35	e18	e29
19	457	880	e580	e450	e980	174	415	e320	e58	e50	e18	e31
20	433	647	e480	e450	e820	196	368	e470	e56	e49	e18	e30
21	479	507	e390	e450	e740	186	322	e400	e54	e43	e17	e34
22	391	483	e350	e380	e540	189	551	e330	e52	e36	e17	e37
23	326	1900	e320	e390	e500	177	1160	305	e56	e33	e17	e35
24	279	1630	e285	e410	e400	162	854	265	e61	e31	e16	e31
25	794	1260	e260	e360	e350	152	1070	232	e66	e29	e16	e27
26	1080	1060	e240	e330	e330	144	770	209	e60	e28	e16	e26
27	567	1240	e220	e300	e295	150	526	191	e52	e26	e16	e24
28	412	5000	e215	e290	e280	144	393	175	e52	e25	e15	e23
29	329	7090	e320	e280	e250	141	317	163	e51	e24	e15	e22
30	271	2490	e330	e220	---	133	279	151	e47	e24	e31	e20
31	233	---	e440	e198	---	154	---	142	---	e24	e35	---
TOTAL	13664	51171	21718	16408	16797	6384	13568	7275	2307	1109	652	821
MEAN	441	1706	701	529	579	206	452	235	76.9	35.8	21.0	27.4
MAX	1580	7390	1700	1550	1780	355	1160	470	143	50	35	47
MIN	64	168	215	198	182	133	199	134	47	24	15	17
AC-FT	27100	101500	43080	32550	33320	12660	26910	14430	4580	2200	1290	1630
CFSM	8.61	33.3	13.7	10.3	11.3	4.02	8.83	4.58	1.50	.70	.41	.53
IN.	9.93	37.18	15.78	11.92	12.20	4.64	9.86	5.29	1.68	.81	.47	.60

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1996, BY WATER YEAR (WY)

	MEAN	294	719	868	917	677	532	345	174	95.4	59.6	43.4	68.0
MAX	907	1706	1376	1257	1063	965	625	383	221	188	288	322	
(WY)	1968	1996	1967	1967	1974	1974	1970	1974	1990	1972	1991	1968	
MIN	13.0	323	519	427	326	177	146	94.3	35.3	22.0	14.6	15.8	
(WY)	1988	1970	1965	1963	1973	1965	1973	1966	1972	1967	1967	1989	

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1962 - 1996

ANNUAL TOTAL	151874											
ANNUAL MEAN	415									408		
HIGHEST ANNUAL MEAN										585		1974
LOWEST ANNUAL MEAN										292		1970
HIGHEST DAILY MEAN										8490		Jan 19 1968
LOWEST DAILY MEAN										11		Oct 10 1987
ANNUAL SEVEN-DAY MINIMUM										11		Oct 10 1987
ANNUAL RUNOFF (AC-FT)	301200									295900		
ANNUAL RUNOFF (CFSM)		8.10								7.98		
ANNUAL RUNOFF (INCHES)		110.35								108.39		
10 PERCENT EXCEEDS		1070								802		
50 PERCENT EXCEEDS		221								110		
90 PERCENT EXCEEDS		24								21		

e Estimated

## ELWHA RIVER BASIN

93

12044900 ELWHA RIVER ABOVE LAKE MILLS, NEAR PORT ANGELES, WA

LOCATION.--Lat 47°58'13", long 123°35'22", in NE 1/4 NE 1/4 sec.32, T.29 N., R.7 W., Clallam County, Hydrologic Unit 17110020, Olympic National Park, on left bank 0.2 mi upstream from Cat Creek, 2.7 mi above Glines Canyon Dam, 12.5 mi southwest of Port Angeles, and at mile 16.2.

DRAINAGE AREA.--198 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1994 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 580.00 ft above sea level.

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

AVERAGE DISCHARGE.--2 years (water years 1995-96), 1,424 ft<sup>3</sup>/s, 97.70 in/yr, 1,031,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,400 ft<sup>3</sup>/s Nov. 8, 1995, gage height, 21.16 ft; minimum discharge, 205 ft<sup>3</sup>/s Oct. 12, 13, 19.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 17,400 ft<sup>3</sup>/s Nov. 8, gage height, 21.16 ft; minimum discharge, 253 ft<sup>3</sup>/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	381	512	4890	1630	812	1110	791	1300	1150	1060	550	324
2	530	490	3740	1810	786	1060	753	1210	1510	1130	565	310
3	515	469	3030	1920	770	1080	688	1130	1840	1190	526	317
4	376	472	2650	1560	891	1060	668	1080	1740	1060	508	305
5	326	482	2190	1400	2590	983	669	1030	1490	932	521	314
6	308	466	1910	2810	4000	934	964	985	1410	885	482	316
7	314	3800	1700	4220	5440	925	1350	956	1430	892	469	328
8	343	12500	1530	3160	6790	996	1320	900	1390	1010	482	411
9	346	4290	1820	2470	4750	1320	1280	853	1280	1060	486	347
10	2440	3020	6450	2090	3350	2010	1190	816	1200	935	473	305
11	1280	6280	7510	1850	2670	1910	1050	792	1180	886	459	296
12	915	3360	6470	1650	2320	1570	1060	899	1160	906	434	298
13	741	3360	7970	1630	2100	1390	964	1450	1180	940	415	301
14	700	3110	5530	2830	1960	1290	911	1320	1200	957	419	506
15	580	2840	4610	4410	1890	1250	1540	1190	1180	986	416	534
16	1070	2380	3480	3370	e1820	1170	1840	1080	1140	893	403	386
17	1900	3370	3010	2560	2500	1100	1710	1140	1060	823	384	327
18	1230	4990	3120	2140	4160	1060	1450	1610	984	777	370	306
19	861	3080	2640	1890	3190	1070	1310	1690	938	826	361	322
20	822	2470	2300	1730	2820	1030	1190	1440	953	759	358	299
21	776	2150	2020	1570	2410	970	1120	1300	979	711	350	296
22	669	2100	1800	1420	2070	935	1140	1230	1020	706	341	299
23	613	3900	1620	1340	1900	888	3340	1170	1100	716	337	281
24	577	3770	1480	1230	1690	844	3640	1150	1130	744	334	274
25	944	4370	1360	1150	1540	805	2710	1260	1080	732	339	264
26	1300	3180	1270	1080	1420	789	2370	1370	1010	697	354	260
27	823	2990	1200	1030	1320	772	1960	1330	1050	690	352	264
28	705	5790	1180	984	1230	739	1690	1240	1030	661	344	263
29	635	12100	1880	917	1160	720	1530	1160	965	646	338	261
30	585	6990	1930	859	---	692	1410	1120	973	633	383	257
31	546	---	1930	841	---	715	---	1100	---	581	375	---
TOTAL	24151	109081	94220	59551	70349	33187	43608	36301	35752	26407	12928	9571
MEAN	779	3636	3039	1921	2426	1071	1454	1171	1192	852	417	319
MAX	2440	12500	7970	4410	6790	2010	3640	1690	1840	1190	565	534
MIN	308	466	1180	841	770	692	668	792	938	581	334	257
AC-FT	47900	216400	186900	118100	139500	65830	86500	72000	70910	52380	25640	18980
CFSM	3.93	18.4	15.4	9.70	12.3	5.41	7.34	5.91	6.02	4.30	2.11	1.61
IN.	4.54	20.49	17.70	11.19	13.22	6.24	8.19	6.82	6.72	4.96	2.43	1.80

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	MEAN	608	2160	2744	1923	2631	1362	1193	1370	1327	918	454	331
MAX	779	3636	3039	1925	2843	1654	1454	1533	1627	1081	546	352	
(WY)	1996	1996	1996	1995	1995	1995	1996	1995	1995	1995	1995	1995	
MIN	438	684	2449	1921	2426	1071	925	1171	1164	821	400	319	
(WY)	1995	1995	1995	1996	1996	1996	1995	1996	1994	1994	1994	1996	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1994	1996
ANNUAL TOTAL	603063	555106		
ANNUAL MEAN	1652	1517	1424	
HIGHEST ANNUAL MEAN			1517	1996
LOWEST ANNUAL MEAN			1330	1995
HIGHEST DAILY MEAN	12500	Nov 8	12500	Nov 8 1995
LOWEST DAILY MEAN	272	Sep 24	206	Oct 19 1994
ANNUAL SEVEN-DAY MINIMUM	287	Sep 20	214	Oct 7 1994
ANNUAL RUNOFF (AC-FT)	1196000	1101000	1031000	
ANNUAL RUNOFF (CFSM)	8.34	7.66	7.19	
ANNUAL RUNOFF (INCHES)	113.30	104.29	97.70	
10 PERCENT EXCEEDS	3090	3170	2440	
50 PERCENT EXCEEDS	1280	1080	1060	
90 PERCENT EXCEEDS	388	347	328	

e Estimated

## ELWHA RIVER BASIN

12044900 ELWHA RIVER ABOVE LAKE MILLS, NEAR PORT ANGELES, WA--Continued

## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: April 1994 to current year.

SUSPENDED SEDIMENT DISCHARGE: March 1994 to current year.

INSTRUMENTATION.--Temperature recorder since April 1994. Automatic pumping sediment sampler since October 1994.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 14.5°C Aug. 3, 4, 1994, Aug. 29, 1996; minimum, 0.0°C Jan. 30, 31, 1996.

SEDIMENT CONCENTRATION: Maximum daily, 4,130 mg/L Nov. 8, 1995; minimum, 1 mg/L on many days during 1994-96.

SEDIMENT DISCHARGE: Maximum daily, 158,000 tons Nov. 8, 1995; minimum, 0.56 tons Oct. 13, 16, 1994 (estimated).

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 14.5°C Aug. 29; minimum, 0.0°C Jan. 30, 31.

SEDIMENT CONCENTRATION: Maximum daily, 4,130 mg/L Nov. 8; minimum, 1 mg/L on many days.

SEDIMENT DISCHARGE: Maximum daily, 158,000 tons Nov. 8; minimum, 0.69 tons Sept. 30.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	9.0	8.0	8.5	3.5	3.0	3.0	6.0	5.0	5.5	6.0	5.0	5.5
2	9.5	8.5	9.0	3.5	2.5	3.0	5.0	4.5	5.0	6.5	5.5	6.0
3	10.0	8.5	9.5	3.5	3.0	3.5	5.5	5.0	5.0	6.0	5.0	5.5
4	8.5	7.5	8.0	4.5	3.5	4.0	5.0	4.0	4.5	5.0	4.0	4.5
5	8.5	7.5	8.0	5.0	4.5	5.0	4.5	3.5	4.0	4.0	3.5	4.0
6	9.0	8.0	8.5	5.0	4.0	4.5	4.0	3.0	3.5	5.5	4.0	5.0
7	9.5	8.0	9.0	5.5	4.5	5.0	4.0	3.0	3.5	5.5	5.0	5.5
8	9.5	8.5	9.0	7.0	5.5	6.5	3.5	3.0	3.0	6.0	5.0	5.5
9	9.0	8.5	9.0	5.5	5.0	5.5	4.0	2.5	3.5	6.0	5.0	5.5
10	9.0	8.0	8.5	5.5	4.5	5.0	5.0	3.5	4.5	6.0	5.5	5.5
11	8.5	7.5	8.0	6.5	5.5	6.0	5.5	5.0	5.5	5.5	5.0	5.5
12	7.5	7.0	7.5	6.0	5.5	6.0	6.0	5.5	6.0	5.0	4.5	5.0
13	8.0	7.0	7.5	7.0	6.0	6.5	6.0	5.5	5.5	6.0	5.0	5.5
14	8.5	7.5	8.0	7.5	7.0	7.0	5.5	5.0	5.5	6.5	6.0	6.0
15	8.5	7.0	8.0	7.5	7.0	7.0	5.5	5.0	5.5	6.0	5.5	6.0
16	8.5	8.0	8.5	7.0	6.0	6.5	6.0	5.0	5.5	6.0	4.5	5.0
17	8.5	7.5	8.0	8.0	7.0	7.5	6.0	5.5	5.5	4.5	4.5	4.5
18	7.5	6.5	7.0	8.0	6.0	6.5	6.0	5.5	6.0	4.5	3.5	4.0
19	7.5	6.0	6.5	6.0	5.0	5.5	5.5	5.0	5.5	4.0	3.5	3.5
20	8.0	7.5	7.5	6.0	5.0	5.5	5.5	5.0	5.0	4.0	3.0	3.5
21	7.5	6.5	7.0	6.5	5.5	6.0	5.5	4.5	5.0	4.0	3.5	3.5
22	6.5	5.5	6.0	7.5	6.5	7.0	5.0	4.0	4.5	4.0	3.5	3.5
23	7.0	6.0	6.5	8.0	7.0	7.5	4.0	3.5	4.0	3.5	3.0	3.5
24	7.0	6.0	6.5	7.5	7.0	7.0	4.0	3.5	3.5	3.5	3.0	3.0
25	7.0	6.5	6.5	7.0	6.0	6.5	3.5	3.0	3.5	3.5	3.0	3.0
26	7.0	6.5	6.5	6.0	5.5	6.0	4.5	3.5	4.0	3.0	2.0	2.5
27	7.0	6.0	6.5	6.0	5.5	5.5	5.0	4.5	4.5	3.0	2.5	3.0
28	6.5	6.0	6.5	6.5	6.0	6.5	5.5	4.5	5.0	2.5	1.5	2.0
29	6.5	5.0	5.5	7.5	6.5	7.0	5.5	5.0	5.0	1.5	.5	1.0
30	5.0	4.0	4.5	6.5	6.0	6.0	5.5	5.0	5.5	.5	.0	.0
31	4.0	3.5	4.0	---	---	---	5.5	5.0	5.0	.5	.0	.5
MONTH	10.0	3.5	7.4	8.0	2.5	5.8	6.0	2.5	4.7	6.5	.0	4.1



## ELWHA RIVER BASIN

95

12044900 ELWHA RIVER ABOVE LAKE MILLS, NEAR PORT ANGELES, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	1.0	.5	1.0	3.5	2.5	3.0	6.0	5.0	5.5	7.0	5.0	6.0
2	1.0	.5	1.0	4.0	3.0	3.5	5.5	4.5	5.0	6.0	4.5	5.5
3	2.0	.5	1.5	4.5	3.5	4.0	5.5	4.0	5.0	6.0	4.5	5.5
4	3.0	2.0	2.5	4.0	4.0	4.0	6.5	4.5	5.5	6.5	4.5	5.5
5	3.0	3.0	3.0	4.5	3.5	4.0	7.5	6.0	6.5	7.5	4.5	6.0
6	4.0	3.0	3.5	5.0	3.5	4.0	7.5	6.5	7.0	7.0	5.0	6.0
7	4.5	3.5	4.0	5.0	4.0	4.5	8.0	6.0	7.0	6.5	5.5	6.0
8	4.5	4.0	4.5	5.5	4.0	5.0	8.0	6.5	7.5	6.0	4.5	5.5
9	4.5	3.5	4.0	6.0	5.0	5.5	8.0	6.5	7.5	6.5	4.5	5.5
10	4.0	3.0	3.5	5.5	4.5	5.0	7.0	6.0	6.5	6.0	4.5	5.5
11	5.0	4.0	4.5	5.5	4.5	5.0	6.5	6.0	6.5	7.0	5.0	6.0
12	5.0	4.5	4.5	5.5	4.5	5.0	6.0	5.0	5.5	8.0	6.5	7.0
13	5.0	4.5	5.0	5.5	4.0	5.0	7.0	4.5	6.0	8.0	6.5	7.5
14	5.0	4.5	5.0	6.0	4.0	5.0	7.5	5.5	6.5	8.0	6.5	7.0
15	5.0	4.5	4.5	5.5	5.0	5.5	7.5	6.5	7.0	7.0	6.0	6.5
16	5.5	4.5	5.0	5.0	4.0	4.5	6.5	5.5	6.0	7.5	5.5	6.5
17	5.5	5.0	5.5	6.0	4.5	5.5	6.0	4.5	5.5	7.5	6.5	7.0
18	5.5	5.0	5.0	6.0	4.5	5.5	6.0	4.5	5.0	7.0	6.0	6.5
19	5.0	4.5	5.0	6.0	5.0	5.5	6.0	4.5	5.0	7.0	5.5	6.5
20	5.0	4.0	4.5	6.0	4.5	5.0	6.5	4.0	5.5	7.5	5.5	6.5
21	4.0	3.5	4.0	6.0	5.0	5.5	7.0	4.5	6.0	6.5	5.5	6.0
22	4.0	2.0	3.5	6.0	5.0	5.5	6.5	5.5	6.0	7.5	6.0	6.5
23	3.5	2.0	3.0	5.5	4.0	5.0	6.0	5.0	5.5	8.5	6.5	7.5
24	3.5	2.5	3.0	5.5	3.5	4.5	5.5	4.5	5.0	9.5	6.5	8.0
25	3.5	2.5	3.0	4.5	2.5	3.5	5.0	5.0	5.0	9.5	7.5	8.5
26	3.0	2.0	2.5	5.0	3.5	4.0	5.5	4.5	5.0	9.5	7.0	8.5
27	3.0	2.5	2.5	5.0	4.0	4.5	6.5	4.5	5.5	9.0	7.0	8.0
28	2.5	1.5	2.0	5.0	3.5	4.5	6.0	5.0	5.5	8.5	6.5	7.5
29	3.0	1.5	2.5	5.0	4.0	4.5	7.5	5.5	6.5	8.0	6.0	7.0
30	---	---	---	5.0	3.5	4.5	6.5	5.5	6.0	9.0	6.5	7.5
31	---	---	---	5.5	4.0	5.0	---	---	---	9.0	6.5	8.0
MONTH	5.5	.5	3.6	6.0	2.5	4.7	8.0	4.0	5.9	9.5	4.5	6.7

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	9.0	7.5	8.5	12.0	9.0	10.5	13.0	11.0	12.0	12.5	10.5	11.5
2	10.5	8.0	9.0	11.5	9.5	10.5	12.5	11.0	12.0	12.5	10.5	11.5
3	10.5	8.0	9.0	11.5	9.5	10.0	11.5	10.0	11.0	12.0	11.0	11.5
4	9.5	7.5	8.5	10.0	8.5	9.5	12.0	10.5	11.5	11.5	10.0	10.5
5	9.5	6.5	8.0	10.5	7.5	9.0	12.5	10.0	11.5	11.0	9.5	10.5
6	9.0	7.5	8.0	11.0	8.0	9.5	12.5	10.0	11.5	10.0	9.5	10.0
7	9.5	7.5	8.5	11.5	8.5	10.5	13.0	10.5	12.0	12.0	9.5	10.5
8	9.0	7.0	8.0	12.5	9.5	11.0	13.5	11.0	12.5	12.0	11.0	11.5
9	8.5	7.0	8.0	12.0	10.0	11.0	14.0	12.0	13.0	12.0	10.5	11.0
10	8.5	7.0	7.5	11.5	9.0	10.5	14.0	11.5	13.0	12.0	10.0	11.0
11	9.0	7.0	8.0	12.0	9.5	11.0	13.0	12.0	12.5	---	---	---
12	10.0	7.0	8.5	12.5	10.0	11.5	13.0	10.5	12.0	---	---	---
13	10.5	7.5	9.0	13.0	10.5	12.0	13.5	11.0	12.0	12.0	11.0	11.5
14	10.0	7.5	9.0	13.5	10.5	12.0	14.0	11.5	12.5	11.0	10.0	10.5
15	10.0	7.5	9.0	13.5	11.0	12.5	13.0	11.0	12.5	10.5	9.5	10.0
16	9.0	7.0	8.0	13.0	10.5	11.5	12.5	11.5	12.0	10.0	9.0	9.5
17	8.5	7.0	7.5	11.0	9.5	10.0	12.5	10.5	11.5	10.5	8.5	9.5
18	9.0	6.0	7.5	10.0	8.5	9.5	12.0	10.0	11.0	10.0	9.0	9.5
19	9.5	6.5	8.0	10.0	8.5	9.0	12.5	10.5	11.0	11.0	9.5	10.0
20	10.0	7.5	8.5	10.0	9.0	9.5	12.0	11.0	11.5	10.5	9.5	10.0
21	10.5	8.0	9.0	12.5	9.5	10.5	12.0	10.0	11.0	9.5	9.0	9.5
22	10.0	8.0	9.0	12.5	10.0	11.5	12.5	10.5	11.5	9.5	8.0	8.5
23	10.0	8.5	9.0	13.0	10.5	12.0	13.0	10.5	11.5	8.5	7.0	8.0
24	9.5	8.0	9.0	13.5	11.0	12.5	13.5	11.0	12.0	9.5	8.0	8.5
25	9.5	8.0	9.0	14.0	11.5	13.0	13.0	11.5	12.0	9.5	7.5	8.5
26	11.0	8.0	9.5	14.0	11.5	13.0	13.0	12.0	12.5	9.5	7.5	8.5
27	10.0	8.5	9.0	14.0	11.5	13.0	13.0	11.5	12.0	10.5	8.5	9.5
28	9.5	8.5	9.0	13.5	12.0	13.0	14.0	12.0	13.0	10.5	9.0	9.5
29	10.5	8.0	9.0	14.0	11.5	13.0	14.5	12.0	13.0	10.5	9.0	9.5
30	10.5	8.5	9.5	13.5	11.5	12.5	13.0	12.5	12.5	11.0	9.5	10.0
31	---	---	---	13.0	11.0	12.0	13.5	11.5	12.5	---	---	---
MONTH	11.0	6.0	8.6	14.0	7.5	11.2	14.5	10.0	12.0	---	---	---

## ELWHA RIVER BASIN

12044900 ELWHA RIVER ABOVE LAKE MILLS, NEAR PORT ANGELES, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	381	---	1.0	512	3	3.9	4890	345	4620
2	530	7	10	490	6	7.9	3740	201	2050
3	515	---	1.4	469	2	2.5	3030	114	936
4	376	1	1.0	472	2	2.5	2650	79	566
5	326	---	.88	482	2	2.6	2190	49	292
6	308	1	.83	466	8	10	1910	31	163
7	314	---	.85	3800	451	9480	1700	22	102
8	343	1	.93	12500	4130	158000	1530	20	82
9	346	---	.99	4290	515	6410	1820	34	231
10	2440	101	823	3020	229	2070	6450	982	19500
11	1280	---	22	6280	1370	30100	7510	1090	23400
12	915	6	15	3360	235	2180	6470	616	12100
13	741	---	8.4	3360	184	1730	7970	1170	28200
14	700	3	6.0	3110	152	1310	5530	248	3710
15	580	---	4.3	2840	120	963	4610	151	1900
16	1070	18	63	2380	70	454	3480	92	870
17	1900	---	370	3370	215	2870	3010	65	532
18	1230	17	61	4990	805	12700	3120	57	483
19	861	---	17	3080	155	1320	2640	37	264
20	822	5	12	2470	71	479	2300	29	179
21	776	---	5.4	2150	46	265	2020	21	116
22	669	1	2.2	2100	39	222	1800	18	90
23	613	---	2.3	3900	451	5990	1620	15	67
24	577	2	3.0	3770	333	3890	1480	11	45
25	944	---	51	4370	404	4920	1360	---	35
26	1300	17	69	3180	138	1210	1270	---	28
27	823	5	12	2990	98	819	1200	---	23
28	705	3	6.0	5790	624	14600	1180	---	23
29	635	3	5.1	12100	3040	108000	1880	---	96
30	585	3	4.8	6990	853	16900	1930	---	100
31	546	4	5.9	---	---	---	1930	---	100
TOTAL	24151	---	1586.28	109081	---	386911.4	94220	---	100903

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	1630	---	60	812	---	15	1110	---	30
2	1810	---	85	786	---	13	1060	9	26
3	1920	---	100	770	---	12	1080	9	26
4	1560	12	50	891	5	12	1060	6	17
5	1400	11	41	2590	81	921	983	---	16
6	2810	190	2460	4000	113	1350	934	6	15
7	4220	274	3170	5440	180	2790	925	4	10
8	3160	85	738	6790	240	4470	996	6	16
9	2470	43	288	4750	90	1210	1320	4	14
10	2090	27	152	3350	38	344	2010	---	22
11	1850	19	94	2670	---	150	1910	---	21
12	1650	12	55	2320	---	90	1570	---	21
13	1630	14	62	2100	---	62	1390	5	19
14	2830	64	520	1960	---	60	1290	5	17
15	4410	196	2370	1890	12	59	1250	2	6.8
16	3370	79	730	e1820	8	38	1170	2	6.3
17	2560	33	231	2500	21	168	1100	2	5.9
18	2140	19	113	4160	90	1040	1060	2	5.7
19	1890	16	82	3190	---	377	1070	4	12
20	1730	14	65	2820	---	234	1030	2	5.6
21	1570	12	51	2410	17	115	970	2	5.2
22	1420	9	35	2070	12	70	935	2	5.0
23	1340	14	51	1900	12	63	888	---	4.8
24	1230	20	66	1690	9	41	844	---	4.6
25	1150	7	22	1540	8	33	805	---	4.3
26	1080	---	23	1420	7	27	789	---	4.3
27	1030	---	25	1320	6	21	772	---	4.2
28	984	11	29	1230	14	46	739	---	4.0
29	917	---	20	1160	11	34	720	---	3.9
30	859	---	21	---	---	---	692	---	3.7
31	841	---	18	---	---	---	715	---	5.8
TOTAL	59551	---	11827	70349	---	13865	33187	---	362.1

e Estimated

## ELWHA RIVER BASIN

97

12044900 ELWHA RIVER ABOVE LAKE MILLS, NEAR PORT ANGELES, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
APRIL			MAY			JUNE			
1	791	---	6.4	1300	---	11	1150	3	9.3
2	753	---	6.1	1210	---	9.8	1510	---	20
3	688	---	5.6	1130	---	6.1	1840	---	35
4	668	---	5.4	1080	---	5.8	1740	10	47
5	669	---	5.4	1030	---	5.6	1490	4	16
6	964	---	7.8	985	---	2.7	1410	2	7.6
7	1350	---	15	956	---	2.6	1430	4	15
8	1320	---	14	900	---	2.4	1390	1	3.8
9	1280	---	14	853	2	4.6	1280	1	3.5
10	1190	4	13	816	1	2.2	1200	1	3.2
11	1050	1	2.8	792	4	8.6	1180	1	3.2
12	1060	2	5.7	899	---	9.7	1160	1	3.1
13	964	1	2.6	1450	4	16	1180	1	3.2
14	911	1	2.5	1320	3	11	1200	2	6.5
15	1540	21	87	1190	---	9.6	1180	1	3.2
16	1840	7	35	1080	4	12	1140	2	6.2
17	1710	4	20	1140	3	9.2	1060	1	2.9
18	1450	4	15	1610	4	17	984	1	2.7
19	1310	2	7.8	1690	3	14	938	2	5.1
20	1190	2	6.4	1440	---	16	953	1	2.6
21	1120	2	5.5	1300	5	18	979	1	2.6
22	1140	2	7.6	1230	3	10	1020	1	2.8
23	3340	154	2010	1170	1	3.2	1100	2	5.9
24	3640	118	1280	1150	3	9.3	1130	2	6.1
25	2710	37	275	1260	1	3.4	1080	1	2.9
26	2370	24	154	1370	2	7.4	1010	2	5.5
27	1960	16	85	1330	1	3.6	1050	1	2.8
28	1690	8	38	1240	4	13	1030	2	5.6
29	1530	4	17	1160	2	6.3	965	4	10
30	1410	---	11	1120	3	9.1	973	1	2.6
31	---	---	---	1100	3	8.9	---	---	---
TOTAL	43608	---	4160.6	36301	---	268.1	35752	---	245.9

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JULY			AUGUST			SEPTEMBER			
1	1060	2	5.7	550	---	1.5	324	---	.87
2	1130	2	6.1	565	---	1.5	310	---	.84
3	1190	3	9.6	526	---	1.4	317	---	.85
4	1060	2	5.7	508	---	1.4	305	---	.82
5	932	2	5.0	521	---	1.4	314	---	.84
6	885	3	7.2	482	---	1.3	316	---	.85
7	892	3	7.2	469	---	1.3	328	---	.88
8	1010	1	2.7	482	---	1.3	411	---	1.0
9	1060	4	11	486	---	1.3	347	---	.94
10	918	2	5.0	473	---	1.3	305	---	.82
11	886	3	7.2	459	---	1.2	296	---	.80
12	906	1	2.4	434	---	1.2	298	---	.80
13	940	2	5.1	415	---	1.1	301	---	.81
14	957	1	2.6	419	---	1.1	506	---	1.3
15	986	3	8.0	416	---	1.1	534	---	1.4
16	893	1	2.4	403	---	1.1	386	---	1.0
17	823	1	2.2	384	---	1.0	327	---	.88
18	777	1	2.1	370	---	1.0	306	---	.82
19	826	1	2.2	361	---	.98	322	---	.86
20	759	---	2.0	358	---	.96	299	---	.80
21	711	---	1.9	350	---	.92	296	---	.80
22	706	---	3.8	341	---	.92	299	---	.80
23	716	---	3.9	337	---	.90	281	---	.76
24	744	2	4.0	334	---	.90	274	---	.74
25	732	1	2.0	339	---	.90	264	---	.72
26	697	1	1.9	354	---	.96	260	1	.70
27	690	6	11	352	---	.95	264	3	2.1
28	661	2	3.6	344	---	.93	263	2	1.4
29	646	3	5.2	338	---	.91	261	1	.70
30	633	---	5.1	383	---	1.0	257	1	.69
31	581	---	3.1	375	---	1.0	---	---	---
TOTAL	26407	---	146.9	12928	---	34.73	9571	---	27.59
YEAR	555106		520338.60						

## ELWHA RIVER BASIN

12045000 LAKE MILLS AT GLINES CANYON, NEAR PORT ANGELES, WA

LOCATION.--Lat 48°00'08", long 123°35'55", in SW 1/4 SE 1/4 sec.17, T.29 N., R.7 W., Clallam County, Hydrfpologic Unit 17110020, Olympic National Park, at Glines Canyon Dam on Elwha River, 2 mi upstream from Griff Creek, 4.1 mi south of Elwha, and 11 mi southwest of Port Angeles.

DRAINAGE AREA.--245 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1927 to current year. Prior to October 1950, monthly change in contents only, published in WSP 1316.

GAGE.--Nonrecording gage. Datum of gage is 19.67 ft below sea level.

REMARKS.--Reservoir is formed by concrete dam, completed in 1927; storage began Apr. 1, 1927. Usable capacity, 6,150 acre-ft between gage heights 592.0 ft, normal minimum operation level, and 610.0 ft, top of spillway gates. Storage below gage height 592.0 ft, 25,240 acre-ft. Figures given herein represent total contents. Water is used for power production by Daishowa America Co., Ltd.

COOPERATION.--Gage-height record furnished by Daishowa America Co., Ltd. Capacity table, revised Oct. 1, 1989, was furnished by Hosey and Associates to be used starting in the 1990 water year.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 39,940 acre-ft Dec. 22, 1936, gage height, 613.0 ft; minimum contents observed since reservoir first filled in May 1927, 24,290 acre-ft Nov. 14, 1929, gage height, 574.4 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 31,624 acre-ft May 25, gage height, 610.7 ft; minimum contents observed, 29,848 acre-ft Dec. 14, gage height, 605.5 ft.

## MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	a609.3	31,146	--
Oct. 31.....	a609.9	31,351	+205
Nov. 30.....	a606.4	30,156	-1,195
Dec. 31.....	a609.1	31,078	+922
CAL YR 1995.....	--	--	-341
Jan. 31.....	a609.9	31,351	+273
Feb. 29.....	a610.0	31,385	+34
Mar. 31.....	a606.7	30,258	-1,127
Apr. 30.....	a610.0	31,385	+1,127
May 31.....	a610.2	31,454	+69
June 30.....	a610.4	31,522	+68
July 31.....	a607.6	30,566	-956
Aug. 31.....	a610.1	31,419	+853
Sept. 30.....	a608.8	30,975	-444
WTR YR 1996.....	--	--	-171

a Interpolated



## ELWHA RIVER BASIN

99

## 12045500 ELWHA RIVER AT MCDONALD BRIDGE, NEAR PORT ANGELES, WA

LOCATION.--Lat 48°03'18", long 123°34'55", in NE 1/4 NW 1/4 sec.33, T.30 N., R.7 W., Clallam County, Hydrologic Unit 17110020, Olympic National Forest, on right bank 300 ft upstream from site of McDonald Bridge (now removed), 0.7 mi upstream from Little River, 4.9 mi below Glines Canyon Dam, 8 mi southwest of Port Angeles, and at mile 8.6.

DRAINAGE AREA.--269 mi.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1897 to December 1901, October 1918 to current year. Published as "at McDonald" October 1897 to December 1901.

REVISED RECORDS.--WSP 1246: Drainage area. WSP 1286: 1898, 1899(M), 1900-1902, 1919, 1920-31(M), 1932, 1933(M). WSP 1566: 1957(M).

GAGE.--Water-stage recorder. Datum of gage is 200.00 ft above sea level. Oct. 1, 1897, to Dec. 31, 1901, nonrecording gage at McDonald Bridge at different datum. Dec. 9, 1918, to May 1, 1936, water-stage recorder under McDonald Bridge at datum 7.4 ft higher.

REMARKS.--Records good. Water is diverted through Glines Canyon powerhouse and returned to river upstream from gage. Flow partly regulated by Lake Mills 4.9 mi upstream (station 12045000). Chemical analyses July 1959 to June 1960, July 1960 to September 1970 (partial-record station), October 1971 to September 1986. Water temperatures April 1976 to August 1977. Prior to 1962, published as Elwha River near Port Angeles. October 1971 to September 1974 published as Elwha River below Little River, near Port Angeles.

AVERAGE DISCHARGE.--82 years (water years 1898-1901, 1919-96), 1,500 ft<sup>3</sup>/s, 75.72 in/yr, 1,087,000 acre-ft/yr, adjusted for storage since April 1927.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,600 ft<sup>3</sup>/s Nov. 18, 1897, gage height, 14.5 ft, from graph based on gage readings, site and datum then in use, from rating curve extended above 3,300 ft<sup>3</sup>/s on basis of two determinations of flow over dam at discharge 26,700 ft<sup>3</sup>/s and 30,100 ft<sup>3</sup>/s, referred to 1897 datum; minimum daily discharge, 10 ft<sup>3</sup>/s Oct. 3, 1938.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 23,900 ft<sup>3</sup>/s Nov. 8, gage height, 22.31 ft; minimum discharge, 295 ft<sup>3</sup>/s Oct. 8, 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	537	705	5950	2070	1260	1320	790	1620	1340	1230	642	425
2	652	718	4530	2460	1360	1280	817	1560	1820	1270	583	366
3	723	732	4000	2800	1390	1210	778	1400	2270	1510	569	357
4	584	721	3550	2170	974	1280	786	1300	2170	1340	592	357
5	500	613	2810	1870	3710	1250	756	1200	1840	1160	576	359
6	502	684	2530	3820	6370	1230	852	1170	1690	1090	543	380
7	550	4590	2220	5840	8470	1060	1220	1130	1720	1040	523	404
8	324	17600	2060	4090	9540	1070	1590	1120	1670	1230	539	438
9	448	5560	2350	3290	6550	1390	1460	1060	1510	1350	536	505
10	2960	3150	8640	2730	4450	2550	1460	1080	1450	1160	536	423
11	1570	8210	10200	2460	4000	2390	1270	1070	1370	1030	578	398
12	1210	3960	8260	2220	e3500	1940	1190	871	1390	1070	451	363
13	910	3560	10600	2110	e3400	1670	1190	1570	1350	1120	422	331
14	923	3810	7470	4110	e3100	1470	985	1700	1410	1170	484	519
15	744	3000	5830	6570	e2900	1520	1670	1480	1410	1220	482	761
16	1300	2650	4510	4370	2770	1420	2190	1300	1290	1170	456	448
17	2370	3890	3620	3510	3100	1250	2060	1340	1270	977	462	359
18	1520	5980	4030	2950	5180	1250	1700	2040	1210	906	446	387
19	1170	3440	3530	2540	3770	1370	1510	2280	1110	963	421	376
20	984	2760	3040	2260	3420	1330	1360	1860	1030	957	435	419
21	1000	2360	2670	2070	2840	1410	1220	1590	963	841	412	392
22	910	2410	2390	1710	2550	1210	1210	1490	1200	901	393	371
23	775	4750	2090	1720	1990	1040	3990	1430	1250	904	418	339
24	777	4470	1980	1540	1980	894	5140	1400	1340	923	408	311
25	1350	5720	1810	1470	1810	916	3470	1530	1240	943	416	318
26	1790	3950	1730	1430	1660	869	3250	1720	1120	911	410	339
27	914	3980	1570	1310	1590	878	2430	1670	1170	892	416	339
28	813	7440	1600	1200	1400	850	2220	1590	1190	823	416	339
29	769	16100	2660	1430	e1340	876	1950	1300	1120	785	416	339
30	779	9280	2720	1410	- - -	871	1790	1400	1040	802	430	339
31	734	- - -	2690	1330	- - -	729	- - -	1270	- - -	797	468	- - -
TOTAL	31092	136793	123640	80860	96374	39793	52304	44541	41953	32485	14879	11801
MEAN	1003	4560	3988	2608	3323	1284	1743	1437	1398	1048	480	393
MAX	2960	17600	10600	6570	9540	2550	5140	2280	2270	1510	642	761
MIN	324	613	1570	1200	974	729	756	871	963	785	393	311
AC-FT	61670	271300	245200	160400	191200	78930	103700	88350	83210	64430	29510	23410
MEAN†	1006	4540	4002	2613	3323	1265	1762	1438	1400	1032	494	386
CFSM†	3.74	16.88	14.88	9.71	12.35	4.70	6.55	5.34	5.20	3.84	1.84	1.44
IN.†	4.31	18.83	17.15	11.20	13.33	5.42	7.30	6.16	5.80	4.42	2.12	1.60
AC-FT†	61880	270100	246100	160700	191200	77800	104800	88420	83280	63470	30360	22970

CAL YR 1995 TOTAL 736407 MEAN 2018 MAX 17600 MIN 301 AC-FT 1461000 MEAN† 2018 CFSM† 7.50 IN.† 101.84 AC-FT† 1461000  
WTR YR 1996 TOTAL 706515 MEAN 1930 MAX 17600 MIN 311 AC-FT 1401000 MEAN† 1931 CFSM† 7.18 IN.† 97.65 AC-FT† 1401000

e Estimated

† Adjusted for change in contents in Lake Mills.

## ELWHA RIVER BASIN

12045500 ELWHA RIVER AT MCDONALD BRIDGE, NEAR PORT ANGELES, WA--Continued

## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1994 to current year.

SUSPENDED SEDIMENT DISCHARGE: April 1994 to September 1995. Miscellaneous sediment measurements October 1995 to September 1996.

INSTRUMENTATION.--Temperature recorder since October 1994. Automatic pumping sampler May 1995 to September 1995.

REMARKS.--Unpublished records of bed load sediment discharge for water years 1994 and 1995 are available in the files of the Tacoma field office.

## EXTREMES FOR PERIOD OF DAILY RECORD:

WATER TEMPERATURE: Maximum, 18.5°C Aug. 8-10, 1996; minimum, 3.0°C Dec. 7, 8, 1994, Mar. 1, 2, 1996, but may have been lower during periods of missing record Dec. 24, 1994 to Jan. 13, 1995, Jan. 18 to Feb. 29, 1996.

SEDIMENT CONCENTRATION (April 1994 to September 1995): Maximum daily, 233 mg/L Dec. 20, 1994; minimum, 1 mg/L Oct. 3, 14, June 30, 1995.

SEDIMENT DISCHARGE (April 1994 to September 1995): Maximum daily, 7,960 tons Dec. 20, 1994; minimum daily, 0.76 tons Sept. 28-30, Oct. 3, 14, June 30, 1995.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURES: Maximum, 18.5°C Aug. 8-10; minimum recorded, 3.0°C Mar. 1, 2, but may have been lower during period of missing record Jan. 18 to Feb. 29.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	13.5	12.5	13.0	7.5	6.5	7.0	7.0	6.5	7.0	5.5	5.0	5.5
2	13.5	12.5	13.0	7.5	6.0	6.5	6.5	5.5	6.0	5.5	5.0	5.5
3	13.5	12.0	12.5	7.5	6.0	6.5	6.0	5.5	6.0	5.5	5.5	5.5
4	13.5	11.5	12.5	7.0	6.5	6.5	6.0	5.5	5.5	5.5	5.0	5.5
5	12.5	11.5	12.0	7.0	6.5	6.5	5.5	5.0	5.0	5.5	5.0	5.0
6	12.5	11.5	12.0	6.5	6.0	6.5	5.0	4.5	5.0	5.5	5.0	5.5
7	13.0	11.5	12.0	7.0	6.0	6.5	5.0	4.5	4.5	6.0	5.5	5.5
8	13.0	11.5	12.0	7.0	6.5	6.5	5.0	4.0	4.5	6.0	5.5	5.5
9	12.5	11.5	12.0	6.5	6.0	6.5	4.5	3.5	4.0	6.0	5.5	6.0
10	12.5	11.5	12.0	6.0	6.0	6.0	5.0	4.0	4.5	6.5	5.5	6.0
11	11.5	11.0	11.0	6.5	6.0	6.0	5.5	5.0	5.0	6.0	5.5	6.0
12	11.5	10.5	10.5	6.5	6.0	6.0	6.0	5.5	5.5	6.0	5.5	6.0
13	11.5	10.0	10.5	6.5	6.0	6.5	6.0	6.0	6.0	6.5	6.0	6.0
14	11.5	10.0	10.5	7.0	6.5	7.0	6.0	6.0	6.0	6.5	6.0	6.5
15	11.0	10.0	10.5	7.0	7.0	7.0	6.0	5.5	6.0	6.5	6.5	6.5
16	11.0	10.0	10.5	7.5	7.0	7.0	6.0	5.5	5.5	6.5	6.0	6.5
17	11.0	10.0	10.5	7.5	7.0	7.0	6.0	5.5	6.0	6.5	6.0	6.5
18	10.5	9.5	10.0	7.5	6.5	7.0	6.0	6.0	6.0	---	---	---
19	10.0	9.0	9.5	7.0	6.5	7.0	6.0	6.0	6.0	---	---	---
20	10.0	9.0	9.5	7.0	6.5	6.5	6.0	5.5	6.0	---	---	---
21	9.5	9.0	9.0	6.5	6.0	6.5	6.0	5.5	5.5	---	---	---
22	9.5	8.5	9.0	6.5	6.5	6.5	5.5	5.0	5.5	---	---	---
23	9.5	8.5	9.0	7.0	6.5	7.0	5.5	5.0	5.0	---	---	---
24	9.5	8.5	9.0	7.0	7.0	7.0	5.0	5.0	5.0	---	---	---
25	9.0	8.5	9.0	7.5	7.0	7.0	5.0	4.5	4.5	---	---	---
26	9.0	8.5	9.0	7.0	7.0	7.0	5.0	4.5	4.5	---	---	---
27	9.0	8.0	8.5	7.0	7.0	7.0	5.0	4.5	4.5	---	---	---
28	8.5	7.5	8.5	7.0	7.0	7.0	5.0	4.5	4.5	---	---	---
29	8.5	7.5	8.0	7.5	7.0	7.5	5.0	4.5	5.0	---	---	---
30	8.5	7.0	7.5	7.5	7.0	7.0	5.5	5.0	5.0	---	---	---
31	8.0	6.5	7.0	---	---	---	5.5	5.0	5.0	---	---	---
MONTH	13.5	6.5	10.3	7.5	6.0	6.7	7.0	3.5	5.3	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	4.5	3.0	3.5	6.5	5.0	5.5	7.5	6.0	6.5
2	---	---	---	4.5	3.0	3.5	7.0	5.0	5.5	7.5	6.0	6.5
3	---	---	---	4.0	3.5	3.5	6.5	5.0	5.5	8.0	6.0	6.5
4	---	---	---	4.0	3.5	4.0	7.5	5.0	6.0	8.0	6.0	6.5
5	---	---	---	4.5	3.5	4.0	7.0	5.5	6.0	8.5	6.0	7.0
6	---	---	---	4.5	3.5	4.0	7.0	5.5	6.0	8.0	6.0	6.5
7	---	---	---	4.0	4.0	4.0	8.0	5.5	6.5	8.0	6.0	7.0
8	---	---	---	4.5	4.0	4.0	8.0	6.0	6.5	7.5	6.0	7.0
9	---	---	---	5.0	4.0	4.5	7.5	6.0	6.5	8.0	6.0	7.0
10	---	---	---	5.5	4.5	5.0	7.0	6.5	6.5	7.5	6.0	7.0
11	---	---	---	6.0	5.0	5.0	7.0	6.5	7.0	7.5	6.0	7.0
12	---	---	---	6.0	4.5	5.5	7.5	6.5	7.0	8.5	6.5	7.0
13	---	---	---	6.5	5.0	5.5	8.5	6.5	7.0	8.0	7.0	7.5
14	---	---	---	6.5	5.0	5.5	8.0	6.5	7.0	8.5	7.0	7.5
15	---	---	---	6.5	5.0	5.5	7.5	6.5	7.5	8.0	7.0	7.5
16	---	---	---	6.0	5.0	5.5	8.5	7.5	8.0	9.0	7.0	7.5
17	---	---	---	6.5	5.0	5.5	8.0	7.0	7.5	8.0	7.0	7.5
18	---	---	---	7.0	5.0	5.5	8.0	6.5	7.5	8.5	8.0	8.0
19	---	---	---	6.5	5.5	6.0	7.5	6.5	7.0	9.0	7.5	8.0
20	---	---	---	6.5	5.5	6.0	8.5	6.0	7.0	8.5	7.0	8.0
21	---	---	---	7.0	5.5	6.0	8.5	6.0	7.0	8.0	7.0	7.5
22	---	---	---	6.0	5.5	5.5	8.0	6.5	7.0	9.0	7.5	8.0
23	---	---	---	7.5	5.5	6.0	7.5	7.0	7.0	9.0	7.5	7.5
24	---	---	---	7.0	5.0	5.5	7.0	6.5	7.0	9.5	7.0	8.0
25	---	---	---	7.0	5.0	5.5	7.0	6.5	6.5	9.5	7.5	8.5
26	---	---	---	7.0	5.0	5.5	7.0	6.0	6.5	9.5	8.0	8.5
27	---	---	---	6.0	5.0	5.5	7.0	5.5	6.5	9.5	8.0	8.5
28	---	---	---	7.0	5.0	5.5	6.5	5.5	6.0	10.0	8.5	9.0
29	---	---	---	7.0	5.0	5.5	7.5	6.0	6.5	9.5	8.0	8.5
30	---	---	---	7.0	5.0	5.5	7.5	5.5	6.5	10.0	8.0	9.0
31	---	---	---	6.5	5.0	5.5	---	---	---	10.0	8.0	9.0
MONTH	---	---	---	7.5	3.0	5.1	8.5	5.0	6.6	10.0	6.0	7.6

## ELWHA RIVER BASIN

101

12045500 ELWHA RIVER AT MCDONALD BRIDGE, NEAR PORT ANGELES, WA--Continued  
 WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	9.5	8.5	9.0	12.5	10.0	11.0	16.0	12.5	14.0	16.5	13.5	14.5
2	10.5	9.0	9.5	12.5	10.5	11.0	15.0	13.0	14.0	16.5	13.5	14.5
3	10.5	9.5	10.0	11.5	11.0	11.0	15.0	13.0	14.0	15.0	13.5	14.5
4	10.5	9.5	10.0	12.0	10.5	11.0	15.0	13.0	14.0	15.0	13.0	14.0
5	11.0	9.0	10.0	12.5	10.5	11.0	17.5	13.0	15.0	15.5	13.0	14.0
6	10.5	9.5	10.0	13.0	10.5	11.5	17.5	14.5	15.5	14.0	13.0	13.5
7	11.0	9.5	10.0	13.0	10.5	11.5	18.0	14.5	15.5	16.0	13.5	14.0
8	11.0	9.5	10.0	13.0	10.5	11.5	18.5	15.0	16.0	15.5	13.5	14.0
9	10.5	9.5	10.0	13.0	11.0	11.5	18.5	15.0	16.0	15.5	13.0	14.0
10	10.5	9.5	9.5	13.5	11.0	12.0	18.5	15.0	16.0	16.0	13.0	14.0
11	10.5	9.0	9.5	14.0	11.0	12.0	17.5	13.5	15.5	15.5	13.0	13.5
12	11.0	9.0	10.0	14.0	11.0	12.0	17.0	13.0	14.5	15.5	13.0	14.0
13	11.0	9.5	10.0	14.0	11.5	12.5	17.0	13.0	14.5	14.5	13.0	13.5
14	11.0	9.0	10.0	14.5	11.5	12.5	17.0	13.0	14.5	14.5	13.0	13.5
15	11.0	9.5	10.0	14.5	11.5	12.5	16.0	13.0	14.5	14.5	13.0	13.5
16	10.5	9.5	10.0	13.5	11.5	12.5	15.0	13.5	14.0	14.5	12.5	13.5
17	10.5	9.5	9.5	13.0	12.0	12.5	16.5	13.0	14.0	15.0	12.0	13.0
18	11.5	9.0	10.0	13.0	12.0	12.5	16.0	13.0	14.0	13.5	12.5	13.0
19	11.0	9.0	10.0	13.0	12.0	12.5	16.0	13.5	14.5	14.0	12.5	13.0
20	11.5	9.0	10.0	13.0	12.0	12.5	16.0	13.5	14.5	13.5	12.5	13.0
21	12.0	9.0	10.0	14.5	12.0	13.0	16.0	13.0	14.0	14.0	12.0	12.5
22	10.5	9.5	10.0	14.5	12.0	13.0	17.0	13.0	14.5	14.5	11.5	12.5
23	10.5	10.0	10.0	15.0	12.0	13.0	17.0	13.0	14.5	14.0	11.0	12.0
24	11.5	10.0	10.5	15.0	12.0	13.0	17.5	13.0	14.5	14.0	11.5	12.5
25	11.5	10.0	10.5	15.0	12.0	13.0	16.5	13.5	14.5	14.0	11.0	12.0
26	11.5	9.5	10.5	15.5	12.0	13.5	15.5	13.5	14.5	14.0	11.5	12.5
27	11.5	10.0	10.5	15.0	12.5	13.5	15.0	13.5	14.5	14.5	11.5	12.5
28	11.0	10.0	10.5	15.0	12.5	13.5	15.5	14.0	14.5	14.0	11.5	12.5
29	12.0	10.0	10.5	15.5	12.5	13.5	16.5	13.5	15.0	14.0	11.5	12.5
30	12.0	10.0	11.0	15.5	12.5	13.5	15.5	13.5	14.5	13.5	11.5	12.5
31	---	---	---	15.5	12.5	14.0	16.5	13.5	14.5	---	---	---
MONTH	12.0	8.5	10.0	15.5	10.0	12.4	18.5	12.5	14.6	16.5	11.0	13.3

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	TEMPER- ATURE WATER (DEG C) (00010)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)
OCT					
26...	1420	1280	9.5	8	28
NOV					
08...	1345	20600	7.5	528	29400
JAN					
17...	1317	4750	6.5	38	487
MAR					
12...	1736	1910	6.0	5	26
APR					
11...	0901	1310	6.5	2	7.1
MAY					
08...	1515	1120	7.0	4	12
JUN					
27...	1001	1200	10.0	1	3.2
AUG					
15...	1720	442	16.0	1	1.2
SEP					
27...	1156	339	11.5	0	0.0

## DUNGENESS RIVER BASIN

12048000 DUNGENESS RIVER NEAR SEQUIM, WA

LOCATION.--Lat 48°00'52", long 123°07'53", in NW 1/4 NE 1/4 sec.13, T.29 N., R.4 W., Clallam County, Hydrologic Unit 17110020, on right bank 1.0 mi upstream from Canyon Creek, 4.8 mi southwest of Sequim, and at mile 11.8.

DRAINAGE AREA.--156 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1923 to September 1930, June 1937 to current year. July 1897 to July 1898 at site downstream from Canyon Creek, published as "near Sequim," records not equivalent.

REVISED RECORDS.--WSP 1316: 1924-25(M), 1927(M). WSP 1932: 1957, 1958-59(M), 1960.

GAGE.--Water-stage recorder. Datum of gage is 569.3 ft above sea level (river-profile survey). June 8, 1923, to Sept. 30, 1930, nonrecording gage just above fish-hatchery diversion 0.5 mi downstream at different datum. June 19 to Aug. 12, 1937, nonrecording gage at present site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station. Water temperatures July 1968 to December 1969. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--66 years (water years 1924-30, 1938-96), 378 ft<sup>3</sup>/s, 32.89 in/yr, 273,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,120 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 8.35 ft; maximum gage height, 8.58 ft Nov. 27, 1949; minimum discharge, 61 ft<sup>3</sup>/s Nov. 23, 1993, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1200	4,240	7.01	Dec. 11	0500	2,640	6.01
Nov. 11	0500	2,160	5.64	Dec. 13	0200	*4,500	*7.15
Nov. 29	1400	3,920	6.83	Feb. 8	1500	2,110	5.60

Minimum discharge, 94 ft<sup>3</sup>/s Oct. 7-9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	117	145	1320	e680	e297	308	231	397	440	494	252	151
2	121	140	1010	e700	e292	302	221	379	624	557	254	143
3	125	136	856	e790	e288	302	207	366	887	644	241	153
4	113	136	788	e630	306	299	201	345	872	570	227	147
5	104	137	674	e600	750	287	201	331	669	445	226	145
6	98	130	605	e1500	1230	272	253	324	624	406	212	138
7	96	515	560	e1480	1630	269	403	318	664	406	205	138
8	97	3120	504	e1000	1920	288	515	303	663	462	205	138
9	94	1300	529	e700	1490	385	536	294	596	515	210	144
10	449	771	1410	e630	994	546	493	281	524	448	211	137
11	336	1440	2150	e600	767	540	435	276	484	417	208	130
12	233	905	2340	e580	648	479	393	300	469	429	e200	127
13	195	768	3240	e560	585	424	356	492	498	450	e196	129
14	195	708	1780	e1000	552	389	330	560	516	465	e192	152
15	182	631	1310	e1600	539	380	423	518	511	486	e188	191
16	204	571	1030	e1100	524	355	522	468	495	452	e183	151
17	319	640	916	e800	594	335	465	460	458	416	e178	137
18	321	1240	938	e680	893	320	405	514	412	362	e174	128
19	234	820	831	556	777	313	366	490	380	322	e170	127
20	211	653	743	506	697	300	343	444	390	309	e166	121
21	198	568	675	471	617	288	323	432	426	304	e163	123
22	e183	527	e630	429	535	285	311	434	419	309	162	120
23	e180	703	e600	406	492	270	747	420	476	321	155	113
24	e175	858	e580	381	446	255	1070	411	547	335	153	110
25	e185	1180	e560	360	411	240	778	439	521	343	150	105
26	292	880	e540	340	379	241	650	517	471	327	155	103
27	211	735	e520	333	359	241	553	535	500	320	158	100
28	194	1120	e540	323	336	229	489	521	484	310	160	99
29	178	2940	e930	e316	321	224	446	476	428	306	157	97
30	164	2090	e950	e310	---	216	421	446	435	308	165	97
31	153	---	e840	e304	---	219	---	419	---	279	164	---
TOTAL	5957	26507	30899	20665	19669	9801	13087	12910	15883	12517	5840	3894
MEAN	192	884	997	667	678	316	436	416	529	404	188	130
MAX	449	3120	3240	1600	1920	546	1070	560	887	644	254	191
MIN	94	130	504	304	288	216	201	276	380	279	150	97
AC-FT	11820	52580	61290	40990	39010	19440	25960	25610	31500	24830	11580	7720
CFSM	1.23	5.66	6.39	4.27	4.35	2.03	2.80	2.67	3.39	2.59	1.21	.83
IN.	1.42	6.32	7.37	4.93	4.69	2.34	3.12	3.08	3.79	2.98	1.39	.93

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1923 1996, BY WATER YEAR (WY)

MEAN	208	344	429	390	389	288	323	561	692	486	260	171
MAX	561	1099	1034	1075	1042	819	519	893	1196	840	521	364
(WY)	1968	1991	1980	1968	1924	1972	1925	1956	1948	1954	1954	1954
MIN	80.6	84.9	117	74.3	106	133	171	292	289	179	129	93.8
(WY)	1988	1988	1977	1979	1929	1962	1975	1977	1926	1926	1944	1928

## SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

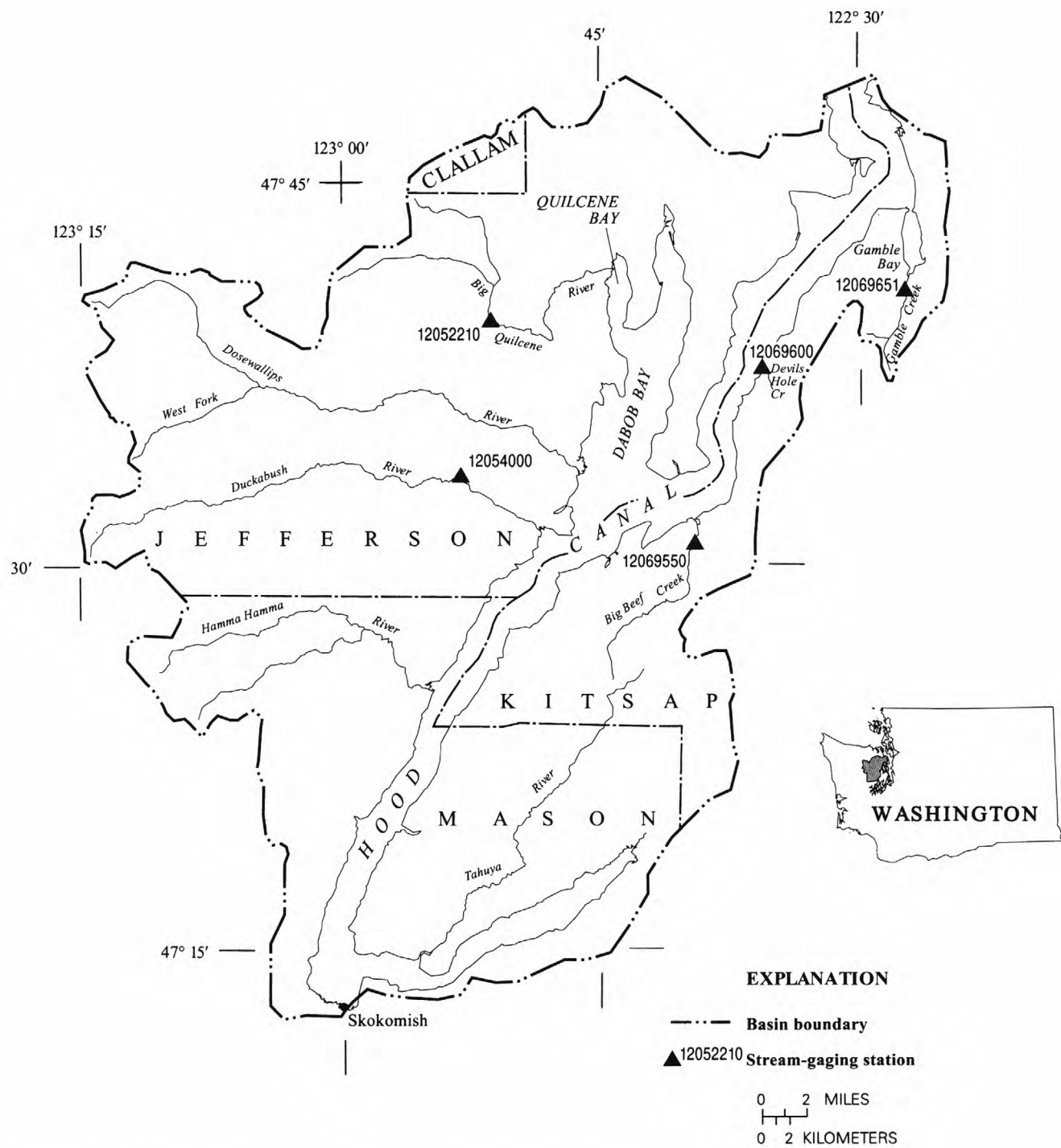
FOR 1996 WATER YEAR

WATER YEARS 1923 - 1996

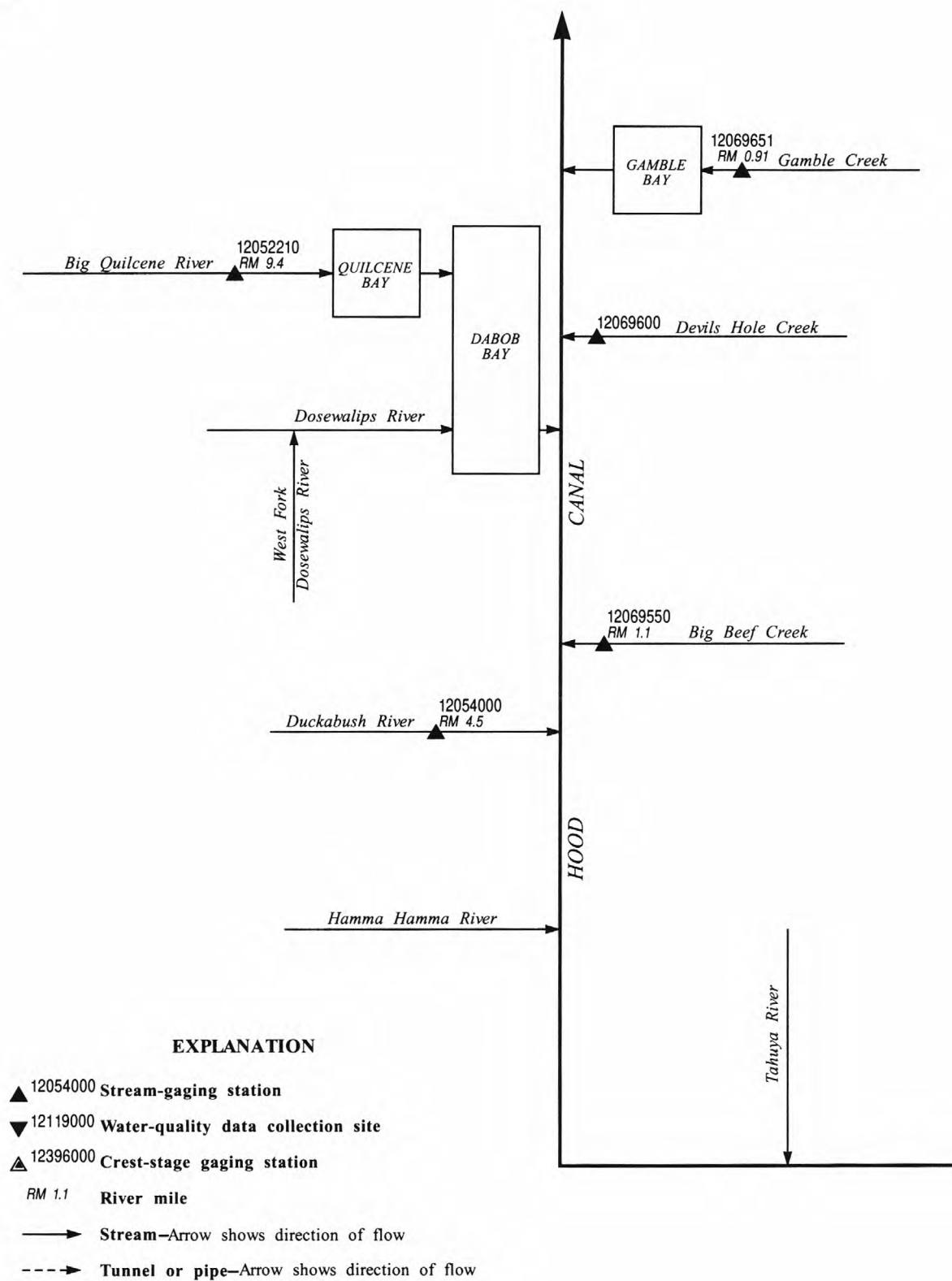
ANNUAL TOTAL	186342	177629										
ANNUAL MEAN	511	485										
HIGHEST ANNUAL MEAN										378		
LOWEST ANNUAL MEAN										545		1954
HIGHEST DAILY MEAN										197		1977
LOWEST DAILY MEAN	3240	Dec 13				3240	Dec 13			5280	Nov 24	1990
ANNUAL SEVEN-DAY MINIMUM	94	Oct 9				94	Oct 9			65	Jan 31	1979
ANNUAL RUNOFF (AC-FT)	103	Sep 21				102	Sep 24			65	Jan 29	1979
ANNUAL RUNOFF (CFSM)	369600					352300				273600		
ANNUAL RUNOFF (INCHES)	3.27					3.11				2.42		
10 PERCENT EXCEEDS	44.44					42.36				32.89		
50 PERCENT EXCEEDS	857					882				721		
90 PERCENT EXCEEDS	416					405				291		
	165					144				133		

e Estimated





**Figure 27.** Location of surface-water stations in the Big Quilcene River, Duckabush River and Big Beef Creek Basins.



**Figure 28.** Schematic diagram showing surface-water stations in the Big Quilcene River, Duckabush River and Big Beef Creek Basins.

## BIG QUILCENE BASIN

105

12052210 BIG QUILCENE RIVER BELOW DIVERSION DAM, NEAR QUILCENE, WA

LOCATION.--Lat 47°47'05", long 122°58'42", in SW 1/4 SE 1/4 sec.31, T.27 N., R.2 W., Jefferson County, Hydrologic Unit 17110018, on left bank, 5.5 mi southwest of Quilcene, and at mile 9.4.

DRAINAGE AREA.--49.4 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1994 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,009.21 ft above sea level.

AVERAGE DISCHARGE.--2 years (water years 1995-96), 162 ft<sup>3</sup>/s, 117,600 acre-ft/yr.

REMARKS.--Records good except those above 300 ft<sup>3</sup>/s, which are poor. Water for municipal use is diverted upstream by City of Port Townsend.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,090 ft<sup>3</sup>/s Dec. 20, 1994, gage height, 5.13 ft, from rating curve extended above 200 ft<sup>3</sup>/s; maximum gage height, 6.41 ft Dec. 12, 1995; minimum discharge, 17 ft<sup>3</sup>/s Nov. 4, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, unknown Dec 12, gage height, 6.41 ft; minimum discharge, 17 ft<sup>3</sup>/s Nov. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25	22	e360	130	41	101	76	183	209	107	63	30
2	24	22	298	127	38	96	74	169	198	113	68	32
3	23	23	254	127	41	97	71	162	218	117	68	36
4	22	23	233	117	43	103	68	156	252	123	63	33
5	22	22	196	108	e300	104	66	149	232	117	58	30
6	22	22	174	151	e490	96	69	146	195	106	54	29
7	22	84	143	264	e510	97	81	143	184	98	53	31
8	25	e590	118	235	e620	111	94	139	182	96	51	29
9	24	e390	111	182	e520	146	102	135	171	101	52	28
10	82	251	e290	145	e340	176	104	127	160	102	52	28
11	58	e390	e780	126	245	170	108	121	152	100	52	27
12	38	e290	e1220	114	193	158	106	123	144	97	51	27
13	28	230	e1330	104	174	140	99	153	139	97	49	24
14	24	186	e840	104	163	126	92	171	136	98	47	28
15	22	161	e630	189	158	121	128	175	134	98	45	32
16	24	144	e430	179	141	120	236	171	133	120	45	30
17	38	195	e330	142	172	112	240	203	131	106	44	31
18	42	e370	e340	124	259	103	194	e300	124	94	43	27
19	33	276	e300	111	247	98	161	e290	118	89	40	26
20	35	212	239	104	289	93	137	261	113	84	39	28
21	29	175	206	94	271	93	126	241	110	79	38	24
22	23	152	173	81	214	91	127	234	111	75	36	23
23	22	166	150	78	171	87	e540	210	117	74	33	22
24	22	199	138	72	148	85	e680	192	137	75	32	23
25	49	300	126	64	133	79	e420	185	132	75	31	23
26	60	249	116	62	124	76	e340	184	123	75	31	23
27	40	216	109	58	116	77	301	183	116	74	31	23
28	31	275	109	54	106	75	256	231	114	73	34	23
29	30	e540	182	49	106	71	230	252	114	71	33	25
30	29	e520	163	48	--	66	211	268	108	71	32	25
31	23	--	146	46	--	69	--	247	--	70	31	--
TOTAL	991	6695	10234	3589	6373	3237	5537	5904	4507	2875	1399	820
MEAN	32.0	223	330	116	220	104	185	190	150	92.7	45.1	27.3
MAX	82	590	1330	264	620	176	680	300	252	123	68	36
MIN	22	22	109	46	38	66	66	121	108	70	31	22
AC-FT	1970	13280	20300	7120	12640	6420	10980	11710	8940	5700	2770	1630

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
MEAN	31.1	140	329	226	253	208	182	174	128	85.2	44.8	26.8
MAX	32.0	223	330	336	385	326	208	191	150	99.9	60.6	28.9
(WY)	1996	1996	1996	1995	1995	1995	1995	1995	1996	1995	1995	1995
MIN	30.3	55.9	328	116	157	104	153	139	84.3	63.1	28.8	24.3
(WY)	1995	1995	1995	1996	1994	1996	1994	1994	1994	1994	1994	1994

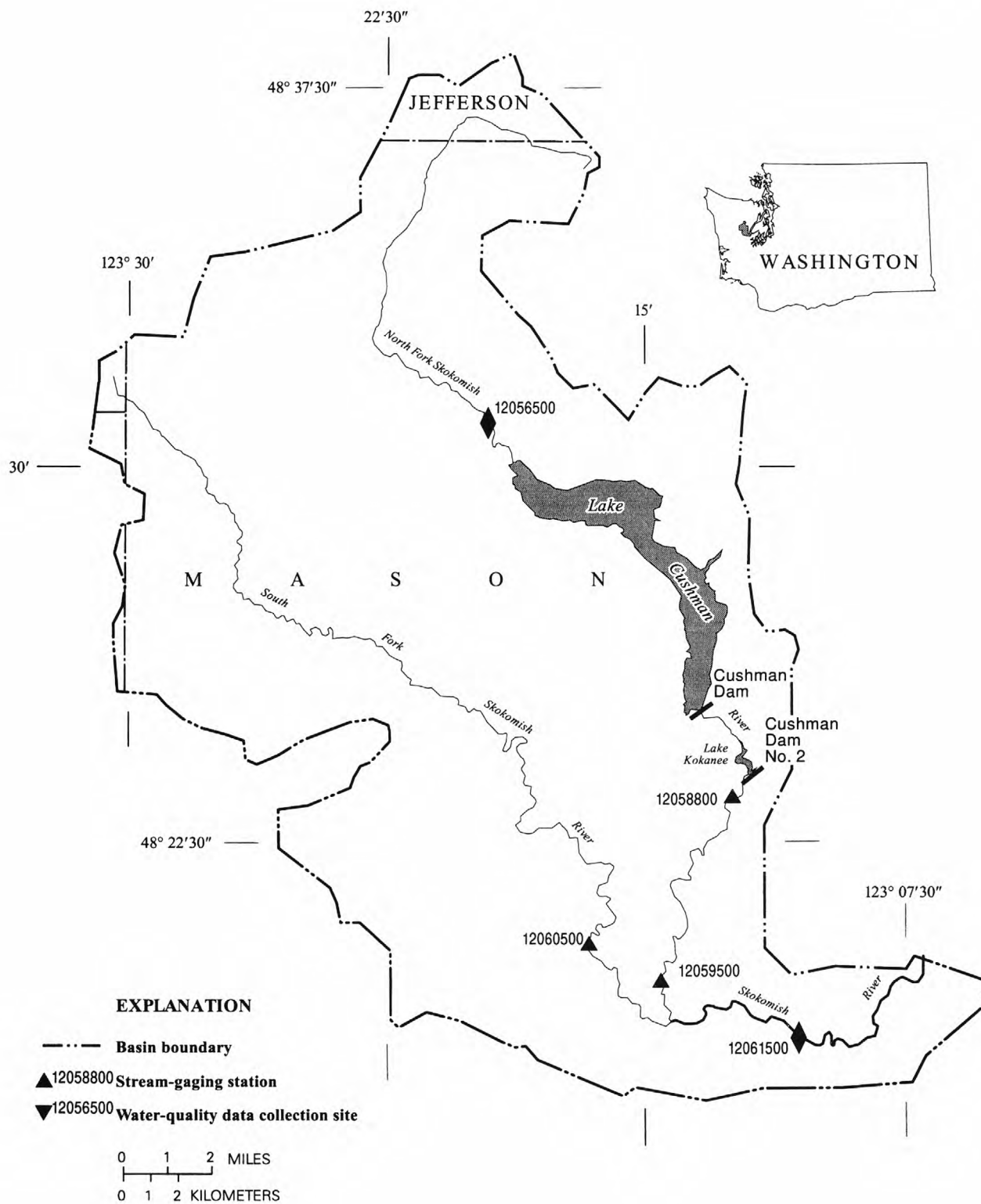
## SUMMARY STATISTICS

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	FOR 1997 WATER YEAR	FOR 1998 WATER YEAR	FOR 1999 WATER YEAR	FOR 2000 WATER YEAR	FOR 2001 WATER YEAR	FOR 2002 WATER YEAR	FOR 2003 WATER YEAR	FOR 2004 WATER YEAR	FOR 2005 WATER YEAR
ANNUAL TOTAL	71690	52161	162	182	143	196	196	196	196	196	196
ANNUAL MEAN	196	143	162	182	143	196	196	196	196	196	196
HIGHEST ANNUAL MEAN											
LOWEST ANNUAL MEAN											
HIGHEST DAILY MEAN	1420	Jan 29	1330	Dec 13	1670	Dec 20	1994	1994	1994	1994	1994
LOWEST DAILY MEAN	22	Sep 22	22	Oct 4	22	Nov 18	1994	1994	1994	1994	1994
ANNUAL SEVEN-DAY MINIMUM	22	Oct 31	22	Oct 31	22	Oct 31	1995	1995	1995	1995	1995
ANNUAL RUNOFF (AC-FT)	142200	103500	117600	117600	117600	117600	117600	117600	117600	117600	117600
10 PERCENT EXCEEDS	386	272	290	290	290	290	290	290	290	290	290
50 PERCENT EXCEEDS	156	109	110	110	110	110	110	110	110	110	110
90 PERCENT EXCEEDS	28	27	25	25	25	25	25	25	25	25	25

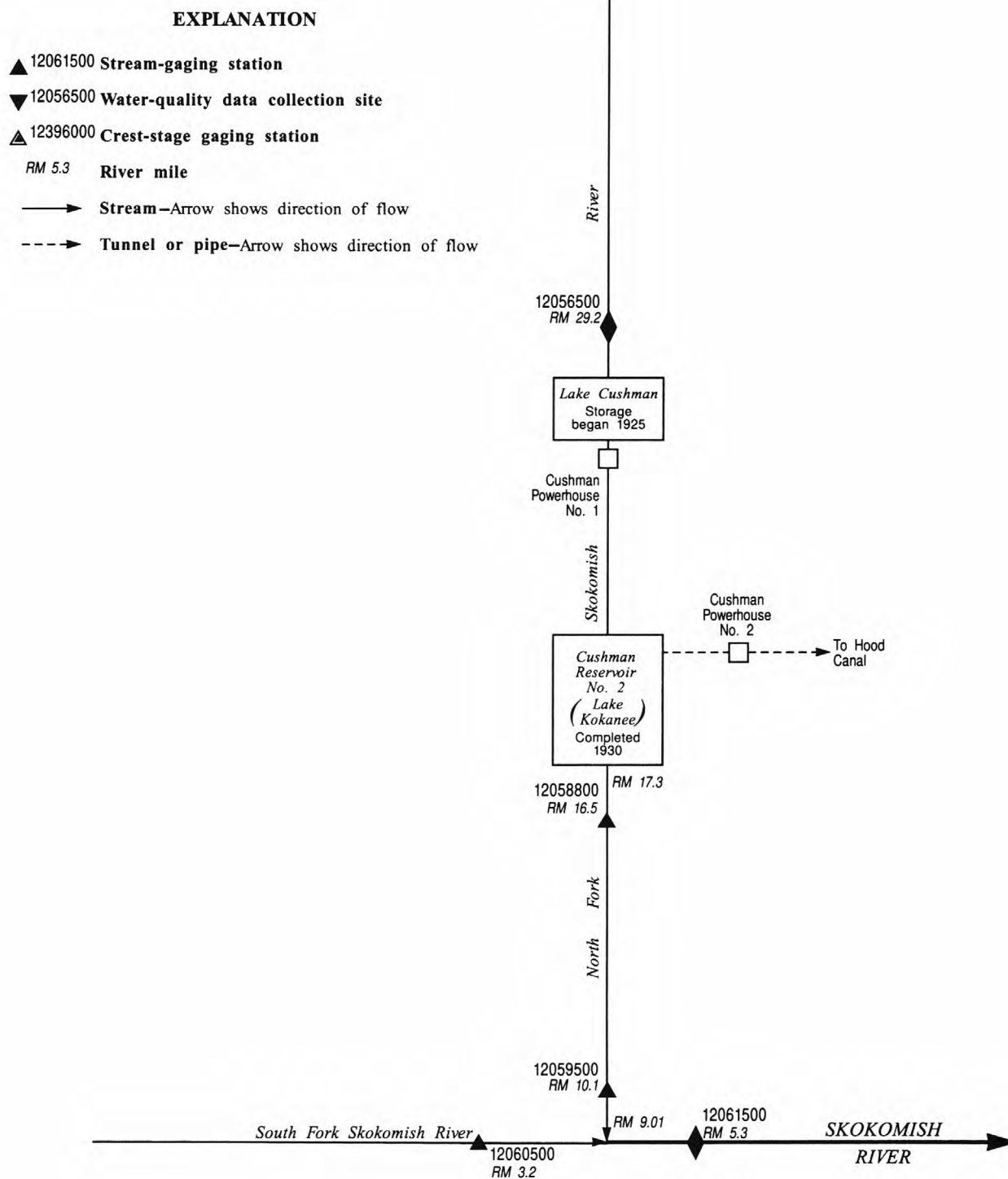
e Estimated







**Figure 29.** Location of surface-water and water-quality stations in the Skokomish River Basin.



**Figure 30.** Schematic diagram showing surface-water and water-quality stations in the Skokomish River Basin.

12056500 NORTH FORK SKOKOMISH RIVER BELOW STAIRCASE RAPIDS, NEAR HOODSPORT, WA

LOCATION.--Lat 47°30'52", long 123°19'43", in NW 1/4 sec.4, T.23 N., R.5 W., Mason County, Hydrologic Unit 17110017, Olympic National Park, on left bank 1.2 mi upstream from Lake Cushman, 2.8 mi upstream from Dry Creek, 11.3 mi northwest of HoodSPORT, and at mile 29.2.

DRAINAGE AREA.--57.2 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WSP 1286: 1932, 1935, 1937(M), 1942(M), 1947(P), 1948(M). WSP 1636: 1940(M). WSP 1736: 1927. WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 762.26 ft above sea level. Prior to Nov. 1, 1934, water-stage recorder, and Nov. 1, 1934, to Nov. 10, 1941, nonrecording gages, on right bank at same datum.

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. Chemical analyses December 1973 to September 1985.

AVERAGE DISCHARGE.--72 years (water years 1925-96), 504 ft<sup>3</sup>/s, 119.77 in/yr, 365,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,000 ft<sup>3</sup>/s Nov. 5, 1934, gage height, 14.4 ft, from high-water mark, from rating curve extended above 9,800 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 12.2 ft; minimum discharge recorded, 16 ft<sup>3</sup>/s Sept. 23, 1930, gage height, 1.12 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	0830	*8,360	*8.15	Dec. 12	2145	7,380	7.74
Nov. 11	0145	5,400	6.84	Jan. 6	1800	3,600	5.90
Nov. 17	2245	5,260	6.78	Jan. 15	0600	3,220	5.66
Nov. 23	1345	4,780	6.54	Feb. 5	2015	4,570	6.43
Nov. 24	1900	3,250	5.68	Feb. 6	2400	3,550	5.87
Nov. 29	1115	6,550	7.38	Feb. 8	1030	3,930	6.09
Dec. 10	1215	5,960	7.11	Feb. 18	0815	3,440	5.80
Dec. 11	0315	7,340	7.72	Apr. 23	1645	7,020	7.57

Minimum discharge, 48 ft<sup>3</sup>/s Sept. 13, 30.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	175	228	1470	771	268	366	397	597	388	224	106	60
2	241	213	1120	814	254	352	351	539	457	230	122	56
3	226	201	932	956	248	365	287	495	536	231	108	58
4	165	203	821	684	306	382	264	454	496	215	103	56
5	137	210	703	583	2280	381	256	428	425	197	103	54
6	123	205	619	1850	2450	352	343	412	399	189	97	56
7	114	1670	556	2750	2700	359	449	395	393	189	93	54
8	117	5130	504	1480	3280	419	454	369	381	200	91	66
9	147	1340	743	1010	1780	644	442	348	354	200	90	63
10	1450	975	3980	838	1080	1240	394	330	330	183	87	55
11	1010	2560	4830	751	825	1040	372	316	319	e176	84	51
12	641	1040	4720	647	723	717	415	372	306	e178	81	49
13	412	975	4110	610	696	580	401	651	311	e178	79	55
14	328	867	2690	1340	680	516	396	548	316	e175	76	233
15	274	862	2040	2350	675	491	921	492	307	e167	75	261
16	520	727	1440	1350	661	440	1240	441	300	e163	73	145
17	1130	1840	1360	899	1750	403	1060	722	281	e160	72	102
18	670	2360	1710	730	2850	378	814	1620	264	e200	73	85
19	448	1100	1260	631	1740	379	766	1270	249	e230	69	88
20	382	799	982	576	1570	365	676	814	250	205	68	76
21	351	672	829	531	1170	338	565	647	254	179	66	70
22	300	749	720	477	857	323	799	570	251	162	65	68
23	270	2930	639	454	721	302	3940	517	269	154	62	62
24	246	2220	575	416	609	284	2550	495	275	149	61	58
25	541	2100	523	385	538	266	1520	530	253	142	60	55
26	646	1290	484	360	485	258	1270	560	234	135	60	53
27	410	1150	460	343	444	249	979	511	236	130	59	52
28	342	2500	496	326	408	235	813	473	234	125	58	50
29	300	4720	888	306	384	228	710	434	220	119	56	49
30	269	2340	1060	282	--	219	655	402	214	116	65	49
31	247	--	1080	277	--	244	--	377	--	111	74	--
TOTAL	12632	44176	44344	25777	32432	13115	24499	17129	9502	5412	2436	2289
MEAN	407	1473	1430	832	1118	423	817	553	317	175	78.6	76.3
MAX	1450	5130	4830	2750	3280	1240	3940	1620	536	231	122	261
MIN	114	201	460	277	248	219	256	316	214	111	56	49
AC-FT	25060	87620	87960	51130	64330	26010	48590	33980	18850	10730	4830	4540
CFSM	7.12	25.7	25.0	14.5	19.6	7.40	14.3	9.66	5.54	3.05	1.37	1.33
IN.	8.22	28.73	28.84	16.76	21.09	8.53	15.93	11.14	6.18	3.52	1.58	1.49

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1924 - 1996, BY WATER YEAR (WY)

	MEAN	365	696	791	677	639	494	516	657	595	335	151	143
MAX	1136	1762	1778	1915	1465	1325	901	1304	1332	1915	1956	1974	1978
(WY)	1968	1984	1934	1953	1991	1972	1943	1956	1956	1956	1956	1974	1978
MIN	42.3	40.0	244	124	111	190	268	333	180	88.5	54.9	50.2	50.2
(WY)	1988	1937	1979	1937	1929	1955	1975	1930	1992	1926	1926	1926	1926

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1924 - 1996

	ANNUAL TOTAL	265381	233743	
ANNUAL MEAN	727	639	504	
HIGHEST ANNUAL MEAN			755	1974
LOWEST ANNUAL MEAN			256	1930
HIGHEST DAILY MEAN	5130	Nov 8	5130	Nov 8
LOWEST DAILY MEAN	56	Sep 24	49	Sep 12
ANNUAL SEVEN-DAY MINIMUM	60	Sep 19	52	Sep 24
ANNUAL RUNOFF (AC-FT)	526400		463600	365300
ANNUAL RUNOFF (CFSM)	12.7		11.2	8.82
ANNUAL RUNOFF (INCHES)	172.59		152.01	119.77
10 PERCENT EXCEEDS	1660		1460	1000
50 PERCENT EXCEEDS	480		382	370
90 PERCENT EXCEEDS	115		73	90

e Estimated

12056500 NORTH FORK SKOKOMISH RIVER BELOW STAIRCASE RAPIDS, NEAR HOODSPORT, WA--Continued

## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD...

SPECIFIC CONDUCTANCE: April to September 1996.

WATER TEMPERATURES: April 1965 to September 1982, June 1989 to December 1989, December 1990 to April 1991, June 1992 to current year.

INSTRUMENTATION.--Temperature recorder April 1965 to September 1982, June 1989 to current year. Water-quality monitor since April 1996. Electronic data logger with sixty-minute recording interval.

## EXTREMES FOR PERIOD OF DAILY RECORD...

SPECIFIC CONDUCTANCE: Maximum recorded, 108 microsiemens Sept. 11, 28, 1996, minimum recorded, 31 microsiemens Apr. 23, 1996.

WATER TEMPERATURES: Maximum recorded, 16.5°C Aug. 14, 15, 1992; minimum, 0.0°C Mar. 24, 1976, Jan. 31, 1996.

## EXTREMES FOR CURRENT YEAR...

SPECIFIC CONDUCTANCE(for the period April to September 1996): Maximum recorded, 108 microsiemens Sept. 11, 28, minimum recorded, 31 microsiemens Apr. 23.

WATER TEMPERATURES: Maximum, 14.5°C July 26; minimum recorded, 0.0°C Jan. 31.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, APRIL TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	---	---	---	76	74	75
2	---	---	---	---	---	---	---	---	---	77	76	76
3	---	---	---	---	---	---	---	---	---	78	77	78
4	---	---	---	---	---	---	---	---	---	79	78	79
5	---	---	---	---	---	---	---	---	---	80	79	80
6	---	---	---	---	---	---	---	---	---	80	80	80
7	---	---	---	---	---	---	---	---	---	81	80	80
8	---	---	---	---	---	---	---	---	---	82	81	81
9	---	---	---	---	---	---	---	---	---	82	82	82
10	---	---	---	---	---	---	---	---	---	83	82	83
11	---	---	---	---	---	---	---	---	---	84	83	83
12	---	---	---	---	---	---	---	---	---	84	75	82
13	---	---	---	---	---	---	---	---	---	75	66	67
14	---	---	---	---	---	---	---	---	---	70	67	69
15	---	---	---	---	---	---	---	---	---	73	70	71
16	---	---	---	---	---	---	---	---	---	75	73	74
17	---	---	---	---	---	---	---	---	---	75	58	69
18	---	---	---	---	---	---	---	---	---	58	51	53
19	---	---	---	---	---	---	69	67	68	60	53	56
20	---	---	---	---	---	---	73	69	71	66	60	64
21	---	---	---	---	---	---	76	73	74	70	66	68
22	---	---	---	---	---	---	76	56	70	72	70	71
23	---	---	---	---	---	---	56	31	43	74	72	73
24	---	---	---	---	---	---	59	41	52	74	73	74
25	---	---	---	---	---	---	62	59	61	73	69	72
26	---	---	---	---	---	---	67	62	65	70	68	69
27	---	---	---	---	---	---	70	67	69	72	69	71
28	---	---	---	---	---	---	72	70	71	75	72	73
29	---	---	---	---	---	---	73	72	73	77	75	77
30	---	---	---	---	---	---	74	73	74	79	77	78
31	---	---	---	---	---	---	---	---	---	80	79	80
MONTH	---	---	---	---	---	---	---	---	---	84	51	74

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	80	78	80	86	84	85	95	94	95	102	101	102
2	78	68	74	84	82	83	95	93	94	102	101	102
3	68	65	67	83	81	82	95	94	95	102	101	102
4	71	65	68	85	82	83	96	95	96	102	101	102
5	74	71	73	87	85	86	96	96	96	104	102	103
6	76	74	75	88	87	87	97	96	97	103	102	102
7	76	75	75	88	87	87	98	97	98	104	102	103
8	76	74	75	88	86	87	98	98	98	104	102	103
9	78	76	77	87	83	85	99	98	99	103	101	102
10	80	78	79	89	86	88	99	99	99	103	101	101
11	81	80	80	90	88	89	100	99	99	108	102	104
12	82	81	82	90	86	87	100	99	99	106	103	104
13	81	80	81	87	84	86	101	100	100	105	100	103
14	80	79	80	87	85	86	101	101	101	102	82	90
15	80	79	80	86	84	85	101	101	101	84	79	81
16	81	79	80	88	85	86	101	101	101	89	84	87
17	82	81	82	90	88	89	101	101	101	94	89	92
18	85	82	84	90	83	87	101	100	100	95	94	95
19	86	85	86	84	83	84	101	101	101	97	95	96
20	86	85	86	87	83	85	102	101	102	99	97	98
21	85	84	85	89	87	88	104	102	103	102	99	100
22	85	84	85	90	89	89	102	102	102	101	99	100
23	85	83	84	90	89	90	103	102	103	103	100	100
24	83	82	82	90	89	90	103	103	103	102	101	101
25	85	83	84	90	87	89	106	102	103	102	101	102
26	86	85	86	90	88	89	103	102	102	103	102	102
27	85	85	85	90	89	90	103	102	102	104	103	103
28	85	84	85	92	90	90	102	102	102	108	103	106
29	86	85	86	93	91	92	103	102	102	104	104	104
30	86	86	86	93	92	93	103	102	102	105	104	104
31	---	---	---	94	93	93	102	101	101	---	---	---
MONTH	86	65	80	94	81	87	106	93	100	108	79	100

## SKOKOMISH RIVER BASIN

111

12056500 NORTH FORK SKOKOMISH RIVER BELOW STAIRCASE RAPIDS, NEAR HOODSPORT, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	10.0	8.5	9.5	4.0	3.5	3.5	6.5	5.5	6.5	5.5	5.5	5.5
2	10.5	9.5	10.0	4.0	3.0	3.5	5.5	5.0	5.5	6.0	5.5	6.0
3	10.5	9.5	10.0	4.0	3.5	3.5	5.5	4.0	5.0	5.5	5.0	5.5
4	9.5	8.5	8.5	4.5	3.5	4.0	5.0	4.0	4.5	5.0	4.5	5.0
5	9.0	8.0	8.5	5.0	4.5	5.0	4.5	4.0	4.5	4.5	3.5	4.5
6	9.5	8.5	9.0	5.0	4.5	4.5	4.5	3.5	4.0	4.5	3.5	4.0
7	9.0	8.5	9.0	7.5	5.0	5.5	4.5	3.5	4.0	5.5	4.5	5.0
8	9.5	8.5	9.0	8.0	6.5	7.5	4.5	4.0	4.0	5.5	5.0	5.5
9	9.0	8.5	9.0	6.5	6.0	6.0	4.5	3.5	4.0	5.5	5.5	5.5
10	9.5	8.5	9.0	6.0	5.5	5.5	5.5	4.0	5.0	5.5	5.0	5.5
11	9.0	8.0	8.5	7.0	6.0	6.5	6.0	5.5	6.0	5.5	5.0	5.5
12	8.5	8.0	8.0	6.5	6.0	6.5	6.5	6.0	6.0	5.0	4.5	5.0
13	8.5	7.5	8.0	7.5	6.5	7.0	6.5	5.5	6.0	5.5	4.5	5.0
14	9.0	8.0	8.5	7.5	7.5	7.5	6.0	5.0	5.5	5.5	5.5	5.5
15	8.5	8.0	8.0	8.5	7.5	8.0	6.0	5.5	5.5	5.5	5.0	5.0
16	9.0	8.5	8.5	8.5	7.5	7.5	6.5	5.5	5.5	5.0	4.5	4.5
17	8.5	8.0	8.5	9.0	8.5	8.5	6.0	5.5	6.0	4.5	4.0	4.0
18	8.0	7.0	7.0	8.5	7.0	7.5	6.0	5.5	5.5	4.0	3.5	4.0
19	7.5	6.5	7.0	7.0	6.0	6.5	6.0	5.5	6.0	4.0	3.5	4.0
20	8.0	7.5	7.5	6.5	6.0	6.0	6.0	5.5	6.0	4.0	2.5	3.0
21	7.5	7.0	7.5	7.0	6.5	6.5	5.5	5.0	5.5	3.5	2.5	3.5
22	7.0	6.0	6.5	7.5	7.0	7.5	5.0	5.0	5.0	4.0	3.0	3.5
23	7.5	6.5	7.0	8.0	7.5	7.5	5.0	4.5	4.5	3.0	3.0	3.0
24	7.0	6.0	6.5	7.5	7.5	7.5	4.5	4.5	4.5	3.5	3.0	3.5
25	8.0	6.5	7.0	7.5	6.5	7.0	4.5	4.0	4.5	3.5	3.0	3.5
26	8.0	7.5	7.5	6.5	6.5	6.5	5.0	4.0	4.5	3.0	2.5	3.0
27	7.5	6.5	7.0	6.5	5.0	6.0	5.5	5.0	5.0	3.5	3.0	3.0
28	7.0	6.5	7.0	7.5	6.0	6.5	5.5	4.5	5.0	3.0	2.0	2.5
29	7.0	5.5	6.0	8.0	7.0	7.5	5.0	4.0	4.5	2.0	1.0	1.5
30	5.5	4.5	4.5	7.0	6.5	7.0	5.0	4.5	5.0	1.0	.5	.5
31	4.5	4.0	4.0	---	---	---	5.5	5.0	5.0	1.0	.0	.5
MONTH	10.5	4.0	7.8	9.0	3.0	6.3	6.5	3.5	5.1	6.0	.0	4.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	1.0	.5	1.0	3.0	2.5	2.5	5.0	4.5	5.0	6.0	5.0	5.5
2	1.0	.5	1.0	3.0	2.5	3.0	4.5	4.0	4.5	5.5	4.0	5.0
3	2.0	.5	1.0	3.5	3.0	3.0	5.0	3.5	4.5	5.5	4.0	4.5
4	---	2.0	---	3.5	3.0	3.5	5.5	4.5	5.0	5.5	4.0	5.0
5	3.5	2.0	3.0	4.0	3.5	3.5	6.0	5.0	5.5	6.0	4.0	5.0
6	4.0	3.5	4.0	4.0	3.5	3.5	6.0	5.5	6.0	6.0	4.5	5.5
7	4.5	4.0	4.0	4.0	3.5	3.5	7.0	5.5	6.0	6.0	4.5	5.5
8	4.5	4.0	4.0	4.5	3.5	4.0	7.0	5.5	6.5	5.0	4.0	4.5
9	4.5	4.0	4.0	4.5	4.0	4.0	6.5	6.0	6.0	5.0	4.0	5.0
10	4.0	3.5	3.5	6.0	4.0	5.0	6.0	5.5	5.5	5.5	4.5	5.0
11	4.5	4.0	4.0	6.0	4.5	5.0	5.5	4.5	5.0	6.0	5.0	5.5
12	4.5	4.0	4.5	5.5	4.5	5.0	4.5	2.0	3.5	7.5	6.0	6.5
13	4.5	4.0	4.5	5.0	4.5	5.0	5.0	3.5	4.0	7.0	6.0	6.5
14	4.5	4.0	4.5	5.5	4.5	5.0	5.5	4.0	4.5	7.5	6.0	7.0
15	4.5	4.0	4.5	5.5	4.5	5.5	5.0	4.5	5.0	7.0	6.5	7.0
16	4.5	4.0	4.5	5.0	4.0	4.5	5.0	4.5	4.5	7.0	5.5	6.5
17	4.5	4.0	4.5	5.0	4.0	4.5	4.5	4.0	4.0	7.0	6.5	7.0
18	4.5	4.0	4.5	5.0	4.0	4.5	5.0	4.0	4.5	7.0	6.0	6.5
19	4.0	3.5	4.0	5.0	4.5	4.5	5.0	4.5	4.5	7.5	6.5	7.0
20	4.0	3.5	3.5	4.5	4.0	4.5	5.5	4.5	5.0	7.0	6.0	6.5
21	3.5	3.5	3.5	5.0	4.0	4.5	6.5	5.0	5.5	7.0	6.0	6.5
22	3.5	1.5	3.0	4.5	4.0	4.5	6.0	5.0	5.5	7.5	6.5	7.0
23	3.0	2.0	2.5	4.5	3.5	4.0	5.0	4.5	5.0	7.5	6.5	7.0
24	3.0	2.0	2.5	4.5	3.0	4.0	5.5	4.5	5.0	8.5	6.5	7.5
25	2.5	2.0	2.5	3.5	2.5	3.0	5.0	4.0	4.5	9.0	7.5	8.0
26	2.5	1.5	2.5	4.0	2.5	3.5	5.5	4.5	5.0	9.0	7.5	8.0
27	2.5	2.0	2.5	4.0	3.0	3.5	6.0	4.5	5.0	8.5	7.0	8.0
28	2.5	1.5	2.0	3.5	2.5	3.0	6.0	4.5	5.0	7.5	7.0	7.0
29	2.5	1.5	2.0	4.0	3.0	3.5	6.5	5.0	5.5	8.0	6.5	7.5
30	---	---	---	4.0	3.0	3.5	6.0	5.0	5.5	8.0	7.0	7.5
31	---	---	---	4.5	3.5	4.0	---	---	---	8.5	6.5	7.5
MONTH	---	.5	---	6.0	2.5	4.0	7.0	2.0	5.0	9.0	4.0	6.4



## SKOKOMISH RIVER BASIN

12056500 NORTH FORK SKOKOMISH RIVER BELOW STAIRCASE RAPIDS, NEAR HOODSPORT, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.0	7.0	7.5	11.0	9.0	10.0	13.5	11.0	12.5	12.0	10.5	11.0
2	9.5	7.5	8.5	11.0	9.5	10.0	12.5	11.0	12.0	11.5	10.0	11.0
3	9.5	8.0	8.5	10.5	9.5	10.0	11.5	10.5	11.0	11.0	10.0	10.5
4	8.5	7.5	8.0	10.0	8.5	9.0	11.5	10.5	11.0	10.5	9.5	10.0
5	9.0	7.0	8.0	10.0	8.5	9.0	12.5	10.5	11.0	10.5	9.5	10.0
6	8.5	7.5	8.0	10.5	8.5	9.5	12.5	10.0	11.0	10.0	9.0	9.5
7	9.0	7.5	8.0	11.5	9.0	10.0	12.5	10.0	11.5	11.0	9.5	10.0
8	9.0	7.5	8.0	12.0	9.5	10.5	13.0	10.5	11.5	11.5	10.0	10.5
9	8.0	7.0	7.5	11.0	10.0	10.5	13.5	11.0	12.0	11.5	10.0	10.5
10	8.0	7.0	7.5	---	---	---	13.5	11.0	12.0	11.0	9.5	10.5
11	8.0	7.0	7.5	---	---	---	12.5	11.0	11.5	11.0	10.0	10.5
12	9.0	6.5	8.0	---	---	---	13.0	10.0	11.5	11.0	10.5	11.0
13	9.5	7.5	8.5	---	---	---	13.0	10.5	11.5	11.0	10.5	10.5
14	9.5	8.0	8.5	---	---	---	13.0	10.5	11.5	11.0	10.5	10.5
15	9.5	7.5	8.5	---	---	---	12.5	10.5	11.5	10.5	10.0	10.0
16	9.0	8.0	8.5	---	---	---	12.0	10.5	11.0	10.0	9.0	9.5
17	8.5	7.5	7.5	---	---	---	12.5	10.0	11.0	10.0	9.0	9.5
18	8.0	6.5	7.5	---	---	---	11.5	9.5	10.5	10.0	9.0	9.5
19	9.0	7.0	8.0	---	---	---	11.5	10.0	10.5	10.5	10.0	10.0
20	9.5	7.5	8.5	10.0	9.5	9.5	11.5	10.0	10.5	10.0	9.5	10.0
21	9.5	7.5	8.5	11.5	9.5	10.5	12.0	9.5	10.5	9.5	9.0	9.0
22	9.5	8.0	8.5	12.5	10.0	11.0	12.0	9.5	10.5	9.5	8.5	9.0
23	9.0	8.0	8.5	13.0	10.5	12.0	12.0	9.5	10.5	9.0	8.0	8.5
24	9.0	8.0	8.5	14.0	11.5	12.5	12.5	10.0	11.0	9.0	8.0	8.5
25	8.5	8.0	8.0	14.0	12.0	13.0	12.0	10.5	11.0	9.5	8.0	8.5
26	10.0	8.0	9.0	14.5	12.0	13.0	11.5	10.5	11.0	9.5	8.5	9.0
27	9.0	8.5	9.0	14.0	12.0	13.0	12.5	11.0	11.5	10.0	9.0	9.5
28	9.0	8.5	8.5	14.0	12.0	13.0	12.0	---	---	10.0	9.0	9.5
29	9.5	8.0	9.0	14.0	11.5	13.0	12.5	11.0	11.5	10.0	9.0	9.5
30	10.0	8.5	9.0	14.0	12.0	13.0	12.0	11.0	11.5	10.5	9.5	10.0
31	---	---	---	14.0	---	---	12.0	10.5	11.5	---	---	---
MONTH	10.0	6.5	8.2	---	---	---	13.5	---	---	12.0	8.0	9.8

## SKOKOMISH RIVER BASIN

113

12058800 NORTH FORK SKOKOMISH RIVER BELOW LOWER CUSHMAN DAM, NEAR POTLATCH, WA

LOCATION.--Lat 47°23'27", long 123°12'30", in SE 1/4 SE 1/4 sec.17, T.22 N., R.4 W., Mason County, Hydrologic Unit 17110017, on right bank 1.2 mi downstream from Lower Cushman Dam (Cushman Dam No. 2), 2.8 mi northwest of Potlatch, and at mile 16.5.

DRAINAGE AREA.--102 mi<sup>2</sup>, approximately, includes 99 mi<sup>2</sup> upstream from Cushman Dam No. 2 which is noncontributing except during spillage.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1988 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 230 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by Lower Cushman Dam (Cushman Dam No. 2) 1.2 mi upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--8 years (water years 1989-96), 50.1 ft<sup>3</sup>/s, 36,280 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,680 ft<sup>3</sup>/s Dec. 19, 1995, gage height, 10.97 ft, from rating curve extended above 570 ft<sup>3</sup>/s; minimum discharge, 4.7 ft<sup>3</sup>/s June 13-15, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,680 ft<sup>3</sup>/s, Dec. 19, gage height, 10.97 ft, from rating curve extended above 570 ft<sup>3</sup>/s; minimum discharge, 30 ft<sup>3</sup>/s, July 27, 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	37	38	43	46	44	46	47	41	39	39	34	35
2	37	38	42	46	44	45	47	41	39	39	34	35
3	37	38	41	47	45	46	47	41	39	37	34	35
4	37	38	42	46	46	45	47	41	39	34	34	34
5	36	37	41	45	51	44	46	40	39	34	e34	35
6	37	38	40	49	56	44	47	40	39	34	e34	35
7	36	41	40	54	54	45	46	40	39	34	e34	35
8	36	54	39	49	58	44	47	40	39	34	e34	34
9	38	43	40	48	51	45	46	40	39	34	e34	35
10	40	42	45	47	49	45	46	40	39	34	e34	35
11	39	47	51	47	48	45	47	40	38	34	e34	35
12	38	43	454	46	47	45	48	40	39	34	e34	35
13	38	41	1540	46	46	45	47	40	39	34	e34	35
14	37	40	2610	48	46	45	47	39	39	34	35	35
15	38	40	2670	51	46	44	47	39	39	34	35	35
16	38	39	2890	49	46	45	48	39	39	34	35	35
17	40	40	3530	48	47	44	48	39	39	34	35	35
18	39	40	3550	47	49	44	48	40	39	34	35	35
19	38	40	3570	47	49	44	45	40	39	34	35	35
20	38	39	3530	48	48	45	43	40	39	34	35	35
21	38	39	1750	49	48	44	43	40	39	34	35	35
22	38	39	47	48	48	44	45	40	38	34	35	35
23	38	45	47	47	48	44	56	40	39	34	35	35
24	38	44	46	47	46	45	473	40	39	34	34	35
25	39	43	46	47	46	44	970	39	39	34	34	33
26	39	42	46	46	47	47	826	39	39	34	34	32
27	39	43	46	46	46	47	49	39	39	31	34	34
28	38	44	46	45	46	47	43	39	39	31	34	35
29	38	54	48	45	46	47	42	39	39	34	34	35
30	38	46	48	45	---	47	41	39	39	33	35	35
31	38	---	48	45	---	47	---	39	---	34	35	---
TOTAL	1175	1255	27026	1464	1391	1398	3522	1233	1168	1060	1066	1042
MEAN	37.9	41.8	872	47.2	48.0	45.1	117	39.8	38.9	34.2	34.4	34.7
MAX	40	54	3570	54	58	47	970	41	39	39	35	35
MIN	36	37	39	45	44	44	41	39	38	31	34	32
AC-FT	2330	2490	53610	2900	2760	2770	6990	2450	2320	2100	2110	2070

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1996, BY WATER YEAR (WY)

	1988	1989	1990	1991	1992	1993	1994	1995	1996	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	35.5	44.7	147	39.7	56.7	36.5	44.1	33.0	36.6	34.6	44.6	43.1						
MAX	38.9	95.4	872	52.8	183	45.1	117	39.8	52.3	41.9	131	99.3						
(WY)	1994	1991	1996	1992	1996	1996	1996	1993	1991	1991	1991	1990						
MIN	33.0	33.6	32.4	33.9	30.7	30.4	31.3	29.2	30.1	29.6	28.4	31.5						
(WY)	1990	1990	1989	1991	1993	1993	1993	1989	1989	1988	1988	1989						

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1988 - 1996

ANNUAL TOTAL	39336	42800		
ANNUAL MEAN	108	117		
HIGHEST ANNUAL MEAN			50.1	
LOWEST ANNUAL MEAN			117	1996
HIGHEST DAILY MEAN	3570	Dec 19	3570	Dec 19 1995
LOWEST DAILY MEAN	31	May 11	31	Jul 27
ANNUAL SEVEN-DAY MINIMUM	32	May 7	33	Jul 24
ANNUAL RUNOFF (AC-FT)	78020		84890	
10 PERCENT EXCEEDS	45		48	
50 PERCENT EXCEEDS	36		40	
90 PERCENT EXCEEDS	33		34	

e Estimated

12058800 NORTH FORK SKOKOMISH RIVER BELOW LOWER CUSHMAN DAM, NEAR POTLATCH, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: May 1989 to August 1990, December 1990 to April 1991, August 1993 to current year.

INSTRUMENTATION.--Temperature recorder.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum recorded, 13.0°C July 4, 5, Oct. 6, 8-10, 1989; minimum, 3.5°C Feb. 15, 1995.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 11.5°C June 15, Aug. 13-15, 18-24; minimum, 4.0°C Feb. 22.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	9.5	8.5	9.0	9.0	8.5	8.5	9.0	8.5	9.0	7.5	7.0	7.0
2	10.0	9.0	9.5	9.0	8.0	8.5	8.5	8.0	8.5	7.5	7.0	7.5
3	9.5	9.0	9.5	9.0	8.5	8.5	8.5	8.0	8.5	7.5	7.0	7.0
4	9.5	8.5	9.0	9.0	8.5	9.0	8.0	8.0	8.0	7.0	6.5	6.5
5	9.5	8.5	9.0	9.5	8.5	9.0	8.0	7.5	7.5	6.5	6.5	6.5
6	9.5	9.0	9.0	9.0	8.5	9.0	8.0	7.0	7.5	7.0	6.5	7.0
7	9.5	9.0	9.0	10.0	9.0	9.5	7.5	7.0	7.5	7.5	7.0	7.5
8	9.5	9.0	9.5	10.0	9.0	9.5	7.5	7.5	7.5	7.5	7.0	7.0
9	9.5	9.0	9.0	9.0	8.5	9.0	7.5	7.5	7.5	7.5	7.0	7.0
10	9.5	9.5	9.5	9.0	8.5	8.5	8.0	7.5	8.0	7.0	7.0	7.0
11	9.5	9.0	9.5	9.5	9.0	9.0	8.5	8.0	8.0	7.0	6.5	7.0
12	9.5	8.5	9.0	9.0	9.0	9.0	8.5	8.0	8.0	7.0	6.5	6.5
13	9.5	9.0	9.0	9.5	9.0	9.0	8.5	8.0	8.0	7.0	6.5	7.0
14	9.5	9.0	9.5	9.5	9.0	9.0	8.0	8.0	8.0	7.0	7.0	7.0
15	9.5	9.0	9.5	9.5	9.0	9.0	8.0	8.0	8.0	7.0	7.0	7.0
16	10.0	9.5	9.5	9.0	9.0	9.0	8.0	8.0	8.0	7.0	6.5	6.5
17	9.5	9.0	9.5	9.5	9.0	9.0	8.0	8.0	8.0	6.5	6.5	6.5
18	9.5	9.0	9.0	9.5	8.5	9.0	8.0	8.0	8.0	6.5	5.5	6.0
19	9.5	8.5	9.0	9.0	8.5	8.5	8.0	8.0	8.0	6.5	5.5	6.0
20	9.5	9.0	9.5	9.0	8.5	8.5	8.0	8.0	8.0	6.0	5.5	6.0
21	9.5	9.0	9.0	9.0	8.5	9.0	8.0	7.5	8.0	6.0	6.0	6.0
22	9.5	9.0	9.0	9.5	9.0	9.0	7.5	7.0	7.5	6.0	5.5	6.0
23	9.5	9.0	9.0	9.5	9.0	9.5	7.0	7.0	7.0	6.0	6.0	6.0
24	9.5	8.5	9.0	9.5	9.0	9.0	7.0	6.5	7.0	6.0	6.0	6.0
25	9.5	9.0	9.0	9.0	8.5	9.0	7.0	6.5	6.5	6.0	5.5	6.0
26	9.5	9.0	9.0	9.0	8.5	8.5	7.0	6.5	6.5	6.0	5.5	5.5
27	9.5	9.0	9.0	8.5	8.5	8.5	7.0	7.0	7.0	6.0	5.5	5.5
28	9.5	9.0	9.0	9.5	8.5	9.0	7.0	7.0	7.0	5.5	5.0	5.5
29	9.0	8.5	9.0	9.5	9.0	9.5	7.5	7.0	7.0	5.5	4.5	5.0
30	9.0	8.5	8.5	9.0	9.0	9.0	7.5	7.0	7.5	5.0	4.5	5.0
31	9.0	8.5	8.5	---	---	---	7.5	7.0	7.0	5.0	4.5	5.0
MONTH	10.0	8.5	9.1	10.0	8.0	8.9	9.0	6.5	7.7	7.5	4.5	6.4

## 115

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	5.0	4.5	5.0	5.5	4.5	4.5	6.5	6.0	6.5	8.0	6.5	7.0
2	5.0	4.5	4.5	5.5	4.5	5.0	6.5	5.5	6.0	7.5	6.5	7.0
3	5.0	4.5	4.5	5.5	5.0	5.0	7.0	5.5	6.0	7.5	6.5	7.0
4	5.5	5.0	5.0	5.5	5.0	5.5	7.0	6.0	6.5	8.0	6.5	7.0
5	5.5	5.0	5.5	5.5	5.0	5.0	7.0	6.0	6.5	8.0	6.5	7.0
6	5.5	5.5	5.5	5.5	5.0	5.0	7.0	6.5	6.5	8.0	6.5	7.0
7	6.0	5.5	6.0	5.5	5.0	5.5	8.0	6.5	7.0	8.0	6.5	7.0
8	6.5	6.0	6.0	6.0	5.5	5.5	7.5	6.5	7.0	7.5	6.5	7.0
9	6.0	5.5	6.0	6.0	5.5	5.5	7.5	6.5	7.0	7.5	6.5	7.0
10	6.0	5.5	5.5	6.0	5.5	5.5	7.5	6.5	7.0	8.0	6.5	7.0
11	6.0	5.0	5.5	6.0	5.5	5.5	7.0	6.5	6.5	7.5	7.0	7.5
12	6.0	5.0	5.5	6.0	5.5	5.5	7.5	6.5	6.5	8.0	7.0	7.5
13	6.0	5.0	5.5	6.0	5.0	5.5	7.0	6.5	6.5	8.0	7.5	7.5
14	6.0	5.5	5.5	6.5	5.0	5.5	7.5	6.5	7.0	8.0	7.5	7.5
15	6.0	5.5	5.5	6.5	5.5	6.0	7.5	7.0	7.0	7.5	7.0	7.5
16	6.0	5.5	5.5	6.0	5.5	5.5	7.0	6.5	6.5	8.5	7.0	7.5
17	6.0	6.0	6.0	6.5	5.5	6.0	6.5	6.5	6.5	7.5	7.5	7.5
18	6.0	6.0	6.0	6.5	5.5	6.0	6.5	6.0	6.5	8.0	7.5	7.5
19	6.0	6.0	6.0	6.5	5.5	6.0	6.5	6.5	6.5	8.0	7.0	7.5
20	6.0	5.5	5.5	6.5	5.5	6.0	7.0	6.0	6.5	8.0	7.0	7.5
21	5.5	5.0	5.5	6.5	5.5	6.0	7.0	6.0	6.5	7.5	7.0	7.5
22	5.5	4.0	5.0	6.0	6.0	6.0	7.0	6.5	6.5	8.5	7.0	8.0
23	5.0	5.0	5.0	7.0	6.0	6.0	7.5	6.5	7.0	8.5	7.5	8.0
24	5.0	4.5	5.0	7.0	5.5	6.0	7.5	6.5	7.0	9.0	7.5	8.0
25	5.0	4.5	5.0	6.5	5.5	6.0	7.0	6.5	7.0	9.0	7.5	8.0
26	5.0	4.5	4.5	6.5	5.5	6.0	7.5	7.0	7.0	8.5	7.5	8.0
27	5.0	4.5	4.5	6.5	5.5	6.0	8.0	7.0	7.5	9.0	7.5	8.0
28	5.0	4.5	4.5	6.5	5.5	6.0	7.5	7.0	7.5	8.0	7.5	8.0
29	5.0	4.5	4.5	7.0	5.5	6.0	8.0	7.0	7.5	8.5	7.5	8.0
30	---	---	---	6.5	5.5	6.0	7.5	7.0	7.0	8.0	7.5	7.5
31	---	---	---	6.5	6.0	6.0	---	---	---	9.0	7.0	7.5
MONTH	6.5	4.0	5.3	7.0	4.5	5.7	8.0	5.5	6.7	9.0	6.5	7.5
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	8.5	7.5	8.0	10.0	8.5	9.0	11.0	9.5	10.0	9.5	8.5	9.0
2	9.5	8.0	8.5	10.0	8.5	9.0	11.0	9.5	10.0	10.0	8.5	9.0
3	9.5	8.0	8.5	9.5	8.5	9.0	10.5	9.5	10.0	9.5	8.5	9.0
4	9.5	8.5	8.5	9.5	8.5	9.0	10.5	9.5	10.0	9.0	8.5	8.5
5	10.0	8.5	9.0	9.5	8.5	8.5	10.0	9.5	9.5	9.0	8.0	8.5
6	9.5	8.5	9.0	10.0	8.0	9.0	10.5	9.0	9.5	8.5	8.0	8.5
7	10.0	9.0	9.5	10.0	8.5	9.0	10.5	9.0	9.5	9.0	8.5	8.5
8	10.5	8.5	9.5	10.5	8.5	9.0	10.5	9.0	9.5	9.5	8.5	8.5
9	10.0	9.0	9.5	9.5	9.0	9.0	10.5	9.5	10.0	9.0	8.5	8.5
10	10.0	9.0	9.5	10.0	8.5	9.0	11.0	9.5	10.0	9.5	8.0	8.5
11	10.5	9.0	9.5	10.5	8.5	9.0	11.0	9.5	10.0	9.5	8.5	8.5
12	11.0	9.0	10.0	10.5	9.0	9.5	11.0	9.5	10.0	9.5	8.5	9.0
13	11.0	9.5	10.0	10.5	9.0	9.5	11.5	9.5	10.5	9.0	8.5	8.5
14	11.0	9.5	10.0	10.5	9.0	9.5	11.5	10.0	10.5	9.0	8.5	8.5
15	11.5	9.5	10.5	10.5	9.0	9.5	11.5	10.0	10.5	9.0	8.5	8.5
16	10.5	10.0	10.0	10.5	9.0	9.5	11.0	10.5	10.5	9.0	8.0	8.5
17	11.0	10.0	10.0	9.5	9.0	9.0	11.0	10.5	10.5	9.0	8.5	8.5
18	10.5	9.5	10.0	9.0	9.0	9.0	11.5	10.5	10.5	9.0	8.5	8.5
19	10.5	9.0	9.5	9.5	8.5	9.0	11.5	10.5	11.0	9.0	8.5	9.0
20	10.5	8.5	9.0	9.0	8.5	8.5	11.5	11.0	11.0	9.0	7.0	8.5
21	10.0	8.5	9.0	10.0	8.5	9.0	11.5	10.5	11.0	9.0	6.5	7.0
22	9.5	8.5	9.0	10.0	8.5	9.0	11.5	10.5	10.5	9.0	7.0	8.0
23	9.5	8.5	9.0	10.0	8.5	9.0	11.5	10.0	10.5	9.0	7.5	8.5
24	9.0	8.5	9.0	10.5	8.5	9.0	11.5	10.0	10.5	9.5	8.5	9.0
25	9.5	8.5	8.5	10.5	8.5	9.5	11.0	10.0	10.5	9.5	8.5	9.0
26	9.5	8.0	8.5	10.5	9.0	9.5	10.5	10.0	10.5	9.5	8.5	9.0
27	9.5	8.0	8.5	10.5	9.0	9.5	11.0	10.0	10.0	9.5	8.5	9.0
28	9.5	8.5	8.5	10.0	9.0	9.5	10.5	9.5	10.0	9.5	9.0	9.0
29	9.5	8.5	8.5	10.5	9.0	9.5	10.5	9.5	9.5	9.5	9.0	9.0
30	10.0	8.0	9.0	10.5	9.0	9.5	9.5	9.0	9.5	9.5	9.0	9.0
31	---	---	---	10.5	9.0	9.5	9.5	9.0	9.0	---	---	---
MONTH	11.5	7.5	9.2	10.5	8.0	9.2	11.5	9.0	10.1	10.0	6.5	8.6
YEAR	11.5	4.0	7.9									

## SKOKOMISH RIVER BASIN

12059500 NORTH FORK SKOKOMISH RIVER NEAR POTLATCH, WA

LOCATION.--Lat 47°19'42", long 123°14'33", in NE 1/4 NW 1/4 sec.7, T.21 N., R.4 W., Mason County, Hydrologic Unit 17110017, on left bank 1.1 mi upstream from South Fork Skokomish River, 5.4 mi southwest of Potlatch, 7.2 mi downstream from city of Tacoma's Cushman Dam No. 2, and at mile 10.1.

DRAINAGE AREA.--117 mi<sup>2</sup>, includes 99 mi<sup>2</sup> upstream from Cushman Dam No. 2 which is noncontributing except during spillage.

PERIOD OF RECORD.--March 1944 to November 1949 (destroyed by flood of Nov. 27, 1949), March 1950 to current year.

GAGE.--Water-stage recorder. Datum of gage is 63.49 ft above sea level (levels by city of Tacoma). Prior to Nov. 27, 1949, and Mar. 18 to May 9, 1950, water-stage recorder at site 200 ft downstream at present datum.

REMARKS.--No estimated daily discharges. Records good. Entire flow of river normally diverted at Cushman Dam No. 2 to supply powerplant which discharges directly into sea (Hood Canal). Main portion of McTaggart Creek is diverted through Deer Meadow Creek into Cushman Reservoir No. 2 and may bypass this station. Flow regulated by Lake Cushman (station 12057500) and by pondage in Cushman Reservoir No. 2, from which spill and releases are infrequent. Water temperatures March 1965 to September 1982.

AVERAGE DISCHARGE.--46 years (water years 1951-96), 113 ft<sup>3</sup>/s, 81,820 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,740 ft<sup>3</sup>/s Nov. 4, 1955, gage height, 10.45 ft; minimum recorded discharge, 1.3 ft<sup>3</sup>/s Sept. 5, 14, 16, 1951.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,300 ft<sup>3</sup>/s Dec. 14, gage height, 8.09 ft; minimum discharge, 32 ft<sup>3</sup>/s Oct. 5-9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	65	392	167	100	125	100	138	75	54	40	40
2	40	62	304	158	96	120	94	127	73	53	44	39
3	37	59	270	152	96	121	91	121	71	52	41	40
4	35	59	283	135	110	119	89	114	69	48	41	39
5	34	59	236	132	334	117	88	108	68	48	41	39
6	34	58	203	251	710	113	89	102	67	47	41	39
7	33	169	181	535	664	115	86	99	67	47	41	40
8	33	982	162	341	879	113	83	95	66	46	41	39
9	39	409	185	239	498	114	83	92	65	46	40	38
10	143	290	402	191	312	125	82	90	64	46	39	38
11	141	590	935	166	232	123	87	88	63	45	40	38
12	99	323	960	146	191	118	113	87	63	44	40	39
13	76	252	2120	142	168	114	103	94	62	43	39	39
14	64	206	3790	191	151	111	97	87	60	43	39	45
15	58	186	3460	363	141	108	99	84	59	43	39	46
16	65	163	3190	304	132	104	114	82	60	43	39	44
17	154	161	3880	221	168	102	133	92	60	43	39	40
18	137	193	3910	184	254	100	141	124	60	47	39	40
19	102	164	3830	169	251	100	148	118	58	48	38	40
20	88	144	3720	175	249	99	144	108	57	44	39	39
21	81	132	2160	215	229	96	132	103	57	43	39	38
22	72	144	211	192	207	97	182	98	56	42	39	39
23	67	379	158	177	196	94	781	93	58	41	38	39
24	62	433	138	164	180	93	895	90	58	42	38	39
25	95	406	127	149	165	90	1230	86	57	42	37	38
26	126	301	117	137	155	90	1120	85	56	42	38	35
27	101	293	111	129	143	92	282	84	55	39	38	37
28	88	351	124	123	134	90	200	82	54	38	38	38
29	80	1250	234	114	127	89	170	80	54	40	38	39
30	73	665	227	109	--	87	152	77	54	40	41	38
31	68	--	202	104	--	91	--	77	--	40	40	--
TOTAL	2363	8948	36222	5975	7272	3270	7208	3005	1846	1379	1224	1181
MEAN	76.2	298	1168	193	251	105	240	96.9	61.5	44.5	39.5	39.4
MAX	154	1250	3910	535	879	125	1230	138	75	54	44	46
MIN	33	58	111	104	96	87	82	77	54	38	37	35
AC-FT	4690	17750	71850	11850	14420	6490	14300	5960	3660	2740	2430	2340

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1950 - 1996, BY WATER YEAR (WY)

	MEAN	67.9	193	270	232	214	144	92.3	48.4	36.2	23.0	20.7	18.5
MAX	943	1005	1262	938	982	570	240	136	300	102	155	74.9	
(WY)	1952	1976	1951	1974	1951	1961	1959	1959	1969	1971	1991	1990	
MIN	5.38	12.6	32.9	41.3	63.6	58.7	32.7	22.2	10.3	5.30	2.83	4.93	
(WY)	1953	1977	1977	1979	1988	1981	1973	1964	1951	1951	1951	1952	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1950 - 1996

ANNUAL TOTAL	82407	79893											
ANNUAL MEAN	226	218											
HIGHEST ANNUAL MEAN										113			
LOWEST ANNUAL MEAN										311			1951
HIGHEST DAILY MEAN	3910	Dec 18	3910	Dec 18	6630	Nov 4	1955			36.6			1977
LOWEST DAILY MEAN	32	Sep 15	33	Oct 7	1.4	Sep 14	1951						
ANNUAL SEVEN-DAY MINIMUM	32	Sep 13	35	Oct 3	1.8	Sep 12	1951						
ANNUAL RUNOFF (AC-FT)	163500		158500		81820								
10 PERCENT EXCEEDS	353		306		231								
50 PERCENT EXCEEDS	91		93		49								
90 PERCENT EXCEEDS	34		39		10								



## SKOKOMISH RIVER BASIN

117

12060500 SOUTH FORK SKOKOMISH RIVER NEAR UNION, WA

LOCATION.--Lat 47°20'16", long 123°16'44", in SW 1/4 NE 1/4 sec.2, T.21 N., R.5 W., Mason County, Hydrologic Unit 17110017, on right bank 3.0 mi upstream from Vance Creek, 2.3 mi upstream from confluence with North Fork, and 8.5 mi west of Union.

DRAINAGE AREA.--76.3 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1931 to September 1984, October 1995 to September 1996.

GAGE.--Water-stage recorder. Datum of gage is 103.35 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--54 years (water years 1932-84, 1996), 744 ft<sup>3</sup>/s, 132.45 in/yr, 538,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,600 ft<sup>3</sup>/s Jan. 22, 1935, Nov. 26, 1949, gage height, 11.0 ft, from rating curve extended above 11,000 ft<sup>3</sup>/s; minimum discharge, 62 ft<sup>3</sup>/s Sept. 18, 1938; minimum gage height, 1.06 ft Oct. 3, 1965.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	0915	*11,400	*6.63	Dec. 13	0100	7,620	5.64
Nov. 11	0445	6,810	5.37	Feb. 5	2130	8,310	5.85
Nov. 23	1630	6,750	5.35	Feb. 6	2400	6,370	5.22
Nov. 29	1315	9,920	6.28	Feb. 8	1345	6,440	5.24
Dec. 11	0630	7,690	5.66	Apr. 23	1815	10,400	6.37

Minimum discharge, 82 ft<sup>3</sup>/s Aug. 29, 30, Sept. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e240	272	1860	1120	414	506	420	802	365	176	116	97
2	e340	248	1490	985	392	482	516	721	355	171	132	89
3	e295	227	1300	1200	383	507	406	664	348	168	124	91
4	e250	218	1300	938	534	583	345	608	341	166	116	88
5	e192	225	1080	823	3210	607	309	561	327	162	116	87
6	e170	232	913	2120	4750	548	305	525	311	158	113	87
7	e160	1640	791	4230	4610	537	342	492	299	154	112	88
8	e175	8020	686	2190	5400	594	320	462	288	149	109	93
9	e220	2150	768	1510	2800	687	299	433	277	149	105	108
10	e1100	1360	3500	1280	1670	1210	293	408	270	148	105	94
11	e1400	3730	5540	1220	1270	1210	297	392	266	144	102	88
12	e900	1680	4140	1030	1060	878	678	386	259	140	102	85
13	e570	1380	5580	922	950	717	711	524	250	136	100	89
14	e450	1320	4290	1830	866	614	611	464	244	133	98	267
15	e390	1210	3390	3660	792	543	727	417	240	132	98	439
16	e640	1090	2160	2400	737	481	1080	384	234	131	95	364
17	e1500	1290	1870	1560	1270	455	1400	487	230	131	95	242
18	1170	2530	2550	1260	2890	409	1240	1360	230	180	96	192
19	741	1380	1830	1090	2260	390	1240	1520	221	295	95	171
20	567	1030	1410	986	2140	397	1210	1090	212	254	97	153
21	473	862	1170	933	1820	368	962	863	210	203	95	141
22	390	939	1000	841	1350	350	1320	748	206	177	92	133
23	339	3800	880	794	1120	329	5850	660	217	161	91	126
24	298	2820	783	731	949	311	3650	596	213	149	89	119
25	519	2690	699	665	831	290	2260	553	209	142	89	114
26	1070	1760	627	611	740	276	2140	523	200	135	89	110
27	653	1530	578	572	670	271	1540	485	191	131	88	107
28	492	2280	642	541	602	256	1230	456	186	128	85	102
29	401	7460	1590	497	551	244	1020	432	182	127	85	101
30	344	3130	1560	458	---	233	892	404	179	123	93	98
31	305	---	1510	434	---	237	---	380	---	120	102	---
TOTAL	16754	58503	57487	39431	47031	15520	33613	18800	7560	4873	3124	4163
MEAN	540	1950	1854	1272	1622	501	1120	606	252	157	101	139
MAX	1500	8020	5580	4230	5400	1210	5850	1520	365	295	132	439
MIN	160	218	578	434	383	233	293	380	179	120	85	85
AC-FT	33230	116000	114000	78210	93290	30780	66670	37290	15000	9670	6200	8260
CFSM	7.08	25.6	24.3	16.7	21.3	6.56	14.7	7.95	3.30	2.06	1.32	1.82
IN.	8.17	28.52	28.03	19.22	22.93	7.57	16.39	9.17	3.69	2.38	1.52	2.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1996, BY WATER YEAR (WY)

MEAN	533	1158	1501	1313	1215	925	764	603	383	223	138	195
MAX	1727	2952	3330	4030	2594	2138	1397	1259	909	479	262	795
(WY)	1968	1984	1967	1953	1961	1972	1937	1948	1956	1974	1975	1978
MIN	85.3	76.8	538	243	414	446	343	298	161	105	80.1	69.0
(WY)	1937	1937	1979	1949	1956	1942	1973	1947	1934	1944	1940	1938

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1931 - 1996

ANNUAL TOTAL	306859	
ANNUAL MEAN	838	744
HIGHEST ANNUAL MEAN		1041
LOWEST ANNUAL MEAN		424
HIGHEST DAILY MEAN	8020	15800
LOWEST DAILY MEAN	85	63
ANNUAL SEVEN-DAY MINIMUM	88	64
ANNUAL RUNOFF (AC-FT)	608700	538900
ANNUAL RUNOFF (CFSM)	11.0	9.75
ANNUAL RUNOFF (INCHES)	149.61	132.45
10 PERCENT EXCEEDS	1860	1620
50 PERCENT EXCEEDS	455	461
90 PERCENT EXCEEDS	104	112

e Estimated

## SKOKOMISH RIVER BASIN

12061500 SKOKOMISH RIVER NEAR POTLATCH, WA

LOCATION.--Lat 47°18'36", long 123°10'33", in SE 1/4 NW 1/4 sec.15, T.21 N., R.4 W., Mason County, Hydrologic Unit 17110017, on upstream side of right pier of bridge on U.S. Highway 101, 3.7 mi downstream from confluence of North and South Forks, 4.7 mi southwest of Potlatch, and at mile 5.3.

DRAINAGE AREA.--227 mi<sup>2</sup>, includes 99 mi<sup>2</sup> upstream from Cushman Dam No. 2 which is noncontributing except during spillage.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1943 to current year.

REVISED RECORDS.--WSP 1716: 1950(M), 1956. WSP 1932: Drainage area. WDR WA-72: 1968(M), 1971(M). WDR WA-75: 1974.

GAGE.--Water-stage recorder Datum of gage is 10.67 ft above sea level. Prior to May 27, 1964, water-stage recorders or nonrecording gage at several sites about 0.6 mi upstream at different datums. Supplementary water-stage recorder on right bank at site 0.6 mi upstream at datum 16.47 ft above sea level used Nov. 16 to Dec. 10, 1964, June 11 to July 7, and Nov. 2-24, 1965.

REMARKS.--Records fair except for those above 8,000 ft<sup>3</sup>/s, which are poor. Above stages of about 15 ft, the river flows out of the main channel upstream from the gage into three channels that bypass the gage. Flow partly regulated by Lake Cushman and Cushman Reservoir No. 2. In normal years, practically entire flow of North Fork is diverted at Cushman Dam No. 2 and is discharged into Puget Sound through Cushman powerplant No. 2. Chemical analyses August 1960 to September 1961, October 1961 to September 1970 (partial-record station), October 1971 to September 1974. Water temperatures May 1955 to September 1962, October 1963 to September 1982. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--53 years (water years 1944-96), 1,193 ft<sup>3</sup>/s, 126.68 in/yr, 864,600 acre-ft.yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,600 ft<sup>3</sup>/s, Nov. 23, 1990, gage height, 16.80 ft (floodmark), from rating curve extended above 14,000 ft<sup>3</sup>/s; maximum gage height, 17.48 ft, Dec. 20, 1994; minimum discharge, 99 ft<sup>3</sup>/s, Oct. 27, 28, Nov. 6-9, 1987.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of December 1933 reached an elevation of 30.8 ft above sea level at site on left bank 150 ft upstream from old highway bridge, discharge, 18,600 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, unknown, Nov. 29, gage height, 16.68 ft; minimum discharge, 192 ft<sup>3</sup>/s Sept. 12, 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	458	480	4170	1700	536	884	539	1100	509	294	234	207
2	409	450	2900	1430	508	847	621	970	497	290	243	201
3	409	428	2250	1690	486	859	517	883	482	288	238	203
4	369	415	2260	1310	615	926	473	817	471	285	234	202
5	343	418	1790	1140	3690	959	440	759	459	282	231	199
6	325	422	1470	2750	9990	914	435	718	445	278	231	199
7	312	1700	1260	8330	10100	906	458	683	432	273	227	199
8	307	13900	1100	4670	12800	968	437	655	418	269	223	199
9	317	4810	1160	2580	6530	1120	408	626	408	266	220	205
10	2610	2500	5330	1840	3560	1530	397	602	399	266	219	203
11	2660	7580	12700	1730	2310	1620	384	590	395	261	214	198
12	1740	3240	8420	1500	1780	1390	641	586	388	257	213	194
13	1010	2380	15300	1370	1510	1190	708	721	378	254	212	195
14	739	2190	15400	2820	1350	1060	599	654	370	251	210	269
15	605	1920	13100	6290	1240	964	e1100	595	364	249	208	428
16	766	1740	7550	4710	1150	873	e2000	561	358	247	208	402
17	1950	1760	7630	2640	1760	801	e1700	632	354	247	209	315
18	1780	4010	10900	1890	5200	747	1050	1660	358	267	209	273
19	1060	2140	7930	1580	4510	725	1020	2080	346	354	206	258
20	828	1560	6820	1450	4150	715	995	1490	336	342	207	246
21	716	1290	4990	1480	3580	661	768	1180	332	303	208	238
22	618	1340	1690	1280	2260	638	1160	1010	328	282	205	232
23	555	7050	1310	1190	1910	600	8840	886	342	268	202	226
24	509	6010	1130	1090	1580	569	9320	797	338	257	201	223
25	645	5510	1010	964	1360	532	5660	733	332	251	199	219
26	1480	3330	928	867	1210	512	5270	689	323	249	199	216
27	935	2680	867	795	1110	503	2840	646	315	244	199	213
28	743	3650	923	740	1010	471	1970	615	307	239	198	213
29	632	17700	2420	671	937	455	1520	587	303	238	195	211
30	566	8870	2570	610	--	432	1270	554	298	235	202	208
31	517	--	2370	570	--	429	--	529	--	235	210	--
TOTAL	26913	111473	149648	63677	88732	25800	53540	25608	11385	8321	6614	6994
MEAN	868	3716	4827	2054	3060	832	1785	826	380	268	213	233
MAX	2660	17700	15400	8330	12800	1620	9320	2080	509	354	243	428
MIN	307	415	867	570	486	429	384	529	298	235	195	194
AC-FT	53380	221100	296800	126300	176000	51170	106200	50790	22580	16500	13120	13870
CFSM	6.78	29.0	37.7	16.0	23.9	6.50	13.9	6.45	2.96	2.10	1.67	1.82
IN.	7.82	32.40	43.49	18.51	25.79	7.50	15.56	7.44	3.31	2.42	1.92	2.00

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1996, BY WATER YEAR (WY)

MEAN	794	1905	2357	2113	2127	1571	1216	847	555	346	246	296
MAX	2570	5582	5169	5540	4067	3432	2005	1675	1213	783	690	1039
(WY)	1976	1991	1995	1953	1995	1972	1969	1948	1956	1974	1991	1978
MIN	115	286	772	524	709	723	487	473	261	189	144	147
(WY)	1988	1994	1986	1949	1985	1992	1973	1980	1992	1944	1944	1987

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1943 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	655003		578705			
ANNUAL MEAN	1795		1581		1193	
HIGHEST ANNUAL MEAN					1756	1974
LOWEST ANNUAL MEAN					635	1977
HIGHEST DAILY MEAN	25000	Feb 19	17700	Nov 29	30000	Dec 20 1994
LOWEST DAILY MEAN	175	Sep 24	194	Sep 12	99	Nov 7 1987
ANNUAL SEVEN-DAY MINIMUM	181	Sep 20	199	Aug 23	105	Oct 22 1987
ANNUAL RUNOFF (AC-FT)	1299000		1148000		864600	
ANNUAL RUNOFF (CFSM)	14.0		12.4		9.32	
ANNUAL RUNOFF (INCHES)	190.36		168.19		126.68	
10 PERCENT EXCEEDS	4540		4050		2580	
50 PERCENT EXCEEDS	746		640		721	
90 PERCENT EXCEEDS	221		213		200	

e Estimated

12061500 SKOKOMISH RIVER NEAR POTLATCH, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: July to September 1996.

WATER TEMPERATURE: July to September 1996.

INSTRUMENTATION.--Water-quality monitor since February 1996. Electronic data logger with fifteen-minute recording interval.

REMARKS.--Instantaneous temperature and specific conductance values for February 1996 through June 1996 are available in the Tacoma field office.

EXTREMES FOR PERIOD JULY TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 87 microsiemens Sept. 6; minimum recorded, 71 microsiemens Sept. 15, 16.

WATER TEMPERATURE: Maximum recorded, 15.5°C July 13, 14, 23-26; minimum recorded, 8.5°C Sept. 23.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, JULY TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	---	---	---	80	78	79	82	79	81
2	---	---	---	---	---	---	81	77	78	82	79	80
3	---	---	---	---	---	---	80	78	79	82	78	80
4	---	---	---	---	---	---	80	78	79	82	78	80
5	---	---	---	77	74	75	81	78	80	83	79	81
6	---	---	---	77	75	76	81	79	80	87	80	82
7	---	---	---	77	74	76	81	79	80	84	80	82
8	---	---	---	78	75	76	81	78	80	83	80	82
9	---	---	---	78	75	76	82	79	80	84	79	81
10	---	---	---	78	75	77	82	78	80	83	79	81
11	---	---	---	78	76	77	82	77	79	85	79	81
12	---	---	---	78	75	77	81	78	79	84	80	82
13	---	---	---	78	75	76	81	79	80	85	80	82
14	---	---	---	78	75	77	82	79	80	81	73	78
15	---	---	---	78	75	77	82	78	80	76	71	74
16	---	---	---	78	76	77	81	79	80	77	71	74
17	---	---	---	79	75	77	83	79	80	78	75	77
18	---	---	---	79	74	77	83	78	80	79	75	77
19	---	---	---	77	72	74	82	78	80	79	76	78
20	---	---	---	77	73	75	81	78	80	80	77	79
21	---	---	---	78	74	76	82	78	80	81	78	79
22	---	---	---	78	75	77	82	79	80	81	77	79
23	---	---	---	79	76	77	82	78	80	82	78	80
24	---	---	---	79	76	78	83	79	81	82	78	80
25	---	---	---	79	77	78	83	79	80	82	78	80
26	---	---	---	80	78	79	82	78	81	82	79	81
27	---	---	---	80	77	79	81	79	80	82	78	80
28	---	---	---	81	78	79	81	79	80	82	77	80
29	---	---	---	81	78	80	82	78	81	82	79	80
30	---	---	---	81	77	79	83	78	80	83	78	80
31	---	---	---	80	78	79	82	79	81	---	---	---
MONTH	---	---	---	---	---	---	83	77	80	87	71	80

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	---	---	---	14.0	10.5	12.0	13.0	10.5	11.5
2	---	---	---	---	---	---	14.5	11.0	12.0	13.0	10.0	11.5
3	---	---	---	---	---	---	13.5	10.0	11.5	12.5	10.5	11.0
4	---	---	---	---	---	---	14.0	10.5	12.0	12.0	9.5	10.5
5	---	---	---	14.0	10.0	12.0	13.5	10.5	12.0	11.5	10.0	10.5
6	---	---	---	14.5	10.0	12.0	14.0	10.5	12.0	11.5	10.0	10.5
7	---	---	---	15.0	10.0	12.5	14.0	10.0	12.0	12.0	10.0	11.0
8	---	---	---	15.0	10.5	12.5	14.5	10.5	12.0	12.5	10.5	11.5
9	---	---	---	13.5	10.5	12.0	14.5	10.5	12.5	12.5	10.0	11.0
10	---	---	---	14.5	10.0	12.0	14.5	10.5	12.0	12.5	9.5	11.0
11	---	---	---	15.0	10.5	12.5	13.5	10.5	12.0	12.0	10.0	11.0
12	---	---	---	15.0	10.5	12.5	14.0	10.0	12.0	12.0	10.5	11.0
13	---	---	---	15.5	10.5	13.0	14.0	10.0	12.0	11.5	10.0	10.5
14	---	---	---	15.5	11.0	13.0	14.0	10.5	12.0	12.5	10.5	11.0
15	---	---	---	15.0	11.0	13.0	14.0	10.0	12.0	13.0	11.0	11.5
16	---	---	---	14.5	10.5	12.5	12.5	10.5	11.5	12.5	10.5	11.5
17	---	---	---	12.0	10.5	11.5	12.0	10.0	11.0	12.5	10.0	11.0
18	---	---	---	12.0	10.0	11.0	13.0	10.0	11.5	11.0	10.0	10.5
19	---	---	---	13.5	11.0	12.0	12.5	10.0	11.0	11.5	10.5	10.5
20	---	---	---	13.5	11.0	12.0	12.5	10.5	11.0	11.0	10.0	10.5
21	---	---	---	15.0	10.5	12.5	13.0	10.0	11.5	11.0	9.5	10.0
22	---	---	---	15.0	10.5	12.5	13.5	10.0	11.5	11.5	9.0	10.0
23	---	---	---	15.5	11.0	13.0	13.5	10.0	11.5	11.0	8.5	10.0
24	---	---	---	15.5	11.0	13.0	13.5	10.0	11.5	11.5	9.0	10.0
25	---	---	---	15.5	11.0	13.0	12.5	10.0	11.5	11.5	9.0	10.0
26	---	---	---	15.5	11.0	13.0	12.0	10.5	11.0	11.5	9.0	10.0
27	---	---	---	14.5	11.0	12.5	12.5	10.5	11.5	12.0	9.5	10.5
28	---	---	---	13.5	11.0	12.0	13.0	10.5	11.5	12.0	9.5	10.5
29	---	---	---	15.0	10.5	12.5	13.5	10.5	11.5	12.0	10.0	10.5
30	---	---	---	14.5	10.5	12.5	13.0	11.0	12.0	11.5	10.0	11.0
31	---	---	---	14.0	10.5	12.0	12.5	10.5	11.5	---	---	---
MONTH	---	---	---	---	---	---	14.5	10.0	11.7	13.0	8.5	10.7

## BIG BEEF CREEK BASIN

12069550 BIG BEEF CREEK NEAR SEABECK, WA

LOCATION.--Lat 47°38'27", long 122°47'02", in NW 1/4 SE 1/4 sec. 22, T.25 N., R.1 W., Kitsap County, Hydrologic Unit 17110018, on left bank 1.1 mi upstream from county road bridge across Big Beef Harbor, and 1.9 mi east of Seabeck.

DRAINAGE AREA.--13.8 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1969 to October 1981, June 1983 to September 1995 (seasonal records), October 1995 to September 1996.

REVISED RECORDS.--WDR WA-76-1: 1975(M).

GAGE.--Water-stage recorder. Elevation of gage is 40 ft above sea level, from topographic map. Prior to July 7, 1978, at site 110 ft downstream at datum 2.03 ft lower.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by Lake Symington, 4.6 mi upstream. No diversions upstream from station.

AVERAGE DISCHARGE.--13 years (water years 1970-81, 1996), 38.9 ft<sup>3</sup>/s, 38.30 in/yr, 28,180 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 757 ft<sup>3</sup>/s Dec. 7, 1970, gage height, 4.92 ft; maximum gage height, 5.74 ft Jan. 16, 1974, site and datum then in use; minimum discharge, 2.2 ft<sup>3</sup>/s Aug. 12-17, 1990.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 640 ft<sup>3</sup>/s Dec. 11, gage height, 5.57 ft; minimum discharge, 3.8 ft<sup>3</sup>/s several days in August and September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.0	9.6	159	62	39	38	26	56	29	e9.7	e6.0	4.0
2	4.4	8.8	128	56	37	36	29	51	27	e9.4	e5.8	3.8
3	4.4	8.2	117	54	36	35	27	44	25	e9.4	e5.6	8.8
4	4.2	8.4	152	48	46	34	24	38	23	e9.1	e5.4	7.7
5	4.2	8.3	119	43	145	34	23	35	21	e8.9	e5.3	5.7
6	4.3	7.7	93	82	310	32	22	32	20	e8.7	e5.1	4.9
7	4.2	18	77	215	228	31	21	30	19	e8.5	e5.0	4.7
8	4.2	134	65	178	364	30	21	30	18	e8.3	e4.9	4.5
9	4.4	126	65	115	298	30	20	28	17	e8.2	e4.7	4.3
10	13	91	195	84	148	31	20	26	16	e8.0	e4.6	4.3
11	42	158	580	66	98	33	20	24	15	e7.9	e4.4	4.3
12	30	128	513	57	73	32	25	24	e14	e7.8	e4.3	4.4
13	15	99	434	52	59	29	25	28	e14	e7.6	e4.2	4.3
14	10	77	489	53	51	28	23	32	e13	e7.4	e4.2	6.1
15	9.5	62	419	95	46	27	23	30	e13	e7.3	e4.3	8.1
16	9.2	52	236	105	42	26	29	25	e13	e7.2	e4.2	5.9
17	16	50	156	84	52	25	32	31	e13	e7.8	4.1	6.4
18	25	66	181	69	79	25	32	62	e13	e9.8	4.1	6.3
19	17	55	147	66	90	25	30	68	e12	e13	4.0	7.6
20	14	45	114	79	108	24	30	55	e12	e11	4.0	8.1
21	13	38	95	122	97	24	29	50	e12	e9.7	4.0	7.4
22	11	41	79	119	89	24	38	49	e12	e8.9	4.0	6.8
23	9.9	100	66	116	99	24	346	45	e11	e8.4	4.0	6.2
24	9.2	148	57	102	82	24	379	41	e12	e7.9	3.8	5.9
25	12	124	51	85	67	23	218	37	e12	e7.3	3.8	5.5
26	22	95	47	70	57	22	174	35	e11	e7.0	3.8	5.4
27	19	91	44	61	50	22	120	33	e11	e6.6	3.8	5.2
28	15	105	46	55	45	21	89	36	e10	e6.4	3.8	5.3
29	14	196	88	50	41	21	71	34	e10	e6.2	3.8	5.5
30	12	228	89	45	---	20	61	33	e9.8	e6.1	3.8	5.6
31	11	---	76	41	---	21	---	31	---	e5.8	3.9	---
TOTAL	387.1	2378.0	5177	2529	2976	851	2027	1173	457.8	255.3	136.7	173.0
MEAN	12.5	79.3	167	81.6	103	27.5	67.6	37.8	15.3	8.24	4.41	5.77
MAX	42	228	580	215	364	38	379	68	29	13	6.0	8.8
MIN	4.0	7.7	44	41	36	20	20	24	9.8	5.8	3.8	3.8
AC-FT	768	4720	10270	5020	5900	1690	4020	2330	908	506	271	343
CFSM	.90	5.74	12.1	5.91	7.44	1.99	4.90	2.74	1.11	.60	.32	.42
IN.	1.04	6.41	13.96	6.82	8.02	2.29	5.46	3.16	1.23	.69	.37	.47

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1969 - 1996, BY WATER YEAR (WY)

	MEAN	11.5	42.2	98.7	81.0	78.5	67.2	37.4	17.3	9.61	5.51	4.18	5.48
MAX	66.7	136	171	137	130	143	67.6	37.8	15.3	9.60	8.41	21.0	
(WY)	1976	1976	1974	1974	1979	1971	1996	1996	1996	1972	1975	1978	
MIN	3.36	4.23	8.03	9.65	15.0	27.5	11.1	9.32	5.05	3.57	2.48	2.56	
(WY)	1988	1994	1977	1977	1977	1996	1977	1977	1989	1991	1994	1994	

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1969 - 1996

ANNUAL TOTAL	18520.9												
ANNUAL MEAN	50.6									38.9			
HIGHEST ANNUAL MEAN										59.5		1974	
LOWEST ANNUAL MEAN										14.9		1977	
HIGHEST DAILY MEAN	580					Dec 11				658		Jan 16	1974
LOWEST DAILY MEAN	3.8					Aug 24				2.2		Aug 13	1990
ANNUAL SEVEN-DAY MINIMUM	3.8					Aug 24				2.3		Aug 11	1990
ANNUAL RUNOFF (AC-FT)	36740									28180			
ANNUAL RUNOFF (CFSM)	3.67									2.82			
ANNUAL RUNOFF (INCHES)	49.93									38.30			
10 PERCENT EXCEEDS	119									75			
50 PERCENT EXCEEDS	25									8.9			
90 PERCENT EXCEEDS	4.4									3.4			

e Estimated

## DEVILS HOLE BASIN

121

12069600 DEVILS HOLE CREEK AT BANGOR SUBBASE, NEAR BANGOR, WA

LOCATION.--Lat 47°44'15", long 122°43'54", in NW 1/4 NW 1/4 sec.19, T.26 N. R.1 E., Kitsap County, Hydrologic Unit 17110018, Bangor Naval Base, 1.2 mi north of Bangor, at mouth.

DRAINAGE AREA.--2.61 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1994 to April 1996 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 5 ft above sea level, from topographic map.

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

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 161 ft<sup>3</sup>/s Dec. 20, 1994, gage height, 6.26 ft; minimum discharge, 2.3 ft<sup>3</sup>/s Oct. 3-5, 1994, gage height, 3.13 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period October 1995 to April 1996, 78 ft<sup>3</sup>/s Apr. 23, gage height, 5.68 ft; minimum discharge during period October 1995 to April 1996, 3.1 ft<sup>3</sup>/s Oct. 8, 9, Nov. 3, 4, gage height, 3.26 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.2	3.4	4.8	5.6	4.7	5.1	5.9	---	---	---	---	---
2	3.4	3.2	4.3	5.3	4.6	5.0	5.8	---	---	---	---	---
3	3.6	3.1	4.2	5.2	4.5	5.0	4.9	---	---	---	---	---
4	3.4	3.2	7.0	5.0	5.7	5.0	4.5	---	---	---	---	---
5	3.3	3.2	5.7	5.0	12	5.0	4.3	---	---	---	---	---
6	3.2	3.2	4.7	7.4	18	4.8	4.2	---	---	---	---	---
7	3.2	4.2	4.2	12	14	4.7	4.2	---	---	---	---	---
8	3.2	8.4	4.0	10	25	4.7	4.1	---	---	---	---	---
9	3.3	6.5	4.1	7.9	23	4.7	4.1	---	---	---	---	---
10	5.4	5.2	11	6.5	13	4.9	4.0	---	---	---	---	---
11	6.3	8.3	39	5.8	9.5	4.9	4.1	---	---	---	---	---
12	5.0	6.1	29	5.4	7.6	4.7	4.6	---	---	---	---	---
13	4.0	4.8	22	5.1	6.5	4.6	5.2	---	---	---	---	---
14	3.6	4.2	32	5.2	5.9	4.5	4.6	---	---	---	---	---
15	3.4	3.9	36	8.4	5.6	4.4	4.7	---	---	---	---	---
16	3.8	3.7	15	8.3	5.3	4.4	5.5	---	---	---	---	---
17	5.3	4.0	10	6.7	7.4	4.4	5.0	---	---	---	---	---
18	4.8	5.2	12	5.9	11	4.3	4.6	---	---	---	---	---
19	3.9	4.3	10	7.6	8.9	4.3	4.3	---	---	---	---	---
20	3.6	3.8	7.7	11	9.3	4.3	4.2	---	---	---	---	---
21	3.5	3.6	6.6	18	8.9	4.3	4.1	---	---	---	---	---
22	3.4	3.7	5.9	13	8.5	4.6	4.9	---	---	---	---	---
23	3.3	5.3	5.4	11	11	4.6	37	---	---	---	---	---
24	3.3	5.4	5.1	8.4	10	4.4	19	---	---	---	---	---
25	3.6	4.8	4.9	6.8	8.6	4.2	12	---	---	---	---	---
26	e4.0	4.2	4.7	6.0	7.1	4.1	11	---	---	---	---	---
27	e3.8	4.3	4.7	5.6	6.2	4.1	8.2	---	---	---	---	---
28	e3.7	5.1	4.8	5.3	5.7	4.1	6.5	---	---	---	---	---
29	e3.6	6.4	8.2	5.1	5.3	4.1	5.6	---	---	---	---	---
30	e3.5	5.8	7.7	4.8	---	4.1	5.2	---	---	---	---	---
31	e3.4	---	6.5	4.7	---	4.3	---	---	---	---	---	---
TOTAL	118.0	140.5	331.2	228.0	272.8	140.6	206.3	---	---	---	---	---
MEAN	3.81	4.68	10.7	7.35	9.41	4.54	6.88	---	---	---	---	---
MAX	6.3	8.4	39	18	25	5.1	37	---	---	---	---	---
MIN	3.2	3.1	4.0	4.7	4.5	4.1	4.0	---	---	---	---	---
AC-FT	234	279	657	452	541	279	409	---	---	---	---	---
CFSM	1.46	1.79	4.09	2.82	3.60	1.74	2.63	---	---	---	---	---
IN.	1.68	2.00	4.72	3.25	3.89	2.00	2.94	---	---	---	---	---

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 1996, BY WATER YEAR (WY)

	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996
MEAN	3.38	4.50	12.6	8.01	9.05	6.55	6.24	3.71	3.47	3.36	3.62	3.30
MAX	3.81	4.68	14.5	8.66	9.41	8.55	6.88	3.71	3.47	3.36	3.62	3.30
(WY)	1996	1996	1995	1995	1996	1995	1996	1995	1995	1995	1995	1995
MIN	2.96	4.32	10.7	7.35	8.68	4.54	5.60	3.71	3.47	3.36	3.62	3.30
(WY)	1995	1995	1996	1996	1995	1996	1995	1995	1995	1995	1995	1995

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## WATER YEARS 1995 - 1996

ANNUAL TOTAL	2068.9		
ANNUAL MEAN	5.67		5.89
HIGHEST ANNUAL MEAN			5.89
LOWEST ANNUAL MEAN			5.89
HIGHEST DAILY MEAN	39	Dec 11	76
LOWEST DAILY MEAN	3.1	Jul 31	2.4
ANNUAL SEVEN-DAY MINIMUM	3.2	Jul 29	2.4
ANNUAL RUNOFF (AC-FT)	4100		4260
ANNUAL RUNOFF (CFSM)	2.17		2.26
ANNUAL RUNOFF (INCHES)	29.49		30.65
10 PERCENT EXCEEDS	9.0		10
50 PERCENT EXCEEDS	4.1		4.5
90 PERCENT EXCEEDS	3.2		3.2

e Estimated



## PORT GAMBLE BASIN

12069651 GAMBLE CREEK NEAR PORT GAMBLE, WA

LOCATION.--Lat 47°47'57", long 122°34'51", in NW 1/4 SW 1/4 sec.29, T.27 N. R.2 E., Kitsap County, Hydrologic Unit 17110018, on left bank, 50 ft upstream from Bond road, 4.6 mi from Poulsbo, 3.5 mi south of Port Gamble, and at mile 0.91.

DRAINAGE AREA.--5.97 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1994 to May 1996 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 50 ft above sea level, from topographic map.

REMARKS.--Records fair. No regulation or diversion upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 120 ft<sup>3</sup>/s Dec. 20, 1994, gage height, 8.64 ft; minimum discharge, 0.49 ft<sup>3</sup>/s Aug. 4, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period October 1995 to May 1996, 85 ft<sup>3</sup>/s Apr. 23, gage height, 7.38 ft; minimum discharge during period October 1995 to May 1996, 0.92 ft<sup>3</sup>/s Oct. 13, 14.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	1.0	3.2	5.5	e3.7	5.1	5.5	5.2	---	---	---	---
2	1.4	1.1	3.1	4.5	3.7	4.7	5.0	4.7	---	---	---	---
3	1.5	1.1	2.6	4.3	3.7	4.7	3.1	5.1	---	---	---	---
4	1.3	1.0	7.1	4.1	6.0	4.6	2.8	3.9	---	---	---	---
5	1.1	1.1	3.9	3.8	21	4.4	2.7	3.3	---	---	---	---
6	1.2	1.2	2.8	7.2	24	3.8	2.7	2.9	---	---	---	---
7	1.2	1.7	2.4	11	17	3.6	2.7	3.2	---	---	---	---
8	1.5	7.5	2.1	8.1	37	3.6	2.5	3.4	---	---	---	---
9	1.4	3.3	2.3	6.4	51	3.6	2.4	3.1	---	---	---	---
10	2.9	2.1	12	5.4	25	4.1	2.2	2.8	---	---	---	---
11	3.0	7.6	44	5.2	15	4.0	2.4	2.5	---	---	---	---
12	1.5	3.5	26	4.6	12	3.4	3.4	2.4	---	---	---	---
13	.96	2.6	21	3.4	9.2	3.2	3.2	3.0	---	---	---	---
14	.95	2.3	24	3.4	7.1	3.2	2.4	4.3	---	---	---	---
15	1.0	2.0	32	8.5	6.1	3.0	2.5	3.6	---	---	---	---
16	1.4	2.0	14	7.0	5.6	2.8	4.5	2.9	---	---	---	---
17	1.6	2.2	9.2	6.1	9.6	2.8	3.6	3.1	---	---	---	---
18	1.8	3.9	13	5.2	13	2.7	2.9	6.5	---	---	---	---
19	1.4	2.4	8.8	7.9	11	2.7	2.5	5.3	---	---	---	---
20	1.3	2.0	6.6	18	12	2.7	2.4	3.4	---	---	---	---
21	1.3	1.7	5.5	29	11	2.5	2.2	3.0	---	---	---	---
22	1.3	1.6	4.8	19	12	2.9	2.8	6.6	---	---	---	---
23	1.3	3.8	4.0	15	18	3.2	42	6.8	---	---	---	---
24	1.4	3.4	3.6	10	12	2.8	24	4.8	---	---	---	---
25	2.0	2.6	3.1	7.8	10	2.6	17	3.7	---	---	---	---
26	1.4	2.1	2.9	6.6	8.2	2.6	16	3.0	---	---	---	---
27	1.2	2.0	2.8	5.9	7.0	2.4	9.4	2.7	---	---	---	---
28	1.1	4.1	3.3	5.5	6.0	2.2	7.1	5.9	---	---	---	---
29	1.1	6.5	9.0	4.9	5.6	2.3	6.0	4.3	---	---	---	---
30	1.1	4.9	7.5	e4.2	---	2.3	5.2	4.1	---	---	---	---
31	1.0	---	6.6	e3.9	---	2.6	---	e3.4	---	---	---	---
TOTAL	43.71	84.3	293.2	241.4	382.5	101.1	193.1	122.9	---	---	---	---
MEAN	1.41	2.81	9.46	7.79	13.2	3.26	6.44	3.96	---	---	---	---
MAX	3.0	7.6	44	29	51	5.1	42	6.8	---	---	---	---
MIN	.95	1.0	2.1	3.4	3.7	2.2	2.2	2.4	---	---	---	---
MED	1.3	2.1	5.5	5.9	11	3.0	3.0	3.4	---	---	---	---
AC-FT	87	167	582	479	759	201	383	244	---	---	---	---
CFSM	.24	.48	1.61	1.33	2.25	.56	1.10	.68	---	---	---	---
IN.	.28	.54	1.86	1.53	2.43	.64	1.23	.78	---	---	---	---

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996	1995	1996
MEAN	1.19	2.65	11.8	8.28	11.1	7.43	5.39	3.05	1.39	1.18	.99	.79	
MAX	1.41	2.81	14.2	8.77	13.2	11.6	6.44	3.96	1.39	1.18	1.43	.94	
(WY)	1996	1996	1995	1995	1996	1995	1996	1996	1995	1995	1995	1995	
MIN	.96	2.49	9.46	7.79	8.97	3.26	4.35	2.13	1.39	1.18	.55	.64	
(WY)	1995	1995	1996	1996	1995	1996	1995	1995	1995	1995	1994	1994	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## WATER YEARS 1994 - 1996

ANNUAL TOTAL	1651.62		
ANNUAL MEAN	4.52		
HIGHEST ANNUAL MEAN		4.87	
LOWEST ANNUAL MEAN		4.87	1995
HIGHEST DAILY MEAN	44	Dec 11	88
LOWEST DAILY MEAN	.67	Aug 4	.52
ANNUAL SEVEN-DAY MINIMUM	.84	Jun 24	.54
ANNUAL RUNOFF (AC-FT)	3280		3520
ANNUAL RUNOFF (CFSM)	.77		.83
ANNUAL RUNOFF (INCHES)	10.48		11.28
10 PERCENT EXCEEDS	10		11
50 PERCENT EXCEEDS	2.3		2.5
90 PERCENT EXCEEDS	.95		.65

e Estimated

## 12070040 JOHNSON CREEK DNR SITE NEAR POULSBO, WA

LOCATION.--Lat 47°44'33", long 122°40'41", in NW 1/4 SE 1/4 sec.16, T.26 N. R.1 E., Kitsap County, Hydrologic Unit 17110018, on left bank, 3 ft upstream from culvert under logging road, 0.9 mi from Poulsbo, and at mile 1.30.

DRAINAGE AREA.--0.17 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1994 to September 1996 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 390 ft above sea level, from topographic map.

REMARKS.--Records poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--2 years (water years 1995-96), 0.13 ft<sup>3</sup>/s, 0.74 in/yr, 92 ac-ft/yr.

EXTREMES FOR PERIOD OR RECORD.--Maximum discharge, 12 ft<sup>3</sup>/s Dec. 20, 1994, gage height 9.72 ft; no flow on many days.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4.3 ft<sup>3</sup>/s Dec. 15, gage height 7.61 ft; no flow on many days during year.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e.00	e.00	e.00	e.08	e.00	.12	e.00	e.00	e.00	e.00	e.00	e.00
2	e.00	e.00	e.00	e.04	e.00	e.09	e.00	e.00	e.00	e.00	e.00	e.00
3	e.00	e.00	e.00	e.02	e.00	e.05	e.00	e.00	e.00	e.00	e.00	e.00
4	e.00	e.00	e.00	e.01	.05	e.02	e.00	e.00	e.00	e.00	e.00	e.00
5	e.00	e.00	e.00	e.01	.13	e.01	e.00	e.00	e.00	e.00	e.00	e.00
6	e.00	e.00	e.00	e.12	.42	e.01	e.00	e.00	e.00	e.00	e.00	e.00
7	e.00	e.00	e.00	e.35	.52	e.00	e.00	e.00	e.00	e.00	e.00	e.00
8	e.00	e.00	e.00	e.20	1.8	e.00	e.00	e.00	e.00	e.00	e.00	e.00
9	e.00	e.00	e.00	e.08	2.5	e.00	e.00	e.00	e.00	e.00	e.00	e.00
10	e.00	e.00	e.00	e.06	1.1	e.00	e.00	e.00	e.00	e.00	e.00	e.00
11	e.00	e.00	e.20	e.04	.59	e.00	e.00	e.00	e.00	e.00	e.00	e.00
12	e.00	e.00	e1.4	e.02	.38	e.00	e.00	e.00	e.00	e.00	e.00	e.00
13	e.00	e.00	e1.2	e.01	.28	e.00	e.00	e.00	e.00	e.00	e.00	e.00
14	e.00	e.00	e2.2	e.01	e.13	e.00	e.00	e.00	e.00	e.00	e.00	e.00
15	e.00	e.00	2.5	e.04	e.10	e.00	e.00	e.00	e.00	e.00	e.00	e.00
16	e.00	e.00	.37	e.04	.10	e.00	e.00	e.00	e.00	e.00	e.00	e.00
17	e.00	e.00	.12	e.02	.13	e.00	e.00	e.00	e.00	e.00	e.00	e.00
18	e.00	e.00	.13	e.01	.24	e.00	e.00	e.00	e.00	e.00	e.00	e.00
19	e.00	e.00	.10	e.01	.24	e.00	e.00	e.00	e.00	e.00	e.00	e.00
20	e.00	e.00	e.04	e.16	.40	e.00	e.00	e.00	e.00	e.00	e.00	e.00
21	e.00	e.00	e.02	.55	.46	e.00	e.00	e.00	e.00	e.00	e.00	e.00
22	e.00	e.00	e.01	.57	.42	e.00	e.20	e.00	e.00	e.00	e.00	e.00
23	e.00	e.00	e.01	.52	.53	e.00	e.50	e.00	e.00	e.00	e.00	e.00
24	e.00	e.00	e.00	.35	.51	e.00	e.30	e.00	e.00	e.00	e.00	e.00
25	e.00	e.00	e.00	.23	.40	e.00	e.25	e.00	e.00	e.00	e.00	e.00
26	e.00	e.00	e.00	.16	.28	e.00	e.15	e.00	e.00	e.00	e.00	e.00
27	e.00	e.00	e.00	.10	.21	e.00	e.05	e.00	e.00	e.00	e.00	e.00
28	e.00	e.00	e.00	e.04	.17	e.00	e.00	e.00	e.00	e.00	e.00	e.00
29	e.00	e.00	e.1	e.03	.14	e.00	e.00	e.00	e.00	e.00	e.00	e.00
30	e.00	e.00	.27	e.02	---	e.00	e.00	e.00	e.00	e.00	e.00	e.00
31	e.00	---	e.12	e.00	---	e.00	---	e.00	---	e.00	e.00	---
TOTAL	0.00	0.00	8.79	3.90	12.23	0.30	1.45	0.00	0.00	0.00	0.00	0.00
MEAN	.000	.000	.28	.13	.42	.010	.048	.000	.000	.000	.000	.000
MAX	.00	.00	2.5	.57	2.5	.12	.50	.00	.00	.00	.00	.00
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.17	7.7	24	.6	2.9	.00	.00	.00	.00	.00
CFSM	.00	.00	1.67	.74	2.48	.06	.28	.00	.00	.00	.00	.00
IN.	.00	.00	1.92	.85	2.68	.07	.32	.00	.00	.00	.00	.00

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 1996, BY WATER YEAR (WY)

	MEAN	.000	.000	.62	.26	.43	.18	.024	.000	.000	.000	.000	.000
MAX	.000	.000	.97	.40	.44	.36	.048	.000	.000	.000	.000	.000	.000
(WY)	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995	1995
MIN	.000	.000	.28	.13	.42	.010	.000	.000	.000	.000	.000	.000	.000
(WY)	1995	1995	1996	1996	1996	1996	1995	1995	1995	1995	1995	1995	1995

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1995 - 1996

ANNUAL TOTAL	44.66	26.67	
ANNUAL MEAN	.12	.073	.13
HIGHEST ANNUAL MEAN			.18
LOWEST ANNUAL MEAN			.073
HIGHEST DAILY MEAN	2.5 Dec 15	2.5 Dec 15	7.7 Dec 20 1994
LOWEST DAILY MEAN	.00 Mar 29	.00 Oct 1	.00 Oct 1 1994
ANNUAL SEVEN-DAY MINIMUM	.00 Mar 29	.00 Oct 1	.00 Oct 1 1994
ANNUAL RUNOFF (AC-FT)	89	53	92
ANNUAL RUNOFF (CFSM)	.72	.43	.74
ANNUAL RUNOFF (INCHES)	9.77	5.84	10.11
10 PERCENT EXCEEDS	.36	.18	.34
50 PERCENT EXCEEDS	.00	.00	.00
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated

12070045 NORTH FORK JOHNSON CREEK NEAR POULSBO, WA

LOCATION.--Lat 47°44'03", long 122°39'45", in NE 1/4 NW 1/4 sec.22, T.26 N. R.1 E., Kitsap County, Hydrologic Unit 17110018, on right bank, 300 ft upstream from Viking Way, 0.3 mi from Poulsbo, and at mile 0.02.

DRAINAGE AREA.--2.04 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1994 to May 1996 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 30 ft above sea level, from topographic map.

REMARKS.--Records fair. No regulation or diversion upstream from station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 64 ft<sup>3</sup>/s Dec. 19, 1994, gage height, 3.10 ft; minimum discharge, 0.04 ft<sup>3</sup>/s on many days during July to September, 1994.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period October 1995 to May 1996, 25 ft<sup>3</sup>/s Apr. 23, gage height, 2.01 ft; minimum discharge during period October 1995 to May 1996, 0.06 ft<sup>3</sup>/s Nov. 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.12	.17	.80	1.3	.87	1.1	1.6	1.1	---	---	---	---
2	.22	.17	.72	1.2	.82	1.1	.91	1.2	---	---	---	---
3	.24	.16	1.4	1.2	.90	1.1	.72	1.2	---	---	---	---
4	.16	.17	3.2	1.0	1.7	1.1	.63	.93	---	---	---	---
5	.14	.18	1.3	1.1	6.9	1.1	.60	.81	---	---	---	---
6	.13	.18	.98	3.0	5.1	.95	.57	.73	---	---	---	---
7	.13	.58	.90	4.0	4.1	.91	.57	.69	---	---	---	---
8	.13	2.7	.82	2.2	12	.88	.52	.69	---	---	---	---
9	.14	.75	1.2	1.6	9.0	.76	.52	.67	---	---	---	---
10	1.0	.84	9.8	1.3	3.7	.76	.48	.61	---	---	---	---
11	.88	2.8	13	1.1	2.5	.76	.56	.57	---	---	---	---
12	.38	.93	12	.99	1.9	.76	.68	.57	---	---	---	---
13	.28	.85	6.9	.92	1.7	.75	.66	.85	---	---	---	---
14	.23	.48	13	1.1	1.4	.75	.55	1.1	---	---	---	---
15	.20	.40	12	3.1	1.2	.72	.75	.78	---	---	---	---
16	.34	.32	4.3	1.8	1.2	.69	1.4	.65	---	---	---	---
17	.42	.53	3.1	1.3	3.6	.69	.92	.92	---	---	---	---
18	.45	.60	5.2	1.2	3.3	.65	.68	2.2	---	---	---	---
19	.29	.18	2.6	2.3	2.7	.63	.62	1.1	---	---	---	---
20	.27	.10	2.0	6.1	4.2	.62	.56	.80	---	---	---	---
21	.29	.08	1.7	7.4	3.0	.58	.52	.72	---	---	---	---
22	.25	.08	1.4	4.0	3.5	.70	1.2	1.5	---	---	---	---
23	.24	1.3	1.2	3.0	4.1	.68	14	1.2	---	---	---	---
24	.21	.85	1.1	2.2	2.9	.60	5.2	.85	---	---	---	---
25	.22	.53	1.0	1.7	2.1	.58	5.3	.69	---	---	---	---
26	.28	.29	.95	1.4	1.7	.57	3.1	.59	---	---	---	---
27	.23	.46	.91	1.3	1.5	.57	1.9	.76	---	---	---	---
28	.21	1.0	1.3	1.2	1.3	.57	1.5	1.9	---	---	---	---
29	.20	3.0	3.9	e1.1	1.2	.57	1.2	1.1	---	---	---	---
30	.18	1.3	2.3	e.96	---	.57	1.1	e1.0	---	---	---	---
31	.17	---	1.7	e.90	---	.71	---	e.90	---	---	---	---
TOTAL	8.63	21.98	112.68	62.97	90.09	23.48	49.52	29.38	---	---	---	---
MEAN	.28	.73	3.63	2.03	3.11	.76	1.65	.95	---	---	---	---
MAX	1.0	3.0	13	7.4	12	1.1	14	2.2	---	---	---	---
MIN	.12	.08	.72	.90	.82	.57	.48	.57	---	---	---	---
AC-FT	.17	.44	224	125	179	.47	.98	.58	---	---	---	---
CFSM	.14	.36	1.78	1.00	1.52	.37	.81	.46	---	---	---	---
IN.	.16	.40	2.05	1.15	1.64	.43	.90	.54	---	---	---	---

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	MEAN	.23	.63	4.38	2.47	2.93	1.81	1.30	.63	.16	.10	.15	.084
MAX	.28	.73	5.13	2.91	3.11	2.86	1.65	.95	.16	.10	.26	.11	
(WY)	1996	1996	1995	1995	1996	1995	1996	1996	1995	1995	1995	1995	1995
MIN	.18	.52	3.63	2.03	2.75	.76	.95	.31	.16	.10	.043	.057	
(WY)	1995	1995	1996	1996	1995	1996	1995	1995	1995	1995	1994	1994	

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

WATER YEARS 1994 - 1996

ANNUAL TOTAL	457.03		
ANNUAL MEAN	1.25	1.35	
HIGHEST ANNUAL MEAN		1.35	1995
LOWEST ANNUAL MEAN		1.35	1995
HIGHEST DAILY MEAN	15	30	Dec 19 1994
LOWEST DAILY MEAN	.07	.04	Jul 19 1994
ANNUAL SEVEN-DAY MINIMUM	.08	.04	Aug 10 1994
ANNUAL RUNOFF (AC-FT)	907	980	
ANNUAL RUNOFF (CFSM)	.61	.66	
ANNUAL RUNOFF (INCHES)	8.33	9.01	
10 PERCENT EXCEEDS	3.2	3.1	
50 PERCENT EXCEEDS	.43	.58	
90 PERCENT EXCEEDS	.09	.06	

e Estimated

12070050 JOHNSON CREEK NEAR POULSBO, WA

LOCATION.--Lat 47°44'00", long 122°39'42", in SE 1/4 NW 1/4 sec.22, T.26 N. R.1 E., Kitsap County, Hydrologic Unit 17110018, on right bank, 100 ft downstream from Viking Way (Hwy. 3), 0.3 mi south of Poulsbo, and at mile 0.10.

DRAINAGE AREA.--2.52 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1994 to May 1996 (discontinued).

GAGE.--Water-stage recorder. Elevation of gage is 20 ft above sea level, from topographic map.

REMARKS.--Records fair. Diversion upstream from station is returned entirely to stream.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 121 ft<sup>3</sup>/s Dec. 19, 1994, gage height, 2.80 ft; minimum discharge, 0.56 ft<sup>3</sup>/s Oct. 4, 1994, gage height, 0.87 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period October 1995 to May 1996, 46 ft<sup>3</sup>/s Apr. 23, gage height, 2.11 ft; minimum daily discharge during period October 1995 to May 1996, 0.86 ft<sup>3</sup>/s Oct. 30 to Nov. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.93	e.86	2.0	2.0	2.2	1.8	3.0	2.3	---	---	---	---
2	1.1	e.86	1.9	1.9	2.1	1.8	1.7	2.4	---	---	---	---
3	1.1	e.86	2.8	1.9	2.4	1.8	1.5	2.3	---	---	---	---
4	.96	e.86	4.1	1.7	4.3	1.8	1.4	1.9	---	---	---	---
5	.93	e.86	2.1	1.8	11	1.8	1.4	1.7	---	---	---	---
6	.93	.91	1.8	4.5	8.2	1.6	1.4	1.7	---	---	---	---
7	.93	1.7	1.7	5.9	7.1	1.6	1.3	1.6	---	---	---	---
8	.93	4.2	1.6	3.2	19	1.6	1.3	1.6	---	---	---	---
9	.96	1.3	2.0	2.6	15	1.6	1.2	1.5	---	---	---	---
10	2.5	1.4	12	2.2	6.3	1.6	1.2	1.4	---	---	---	---
11	2.1	4.1	19	1.9	4.1	1.6	1.4	1.4	---	---	---	---
12	1.1	1.5	17	1.8	3.1	1.5	1.6	1.4	---	---	---	---
13	.99	1.4	11	1.7	2.5	1.5	1.4	2.0	---	---	---	---
14	.94	1.2	22	2.0	2.2	1.4	1.3	2.1	---	---	---	---
15	.92	1.2	18	5.2	2.0	1.4	1.6	1.6	---	---	---	---
16	1.2	1.1	6.7	3.1	1.9	1.4	2.5	1.4	---	---	---	---
17	1.3	1.9	4.8	2.4	5.5	1.4	1.7	1.9	---	---	---	---
18	1.3	2.0	7.1	2.2	4.9	1.4	1.4	4.3	---	---	---	---
19	1.0	1.3	3.9	4.3	4.3	1.3	1.3	2.1	---	---	---	---
20	1.0	1.2	2.9	8.5	6.4	1.3	1.2	1.8	---	---	---	---
21	.99	1.2	2.4	11	4.9	1.3	1.2	1.8	---	---	---	---
22	.90	1.4	2.0	7.3	5.7	1.6	2.4	3.2	---	---	---	---
23	.90	4.1	1.7	6.2	6.8	1.5	22	2.4	---	---	---	---
24	.90	2.7	1.5	5.3	4.9	1.4	7.5	1.8	---	---	---	---
25	.95	2.4	1.4	4.0	3.6	1.3	8.4	1.6	---	---	---	---
26	1.0	2.2	1.3	3.5	2.8	1.4	5.9	1.5	---	---	---	---
27	.94	2.8	1.3	3.2	2.4	1.4	3.9	2.0	---	---	---	---
28	.90	4.0	1.9	2.8	2.2	1.3	2.9	4.0	---	---	---	---
29	.88	4.7	5.3	2.5	2.0	1.3	2.5	2.3	---	---	---	---
30	.86	2.5	3.2	2.3	---	1.3	2.2	e2.2	---	---	---	---
31	e.86	---	2.3	2.2	---	1.7	---	e2.0	---	---	---	---
TOTAL	33.20	58.73	168.7	111.1	149.8	46.7	89.7	63.2	---	---	---	---
MEAN	1.07	1.96	5.44	3.58	5.17	1.51	2.99	2.04	---	---	---	---
MAX	2.5	4.7	22	11	19	1.8	22	4.3	---	---	---	---
MIN	.86	.86	1.3	1.7	1.9	1.3	1.2	1.4	---	---	---	---
AC-FT	.66	.116	.335	.220	.297	.93	.178	.125	---	---	---	---
CFSM	.42	.78	2.16	1.42	2.05	.60	1.19	.81	---	---	---	---
IN.	.49	.87	2.49	1.64	2.21	.69	1.32	.93	---	---	---	---

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
MEAN	1.04	1.82	7.37	4.06	4.74	3.13	2.57	1.55	.93	.86	.94	.81
MAX	1.07	1.96	9.30	4.53	5.17	4.75	2.99	2.04	.93	.86	1.17	.92
(WY)	1996	1996	1995	1995	1996	1995	1996	1996	1995	1995	1995	1995
MIN	1.01	1.68	5.44	3.58	4.31	1.51	2.16	1.07	.93	.86	.72	.70
(WY)	1995	1995	1996	1996	1995	1996	1995	1995	1995	1995	1994	1994

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

WATER YEARS 1994 1996

ANNUAL TOTAL	885.27		
ANNUAL MEAN	2.43		
HIGHEST ANNUAL MEAN		2.73	1995
LOWEST ANNUAL MEAN		2.73	1995
HIGHEST DAILY MEAN	22	Dec 14	
LOWEST DAILY MEAN	.80	Jul 19	
ANNUAL SEVEN-DAY MINIMUM	.81	Jul 17	
ANNUAL RUNOFF (AC-FT)	1760		1970
ANNUAL RUNOFF (CFSM)	.96		1.08
ANNUAL RUNOFF (INCHES)	13.07		14.69
10 PERCENT EXCEEDS	5.6		5.5
50 PERCENT EXCEEDS	1.3		1.3
90 PERCENT EXCEEDS	.86		.74

e Estimated

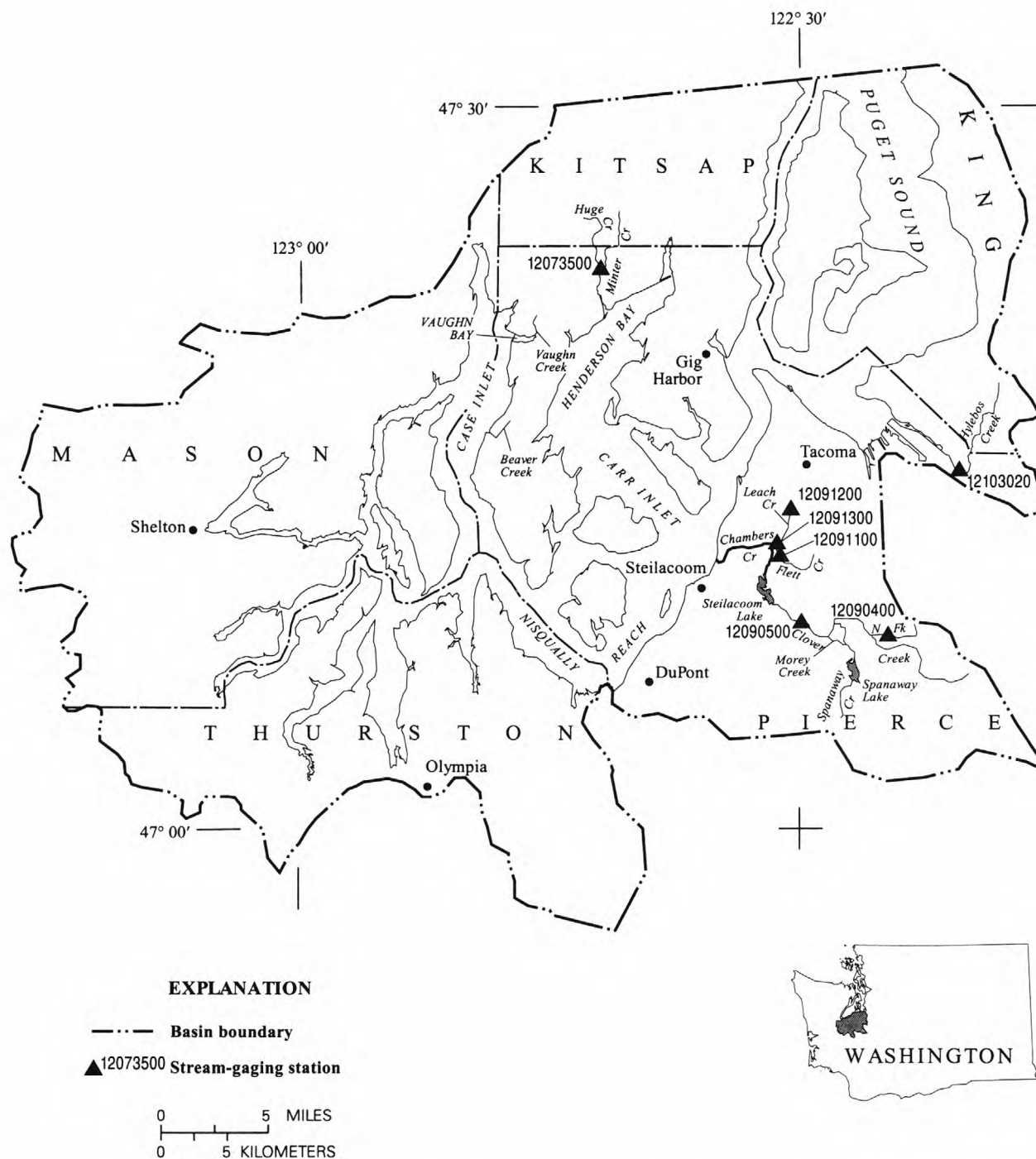
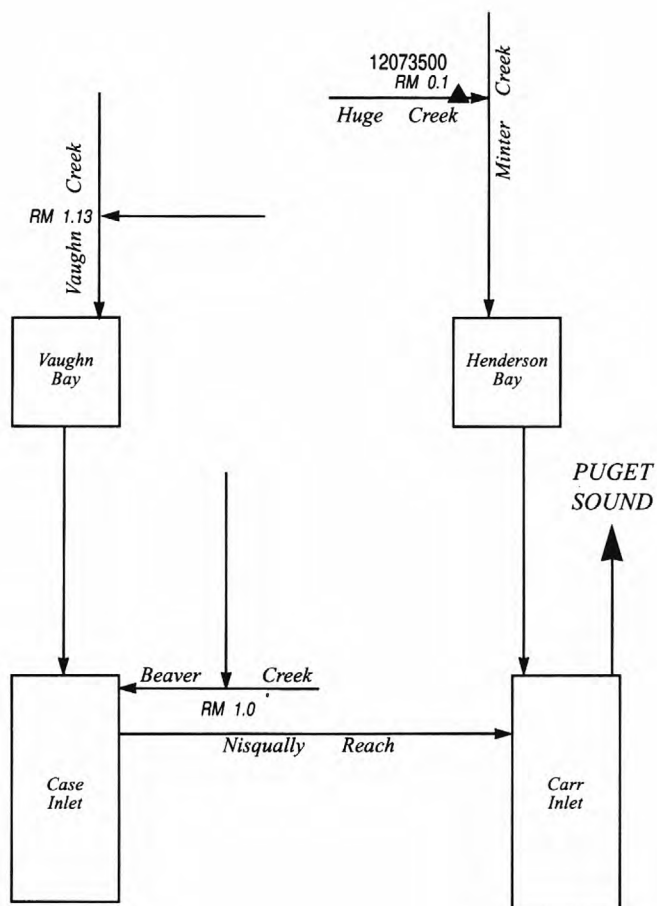


Figure 31. Location of surface-water stations in the Minter Creek Basin.





#### EXPLANATION

- ▲ 12073600 Stream-gaging station
- ▼ 12119000 Water-quality data collection site
- ▲ 12396000 Crest-stage gaging station
- RM 1.0 River mile
- Stream—Arrow shows direction of flow
- Tunnel or pipe—Arrow shows direction of flow

**Figure 32.** Schematic diagram showing surface-water stations in the Minter Creek, Case Inlet and Vaughn Bay Basins.

## MINTER CREEK BASIN

12073500 HUGE CREEK NEAR WAUNA, WA

LOCATION.--Lat 47°23'22", long 122°41'52", at north line sec.20, T.22 N., R.1 E., Pierce County, Hydrologic Unit 17110019, on right bank 25 ft upstream from bridge, 0.1 mi upstream from mouth, and 2.5 mi west of Wauna.

DRAINAGE AREA.--6.47 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1947 to September 1969, October 1977 to current year.

REVISED RECORDS.--WSP 1636: 1953-54, 1956, 1957(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 100 ft above sea level, from topographic map. Prior to Sept. 27, 1978, at site 50 ft downstream and prior to June 26, 1951, at datum 0.86 ft higher.

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

AVERAGE DISCHARGE.--41 years (water years 1948-69, 1978-96), 10.9 ft<sup>3</sup>/s, 22.95 in/yr, 7,920 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 547 ft<sup>3</sup>/s, Nov. 24, 1990, gage height, 5.13 ft, from rating curve extended above 185 ft<sup>3</sup>/s; minimum discharge, 2.4 ft<sup>3</sup>/s, Sept. 30, 1994, Oct. 1, 1994.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 70 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	1445	184	3.69	Jan. 21	0600	75	2.59
Dec. 11	0445	125	3.16	Feb. 8	1330	*231	*4.06
Dec. 14	0845	124	3.15	Apr. 23	1815	139	3.30

Minimum discharge, 4.9 ft<sup>3</sup>/s, on several days in September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.6	5.6	42	17	12	14	13	14	9.3	6.9	5.8	5.4
2	6.2	5.7	33	16	11	14	11	13	9.1	6.9	7.0	5.2
3	5.9	5.6	28	17	11	15	9.8	12	8.7	6.7	6.4	5.6
4	5.4	5.6	33	14	13	14	9.5	12	8.8	6.8	6.1	5.5
5	5.3	5.7	23	13	22	13	9.2	11	8.8	6.9	5.8	5.5
6	5.4	6.0	19	18	48	12	9.4	10	8.6	6.7	5.6	5.1
7	5.3	16	16	52	62	12	9.4	9.9	8.5	6.5	5.8	5.4
8	5.4	32	13	37	166	12	9.2	9.5	8.4	6.5	5.6	5.3
9	5.6	11	16	25	103	12	8.8	9.4	8.4	6.6	5.5	5.1
10	12	11	32	20	54	15	8.6	9.1	8.2	6.6	5.6	5.1
11	13	28	107	16	38	19	9.5	9.1	8.0	6.3	5.5	5.1
12	7.1	15	94	14	30	15	11	10	8.5	6.3	5.4	5.1
13	6.2	15	98	13	25	14	9.4	14	8.3	6.2	5.5	5.3
14	6.0	17	95	19	22	13	8.9	12	8.3	6.4	5.5	6.5
15	5.8	13	84	43	20	12	9.3	11	7.9	6.2	5.4	8.8
16	7.7	10	45	41	18	12	12	11	7.9	6.1	5.4	5.8
17	10	9.1	32	26	24	11	10	12	7.8	6.1	5.3	5.5
18	7.6	9.7	44	21	31	11	11	13	7.7	7.9	5.4	5.5
19	6.5	9.7	31	21	34	11	12	12	7.7	7.9	5.3	5.9
20	6.4	8.8	23	39	31	10	11	11	7.5	6.9	5.7	5.4
21	6.7	8.1	19	63	27	10	10	12	7.4	6.5	6.1	5.2
22	6.2	10	17	42	28	11	13	13	7.2	6.2	5.5	5.1
23	6.0	24	14	37	35	11	9.1	11	8.6	6.2	5.4	5.3
24	6.0	32	13	35	28	9.9	78	12	8.1	6.2	5.3	5.0
25	7.0	33	12	27	23	9.7	47	11	7.6	6.1	5.2	4.9
26	8.0	22	11	22	20	9.7	40	9.8	7.3	6.0	5.3	5.0
27	6.4	22	10	19	18	9.7	27	9.6	7.2	5.9	5.3	5.0
28	6.0	31	11	17	16	9.5	20	9.6	7.1	5.8	5.2	5.1
29	5.9	131	30	15	15	9.6	16	9.7	7.1	6.0	5.2	5.1
30	5.6	77	30	13	---	9.6	15	9.3	7.0	5.7	5.7	5.1
31	5.6	---	21	12	---	10	---	9.2	---	5.7	5.4	---
TOTAL	207.8	629.6	1096	784	985	370.7	559.0	341.2	241.0	199.7	173.2	162.9
MEAN	6.70	21.0	35.4	25.3	34.0	12.0	18.6	11.0	8.03	6.44	5.59	5.43
MAX	13	131	107	63	166	19	91	14	9.3	7.9	7.0	8.8
MIN	5.3	5.6	10	12	11	9.5	8.6	9.1	7.0	5.7	5.2	4.9
AC-FT	412	1250	2170	1560	1950	735	1110	677	478	396	344	323
CFSM	1.04	3.24	5.46	3.91	5.25	1.85	2.88	1.70	1.24	1.00	.86	.84
IN.	1.19	3.62	6.30	4.51	5.66	2.13	3.21	1.96	1.39	1.15	1.00	.94

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1947 - 1996, BY WATER YEAR (WY)

	5.41	10.2	17.7	22.5	22.3	15.5	10.5	7.40	5.97	4.99	4.55	4.64
MEAN	5.41	10.2	17.7	22.5	22.3	15.5	10.5	7.40	5.97	4.99	4.55	4.64
MAX	8.83	29.2	38.2	47.1	54.6	38.8	24.6	12.3	8.60	7.31	6.18	6.68
(WY)	1957	1991	1995	1966	1961	1950	1991	1959	1984	1961	1968	1978
MIN	3.45	3.55	4.97	5.37	5.72	7.23	6.17	4.52	4.39	3.50	3.15	3.23
(WY)	1988	1994	1953	1979	1993	1992	1952	1994	1994	1994	1994	1989

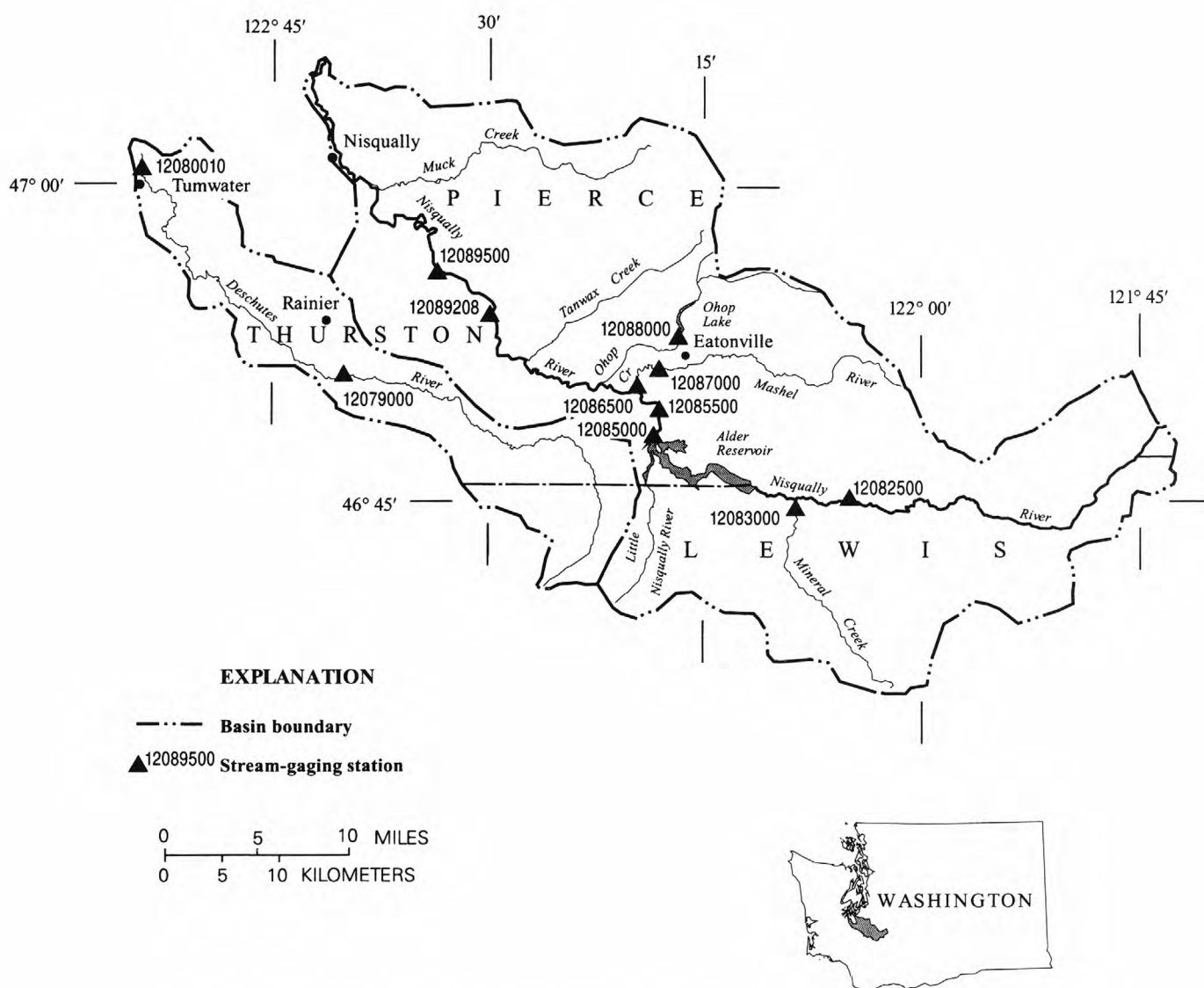
## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

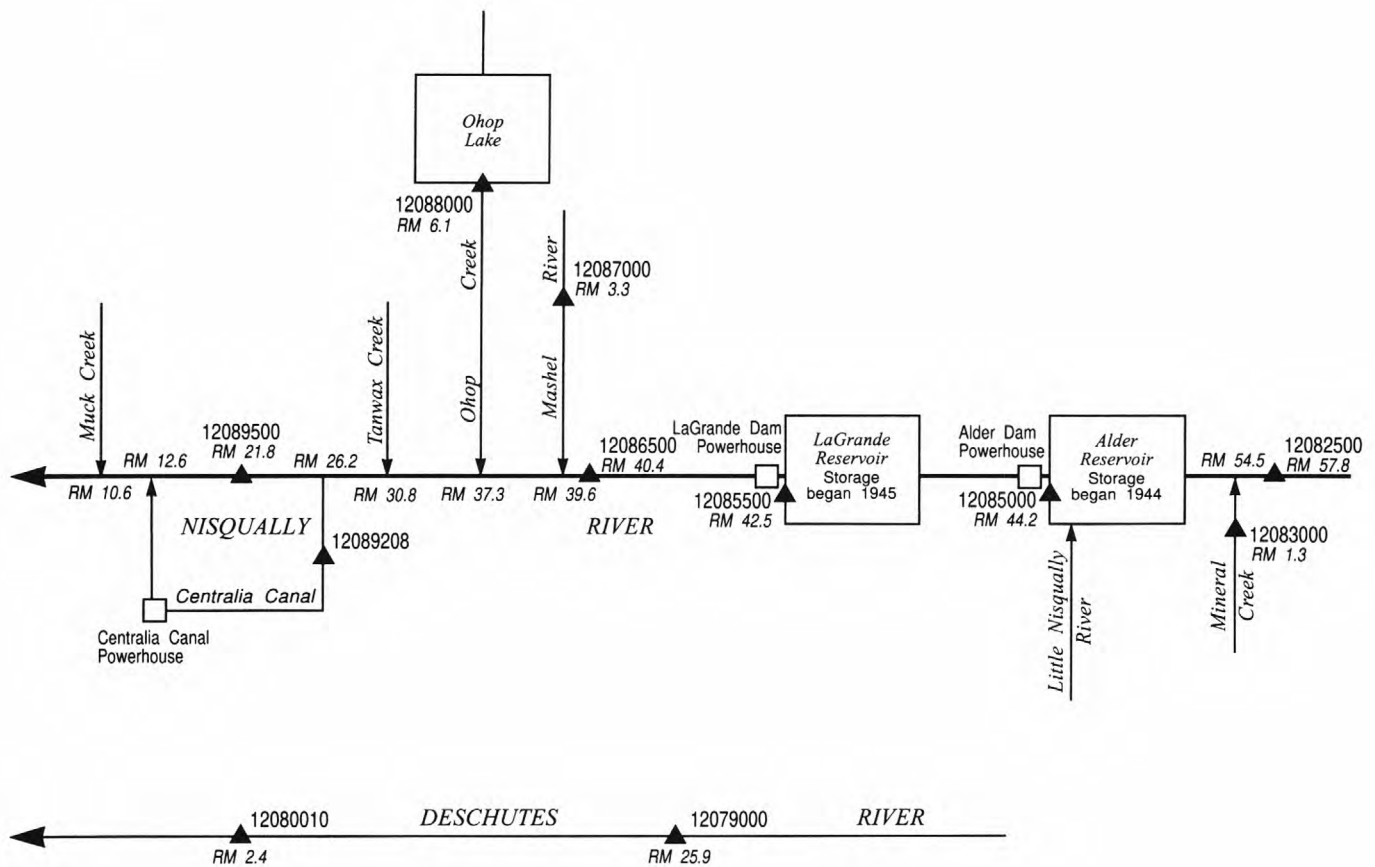
## FOR 1996 WATER YEAR

## WATER YEARS 1947 - 1996

ANNUAL TOTAL	4872.8	5750.1	
ANNUAL MEAN	13.4	15.7	
HIGHEST ANNUAL MEAN			10.9
LOWEST ANNUAL MEAN			17.1
HIGHEST DAILY MEAN	179	Feb 19	355
LOWEST DAILY MEAN	3.7	Sep 2	2.7
ANNUAL SEVEN-DAY MINIMUM	3.8	Sep 19	2.8
ANNUAL RUNOFF (AC-FT)	9670	11410	7920
ANNUAL RUNOFF (CFSM)	2.06	2.43	1.69
ANNUAL RUNOFF (INCHES)	28.02	33.06	22.95
10 PERCENT EXCEEDS	28	32	21
50 PERCENT EXCEEDS	7.1	9.7	6.7
90 PERCENT EXCEEDS	4.0	5.4	4.2



**Figure 33.** Location of surface-water stations in the Deschutes and Nisqually River Basins.



#### EXPLANATION

- ▲ 12085000 Stream-gaging station
- ▼ 14142500 Water-quality data collection site
- ▲ 12396000 Crest-stage gaging station
- RM 37.3 River mile
- Stream—Arrow shows direction of flow
- > Tunnel or pipe—Arrow shows direction of flow

**Figure 34.** Schematic diagram showing surface-water stations in the Deschutes and Nisqually River Basins.

DESCHUTES RIVER BASIN

131

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 75 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 mi<sup>2</sup>.

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 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 sea level.

REMARKS.--No estimated daily discharges. Records good. 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.--36 years (water years 1950-75, 1981, 1988-96), 261 ft<sup>3</sup>/s, 39.49 in/yr, 189,100 acre-ft/yr.

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

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 2,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	2400	3,500	10.52	Feb. 7	0400	4,880	12.37
Dec. 13	0800	2,760	9.41	Feb. 8	1830	*7,850	*15.74
Dec. 14	2200	2,680	9.29	Apr. 23	2200	3,730	10.80
Feb. 6	0100	2,920	9.66				

Minimum discharge, 27 ft<sup>3</sup>/s Sept. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	44	75	2060	439	202	270	262	307	150	69	43	30
2	39	69	1590	367	192	258	365	272	142	67	45	29
3	43	64	1050	560	183	284	299	250	134	66	50	30
4	56	61	957	609	211	400	244	234	128	71	47	31
5	46	63	694	513	915	477	210	212	123	66	46	31
6	41	70	512	510	2800	460	194	195	117	63	45	31
7	39	286	405	1440	3900	421	181	188	113	62	43	31
8	37	1140	335	1170	5900	395	168	181	109	60	41	29
9	37	928	319	713	3790	380	158	166	105	59	39	29
10	78	433	447	515	1570	359	160	157	102	58	37	28
11	338	1080	1320	408	1020	345	173	155	98	57	37	28
12	252	735	1160	350	770	330	319	163	95	57	36	28
13	154	484	2380	308	618	305	439	229	93	55	36	28
14	113	426	2050	290	519	275	364	273	91	54	36	30
15	105	346	1830	522	451	251	312	259	88	51	35	47
16	127	308	943	919	401	230	372	260	86	50	34	55
17	151	260	641	647	401	213	459	284	86	51	33	46
18	192	316	514	480	590	201	444	375	94	59	35	39
19	143	293	427	490	977	195	399	500	86	71	36	38
20	120	248	365	601	966	187	370	442	82	65	35	38
21	112	211	319	882	874	175	322	360	80	58	34	36
22	100	183	282	640	650	180	287	351	78	55	33	38
23	86	191	252	509	691	172	1720	371	83	53	32	36
24	78	356	226	431	574	164	2060	342	97	51	31	33
25	74	1020	205	375	470	155	1000	293	88	50	31	32
26	149	888	189	331	402	151	905	251	80	48	30	30
27	147	632	178	305	356	149	679	221	77	47	31	30
28	125	774	172	287	320	144	513	200	78	46	32	29
29	106	2210	207	259	292	143	415	189	75	46	31	29
30	92	2380	324	234	--	143	348	172	72	45	30	29
31	83	--	473	214	--	140	--	160	--	44	30	--
TOTAL	3307	16530	22826	16318	31005	7952	14141	8012	2930	1754	1134	998
MEAN	107	551	736	526	1069	257	471	258	97.7	56.6	36.6	33.3
MAX	338	2380	2380	1440	5900	477	2060	500	150	71	50	55
MIN	37	61	172	214	183	140	158	155	72	44	30	28
AC-FT	6560	32790	45280	32370	61500	15770	28050	15890	5810	3480	2250	1980
CFSM	1.19	6.14	8.20	5.86	11.9	2.86	5.25	2.88	1.09	.63	.41	.37
IN.	1.37	6.85	9.46	6.76	12.84	3.29	5.86	3.32	1.21	.73	.47	.41

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 1996, BY WATER YEAR (WY)

	MEAN	98.9	333	507	573	530	407	315	164	102	55.1	40.1	42.1
MAX	274	725	1063	1071	1069	839	659	287	233	110	74.1	89.7	
(WY)	1956	1961	1956	1953	1996	1972	1991	1960	1990	1974	1968	1968	
MIN	23.1	35.9	189	162	126	116	118	72.2	42.8	37.6	24.0	25.1	
(WY)	1988	1953	1953	1957	1993	1992	1973	1994	1992	1970	1992	1952	

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1949 - 1996

ANNUAL TOTAL	100369	126907	
ANNUAL MEAN	275	347	261
HIGHEST ANNUAL MEAN			389
LOWEST ANNUAL MEAN			156
HIGHEST DAILY MEAN	2380	Nov 30	6000
LOWEST DAILY MEAN	27	Sep 1	19
ANNUAL SEVEN-DAY MINIMUM	28	Aug 27	20
ANNUAL RUNOFF (AC-FT)	199100	251700	189100
ANNUAL RUNOFF (CFSM)	3.06	3.86	2.91
ANNUAL RUNOFF (INCHES)	41.58	52.57	39.49
10 PERCENT EXCEEDS	644	771	595
50 PERCENT EXCEEDS	163	185	128
90 PERCENT EXCEEDS	33	35	34



## DESCHUTES RIVER BASIN

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

LOCATION.--Lat 47°00'43", long 122°54'07", in NW 1/4 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 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1945 to November 1954, water years 1953-57 (annual maximum), June 1957 to June 1964, published as "12080000 Deschutes River near Olympia". October 1990 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 75 ft above sea level, from topographic map. April 1945 to Nov. 1954, water-stage recorder, Nov. 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.--21 years (water years 1946-54, 1958-63, 1991-96), 393 ft<sup>3</sup>/s, 32.97 in/yr, 284,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,700 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 34.17 ft, on basis of slope-area measurement of peak flow; minimum discharge, 51 ft<sup>3</sup>/s Sept. 22-24, 1995.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	1415	4,170	30.46	Jan. 8	0230	2,740	29.10
Dec. 13	2230	3,570	29.92	Feb. 9	unknown	*10,700	*34.17
Dec. 15	1230	3,590	29.94	Apr. 24	1330	3,340	29.90

Minimum daily discharge, 58 ft<sup>3</sup>/s Oct. 8.

REVISIONS.--The maximum discharges and peaks greater than base discharge, for the 1991 and 1992 water years have been revised as shown on the following table. They supersede figures published in the reports for 1991 and 1992.

Water Year	Date	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
1991	Nov. 25, 1990	4,710	31.19
1991	Dec. 5, 1990	2,480	28.95
1991	Jan. 13, 1991	2,420	28.87
1991	Feb. 20, 1991	2,330	28.76
1991	Apr. 6, 1991	*6,410	*32.32
1992	Jan. 29, 1992	*3,380	*29.94

Revised daily discharges, in cubic feet per second, for periods in November 1990, April 1991, and January 1992 are given below. These figures supersede those published in the reports for 1991-1993.

Nov. 24, 1990....	2,180	Apr. 6, 1991....	4,160	Jan. 28, 1992....	2,140
Nov. 25.....	3,950	Apr. 7.....	4,440	Jan. 29.....	2,890
Nov. 26.....	2,190			Jan. 30.....	2,030
				Jan. 31.....	1,900

	TOTAL	MEAN	MAX	MIN	AC-FT	CFSM	IN.
November 1990	22410	747	3950	179	44450	4.61	5.15
April 1991	28071	936	4440	366	55680	5.78	6.45
WTR YR 1991	164001	449	4440	87	325300	2.77	37.66
CAL YR 1991	140504	385	4440	82	278700	2.38	32.26
January 1992	18074	583	2890	190	35850	3.60	4.15
WTR YR 1992	93150	255	2890	61	184800	1.57	21.39
CAY YR 1992	94439	258	2890	58	187300	1.59	21.69

DESCHUTES RIVER BASIN

133

12080010 DESCHUTES RIVER AT E STREET BRIDGE, AT TUMWATER, WA--Continued  
DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	66	129	3010	800	468	545	378	564	321	184	152	108
2	72	123	2700	697	448	524	512	521	313	176	158	107
3	66	118	1940	812	428	537	487	486	301	176	163	112
4	70	114	1520	1030	430	617	428	460	290	176	168	109
5	72	120	1210	938	657	711	390	432	280	175	164	111
6	67	124	939	917	2910	722	372	408	273	171	163	109
7	e65	232	770	1630	4500	688	360	390	261	173	161	109
8	e58	888	638	2300	5270	660	343	382	255	169	158	109
9	e70	1520	590	1390	e8150	640	328	364	246	165	155	107
10	e120	784	665	1020	2940	632	324	349	242	161	154	105
11	e200	1110	1440	817	1830	618	332	346	238	158	154	104
12	e390	1320	1890	694	1460	605	407	359	233	157	155	103
13	e250	811	2570	619	1260	565	569	403	229	156	154	e105
14	188	685	2980	581	1110	522	548	455	225	162	152	e115
15	155	573	3240	749	1020	490	491	437	222	156	149	e150
16	148	517	1970	1370	946	463	531	442	219	156	148	e170
17	198	455	1340	1220	927	442	593	448	223	175	151	e130
18	229	465	1110	911	1010	422	632	533	225	192	147	e115
19	230	482	928	868	1260	412	587	643	220	201	137	115
20	197	425	790	995	1380	403	560	647	207	199	135	115
21	175	380	692	1490	1220	389	513	565	203	191	145	114
22	168	345	622	1260	1020	392	494	536	199	186	135	112
23	153	359	554	1050	993	383	961	544	214	177	111	111
24	140	483	503	899	940	366	2750	532	230	169	111	112
25	141	966	462	804	839	352	1550	482	216	167	110	108
26	151	1390	428	709	742	344	1230	437	203	162	111	107
27	207	1030	392	647	675	339	1040	404	195	158	111	106
28	185	1020	390	619	622	330	850	377	193	156	111	104
29	164	1930	454	577	576	326	718	364	191	155	110	104
30	149	3700	570	528	--	326	624	347	187	154	109	104
31	137	--	746	489	--	323	--	332	--	156	107	--
TOTAL	4681	22598	38053	29430	46031	15088	19902	13989	7054	5269	4349	3390
MEAN	151	753	1228	949	1587	487	663	451	235	170	140	113
MAX	390	3700	3240	2300	8150	722	2750	647	321	201	168	170
MIN	58	114	390	489	428	323	324	332	187	154	107	103
AC-FT	9280	44820	75480	58370	91300	29930	39480	27750	13990	10450	8630	6720
CFSM	.93	4.65	7.58	5.86	9.80	3.00	4.10	2.79	1.45	1.05	.87	.70
IN.	1.07	5.19	8.74	6.76	10.57	3.46	4.57	3.21	1.62	1.21	1.00	.78

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

MEAN	158	484	673	728	839	567	479	303	190	130	107	101
MAX	315	919	1228	1308	1587	1176	936	499	271	170	140	152
(WY)	1948	1961	1996	1953	1996	1950	1991	1948	1993	1996	1996	1959
MIN	76.8	84.1	242	346	243	245	296	140	110	77.1	69.8	57.2
(WY)	1953	1994	1953	1994	1993	1992	1994	1994	1992	1992	1992	1995

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1945 - 1996

ANNUAL TOTAL	158473	209834	
ANNUAL MEAN	434	573	393
HIGHEST ANNUAL MEAN			573
LOWEST ANNUAL MEAN			235
HIGHEST DAILY MEAN	3700	Nov 30	8150
LOWEST DAILY MEAN	52	Sep 22	58
ANNUAL SEVEN-DAY MINIMUM	53	Sep 18	67
ANNUAL RUNOFF (AC-FT)	314300	416200	284800
ANNUAL RUNOFF (CFSM)	2.68	3.54	2.43
ANNUAL RUNOFF (INCHES)	36.39	48.18	32.97
10 PERCENT EXCEEDS	1000	1220	847
50 PERCENT EXCEEDS	311	377	248
90 PERCENT EXCEEDS	70	111	94

e Estimated

## NISQUALLY RIVER BASIN

12082500 NISQUALLY RIVER NEAR NATIONAL, WA

LOCATION.--Lat 46°45'10", long 122°04'57", in SW 1/4 SW 1/4 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 mi<sup>2</sup>.

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 sea level, from river-profile map.

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

AVERAGE DISCHARGE.--54 years (water years 1943-96), 768 ft<sup>3</sup>/s, 78.42 in/yr, 556,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 21,200 ft<sup>3</sup>/s, Feb. 8, 1996, gage height, 12.18 ft; minimum discharge, 100 ft<sup>3</sup>/s, Nov. 10, 17, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,600 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1715	7,500	8.43	Dec. 13	0200	3,860	6.28
Nov. 11	0845	6,940	8.19	Jan. 7	1915	4,170	6.49
Nov. 13	1615	4,890	7.18	Feb. 8	1400	*21,200	*12.18
Nov. 28	0845	16,000	11.33	Apr. 23	2245	2,990	5.11
Nov. 29	1930	16,500	11.33				

Minimum daily discharge, 300 ft<sup>3</sup>/s Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	462	e480	e5800	1640	e680	638	e700	e1000	840	683	747	616
2	771	e440	4180	1500	e660	652	e750	e950	816	701	729	586
3	1090	e400	3340	1910	e630	666	e700	e910	856	731	719	568
4	981	e360	e2300	1680	e610	702	e680	e870	930	767	679	e500
5	787	e370	1510	1430	e1000	720	e650	e830	938	769	663	e470
6	636	e380	e1350	1440	2880	737	e640	e790	917	752	639	e500
7	529	979	e1200	3260	7640	749	e660	e760	916	737	610	e460
8	471	4780	e1050	3000	15700	762	e690	e730	944	736	600	e430
9	438	3090	1070	2090	7270	785	e760	e700	929	757	607	e400
10	791	1720	1400	1630	3000	862	e800	e680	890	762	631	e370
11	1420	4410	2790	1360	2230	973	e820	e660	858	760	660	e380
12	1190	2710	2690	1190	e1600	1000	e840	711	832	773	673	e390
13	949	3420	3370	1080	e1500	1000	e850	865	818	810	668	e420
14	800	2750	2830	1200	e1400	988	e830	1010	806	860	661	e425
15	758	2040	2300	1780	e1350	972	e820	1020	798	910	658	e520
16	837	1610	1780	2210	e1350	953	858	1040	789	813	651	e580
17	1120	1300	1490	1700	e1550	936	935	1020	774	765	634	e500
18	1110	1620	1340	1420	e2600	915	928	1090	756	704	610	e470
19	874	1330	1190	1250	e2300	896	881	1330	726	631	588	e440
20	754	1170	1070	1190	e1900	876	838	1210	697	576	575	e420
21	758	1090	982	1110	e1700	856	808	1140	679	574	565	e400
22	661	1090	903	1010	e1500	838	783	1110	669	578	556	e400
23	565	1450	839	e970	e1300	818	1750	1110	667	630	549	e385
24	532	1910	790	e930	e1150	797	2510	1080	703	716	549	e375
25	524	2270	767	e900	e1000	775	1870	1050	729	743	557	e360
26	1100	2020	750	e870	e900	750	1560	1030	726	746	591	e350
27	892	2500	737	e830	e780	728	1310	1020	717	758	608	e330
28	746	11700	727	e800	e710	708	e1150	990	710	766	614	e315
29	643	e12500	883	e770	e690	688	e1100	954	699	768	615	e300
30	e570	e9000	1210	e730	---	671	e1050	923	689	769	636	e305
31	e520	---	1820	e700	---	654	---	880	---	763	649	---
TOTAL	24279	80889	54458	43580	67580	25065	29521	29463	23818	22808	19491	12965
MEAN	783	2696	1757	1406	2330	809	984	950	794	736	629	432
MAX	1420	12500	5800	3260	15700	1000	2510	1330	944	910	747	616
MIN	438	360	727	700	610	638	640	660	667	574	549	300
AC-FT	48160	160400	108000	86440	134000	49720	58550	58440	47240	45240	38660	25720
CFSM	5.89	20.3	13.2	10.6	17.5	6.08	7.40	7.15	5.97	5.53	4.73	3.25
IN.	6.79	22.62	15.23	12.19	18.90	7.01	8.26	8.24	6.66	6.38	5.45	3.63

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1996, BY WATER YEAR (WY)

	MEAN	459	822	957	856	834	639	788	1034	1046	800	553	429
MAX	1333	2696	2344	1805	2330	1784	1276	1681	2010	1334	870	739	
(WY)	1948	1996	1976	1974	1996	1972	1990	1949	1974	1974	1974	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	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1942 - 1996
ANNUAL TOTAL	368546	433917	
ANNUAL MEAN	1010	1186	768
HIGHEST ANNUAL MEAN			1186
LOWEST ANNUAL MEAN			496
HIGHEST DAILY MEAN	12500	Nov 29	15700
LOWEST DAILY MEAN	330	Sep 27	105
ANNUAL SEVEN-DAY MINIMUM	368	Sep 7	116
ANNUAL RUNOFF (AC-FT)	731000	860700	556100
ANNUAL RUNOFF (CFSM)	7.59	8.91	5.77
ANNUAL RUNOFF (INCHES)	103.08	121.37	78.42
10 PERCENT EXCEEDS	1610	1910	1340
50 PERCENT EXCEEDS	727	809	622
90 PERCENT EXCEEDS	439	523	320

e Estimated

## 12083000 MINERAL CREEK NEAR MINERAL, WA

LOCATION.--Lat 46°44'40", long 122°08'36", in SE 1/4 SW 1/4 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. Prior to May 14, 1987, at site 0.25 mi downstream.

DRAINAGE AREA.--75.2 mi<sup>2</sup>.

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

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

GAGE.--Water-stage recorder. Elevation of gage is 1,340 ft above sea level, from topographic map. Prior to May 14, 1987, at site 0.25 mi downstream at datum 1.90 ft lower.

REMARKS.--Records good except those above 5,000 ft<sup>3</sup>/s, which are poor. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--54 years (water years 1943-96), 363 ft<sup>3</sup>/s, 65.66 in/yr, 263,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,900 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 12.89 ft, from rating curve extended above 560 ft<sup>3</sup>/s, based on runoff comparisons with nearby stations; minimum discharge, 13 ft<sup>3</sup>/s Sept. 23-25, 1989, gage height, 6.93 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1530	2,970	11.03	Nov. 29	1430	7,020	12.34
Nov. 11	0745	2,730	10.88	Feb. 6	2315	5,000	11.71
Nov. 28	0500	4,320	11.57	Feb. 8	1615	*14,900	*12.89

Minimum discharge, 31 ft<sup>3</sup>/s Aug. 23-27, 29-31, Sept. 1-3, 10-13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	72	170	3010	685	160	314	366	393	211	67	36	31
2	60	157	1960	579	147	303	485	361	199	63	40	31
3	116	147	1390	1010	144	353	385	345	187	61	45	31
4	95	139	1330	887	189	469	341	328	175	60	40	34
5	72	148	985	701	767	450	317	303	167	58	42	36
6	63	171	776	738	2980	437	304	284	156	56	40	39
7	60	915	634	2110	4090	421	296	278	149	54	38	35
8	54	2320	532	1720	9260	441	293	269	142	52	37	33
9	53	1570	569	1100	2990	490	286	254	136	50	36	32
10	214	945	750	820	1310	529	281	242	129	49	35	31
11	628	2200	1540	643	916	524	301	237	124	48	35	31
12	465	1410	1420	527	694	486	407	237	119	45	34	31
13	299	1150	2200	447	589	439	425	303	114	44	34	31
14	220	948	2180	448	530	400	397	350	109	42	34	34
15	177	752	1670	931	494	374	389	367	106	41	33	59
16	231	592	1140	1240	470	349	530	360	102	40	33	66
17	358	478	868	886	526	330	514	378	101	41	33	51
18	431	569	728	689	921	311	468	449	106	45	33	43
19	304	509	599	592	994	305	429	606	97	65	33	44
20	248	440	511	640	849	294	397	527	92	54	32	41
21	249	377	445	627	698	278	369	446	87	48	32	40
22	213	341	392	497	589	277	381	432	84	45	32	42
23	188	475	347	433	538	262	955	403	88	43	32	39
24	171	782	309	383	466	254	1080	368	96	42	31	37
25	193	1140	273	330	424	239	909	337	90	41	31	36
26	500	1120	246	287	392	233	844	310	81	40	31	35
27	357	1260	227	259	361	226	688	288	78	39	31	34
28	288	3340	217	238	338	218	563	272	77	39	32	34
29	241	5900	356	210	325	219	483	264	73	38	31	34
30	209	3810	586	182	---	217	429	246	69	37	31	34
31	188	---	833	170	---	224	---	226	---	37	31	---
TOTAL	7017	34275	29023	21009	33151	10666	14312	10463	3544	1484	1068	1129
MEAN	226	1142	936	678	1143	344	477	338	118	47.9	34.5	37.6
MAX	628	5900	3010	2110	9260	529	1080	606	211	67	45	66
MIN	53	139	217	170	144	217	281	226	69	37	31	31
AC-FT	13920	67980	57570	41670	65750	21160	28390	20750	7030	2940	2120	2240
CFSM	3.01	15.2	12.4	9.01	15.2	4.58	6.34	4.49	1.57	.64	.46	.50
IN.	3.47	16.96	14.36	10.39	16.40	5.28	7.08	5.18	1.75	.73	.53	.56

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1996, BY WATER YEAR (WY)

MEAN	155	515	676	655	626	477	498	386	208	82.7	47.1	56.1
MAX	527	1219	1463	1568	1443	1358	873	745	552	195	94.5	192
(WY)	1956	1956	1976	1953	1982	1972	1991	1949	1955	1983	1968	1959
MIN	23.1	35.9	128	138	146	155	226	141	50.9	38.9	23.6	18.3
(WY)	1953	1953	1977	1977	1977	1992	1973	1994	1992	1970	1970	1989

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1942 - 1996
ANNUAL TOTAL	147781	167141	
ANNUAL MEAN	405	457	363
HIGHEST ANNUAL MEAN			527
LOWEST ANNUAL MEAN			181
HIGHEST DAILY MEAN	5900	Nov 29	9260
LOWEST DAILY MEAN	26	Sep 23	31
ANNUAL SEVEN-DAY MINIMUM	26	Sep 20	31
ANNUAL RUNOFF (AC-FT)	293100	331500	263300
ANNUAL RUNOFF (CFSM)	5.38	6.07	4.83
ANNUAL RUNOFF (INCHES)	73.10	82.68	65.66
10 PERCENT EXCEEDS	921	946	788
50 PERCENT EXCEEDS	242	278	232
90 PERCENT EXCEEDS	41	35	37

## NISQUALLY RIVER BASIN

## 12085000 ALDER RESERVOIR AT ALDER, WA

LOCATION.--Lat 46°48'09", long 122°18'37", in SE 1/4 NW 1/4 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 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is 7.61 ft above sea level (levels by city of Tacoma). 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 production. Chemical analyses December 1973 to September 1983 (samples were taken near the dam).

COOPERATION.--Reservoir elevations and contents, at 2400 hours, provided by Tacoma City Light.

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, 86,710 acre-ft Mar. 26, 1969, gage height, 1,142.77 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents recorded, 210,500 acre-ft Feb. 8, gage height, 1,206.03 ft; minimum contents recorded, 122,900 acre-ft Sept. 30, gage height, 1,171.08 ft.

Capacity table (gage height, in feet, and total contents, in acre-feet)  
(Based on project resurvey and maps provided by city of Tacoma in 1985)

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 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	143400	148800	198600	171600	167000	164600	169800	194700	201400	192200	177100	154100
2	142700	147700	188900	172200	165500	164200	171200	192300	201700	191800	176600	153100
3	143100	146900	180900	175100	164300	164200	171800	189800	202400	192300	175900	152000
4	142700	145900	178500	177100	163400	165100	171900	188900	203100	191500	174800	150500
5	142200	145000	179300	177700	166300	166000	171900	187600	203300	190800	173800	149300
6	140800	144300	180100	178700	178700	166700	171800	186300	203400	190200	172900	148000
7	139700	147000	180100	186500	195500	167600	172100	185600	203800	189700	171800	146600
8	138300	161200	178400	189800	210500	168300	172400	184600	204100	189200	170900	145300
9	137100	167700	174300	189200	208500	169800	172900	183700	204100	188900	170100	144000
10	137800	170200	171200	186700	202600	171900	173400	182900	203800	188200	169500	142800
11	143400	181200	174600	183500	201100	174000	174000	182300	203600	187800	168900	141700
12	143800	184300	176800	181800	201100	175700	175500	182000	203300	187600	168200	140900
13	144700	187500	183500	181000	199900	176800	177000	182400	202900	187500	167100	140000
14	144900	188900	190000	179800	198200	177400	178000	183700	202400	187500	166300	139000
15	144900	188400	192000	180600	194900	177700	179300	185100	201700	187500	165700	138700
16	145500	188400	190300	184000	190200	177900	182100	186200	201300	187200	165100	137800
17	144200	188400	187000	186200	187000	177900	184600	187600	200600	186800	164400	136600
18	148100	189300	184200	187200	187800	177600	186000	190000	199700	186200	163500	135500
19	148800	189300	181800	187300	189300	177300	186500	193700	198700	185600	162700	134500
20	149000	188700	178800	187900	188100	176800	186500	196400	197700	184600	161900	133300
21	149300	187800	176800	188200	184300	176200	186200	198200	197000	183500	161200	132200
22	149300	186500	175400	187600	179600	175700	185000	200200	196400	182600	160800	130800
23	149000	186300	173700	186700	175400	174800	190800	201300	196100	182100	160300	129600
24	148400	188900	171800	185300	171500	174000	194500	201100	196100	181500	159800	128400
25	148100	192800	169500	183700	167300	173000	195700	200800	195700	180700	159100	127400
26	149700	194400	167300	181700	164800	172400	198600	200600	195200	180200	158600	126300
27	150500	194200	166400	179800	165100	171800	199700	200800	194700	179900	157700	125100
28	150800	202100	165700	177600	165000	171200	199400	200800	194200	179500	156900	124200
29	150800	207800	165700	175100	164800	170400	198200	200900	193300	179000	156200	123600
30	150300	203300	167100	172400	---	169600	196700	200900	192700	178500	155800	122900
31	149700	---	169800	169500	---	169200	---	201300	---	177900	155300	---
MAX	150800	207800	198600	189800	210500	177900	199700	201300	204100	192300	177100	154100
MIN	137100	144300	165700	169500	163400	164200	169800	182000	192700	177900	155300	122900
†	1183.67	1203.60	1191.86	1191.75	1189.94	1191.63	1201.40	1202.93	1200.05	1194.80	1185.93	1171.08
‡	+4900	+53600	-33500	-300	-4700	+4400	+27500	+4600	-8600	-14800	-22600	-32400

CAL YR 1995 MAX --- MIN --- AC-FT† -19400  
WTR YR 1996 MAX 210500 MIN 122900 AC-FT‡ -21900

† Gage height, in feet at end of month.

‡ Change in contents, in acre-feet.



## NISQUALLY RIVER BASIN

137

## 12085500 LA GRANDE RESERVOIR AT LA GRANDE, WA

LOCATION.--Lat 46°49'23", long 122°18'13", in SW 1/4 SE 1/4 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 mi<sup>2</sup>.

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. Monthend contents January 1945 to September 1950, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 7.61 ft below sea level (levels by city of Tacoma). Prior to June 12, 1947, monthend 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. Usable 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 city of Tacoma for power production.

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, 2,672 acre-ft Dec. 13, gage height, 934.82 ft; minimum contents recorded, 1,636 acre-ft Oct. 6, gage height, 910.23 ft.

## MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30.....	919.25	1,939	--
Oct. 31.....	926.97	2,269	+330
Nov. 30.....	929.62	2,398	+129
Dec. 31.....	929.30	2,382	-16
CAL YR 1995.....	--	--	-2
Jan. 31.....	928.35	2,335	-47
Feb. 29.....	929.04	2,369	+34
Mar. 31.....	930.03	2,419	+50
Apr. 30.....	929.16	2,375	-44
May 31.....	929.65	2,399	+24
June 30.....	930.23	2,429	+30
July 31.....	930.07	2,421	-8
Aug. 31.....	929.68	2,401	-20
Sept.30.....	929.12	2,373	-28
WTR YR 1996.....	--	--	+434

## NISQUALLY RIVER BASIN

12086500 NISQUALLY RIVER AT LA GRANDE, WA

LOCATION.--Lat 46°50'25", long 122°19'38", in NW 1/4 SE 1/4 sec.29, T.16 N., R.4 E., Pierce County, Hydrologic Unit 17110015, on right bank 0.4 mi downstream from city of Tacoma powerplant, 0.6 mi northwest of La Grande, 0.8 mi upstream from Mashel River, and at mile 40.4.

DRAINAGE AREA.--292 mi<sup>2</sup>.

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. WRD WA-74: 1956(M), 1959-61(M), 1965.

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

REMARKS.--Records fair. Flow regulated by city of Tacoma 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.--70 years (water years 1907-11, 1920-31, 1944-96), 1,425 ft<sup>3</sup>/s, 66.27 in/yr, 1,032,000 acre-ft/yr, adjusted for storage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 39,500 ft<sup>3</sup>/s, Feb. 8, 1996, gage height, 15.30 ft, from rating curve extended above 5,300 ft<sup>3</sup>/s and computed flow over dam as provided by Tacoma Public Utilities, caused by emergency release from Alder Dam; practically no flow on many occasions at site "near La Grande" (which excluded diversion between 1920 and 1930) as a result of regulation.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 39,500 ft<sup>3</sup>/s, Feb. 8, gage height, 15.30 ft; minimum discharge, 632 ft<sup>3</sup>/s, Aug. 26, gage height, 4.09 ft; minimum daily discharge, 689 ft<sup>3</sup>/s, Aug. 23, 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1160	1090	12700	1700	1820	1340	942	3240	800	905	1020	912
2	1170	1090	11300	1830	1240	1320	925	3240	797	832	1020	912
3	1140	1090	8610	1960	1240	1340	918	3190	825	874	1020	1020
4	1090	1090	5480	1970	1240	1340	924	2180	959	925	1010	1100
5	1060	1090	2840	1990	1440	1350	930	2110	957	937	1040	1030
6	1060	1090	1970	1970	3350	1350	927	2080	966	932	1010	1030
7	1050	1090	1960	3130	7070	1280	930	1490	960	888	1000	1040
8	1050	1450	2530	4120	e22600	1260	923	1470	959	899	1010	1030
9	1050	2120	3790	4130	17400	1260	920	1450	949	979	1020	1030
10	1050	2100	4470	4110	9540	1280	920	1190	958	979	1020	1030
11	1050	2560	4520	3800	5900	1260	920	1170	959	988	1040	1100
12	1050	3460	4510	2640	4060	1260	928	1150	958	988	1040	930
13	1050	3450	4500	1970	3960	1250	949	1180	953	999	1140	1030
14	1050	3480	4390	2220	3930	1250	949	1190	1020	1010	1120	1030
15	1050	3480	4440	3050	4310	1250	947	1190	1090	1010	859	1040
16	1050	2750	4510	2730	4720	1250	956	1200	1100	1050	843	1050
17	1050	2140	4480	1940	4720	1250	921	1210	1090	1100	845	1050
18	1040	2130	3760	1950	4710	1250	1220	1220	1110	1110	845	1020
19	1040	2130	3160	1970	4720	1250	1580	1220	1120	1070	845	978
20	1040	2120	3140	1960	5050	1250	1600	1220	1060	1040	811	1030
21	1040	2120	2400	1950	5330	1250	1610	1250	952	1050	704	1050
22	1040	2120	1920	1950	5410	1250	2330	1250	872	1080	697	1040
23	1040	2110	1910	1940	4940	1250	4170	1760	864	923	689	1000
24	1040	2100	1910	1940	4500	1250	5290	2400	876	1080	689	907
25	1040	2580	1910	1940	4440	1220	4630	2310	883	1190	695	810
26	1050	3320	1900	1940	3530	979	3300	2130	837	1050	821	816
27	1070	4470	1320	1940	1500	958	3270	1630	904	1040	1120	818
28	1070	10600	1240	1940	1370	947	3250	1550	906	995	1070	818
29	1060	17300	1240	1940	1340	939	3250	1290	913	988	928	818
30	1090	16500	1230	1930	---	939	3240	1260	924	998	928	818
31	1090	---	1700	1940	---	930	---	834	---	1010	910	---
TOTAL	32980	104220	115740	72490	145380	37552	54569	51254	28521	30919	28809	29287
MEAN	1064	3474	3734	2338	5013	1211	1819	1653	951	997	929	976
MAX	1170	17300	12700	4130	22600	1350	5290	3240	1120	1190	1140	1100
MIN	1040	1090	1230	1700	1240	930	918	834	797	832	689	810
AC-FT	65420	206700	229600	143800	288400	74480	108200	101700	56570	61330	57140	58090
MEAN†	1149	4377	3189	2333	4931	1283	2281	1728	807	756	561	431
CFSM†	3.93	14.99	10.92	7.99	16.89	4.40	7.81	5.92	2.76	2.59	1.92	1.48
IN.†	4.54	16.72	12.59	9.21	18.22	5.07	8.71	6.83	3.08	2.99	2.22	1.65
AC-FT†	70650	260400	196100	143500	283700	78930	135700	106300	48000	46520	34520	25660

CAL YR 1995 TOTAL 629652 MEAN 1725 MAX 17300 MIN 649 AC-FT 1249000 MEAN† 1699 CFSM† 5.82 IN.† 78.98 AC-FT†1230000  
WTR YR 1996 TOTAL 731721 MEAN 1999 MAX 22600 MIN 689 AC-FT 1451000 MEAN† 1971 CFSM† 6.75 IN.† 91.82 AC-FT†1430000

e Estimated

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

## NISQUALLY RIVER BASIN

139

## 12087000 MASHEL RIVER NEAR LA GRANDE, WA

LOCATION.--Lat 46°51'25", long 122°18'05", in NW 1/4 SE 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 mi<sup>2</sup>.

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 sea level. Prior to Oct. 1, 1957, on right bank at same datum.

REMARKS.--No estimated daily discharges. Records good. Small diversion for municipal supply for Eatonville. Some regulation at low water by millpond in Eatonville.

AVERAGE DISCHARGE.--22 years (1940-56, 1992-96), 223 ft<sup>3</sup>/s, 37.58 in/yr, 161,700 acre-ft/yr.

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

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	0830	1,510	5.86	Dec. 14	1900	1,640	5.98
Nov. 28	0330	5,100	8.25	Feb. 5	2100	1,870	6.19
Dec. 1	0800	2,270	6.52	Feb. 8	1030	*6,220	*8.55
Dec. 13	0500	1,500	5.85	Apr. 23	2130	1,650	5.71

Minimum discharge, 3.0 ft<sup>3</sup>/s Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	52	71	1950	460	118	172	288	294	142	44	11	8.8
2	51	62	1280	354	104	167	399	248	127	39	14	8.7
3	199	56	820	640	108	213	272	234	116	38	29	9.6
4	134	53	734	554	184	382	210	243	106	40	21	13
5	77	56	530	432	802	408	174	205	96	37	32	17
6	55	72	406	480	1820	410	162	179	87	33	30	22
7	51	305	330	724	3010	366	155	179	80	30	20	17
8	43	662	274	645	5050	388	142	180	75	27	15	14
9	40	646	314	499	2600	416	131	156	72	25	13	13
10	78	377	448	430	1110	403	185	141	71	24	12	13
11	504	1090	994	345	697	361	208	147	65	23	9.6	13
12	365	701	785	290	510	321	314	169	60	21	9.2	11
13	203	654	1280	246	415	270	454	396	56	20	9.7	12
14	133	544	1260	254	349	227	381	482	54	18	8.7	15
15	97	396	1000	459	299	198	328	505	50	17	7.2	72
16	120	322	637	714	267	175	567	435	47	16	7.0	86
17	170	254	471	476	393	157	526	420	50	18	6.9	62
18	206	375	389	363	596	143	417	463	87	30	7.0	38
19	143	327	328	351	828	139	344	597	62	51	7.2	41
20	126	259	276	442	665	134	293	503	49	40	7.7	42
21	147	207	234	485	535	120	251	407	43	30	9.7	35
22	134	176	202	365	428	152	227	510	41	24	9.9	63
23	110	192	178	305	413	142	960	559	57	21	10	46
24	92	334	158	265	345	143	1070	455	105	18	9.9	33
25	92	998	141	229	294	120	761	362	98	16	6.4	26
26	284	810	130	198	261	110	655	293	67	14	8.2	23
27	216	939	127	182	226	102	556	244	56	13	9.5	21
28	155	3330	137	166	198	95	444	217	77	12	11	19
29	119	1590	196	150	182	98	365	207	64	12	11	18
30	97	1610	368	121	---	99	308	195	51	12	9.1	17
31	82	---	550	118	---	102	---	164	---	11	9.0	---
TOTAL	4375	17468	16927	11742	22807	6733	11547	9789	2211	774	380.9	829.1
MEAN	141	582	546	379	786	217	385	316	73.7	25.0	12.3	27.6
MAX	504	3330	1950	724	5050	416	1070	597	142	51	32	86
MIN	40	53	127	118	104	95	131	141	41	11	6.4	8.7
AC-FT	8680	34650	33570	23290	45240	13350	22900	19420	4390	1540	756	1640
CFSM	1.75	7.22	6.77	4.69	9.75	2.69	4.77	3.91	.91	.31	.15	.34
IN.	2.02	8.05	7.80	5.41	10.51	3.10	5.32	4.51	1.02	.36	.18	.38

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 1996, BY WATER YEAR (WY)

	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
MEAN	114	316	431	339	401	300	293	215	155	61.2	26.5	38.7														
MAX	307	688	890	694	786	567	475	441	329	178	70.6	115														
(WY)	1956	1956	1947	1953	1996	1950	1955	1945	1946	1993	1954	1954														
MIN	9.97	12.8	83.2	113	98.7	88.2	132	67.2	25.2	14.4	12.3	11.2														
(WY)	1953	1953	1953	1957	1941	1941	1942	1947	1992	1951	1996	1952														

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1941 - 1996

ANNUAL TOTAL	82756.7	105583.0	
ANNUAL MEAN	227	288	223
HIGHEST ANNUAL MEAN			337
LOWEST ANNUAL MEAN			125
HIGHEST DAILY MEAN	3330	Nov 28	5570
LOWEST DAILY MEAN	7.4	Sep 24	4.6
ANNUAL SEVEN-DAY MINIMUM	8.4	Sep 20	5.1
ANNUAL RUNOFF (AC-FT)	164100	209400	161700
ANNUAL RUNOFF (CFSM)	2.81	3.57	2.77
ANNUAL RUNOFF (INCHES)	38.15	48.67	37.58
10 PERCENT EXCEEDS	546	641	504
50 PERCENT EXCEEDS	133	160	138
90 PERCENT EXCEEDS	14	13	17



## NISQUALLY RIVER BASIN

141

12089208 CENTRALIA POWER CANAL NEAR MCKENNA, WA

LOCATION.--Lat 46°54'01", long 122°29'50", in NE 1/4 SW 1/4 sec.1, T.16 N., R.2 E., Thurston County, Hydrologic Unit 17110015, on right bank 500 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. Elevation of gage is 330 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by headworks 500 ft upstream from station. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 900 ft<sup>3</sup>/s Nov. 11, 1990, gage height, 7.72 ft; minimum discharge, no flow on many days during 1990, 1992, 1993, 1994, and 1996 water years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 764 ft<sup>3</sup>/s Jan. 9, gage height, 7.03 ft; no flow Feb. 8 to Aug. 9, Aug. 18-20, Sept. 3-7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e19	650	719	727	e720	.00	.00	.00	.00	.00	.00	342
2	e200	660	710	726	e720	.00	.00	.00	.00	.00	.00	342
3	425	646	709	728	723	.00	.00	.00	.00	.00	.00	e190
4	533	641	708	728	723	.00	.00	.00	.00	.00	.00	e.00
5	580	668	715	725	717	.00	.00	.00	.00	.00	.00	e.00
6	588	646	718	726	716	.00	.00	.00	.00	.00	.00	e.00
7	586	690	715	723	715	.00	.00	.00	.00	.00	.00	e150
8	584	694	722	725	e388	.00	.00	.00	.00	.00	.00	170
9	579	700	717	728	.00	.00	.00	.00	.00	.00	e110	171
10	591	698	717	713	.00	.00	.00	.00	.00	.00	182	237
11	677	653	718	708	.00	.00	.00	.00	.00	.00	186	382
12	717	719	718	718	.00	.00	.00	.00	.00	.00	255	381
13	705	725	710	719	.00	.00	.00	.00	.00	.00	329	431
14	693	718	714	449	.00	.00	.00	.00	.00	.00	333	444
15	691	712	716	658	.00	.00	.00	.00	.00	.00	329	471
16	670	710	718	718	.00	.00	.00	.00	.00	.00	329	499
17	668	714	718	723	.00	.00	.00	.00	.00	.00	330	511
18	669	710	721	726	.00	.00	.00	.00	.00	.00	e225	484
19	668	713	722	726	.00	.00	.00	.00	.00	.00	e.00	460
20	671	716	726	727	.00	.00	.00	.00	.00	.00	e50	465
21	682	724	722	728	.00	.00	.00	.00	.00	.00	270	472
22	688	713	726	725	.00	.00	.00	.00	.00	.00	307	472
23	681	727	725	725	.00	.00	.00	.00	.00	.00	285	466
24	669	651	728	721	.00	.00	.00	.00	.00	.00	272	402
25	600	417	727	725	.00	.00	.00	.00	.00	.00	273	357
26	612	717	724	726	.00	.00	.00	.00	.00	.00	267	366
27	682	714	724	723	.00	.00	.00	.00	.00	.00	286	383
28	690	715	729	721	.00	.00	.00	.00	.00	.00	246	388
29	654	709	731	722	.00	.00	.00	.00	.00	.00	340	388
30	661	708	729	723	.00	.00	.00	.00	.00	.00	343	365
31	667	---	728	e720	---	.00	---	.00	---	.00	342	---
TOTAL	18800	20578	22324	22080	5422.00	0.00	0.00	0.00	0.00	0.00	5889.00	10189.00
MEAN	606	686	720	712	187	.000	.000	.000	.000	.000	190	340
MAX	717	727	731	728	723	.00	.00	.00	.00	.00	343	511
MIN	19	417	708	449	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	37290	40820	44280	43800	10750	.00	.00	.00	.00	.00	11680	20210
CAL YR 1995	TOTAL	213772	MEAN 586	MAX 731	MIN 19	AC-FT 424000						
WTR YR 1996	TOTAL 105282.00	MEAN 288	MAX 731	MIN .00	AC-FT 208800							

e Estimated



## NISQUALLY RIVER BASIN

## 12089500 NISQUALLY RIVER AT MCKENNA, WA

LOCATION.--Lat 46°56'01", long 122°33'35", in SE 1/4 NW 1/4 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 mi<sup>2</sup>.

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 sea level. Prior to Sept. 30, 1968, water-stage recorder at site 80 ft downstream at present datum. Prior to Oct. 11, 1985, water-stage recorder at site 20 ft upstream at present datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. 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.--40 years (water years 1948-68, 1978-96), 1,299 ft<sup>3</sup>/s, 941,200 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,000 ft<sup>3</sup>/s Feb. 8 or 9, 1996, gage height, 17.13 ft, estimated based on comparison with upstream gaging stations; minimum discharge, 20 ft<sup>3</sup>/s Sept. 10, 11, 1965, Aug. 31, 1966.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 50,000 ft<sup>3</sup>/s Feb. 8 or 9, gage height, 17.13 ft, estimated based on comparison with upstream gaging stations; minimum daily discharge, 410 ft<sup>3</sup>/s Aug. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1210	591	15700	2040	1650	1760	1370	3230	1370	1120	1020	e630
2	1050	572	14100	1910	955	1710	1710	3150	1280	1090	1020	e625
3	888	574	10300	2330	895	1750	1640	3100	1230	1070	1030	e850
4	760	575	6980	2430	964	1970	1530	2400	1220	1070	1030	e1120
5	618	557	3680	2280	1520	2110	1450	2210	1240	1080	1040	e1020
6	600	595	2400	2270	4790	2150	1400	2160	1240	1080	1040	e980
7	579	726	2160	3360	10300	2020	1360	1850	1230	1070	1020	e910
8	573	1250	2370	4740	e26200	1960	1340	1800	1230	1060	1020	e905
9	574	2450	3560	4480	e27300	1990	1320	1760	1210	1060	983	e900
10	582	1970	4440	4360	14600	1970	1320	1560	1210	1060	e855	e840
11	871	3000	5230	4020	8280	1950	1370	1510	1200	1060	e870	e670
12	834	3840	5040	2830	5070	1900	1470	1550	1190	1060	e810	e580
13	679	3560	5780	1960	4710	1810	1690	1850	1180	1050	e840	e560
14	609	3550	5590	2290	4440	1730	1770	2230	1170	1050	e800	e555
15	570	3300	5700	3170	4500	1680	1670	2210	1200	1040	e550	e560
16	585	2700	5140	3490	5120	1640	1940	2210	1220	1060	e525	e570
17	612	1880	4760	2340	5170	1610	1980	2090	1220	1110	e520	e540
18	659	1940	4080	2120	5410	1580	1960	2070	1260	1120	e630	e535
19	608	1920	3220	2100	5820	1560	2120	2210	1290	1140	e850	e530
20	583	1830	3090	2160	5920	1560	2110	2230	1280	1120	e770	e560
21	595	1760	2520	2390	6150	1530	2040	2110	1210	1110	e440	e570
22	602	1720	1810	2270	5860	1560	2140	2070	1140	1110	e410	e570
23	578	1690	1750	2110	5430	1590	3810	2310	1100	1020	e415	e540
24	565	1900	1690	2020	4680	1560	6860	2830	1110	1050	e425	548
25	604	3160	1660	1960	4510	1540	5930	2830	1190	1200	e440	570
26	738	3860	1620	1910	3830	1320	4010	2770	1140	1050	e490	543
27	692	4210	1130	1870	2030	1290	3800	2420	1120	1050	e770	540
28	626	12400	925	1830	1850	1290	3580	2080	1120	1030	e885	540
29	608	18000	956	1800	1790	1270	3410	1890	1120	1020	e650	540
30	608	19700	1350	1720	---	1270	3280	1730	1120	1020	e640	550
31	596	---	1920	1670	---	1270	---	1550	---	1020	e635	---
TOTAL	20856	105780	130651	78230	179744	51900	71380	67970	36040	33250	23423	19951
MEAN	673	3526	4215	2524	6198	1674	2379	2193	1201	1073	756	665
MAX	1210	19700	15700	4740	27300	2150	6860	3230	1370	1200	1040	1120
MIN	565	557	925	1670	895	1270	1320	1510	1100	1020	410	530
AC-FT	41370	209800	259100	155200	356500	102900	141600	134800	71490	65950	46460	39570

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1996, BY WATER YEAR (WY)

	MEAN	826	1673	2282	2079	2287	1569	1373	1187	902	550	421	511
MAX	1693	4071	5516	4264	6198	3398	2714	2659	1894	1308	756	1167	
(WY)	1956	1956	1978	1965	1996	1950	1991	1949	1950	1955	1996	1977	
MIN	298	272	655	705	668	405	553	499	254	85.5	137	148	
(WY)	1962	1953	1953	1979	1985	1962	1978	1978	1965	1965	1963	1965	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1948 - 1996
ANNUAL TOTAL	557936	819175	
ANNUAL MEAN	1529	2238	1299
HIGHEST ANNUAL MEAN			2238
LOWEST ANNUAL MEAN			711
HIGHEST DAILY MEAN	19700	27300	27300
LOWEST DAILY MEAN	318	410	22
ANNUAL SEVEN-DAY MINIMUM	326	484	27
ANNUAL RUNOFF (AC-FT)	1107000	1625000	941200
10 PERCENT EXCEEDS	2980	4490	2290
50 PERCENT EXCEEDS	702	1490	944
90 PERCENT EXCEEDS	508	579	379

e Estimated

## CHAMBERS CREEK BASIN

143

12090400 NORTH FORK CLOVER CREEK NEAR PARKLAND, WA

LOCATION.--Lat 47°08'05", long 122°24'50", in SE 1/4 NW 1/4 sec.15, T.19 N., R.3 E., Pierce County, Hydrologic Unit 17110019, at Golden Given Avenue crossing, 1.5 mi southeast of Parkland.

DRAINAGE AREA.--6.25 mi<sup>2</sup>.

PERIOD OF RECORD.--Water years 1960-1975 (annual maximum), November 1990 to September 1992 and October 1994 to current year.

GAGE.--Water-stage recorder. Datum of gage is 315 ft above sea level, from topographic map.

REMARKS.--Records fair except for those below 2 ft<sup>3</sup>/s and above 100 ft<sup>3</sup>/s and estimated daily discharges, which are poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--3 years (water years 1992, 1995-96), 7.59 ft<sup>3</sup>/s, 16.50 in/yr, 5,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined Feb. 8, 1996, gage height, 12.81 ft, from outside high-water mark, affected by backwater; no flow for many days most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, not determined Feb. 8, gage height, 12.81 ft, from outside high-water mark, affected by backwater; no flow for many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.20	.00	83	e12	e4.2	e4.0	15	5.7	.46	.00	.00	.00
2	.05	.00	68	12	e3.6	3.7	10	4.6	.22	.00	.00	.00
3	.30	.00	35	26	e3.4	10	6.2	4.0	.02	.00	.00	.00
4	.01	.00	33	12	e10	9.9	e5.1	3.2	.00	.08	e.00	.00
5	.01	.00	15	12	49	8.8	e4.4	2.6	.00	.00	e.00	.00
6	.01	.05	9.8	21	135	8.3	e4.2	2.1	.00	.00	e.00	.00
7	.00	13	7.3	92	161	6.9	e3.9	2.0	.00	.00	e.00	.00
8	.00	22	5.3	34	e400	6.7	e3.5	1.9	.00	.00	e.00	.00
9	.00	6.1	17	17	e110	6.0	e3.0	1.3	.00	.00	e.00	.00
10	10	6.0	42	11	34	8.7	e5.0	.95	.00	.00	e.00	.00
11	13	43	68	7.9	24	13	6.3	1.6	.00	.00	e.00	.00
12	2.1	9.8	45	6.2	19	8.4	7.0	4.4	.00	.00	e.00	.00
13	.56	14	41	6.5	14	6.4	6.5	26	.00	.00	e.00	.00
14	.03	9.6	38	18	12	5.1	4.7	13	.00	.00	.00	.00
15	.00	5.1	26	72	10	4.1	5.4	8.1	.00	.00	.00	5.7
16	1.3	3.4	14	40	9.1	3.5	24	6.6	.00	.00	.00	.15
17	2.5	2.0	12	19	20	3.0	12	10	.00	.00	.00	.00
18	.85	6.7	38	12	30	2.7	13	15	.00	.43	.00	.00
19	.06	4.3	20	21	33	3.0	14	14	.00	.42	.00	.00
20	1.9	2.0	11	86	22	2.5	10	9.2	.00	.00	.00	.00
21	.83	1.1	8.1	76	19	2.2	7.5	6.7	.00	.00	.00	.00
22	.08	.95	5.9	40	14	4.9	13	6.4	.00	.00	.00	.00
23	.02	13	4.3	27	27	4.0	143	4.7	.42	.00	.00	.00
24	.00	23	3.3	30	15	3.3	70	3.8	.79	.00	.00	.00
25	1.2	29	2.6	24	11	2.4	44	2.7	.01	.00	.00	.00
26	1.2	18	2.1	14	8.8	2.0	36	1.9	.00	.00	.00	.00
27	.09	16	2.2	10	7.1	1.9	19	1.4	.46	.00	.00	.00
28	.01	69	3.9	8.4	5.6	1.6	12	1.1	1.0	.00	.00	.00
29	.00	214	34	6.8	e5.0	2.1	8.4	.99	.01	.00	.00	.00
30	.00	86	32	e5.6	---	2.0	6.2	.88	.00	.00	.00	.00
31	.00	---	e18	e4.8	---	3.0	---	.96	---	.00	.00	---
TOTAL	36.31	617.10	744.8	784.2	1215.8	154.1	522.3	167.78	3.39	0.93	0.00	5.85
MEAN	1.17	20.6	24.0	25.3	41.9	4.97	17.4	5.41	.11	.030	.000	.19
MAX	13	214	83	92	400	13	143	26	1.0	.43	.00	5.7
MIN	.00	.00	2.1	4.8	3.4	1.6	3.0	.88	.00	.00	.00	.00
AC-FT	72	1220	1480	1560	2410	306	1040	333	6.7	1.8	.00	12
CFSM	.19	3.29	3.84	4.05	6.71	.80	2.79	.87	.02	.00	.00	.03
IN.	.22	3.67	4.43	4.67	7.24	.92	3.11	1.00	.02	.01	.00	.03

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1996, BY WATER YEAR (WY)

	1991	1992	1993	1994	1995	1996
MEAN	.40	8.99	17.5	17.0	27.0	11.0
MAX	1.17	20.6	24.0	25.3	41.9	20.4
(WY)	1996	1996	1996	1996	1991	1996
MIN	.000	2.76	4.68	12.3	15.2	3.73
(WY)	1995	1995	1992	1995	1992	1995

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1991 - 1996

	1995 CALENDAR YEAR	1996 WATER YEAR	1991 - 1996
ANNUAL TOTAL	3147.15	4252.56	7.59
ANNUAL MEAN	8.62	11.6	11.6
HIGHEST ANNUAL MEAN			4.20
LOWEST ANNUAL MEAN			4.00
HIGHEST DAILY MEAN	230	400	400
LOWEST DAILY MEAN	.00	.00	.00
ANNUAL SEVEN-DAY MINIMUM	.00	.00	.00
ANNUAL RUNOFF (AC-FT)	6240	8430	5500
ANNUAL RUNOFF (CFSM)	1.38	1.86	1.21
ANNUAL RUNOFF (INCHES)	18.73	25.31	16.50
10 PERCENT EXCEEDS	23	29	22
50 PERCENT EXCEEDS	1.3	2.6	1.1
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated

## CHAMBERS CREEK BASIN

12090500 CLOVER CREEK NEAR TILlicum, WA

LOCATION.--Lat 47°08'40", long 122°30'10", in SW 1/4 SW 1/4 sec.12, T.19 N., R.2 E., Pierce County, Hydrologic Unit 17110019, at Bridgeport Way crossing, 2.5 mi northeast of Tillicum.

DRAINAGE AREA.--73.8 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1949 to October 1954, October 1959 to September 1970 (annual maximums only), September 1990 to October 1992, October 1994 to current year.

GAGE.--Water-stage recorder. Datum of gage is 270 ft above sea level, from topographic map. Prior to October 1, 1994, at datum 5.00 ft lower.

REMARKS.--Records fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--9 years (water years 1950-54, 1991-92, 1995-96), 44.8 ft<sup>3</sup>/s, 8.25 in/yr, 32,460 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 568 ft<sup>3</sup>/s Feb. 12, 1991, gage height, 5.71 ft (datum then in use); no flow for many days in 1949, 1952-53.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 418 ft<sup>3</sup>/s Feb. 9, gage height, 9.29 ft; minimum daily discharge, 0.91 ft<sup>3</sup>/s Oct. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.7	4.4	67	e66	91	e140	e80	104	59	32	19	5.1
2	1.9	4.0	74	67	87	138	e150	100	56	30	20	5.1
3	1.7	3.9	77	70	86	140	e148	97	54	29	19	9.8
4	1.3	4.0	75	68	87	139	e135	91	53	29	20	9.5
5	1.2	4.4	72	70	99	136	e125	87	53	27	20	8.9
6	1.1	4.6	67	71	128	132	e115	84	52	25	21	8.8
7	1.0	14	63	89	178	127	e110	82	51	25	21	8.0
8	.91	15	60	95	299	120	e100	79	50	24	20	7.7
9	.97	9.2	62	92	395	116	e90	76	48	24	19	7.7
10	9.8	13	70	87	349	115	e80	73	47	26	19	7.7
11	12	18	80	80	299	116	72	71	46	24	19	7.3
12	4.9	13	89	75	266	114	72	73	43	25	15	7.1
13	4.4	16	92	74	239	111	72	81	42	26	11	7.4
14	4.1	14	90	75	221	108	70	79	41	28	11	8.0
15	4.1	13	89	90	205	105	71	78	40	28	11	11
16	5.2	12	86	101	193	102	79	77	38	28	9.9	7.4
17	6.2	12	82	101	191	98	81	78	39	28	11	7.1
18	4.6	14	86	96	193	96	84	80	37	32	10	7.0
19	4.4	12	83	95	199	95	83	80	36	33	10	7.8
20	6.5	12	79	108	199	93	82	78	32	32	9.1	6.9
21	5.2	12	74	130	191	91	80	80	30	31	8.3	6.5
22	4.5	12	71	138	184	91	84	82	32	30	7.7	6.2
23	4.4	17	67	135	187	90	124	80	37	28	7.7	6.2
24	4.2	17	64	129	183	88	161	77	34	27	7.3	6.2
25	7.2	18	61	125	174	86	166	73	34	28	5.8	6.2
26	5.1	18	58	120	167	84	163	70	37	26	5.8	6.2
27	4.3	20	56	113	162	83	154	68	39	25	5.8	6.2
28	4.2	31	56	110	156	e76	145	66	35	22	5.8	6.2
29	4.2	52	64	104	e150	e74	137	64	35	20	5.8	6.2
30	4.3	59	66	100	---	e74	114	63	34	21	5.8	6.2
31	4.4	---	e70	95	---	e70	---	61	---	21	5.2	---
TOTAL	129.98	468.5	2250	2969	5558	3248	3227	2432	1264	834	386.0	217.6
MEAN	4.19	15.6	72.6	95.8	192	105	108	78.5	42.1	26.9	12.5	7.25
MAX	12	59	92	138	395	140	166	104	59	33	21	11
MIN	.91	3.9	56	66	86	70	70	61	30	20	5.2	5.1
AC-FT	258	929	4460	5890	11020	6440	6400	4820	2510	1650	766	432
CFSM	.06	.21	.98	1.30	2.60	1.42	1.46	1.06	.57	.36	.17	.10
IN.	.07	.24	1.13	1.50	2.80	1.64	1.63	1.23	.64	.42	.19	.11

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 1996, BY WATER YEAR (WY)

	MEAN	3.75	12.6	51.2	81.6	124	97.2	76.6	45.1	25.5	13.8	6.27	3.69
MAX	10.3	37.0	119	158	279	192	133	78.5	42.1	26.9	12.5	9.25	
(WY)	1951	1991	1951	1951	1951	1950	1991	1996	1996	1996	1996	1954	
MIN	.000	.000	.000	25.2	47.1	38.0	29.8	20.7	9.93	4.47	.56	.077	
(WY)	1953	1953	1953	1952	1952	1992	1952	1952	1992	1952	1952	1952	

## SUMMARY STATISTICS

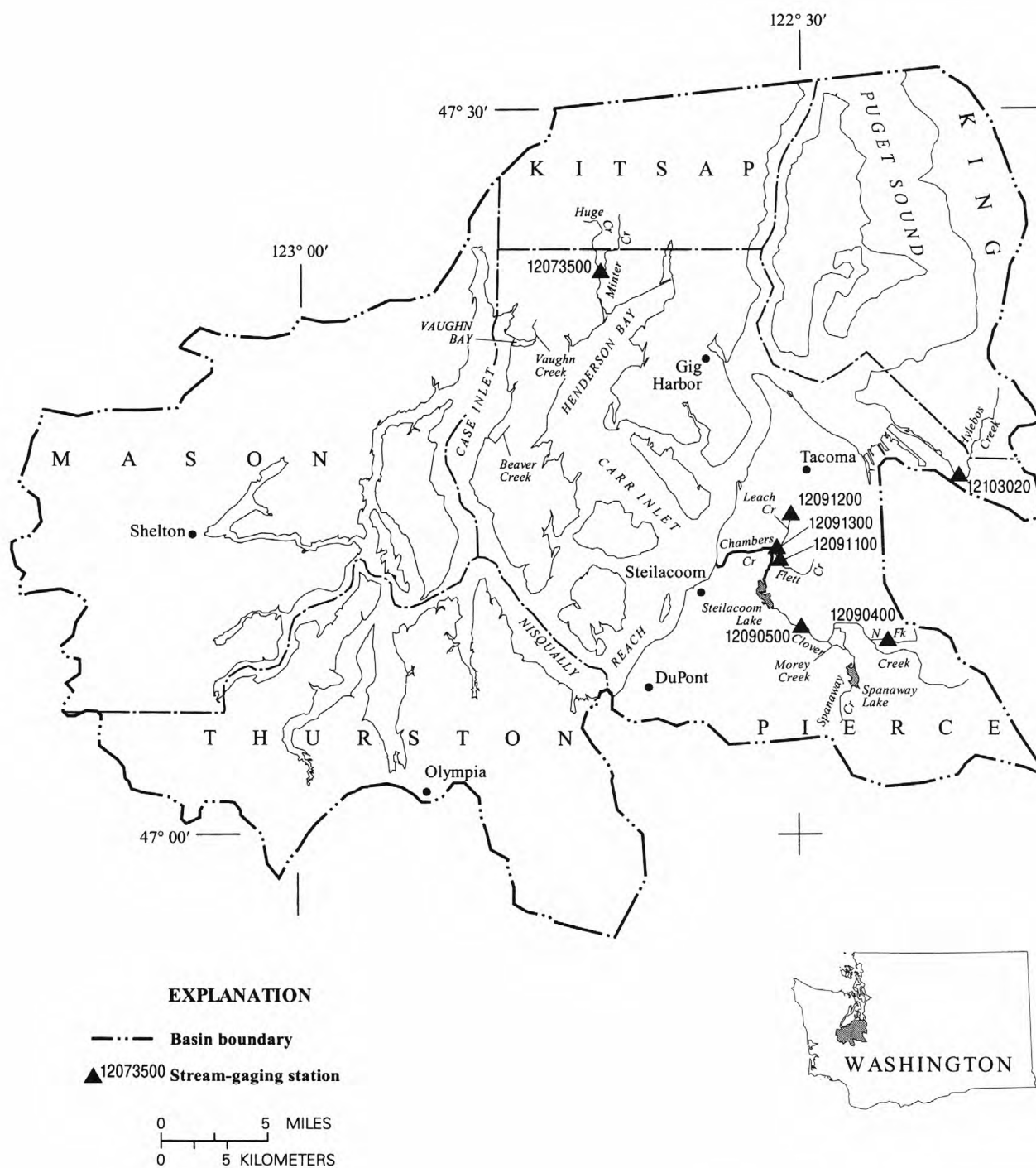
## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1949 - 1996

ANNUAL TOTAL	13364.66	22984.08	
ANNUAL MEAN	36.6	62.8	44.8
HIGHEST ANNUAL MEAN			77.4
LOWEST ANNUAL MEAN			17.4
HIGHEST DAILY MEAN	165	395	532
LOWEST DAILY MEAN	.91	.91	.00
ANNUAL SEVEN-DAY MINIMUM	1.1	1.2	.00
ANNUAL RUNOFF (AC-FT)	26510	45590	32460
ANNUAL RUNOFF (CFSM)	.50	.85	.61
ANNUAL RUNOFF (INCHES)	6.74	11.59	8.25
10 PERCENT EXCEEDS	81	136	119
50 PERCENT EXCEEDS	23	57	22
90 PERCENT EXCEEDS	3.0	5.8	1.5

e Estimated



**Figure 35.** Location of surface-water stations in the Chambers Creek Basin.

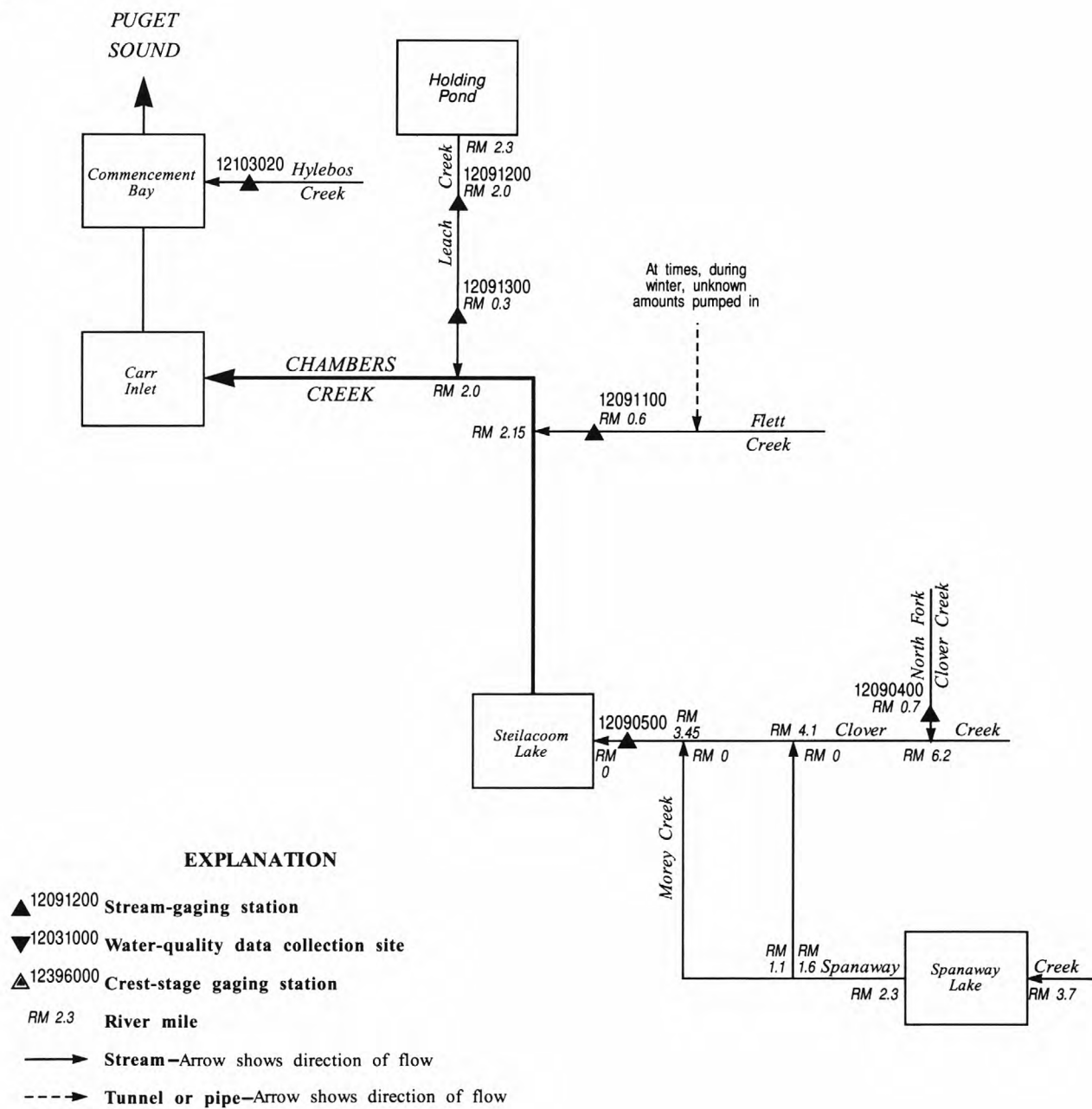


Figure 36. Schematic diagram showing surface-water stations in the Chambers Creek Basin.



## CHAMBERS CREEK BASIN

147

12091100 FLETT CREEK AT TACOMA, WA

LOCATION.--Lat 47°11'23", long 122°31'08", in NE 1/4 SW 1/4 sec.26, T.20 N., R.2 E., Pierce County, Hydrologic Unit 17110019, on right bank at 75th Street bridge, 0.6 mi upstream from mouth and 0.7 mi west of city limits of Tacoma.

DRAINAGE AREA.--7.33 mi<sup>2</sup>, excludes 0.68 mi<sup>2</sup> storm drainage diverted to Leach Creek basin but does not include some urban storm drainage diverted into the basin.

PERIOD OF RECORD.--June 1959 to September 1985, October 1985 to current year (seasonal records).

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 195.05 ft above sea level (levels by USGS National Mapping Division).

REMARKS.--Records fair except for estimated daily discharges, which are poor. Storm sewer drainage upstream from station. Several diversions for irrigation and industrial use. At times during winter months 1,000 gpm are pumped into creek for short intervals from Mountain View Memorial Park. Since October 1979, Flett Creek flood control retention ponds store and release flood water upstream from station. Chemical analyses October 1964 to September 1965.

AVERAGE DISCHARGE.--26 years (water years 1960-85), 10.0 ft<sup>3</sup>/s, 7,240 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 203 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 3.08 ft, from rating curve extended above 115 ft<sup>3</sup>/s; minimum discharge, 0.09 ft<sup>3</sup>/s Oct. 23-25, Nov. 11, 12, 1987.

EXTREMES FOR THE PERIOD OCTOBER TO MAY.--Maximum discharge, 203 ft<sup>3</sup>/s Feb. 8, gage height, 3.08 ft; minimum discharge, 0.14 ft<sup>3</sup>/s Nov. 3, 4.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1995 TO MAY 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY
1	.64	.17	63	e25	e21	25	18	49
2	.78	.15	63	e24	e20	19	19	41
3	.79	.14	58	e25	e19	23	17	39
4	.47	.16	53	e23	e19	25	15	37
5	.39	.19	50	e21	e28	25	13	27
6	.43	2.4	47	e28	e40	23	12	24
7	.40	9.8	33	e40	e70	19	12	22
8	.49	18	29	e39	e115	19	10	20
9	.74	32	31	e35	106	14	8.3	18
10	5.2	26	34	e29	88	18	10	18
11	11	32	49	e25	85	20	13	19
12	15	37	55	e22	79	20	12	25
13	18	28	e55	e20	75	18	13	49
14	17	23	e53	e20	74	12	10	47
15	6.8	22	e51	e19	68	13	11	45
16	4.5	20	e45	e34	57	11	23	43
17	6.8	14	e41	e33	48	11	25	44
18	6.2	13	e44	e30	49	10	27	44
19	4.8	11	e36	e30	52	10	25	45
20	5.4	8.9	e31	e43	51	9.5	23	43
21	8.8	7.3	e27	e54	47	8.8	22	39
22	5.4	7.4	e25	e54	34	11	25	34
23	1.7	11	e23	e50	49	11	53	29
24	4.8	16	e20	e40	51	9.5	77	25
25	3.4	21	e19	e35	32	8.6	83	17
26	8.5	21	e18	e31	31	8.1	89	17
27	2.6	22	e18	e28	33	7.9	77	16
28	3.5	26	e17	e26	28	7.3	72	12
29	.67	48	e22	e24	28	7.3	57	14
30	3.0	63	e27	e23	---	7.1	65	12
31	1.7	---	e26	e22	---	7.8	---	12
TOTAL	149.90	540.61	1163	952	1497	438.9	936.3	926
MEAN	4.84	18.0	37.5	30.7	51.6	14.2	31.2	29.9
MAX	18	63	63	54	115	25	89	49
MIN	.39	.14	17	19	19	7.1	8.3	12
AC-FT	297	1070	2310	1890	2970	871	1860	1840

e Estimated

## 12091200 LEACH CREEK NEAR FIRCREST, WA

LOCATION.--Lat 47°13'18", long 122°30'29", in lot 24, block 14, SE 1/4 NE 1/4 sec.14, T.20 N., R.2 E., Pierce County, Hydrologic Unit 17110019, on left bank 1.0 mi south of Fircrest, and 2 mi upstream from mouth.

DRAINAGE AREA.--4.73 mi<sup>2</sup> includes 0.68 mi<sup>2</sup> storm drainage from Flett Creek basin.

PERIOD OF RECORD.--March 1957 to September 1985, October 1985 to April 1988 (seasonal records), October 1988 to current year.

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder and metal weir control. Prior to Oct. 19, 1979, at site 20 ft downstream at same datum. Datum of gage is 222.98 ft above sea level (levels by U.S. Geological Survey National Mapping Division).

REMARKS.--Records fair. Since Oct. 1, 1961, flow may be regulated at dam upstream from station. Low flows supplemented from well in basin beginning June 30, 1993. Storage is not retained and observed annual runoff closely represents natural runoff of basin. Drainage into basin influenced by urbanizing of area. No known diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--36 years (water years 1958-85, 1989-96), 4.49 ft<sup>3</sup>/s, 12.91 in/yr, 3,260 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 309 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 5.76 ft, from rating curve extended above 200 ft<sup>3</sup>/s; minimum discharge, 0.1 ft<sup>3</sup>/s Sept. 22, 1965.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 185 ft<sup>3</sup>/s Feb. 8, gage height, 4.00 ft; minimum discharge, 1.5 ft<sup>3</sup>/s Oct. 4-8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.6	1.8	35	3.4	3.0	3.0	17	3.2	2.8	2.7	2.6	2.5
2	7.0	1.8	24	11	2.7	2.9	4.8	3.1	2.7	2.7	6.7	2.5
3	4.4	1.7	17	12	8.7	10	4.3	3.1	2.8	4.0	3.0	12
4	1.5	1.9	12	5.5	5.9	5.2	3.6	3.0	2.8	3.1	3.1	2.7
5	1.5	4.0	3.4	11	e27	3.8	3.3	3.1	2.7	2.8	2.8	5.3
6	1.7	5.5	2.9	10	37	3.2	9.2	2.9	2.7	2.8	2.8	2.8
7	1.6	36	2.5	41	37	3.8	3.6	3.0	2.6	2.8	2.8	2.5
8	3.1	27	2.3	6.4	87	3.6	3.3	2.9	2.6	2.9	2.5	2.5
9	4.8	3.1	23	5.5	20	4.5	4.2	2.8	2.6	2.7	2.5	2.6
10	33	14	27	3.7	7.3	13	4.2	2.8	2.6	2.7	2.4	2.6
11	24	25	34	3.3	5.1	10	6.3	4.9	2.6	2.7	2.4	2.6
12	2.9	4.0	17	3.1	4.2	4.2	5.0	8.6	2.7	2.7	2.4	2.6
13	2.0	12	20	8.1	3.8	3.7	3.7	20	2.7	2.7	2.4	5.2
14	1.7	3.3	25	14	3.7	3.5	3.4	3.7	2.6	2.7	2.5	8.5
15	3.3	4.5	6.1	38	3.4	3.4	8.6	3.2	2.6	2.7	2.5	12
16	8.5	2.1	3.5	7.3	3.4	3.4	18	3.0	2.6	2.7	2.5	3.3
17	9.9	4.7	9.0	4.7	15	3.4	5.1	9.0	3.8	2.8	2.5	3.1
18	2.0	4.9	24	5.0	17	3.4	11	13	2.8	5.5	2.5	4.0
19	1.6	2.3	3.8	15	11	3.8	6.6	5.2	2.7	5.5	2.6	4.1
20	9.7	2.1	3.0	37	9.8	3.4	3.6	3.7	2.7	3.0	2.7	3.1
21	3.9	2.0	2.7	39	7.4	4.1	3.2	6.3	2.7	2.9	2.6	3.0
22	1.7	4.9	2.6	13	11	6.4	22	4.2	2.7	2.7	2.5	2.9
23	1.8	23	2.7	10	18	4.1	56	3.3	13	2.6	2.4	2.9
24	1.7	15	2.5	14	5.3	3.5	33	3.0	6.5	2.6	2.4	3.1
25	12	19	2.4	5.2	3.9	3.3	21	2.9	3.0	2.5	2.7	2.8
26	2.9	5.4	2.4	5.3	3.4	3.2	11	2.8	2.7	2.5	2.6	2.7
27	2.1	15	3.8	3.7	3.1	3.2	4.4	2.8	2.6	2.6	2.5	2.8
28	2.0	27	12	4.5	3.0	3.2	3.7	2.8	2.7	2.6	2.5	2.9
29	1.8	52	35	3.5	3.0	3.6	3.4	2.8	2.7	2.7	2.5	2.9
30	1.7	24	16	2.9	---	3.2	3.6	2.8	2.7	2.6	3.5	2.9
31	1.8	---	4.1	3.2	---	11	---	2.8	---	2.7	2.5	---
TOTAL	159.2	349.0	380.7	349.3	370.1	144.0	290.1	140.7	96.0	91.2	84.9	115.4
MEAN	5.14	11.6	12.3	11.3	12.8	4.65	9.67	4.54	3.20	2.94	2.74	3.85
MAX	33	52	35	41	87	13	56	20	13	5.5	6.7	12
MIN	1.5	1.7	2.3	2.9	2.7	2.9	3.2	2.8	2.6	2.5	2.4	2.5
AC-FT	316	692	755	693	734	286	575	279	190	181	168	229
CFSM	1.09	2.46	2.60	2.38	2.70	.98	2.04	.96	.68	.62	.58	.81
IN.	1.25	2.74	2.99	2.75	2.91	1.13	2.28	1.11	.76	.72	.67	.91

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1957 - 1996, BY WATER YEAR (WY)

	3.93	6.80	7.37	7.48	6.50	5.21	4.17	2.95	2.78	2.26	2.40	2.81
MEAN	3.93	6.80	7.37	7.48	6.50	5.21	4.17	2.95	2.78	2.26	2.40	2.81
MAX	8.38	16.8	14.6	16.3	14.4	12.4	10.3	5.52	5.22	4.58	3.87	6.92
(WY)	1986	1991	1980	1990	1982	1972	1991	1984	1981	1983	1975	1978
MIN	1.57	2.53	3.54	2.80	1.72	2.22	2.09	1.72	1.40	1.33	1.12	1.24
(WY)	1973	1977	1977	1962	1993	1992	1977	1965	1969	1969	1969	1989

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1957 - 1996

ANNUAL TOTAL	1899.7	2570.6	
ANNUAL MEAN	5.20	7.02	4.49
HIGHEST ANNUAL MEAN			7.02
LOWEST ANNUAL MEAN			2.60
HIGHEST DAILY MEAN	52	Nov 29	166
LOWEST DAILY MEAN	1.5	Jan 25	.50
ANNUAL SEVEN-DAY MINIMUM	1.6	Sep 13	.71
ANNUAL RUNOFF (AC-FT)	3770	5100	3260
ANNUAL RUNOFF (CFSM)	1.10	1.48	.95
ANNUAL RUNOFF (INCHES)	14.94	20.22	12.91
10 PERCENT EXCEEDS	14	17	9.6
50 PERCENT EXCEEDS	2.1	3.3	2.5
90 PERCENT EXCEEDS	1.6	2.5	1.5

e Estimated

LOCATION.--(revised) Lat 47°11'54", long 122°31'17", in NW 1/4 NW 1/4 sec. 26, T.20 N., R.2 E., Pierce County, Hydrologic Unit 17110019, on right bank 0.3 mi upstream from mouth, and 4.1 mi northeast of Steilacoom.

DRAINAGE AREA.--6.56 mi<sup>2</sup>, includes 0.68 mi<sup>2</sup> storm drainage from Flett Creek basin. Area used prior to July 1967, 5.88 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1957 to September 1985, October 1985 to September 1992 (seasonal records), October 1992 to current year.

REVISÉD RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 140 ft above sea level (levels by U.S. Geological Survey National Mapping Division). Prior to June 27, 1973, water-stage recorder at site 150 ft upstream at different datum. Supplementary water-stage recorder at site 50 ft downstream at different datum used Feb. 4, 1963, to Feb. 27, 1964. June 27, 1973, to Mar. 14, 1975, nonrecording gage at site 350 ft upstream at different datum.

REMARKS...Records fair except for estimated daily discharges and those below 15 ft<sup>3</sup>/s, which are poor. Drainage basin influenced by urbanizing of area. Some pumping for community use upstream from gage. Flow can be regulated by manually operated gate in flood control dam. Low flows supplemented from well in basin beginning June 30, 1993. Storage is not retained and observed annual runoff closely represents natural runoff of basin. Chemical analyses October 1962 to September 1965, October 1975 to September 1976.

AVERAGE DISCHARGE.--32 years (water years 1958-85, 1993-96), 10.6 ft<sup>3</sup>/s, 7,650 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum recorded discharge, 378 ft<sup>3</sup>/s, Jan. 18, 1986, by culvert computation of peak flow through culvert, gage height, 5.21 ft, from outside high-water mark; minimum discharge, 2.0 ft<sup>3</sup>/s, July 3, 1961.

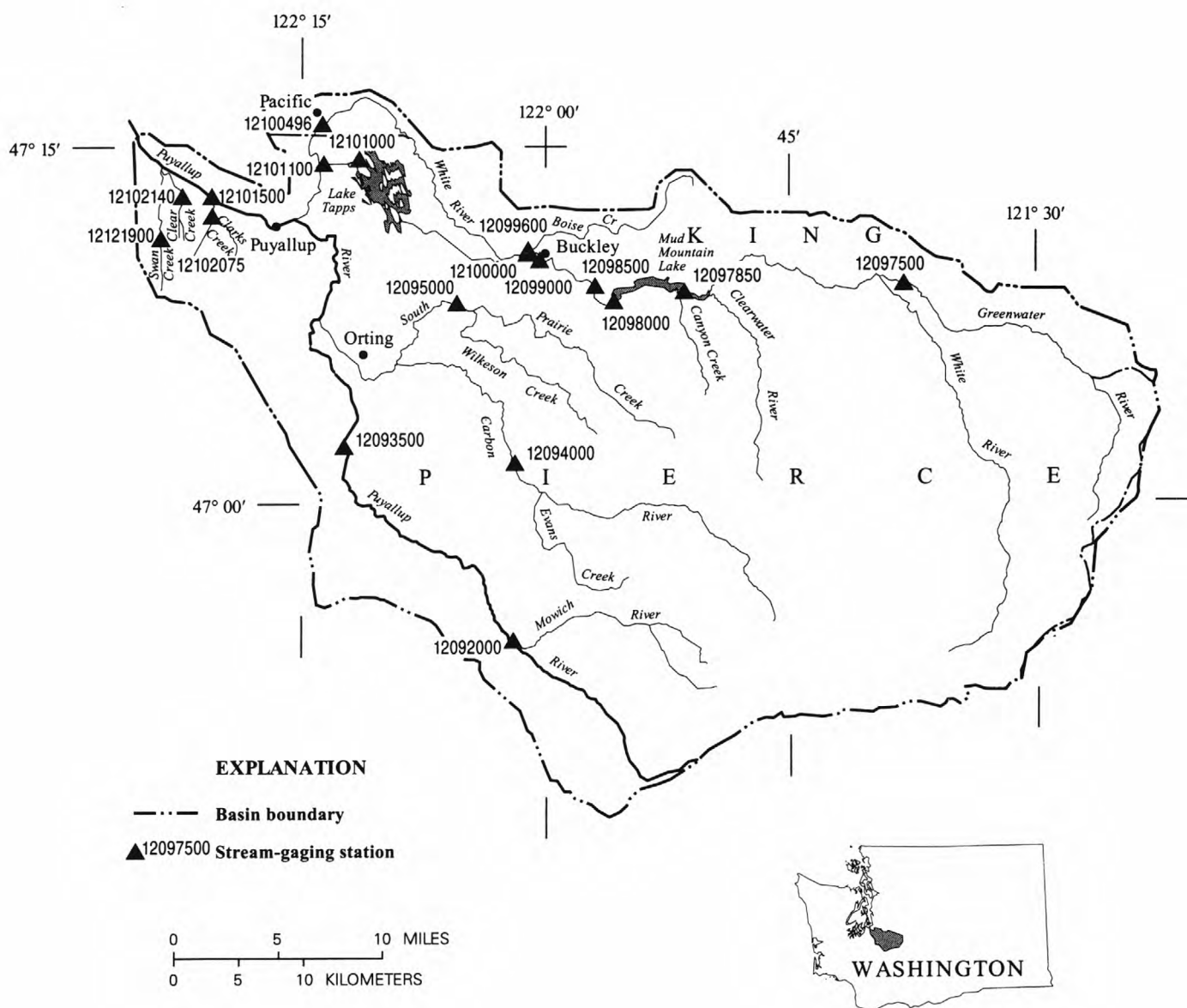
EXTREMES FOR CURRENT YEAR.--Maximum discharge, 212 ft<sup>3</sup>/s, Feb. 8, gage height, 4.02 ft, from outside high-water mark; minimum daily discharge, 3.9 ft<sup>3</sup>/s, Oct. 30.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	7.1	4.0	55	8.1	6.5	8.9	34	9.5	8.1	7.6	7.2	8.1
2	14	4.0	e50	12	5.7	8.6	13	8.7	8.1	7.5	13	8.1
3	13	4.2	40	27	7.8	20	11	8.7	8.2	8.3	7.6	19
4	6.8	6.8	e25	8.1	19	13	10	8.2	8.0	9.8	8.1	12
5	6.6	5.7	11	17	37	11	9.2	8.1	8.1	7.5	7.5	11
6	6.8	55	8.5	22	62	9.4	18	7.9	7.9	7.2	7.2	12
7	7.1	57	7.4	66	e80	10	11	7.8	7.8	7.3	7.1	9.3
8	9.4	11	6.7	22	e140	10	9.6	7.7	7.5	7.4	7.0	9.2
9	9.9	14	30.7	14	38	10	11	7.7	7.7	7.2	6.8	9.3
10	57	57	44	10	17	22	11	7.6	7.6	7.1	6.7	9.2
11	51	e12	60	9.2	13	23	14	12	7.6	6.9	6.8	9.7
12	9.9	14	27	8.3	11	12	13	17	7.7	7.0	6.8	9.3
13	4.9	e20	41	11	9.7	11	11	40	7.6	6.9	7.7	12
14	4.2	6.7	41	28	8.9	11	9.8	13	7.5	6.9	8.1	19
15	4.6	9.0	17	56	8.2	10	13	11	7.4	6.7	7.6	28
16	15	4.3	9.9	24	7.9	9.7	30	10	7.4	6.8	7.6	11
17	19	9.7	13	11	23	9.8	e14	20	9.1	7.1	7.8	9.7
18	5.4	8.7	45	9.4	25	9.7	e21	25	7.8	11	7.8	11
19	4.4	4.2	11	25	22	11	e18	17	7.5	13	7.9	12
20	18	4.0	8.2	56	17	9.8	e11	11	7.4	8.3	8.2	9.7
21	4.9	4.2	6.7	63	15	9.9	e9.5	15	7.3	8.1	8.2	9.8
22	5.1	9.7	6.3	22	13	15	23	13	7.4	7.8	8.1	9.7
23	4.7	42	6.3	18	36	11	e90	10	21	7.7	7.9	9.3
24	18	30	5.3	24	16	10	62	9.6	17	7.6	8.0	9.4
25	12	31	5.1	14	11	9.0	35	9.1	9.8	7.5	8.2	9.3
26	4.5	13	4.9	12	10	8.7	31	8.8	7.9	7.3	8.3	9.5
27	4.2	21	6.4	8.8	9.7	8.7	14	8.5	7.6	7.3	8.3	9.5
28	4.1	e50	12	10	9.2	8.6	11	8.4	7.6	7.2	8.3	9.6
29	4.0	e110	57	8.0	8.9	9.7	10	8.4	7.7	7.3	8.0	9.7
30	3.9	38	38	6.6	---	8.6	9.9	8.3	7.7	7.1	9.3	9.8
31	4.0	---	11	7.1	---	16	---	8.2	---	7.2	8.3	---
TOTAL	343.5	660.2	709.7	637.6	687.5	355.1	588.0	365.2	257.0	239.6	245.4	334.2
MEAN	11.1	22.0	22.9	20.6	23.7	11.5	19.6	11.8	8.57	7.73	7.92	11.1
MAX	57	110	60	66	140	23	90	40	21	13	13	28
MIN	3.9	4.0	4.9	6.6	5.7	8.6	9.2	7.6	7.3	6.7	6.7	8.1
AC-FT	681	1310	1410	1260	1360	704	1170	724	510	475	487	661

MEAN	9.43	13.8	14.7	16.1	14.9	12.3	10.9	8.89	7.92	6.89	6.94	7.72
MAX	17.4	28.9	24.9	34.4	28.1	25.2	23.0	18.3	14.5	10.6	9.88	11.1
(WY)	1986	1991	1995	1990	1974	1972	1991	1984	1984	1983	1957	1996
MIN	5.96	7.30	8.64	6.87	6.66	5.12	6.36	5.78	5.23	5.04	4.40	5.19
(WY)	1988	1970	1977	1985	1973	1973	1973	1971	1969	1973	1969	1974

ANNUAL TOTAL	4602.9		5423.0			
ANNUAL MEAN	12.6		14.8		10.6	
HIGHEST ANNUAL MEAN					15.1	1983
LOWEST ANNUAL MEAN					7.49	1962
HIGHEST DAILY MEAN	110	Nov 29	140	Feb 8	250	Nov 24 1990
LOWEST DAILY MEAN	3.9	Oct 30	3.9	Oct 30	3.6	Aug 25 1971
ANNUAL SEVEN-DAY MINIMUM	4.0	Oct 27	4.0	Oct 27	3.8	Aug 24 1971
ANNUAL RUNOFF (AC-FT)	9130		10760		7650	
10 PERCENT EXCEEDS	27		30		19	
50 PERCENT EXCEEDS	7.8		9.5		8.2	
90 PERCENT EXCEEDS	5.1		6.7		5.7	

e Estimated



**Figure 37.** Location of surface-water stations in the Puyallup River Basin.

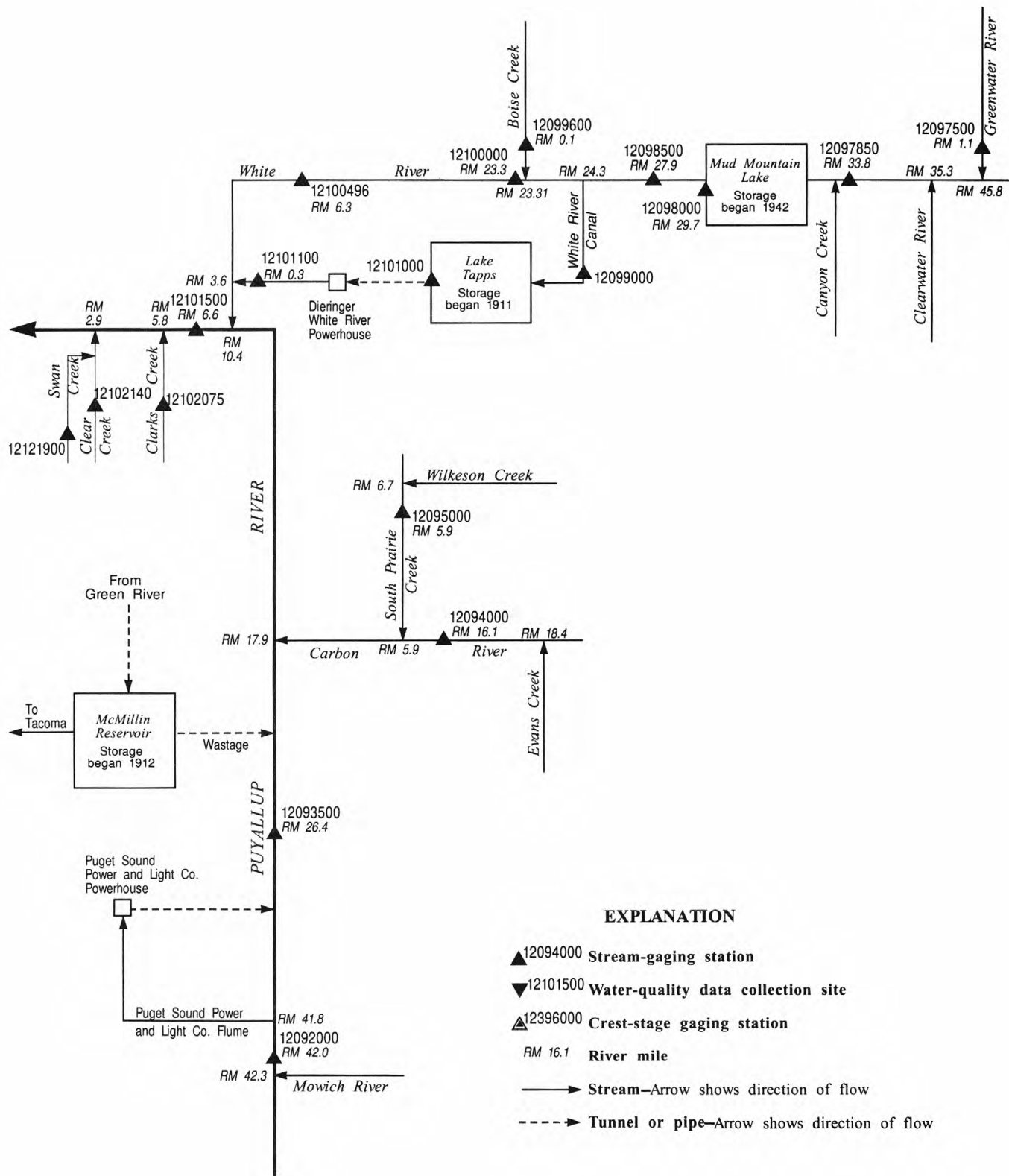


Figure 38. Schematic diagram showing surface-water stations in the Puyallup River Basin.



## PUYALLUP RIVER BASIN

12092000 PUYALLUP RIVER NEAR ELECTRON, WA

LOCATION.--Lat 46°54'14", long 122°02'02", in SE 1/4 NW 1/4 sec.3, T.16 N., R.6 E., Pierce County, Hydrologic Unit 17110014, on left bank 1,000 ft upstream from Puget Sound Power & Light Co.'s flume headworks, 0.3 mi downstream from Mowich River, 9.8 mi southeast of Electron, and at mile 42.0.

DRAINAGE AREA.--92.8 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1908 to December 1933, October 1944 to September 1949, October 1957 to current year.

REVISED RECORDS.--WSP 1092: 1946(M). WSP 1346: 1913, 1916-17(M), 1918-23, drainage area. WSP 1566: 1945(M), 1947(P).

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 1,632.7 ft above sea level. Prior to Jan. 1, 1913, nonrecording gage, and Jan. 1, 1913, to Sept. 30, 1926, Oct. 1, 1944, to Sept. 30, 1949, and Oct. 1, 1957, to Nov. 22, 1959 (gage destroyed by flood), water-stage recorder, at sites near present gage at different datums. Aug. 19, 1960, to Dec. 23, 1980, at site 160 ft downstream at different datum. Dec. 24, 1980, to Dec. 24, 1987, at site 60 ft downstream at different datum. U.S. Geological Survey satellite telemetry at station.

REMARKS.--Records fair except for flows above 2,700 ft<sup>3</sup>/s and estimated daily discharges, which are poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--69 years (water years 1909-33, 1945-49, 1958-96), 525 ft<sup>3</sup>/s, 76.80 in/yr, 380,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 16,000 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 10.94 ft, from floodmarks, result of slope-area measurement; minimum daily discharge, 90 ft<sup>3</sup>/s Nov. 25, 1993, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1815	2,430	5.73	Nov. 28	1400	unknown	a8.28
Nov. 8	1815	6,170	8.25	Dec. 11	0145	3,220	6.39
Nov. 11	0700	5,760	8.02	Jan. 7	1415	2,850	6.09
Nov. 13	1145	3,380	6.51	Feb. 8	unknown	*16,000	b10.94

Minimum daily discharge, 150 ft<sup>3</sup>/s Mar. 28-31.

a From crest-stage gage.

b From floodmark.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	309	293	2420	876	313	e220	e200	e450	e330	402	357	287
2	780	268	1840	816	292	e200	e260	e420	e400	432	374	270
3	1400	250	1230	1350	288	e250	e220	e400	e600	457	345	261
4	867	246	1160	935	341	e350	e200	e380	e590	456	326	240
5	569	239	894	695	834	e325	e190	e360	e470	401	377	244
6	437	238	714	887	2160	e325	e200	e350	441	383	342	237
7	419	1070	622	2060	4390	e300	e250	e350	475	391	337	236
8	367	3220	564	1370	e10000	e350	e260	e320	457	420	358	246
9	325	1770	625	910	e1800	e450	e275	e300	421	422	364	250
10	1170	1090	1160	708	e1000	e550	e325	e290	400	397	378	244
11	1600	2820	1850	615	e800	e500	e300	e300	392	405	383	269
12	1010	1380	e1520	554	e700	e450	e290	e350	389	431	359	293
13	714	2130	1750	503	e600	e375	e300	e600	393	447	347	287
14	621	1390	1350	683	e550	e325	e280	e900	388	478	366	289
15	596	996	1000	1110	e500	e300	e280	e800	389	465	351	338
16	817	740	742	1160	e500	e275	e500	e700	388	427	332	295
17	940	628	598	728	e550	e250	e460	e650	375	404	305	263
18	802	837	601	620	e650	e225	e400	e700	369	376	285	240
19	591	632	568	561	e600	e225	e350	e750	346	372	279	283
20	533	541	520	535	e550	e200	e330	e700	342	336	282	245
21	497	463	492	512	e500	e190	e300	e600	349	338	273	236
22	439	459	464	468	e450	e200	e290	e700	349	360	276	245
23	382	753	435	433	e400	e190	e1000	e750	385	385	297	230
24	349	915	407	410	e375	e190	e1200	e700	403	405	331	221
25	415	1290	389	394	e330	e180	e900	e650	391	403	356	216
26	1020	1020	369	376	e300	e170	e750	e600	386	403	358	234
27	634	1560	357	375	e280	e160	e660	e510	397	418	343	247
28	511	e6200	360	363	e260	e150	e575	e450	414	407	339	258
29	432	5310	501	345	e225	e150	e500	e450	382	421	359	267
30	373	2910	665	314	---	e150	e450	e400	384	410	387	253
31	327	---	1280	315	---	e150	---	e350	---	379	324	---
TOTAL	20246	41658	27447	21981	30538	8325	12495	16230	12195	12631	10490	7724
MEAN	653	1389	885	709	1053	269	416	524	406	407	338	257
MAX	1600	6200	2420	2060	10000	550	1200	900	600	478	387	338
MIN	309	238	357	314	225	150	190	290	330	336	273	216
AC-FT	40160	82630	54440	43600	60570	16510	24780	32190	24190	25050	20810	15320
CFSM	7.04	15.0	9.54	7.64	11.3	2.89	4.49	5.64	4.38	4.39	3.65	2.77
IN.	8.12	16.70	11.00	8.81	12.24	3.34	5.01	6.51	4.89	5.06	4.21	3.10

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1996, BY WATER YEAR (WY)

MEAN	395	564	592	529	452	363	425	614	757	670	539	404
MAX	1015	1467	2214	1071	1053	944	657	1019	1248	1256	746	727
(WY)	1960	1933	1934	1918	1996	1972	1988	1929	1974	1917	1917	1927
MIN	185	134	174	193	154	146	200	380	406	407	338	257
(WY)	1981	1930	1915	1979	1922	1922	1975	1909	1996	1996	1996	1996

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

WATER YEARS 1909 - 1996

ANNUAL TOTAL	220720	221960	
ANNUAL MEAN	605	606	525
HIGHEST ANNUAL MEAN			664
LOWEST ANNUAL MEAN			378
HIGHEST DAILY MEAN	6200	Nov 28	10000
LOWEST DAILY MEAN	198	Sep 26	150
ANNUAL SEVEN-DAY MINIMUM	252	Sep 20	159
ANNUAL RUNOFF (AC-FT)	437800	440300	380000
ANNUAL RUNOFF (CFSM)	6.52	6.53	5.65
ANNUAL RUNOFF (INCHES)	88.48	88.98	76.80
10 PERCENT EXCEEDS	1000	1030	892
50 PERCENT EXCEEDS	470	400	436
90 PERCENT EXCEEDS	276	245	220

e Estimated

12093500 PUYALLUP RIVER NEAR ORTING, WA

LOCATION.--Lat 47°02'22", long 122°12'24", in SW 1/4 SW 1/4 sec.17, T.18 N., R.5 E., Pierce County, Hydrologic Unit 17110014, on right bank 600 ft downstream from highway bridge, 4.0 mi south of Orting, 8.5 mi upstream from Carbon River, and at mile 26.4.

DRAINAGE AREA.--172 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1931 to current year.

REVISED RECORDS.--WSP 932: 1937-39. WSP 962: 1934. WSP 1246: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 352.5 ft above sea level. Prior to Feb. 6, 1946, at site 600 ft upstream at datum 8.93 ft higher. Supplementary water-stage recorder 200 ft upstream at datum 7.1 ft higher than present gage datum, used at times during period in 1942-46. Feb. 6, 1946, to Mar. 12, 1965, at present site at datum 5.0 ft higher. U.S. Corps of Engineers satellite telemeter at station.

REMARKS.--Records fair and for the period Nov. 4-29. Up to 400 ft<sup>3</sup>/s diverted for Electron powerplant of Puget Sound Power and Light Co. which is returned to river 4.8 mi upstream from gage. Minor regulation by Electron powerplant. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--65 years (water years 1932-96), 712 ft<sup>3</sup>/s, 56.27 in/yr, 516,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 18,300 ft<sup>3</sup>/s Feb. 8, 1996, from slope area measurement, gage height, 11.37 ft; minimum discharge, 25 ft<sup>3</sup>/s Nov. 28, 1952; minimum daily, 59 ft<sup>3</sup>/s Nov. 29, 1952.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1845	5,280	8.17	Dec. 13	0430	4,830	7.48
Nov. 11	0745	5,760	8.38	Jan. 7	0915	5,700	7.87
Nov. 28	0415	13,600	10.44	Feb. 8	unknown	*18,300	*11.37

Minimum discharge, 210 ft<sup>3</sup>/s Sept. 3, 7, 10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	381	387	6820	2720	e1090	484	406	742	571	498	460	360
2	786	355	5080	2480	e1060	470	529	640	639	589	497	321
3	1580	341	3730	3390	e1020	546	416	604	905	706	466	289
4	1110	334	3260	2850	1240	748	374	563	888	739	375	291
5	688	340	2700	2420	2260	706	355	514	710	545	531	274
6	516	354	2350	2620	5610	705	387	492	688	466	440	265
7	498	1330	e2000	4540	9390	651	540	492	809	466	403	253
8	422	3530	e1820	3780	13400	702	572	476	774	576	456	271
9	381	2560	e1940	2940	5820	856	581	445	639	633	496	283
10	1100	1660	2580	2550	3190	1050	653	415	555	519	531	254
11	2050	3630	3800	2200	e2320	995	614	440	516	524	594	318
12	1420	2370	3290	1960	e1860	909	563	608	503	614	486	375
13	979	2750	4080	1790	e1560	756	617	1100	507	681	452	369
14	828	2150	3460	2200	e1340	653	562	1430	488	798	519	380
15	777	1660	3060	2840	e1240	601	559	1350	486	788	484	557
16	1030	1340	2540	3220	e1210	532	977	1170	478	655	433	459
17	1150	1060	2260	2500	e1340	487	871	1110	441	586	368	350
18	1100	1360	2220	2130	e1790	455	728	1130	447	496	324	290
19	787	1060	2020	2020	e1580	447	633	1250	377	482	300	364
20	713	891	1850	2050	e1300	423	564	1100	354	388	308	301
21	680	779	1700	2140	1150	398	522	912	361	376	287	270
22	611	759	1590	1910	958	418	510	1110	362	423	297	298
23	536	1060	1480	1770	900	391	1780	1230	439	500	332	269
24	483	1460	1400	1650	784	388	2340	1090	534	571	417	244
25	467	2330	1320	1560	700	349	1600	997	505	590	501	229
26	1270	1960	1270	1440	639	340	1350	953	466	582	539	252
27	838	2040	1240	1380	599	324	1150	843	499	653	489	282
28	682	8820	1260	1310	564	306	956	740	566	628	488	298
29	567	8800	1670	1240	515	313	828	733	474	640	523	316
30	491	7000	2410	e1190	---	307	753	713	462	644	695	298
31	435	---	3280	e1130	---	306	---	603	---	538	484	---
TOTAL	25356	64470	79480	69920	66429	17016	23290	25995	16443	17894	13975	9380
MEAN	818	2149	2564	2255	2291	549	776	839	548	577	451	313
MAX	2050	8820	6820	4540	13400	1050	2340	1430	905	798	695	557
MIN	381	334	1240	1130	515	306	355	415	354	376	287	229
AC-FT	50290	127900	157600	138700	131800	33750	46200	51560	32610	35490	27720	18610
CFSM	4.76	12.5	14.9	13.1	13.3	3.19	4.51	4.88	3.19	3.36	2.62	1.82
IN.	5.48	13.94	17.19	15.12	14.37	3.68	5.04	5.62	3.56	3.87	3.02	2.03

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1932 - 1996, BY WATER YEAR (WY)

MEAN	476	819	954	886	777	609	649	780	870	726	560	445
MAX	1291	2149	3015	2314	2291	1619	1038	1282	1470	1239	881	748
(WY)	1960	1996	1934	1934	1996	1972	1991	1936	1974	1933	1983	1968
MIN	210	92.8	205	205	280	266	303	494	311	483	373	283
(WY)	1953	1953	1953	1937	1977	1941	1975	1941	1934	1977	1957	1936

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1932 - 1996
ANNUAL TOTAL	337771	429648	
ANNUAL MEAN	925	1174	712
HIGHEST ANNUAL MEAN			1174
LOWEST ANNUAL MEAN			465
HIGHEST DAILY MEAN	8820	Nov 28	13400
LOWEST DAILY MEAN	217	Sep 26	229
ANNUAL SEVEN-DAY MINIMUM	262	Sep 21	263
ANNUAL RUNOFF (AC-FT)	670000	852200	516000
ANNUAL RUNOFF (CFSM)	5.38	6.83	4.14
ANNUAL RUNOFF (INCHES)	73.05	92.92	56.27
10 PERCENT EXCEEDS	1980	2490	1180
50 PERCENT EXCEEDS	600	653	581
90 PERCENT EXCEEDS	358	341	310

e Estimated



## 12095000 SOUTH PRAIRIE CREEK AT SOUTH PRAIRIE, WA

LOCATION.--Lat 47°08'23", long 122°05'29", in the NE 1/4 NW 1/4 sec.18, T.19 N., R.6 E., Pierce County, Hydrologic Unit 17110014, on left bank 300 ft upstream from bridge on State Highway 162, 0.8 mi downstream from Wilkeson Creek, 0.3 mi east of South Prairie, and at mile 5.9.

DRAINAGE AREA.--79.5 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1949 to September 1971, October 1987 to current year.

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 400.0 ft above sea level. June 1949 to June 1969, water-stage recorder at site 400 ft downstream at different datum. June 1969 to September 1971, at present site at different datum.

REMARKS.--Records good except those for the period May to September and those above 4,000 ft<sup>3</sup>/s, which are fair. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--31 years (water years 1950-71, 1988-96), 237 ft<sup>3</sup>/s, 40.46 in/yr, 171,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,170 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 35.14 ft, on basis of contracted-opening measurement of peak flow; minimum discharge, 20 ft<sup>3</sup>/s Sept. 23, 1967, gage height, 0.80 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 1,400 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1845	1,510	29.94	Jan. 7	1030	1,820	30.24
Nov. 11	0900	1,920	30.33	Feb. 7	0015	4,550	32.52
Nov. 28	0715	4,860	32.76	Feb. 8	1000	*a8,170	*35.14

Minimum discharge, 24 ft<sup>3</sup>/s Aug. 14, 15, 29-31, Sept. 1.

REVISIONS.--The peak discharges and annual maximum (\*) reported for water years 1990 and 1991 have been revised as shown in the following table. These figures supersede those published in the reports for 1990 and 1991.

Water Year	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
1990	Jan. 9	1645	*5,930	*33.55

Water Year	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
1991	Nov. 24	1900	4,450	32.45
	Feb. 19	2230	*5,390	*33.16
	Apr. 5	4200	3,590	31.78

## PUYALLUP RIVER BASIN

12095000 SOUTH PRAIRIE CREEK AT SOUTH PRAIRIE, WA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	110	91	2290	775	141	206	151	272	179	e110	e32	24
2	102	86	1410	591	129	196	260	230	177	e108	e32	26
3	431	82	878	817	123	272	195	210	192	e104	e50	27
4	474	79	767	601	194	403	172	193	175	e170	e40	34
5	218	82	558	472	598	409	160	173	151	e145	e40	36
6	149	89	430	540	2210	404	182	155	141	e130	e36	54
7	138	490	344	1330	3640	374	272	150	143	e118	e34	42
8	116	964	284	1090	6700	388	221	161	136	e105	e33	37
9	108	754	296	704	3800	425	203	146	123	e98	e32	37
10	389	423	415	525	1600	440	278	135	115	e104	e31	38
11	994	1300	584	397	996	418	289	174	107	e88	30	37
12	525	783	460	322	748	424	249	301	101	e74	30	38
13	310	727	614	279	613	337	246	777	94	e63	28	42
14	219	600	548	521	508	290	225	853	93	e55	26	51
15	171	408	496	711	429	262	213	731	86	e47	28	115
16	246	353	388	936	391	230	379	630	82	40	32	113
17	247	262	328	642	455	214	324	533	79	45	32	104
18	275	281	419	476	603	196	276	448	87	59	29	77
19	212	264	391	416	642	194	261	429	79	62	29	76
20	199	216	324	438	543	187	251	433	70	59	28	79
21	187	183	278	488	486	167	227	378	66	50	29	69
22	165	163	238	397	408	177	251	409	66	48	38	71
23	142	195	204	340	413	165	534	408	95	46	41	65
24	129	305	179	309	352	175	808	386	140	33	40	60
25	120	927	158	280	309	150	692	341	135	37	37	55
26	170	692	144	246	282	142	612	303	100	37	33	52
27	143	613	135	221	253	135	476	261	102	34	35	48
28	125	3250	137	203	224	126	378	228	155	e36	35	44
29	113	2710	336	180	212	128	316	250	123	e35	26	43
30	104	2280	760	153	---	127	274	225	e120	e34	24	43
31	98	---	1230	149	---	119	---	196	---	e33	24	---
TOTAL	7129	19652	16023	15549	28002	7880	9375	10519	3512	2207	1014	1637
MEAN	230	655	517	502	966	254	313	339	117	71.2	32.7	54.6
MAX	994	3250	2290	1330	6700	440	808	853	192	170	50	115
MIN	98	79	135	149	123	119	151	135	66	33	24	24
AC - FT	14140	38980	31780	30840	55540	15630	18600	20860	6970	4380	2010	3250
CFSM	2.89	8.24	6.50	6.31	12.1	3.20	3.93	4.27	1.47	.90	.41	.69
IN.	3.34	9.20	7.50	7.28	13.10	3.69	4.39	4.92	1.64	1.03	.47	.79

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1949 - 1996, BY WATER YEAR (WY)

MEAN	143	317	359	384	360	267	298	258	217	109	64.8	71.3
MAX	349	723	728	683	966	527	517	463	439	270	193	233
(WY)	1960	1991	1956	1971	1996	1950	1991	1960	1964	1993	1968	1968
MIN	26.4	35.2	61.5	126	112	138	157	131	59.1	48.7	32.7	34.9
(WY)	1988	1953	1953	1957	1993	1992	1995	1992	1992	1995	1996	1967

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1949 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	88068		122499						
ANNUAL MEAN	241		335			237			
HIGHEST ANNUAL MEAN						335			1996
LOWEST ANNUAL MEAN						141			1994
HIGHEST DAILY MEAN	3250	Nov 28	6700	Feb 8	6700		Feb 8	1996	
LOWEST DAILY MEAN	28	Sep 24	24	Aug 30	24		Sep 6	1951	
ANNUAL SEVEN-DAY MINIMUM	32	Sep 20	26	Aug 29	25		Oct 8	1987	
ANNUAL RUNOFF (AC-FT)	174700		243000			171500			
ANNUAL RUNOFF (CFSM)	3.03		4.21			2.98			
ANNUAL RUNOFF (INCHES)	41.21		57.32			40.46			
10 PERCENT EXCEEDS	466		657			455			
50 PERCENT EXCEEDS	156		194			173			
90 PERCENT EXCEEDS	42		37			46			

e Estimated



## 12097500 GREENWATER RIVER AT GREENWATER, WA

LOCATION.--Lat 47°09'13", long 121°38'10", in NE 1/4 NE 1/4 sec.10, T.19 N., R.9 E., Pierce County, Hydrologic Unit 17110014, on left bank at bridge crossing, 0.7 mi east of Greenwater, and at mile 1.1.

DRAINAGE AREA.--73.5 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1911 to August 1912 (fragmentary), May 1929 to September 1977, June 1980 to September 1993 (seasonal records), October 1993 to current year. Published as "near Enumclaw" 1911-12.

REVISED RECORDS.--WSP 1716: 1947(M). WA-94-1: 1990(M), 1993(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,720 ft above sea level, from river-profile survey. Prior to Aug. 10, 1912, nonrecording gages at sites approximately 500 ft upstream at different datums. May 1, 1929, to Aug. 14, 1934, water-stage recorder at site 1,400 ft upstream at different datum. Aug. 17, 1934, to Sept. 30, 1977, water-stage recorder at site 500 ft upstream at different datum.

REMARKS.--Records good except for periods of estimated record, Jan. 30 to Feb. 5, June 27 to July 1, Sept. 4-11, which are fair and Nov. 28-30, Feb. 8-15, which are poor. No regulation upstream from station.

AVERAGE DISCHARGE.--51 years (water years 1930-77, 1994-96), 212 ft<sup>3</sup>/s, 39.23 in/yr, 153,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,900 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 8.94 ft, from rating curve extended above 2,400 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum discharge, 23 ft<sup>3</sup>/s Oct. 7, 1934.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Dec. 2, 1977, reached a stage of 9.8 ft former site and datum, from floodmarks, discharge, about 10,500 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,900 ft<sup>3</sup>/s Feb. 8, gage height, 8.94 ft; minimum discharge, 35 ft<sup>3</sup>/s Sept. 27-29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	119	1890	706	e200	249	148	321	274	e136	55	38
2	75	111	1270	621	e197	236	150	294	270	136	59	38
3	159	107	905	789	e192	239	141	273	284	134	63	42
4	147	105	791	713	e190	263	138	255	308	130	60	e51
5	90	104	683	576	e200	251	136	237	304	123	64	e50
6	71	102	582	514	559	242	141	226	299	118	58	e48
7	67	224	471	760	2220	236	154	220	298	115	51	e42
8	62	450	462	909	e4700	249	188	212	298	108	48	e41
9	58	574	458	747	e3600	282	232	203	287	99	46	e40
10	134	460	458	615	e1400	322	261	194	270	99	45	e39
11	368	1140	461	530	e880	325	273	205	260	97	44	e37
12	280	844	510	473	e700	325	271	225	244	93	44	36
13	206	758	679	436	e620	311	266	259	230	89	43	38
14	166	743	654	473	e590	284	249	334	217	87	42	43
15	141	620	578	562	e590	274	246	383	205	86	42	52
16	160	524	509	679	581	261	308	427	195	86	42	49
17	222	449	456	595	578	248	311	429	188	87	41	56
18	292	431	423	507	652	236	286	408	184	88	43	46
19	232	383	378	461	678	227	267	388	176	88	45	44
20	201	348	344	427	632	218	250	363	168	82	46	42
21	179	322	321	378	566	211	234	344	162	76	46	40
22	162	304	302	340	506	209	227	360	154	75	45	43
23	148	323	286	323	465	201	259	339	154	72	44	42
24	139	403	268	304	410	196	391	326	156	71	43	40
25	141	694	245	286	370	185	441	327	149	70	42	38
26	173	705	235	264	336	180	458	336	143	68	42	36
27	158	843	225	248	311	175	418	340	e145	66	43	36
28	149	e3850	217	238	277	162	375	325	e142	65	42	35
29	141	e4800	240	224	261	158	344	329	e138	63	41	36
30	133	e2680	386	e214	---	153	333	311	e136	60	40	36
31	126	---	824	e208	---	146	---	286	---	58	39	---
TOTAL	4818	23520	16511	15120	23461	7254	7896	9479	6438	2825	1448	1254
MEAN	155	784	533	488	809	234	263	306	215	91.1	46.7	41.8
MAX	368	4800	1890	909	4700	325	458	429	308	136	64	56
MIN	38	102	217	208	190	146	136	194	136	58	39	35
AC-FT	9560	46650	32750	29990	46530	14390	15660	18800	12770	5600	2870	2490
CFSM	2.11	10.7	7.25	6.64	11.0	3.18	3.58	4.16	2.92	1.24	.64	.57
IN.	2.44	11.90	8.36	7.65	11.87	3.67	4.00	4.80	3.26	1.43	.73	.63

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

	73.7	184	259	247	224	195	281	428	362	145	65.5	52.5
MEAN	73.7	184	259	247	224	195	281	428	362	145	65.5	52.5
MAX	347	784	1116	597	809	640	457	833	900	371	133	128
(WY)	1960	1996	1934	1934	1996	1972	1956	1949	1950	1950	1976	1959
MIN	24.1	29.7	35.0	45.3	70.3	77.5	124	158	83.0	51.6	36.5	30.9
(WY)	1988	1937	1953	1937	1936	1941	1973	1941	1992	1934	1934	1987

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1929 - 1996

	101796	120024	212	328	1996
ANNUAL TOTAL	101796	120024	212	328	1996
ANNUAL MEAN	279	328	212	328	1996
HIGHEST ANNUAL MEAN			92.4		1941
LOWEST ANNUAL MEAN					
HIGHEST DAILY MEAN	4800	Nov 29	4800	Nov 29	1995
LOWEST DAILY MEAN	33	Sep 24	35	Sep 28	1987
ANNUAL SEVEN-DAY MINIMUM	34	Sep 20	37	Sep 24	1987
ANNUAL RUNOFF (AC-FT)	201900	238100	153800		
ANNUAL RUNOFF (CFSM)	3.79	4.46	2.89		
ANNUAL RUNOFF (INCHES)	51.52	60.75	39.23		
10 PERCENT EXCEEDS	485	620	450		
50 PERCENT EXCEEDS	203	231	137		
90 PERCENT EXCEEDS	46	43	43		

e Estimated

## PUYALLUP RIVER BASIN

12097850 WHITE RIVER BELOW CLEARWATER RIVER, NEAR BUCKLEY, WA

LOCATION.--Lat 47°08'49", long 121°51'32", in NE 1/4 SW 1/4 sec.12, T.19 N., R.7 E., King County, Hydrologic Unit 17110014, on right bank 300 ft upstream from Canyon Creek, 1.5 mi downstream from Clearwater River, 6.4 mi east of Buckley, and at mile 33.8.

DRAINAGE AREA.--375 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1974 to September 1976, March 1982 to February 1996 (discontinued).

REVISED RECORDS.--WDR WA-76-1: 1975(M).

GAGE.--Water-stage recorder. Datum of gage is 1,100.00 ft above sea level (Corps of Engineers bench mark). Prior to March 1982, at datum 47.16 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station. Sediment records June 1974 to June 1976. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--15 years (water years 1975-76, 1983-95), 1,286 ft<sup>3</sup>/s, 46.61 in/yr, 931,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,800 ft<sup>3</sup>/s Dec. 2, 1975, gage height, 55.16 ft, present datum, from high-water mark in well; maximum gage height, 95 ft Feb. 9, 1996, result of backwater from Mud Mountain Lake; minimum discharge, 252 ft<sup>3</sup>/s Nov. 8-11, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge for period October 1995 to February 1996, 20,500 ft<sup>3</sup>/s Nov. 28, gage height, 55.44 ft; maximum gage height, 95 ft Feb. 9, result of backwater from Mud Mountain Lake; minimum discharge, 556 ft<sup>3</sup>/s Feb. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	635	825	e8500	3490	658	---	---	---	---	---	---	---
2	707	805	e6700	2870	616	---	---	---	---	---	---	---
3	1820	791	e5000	3860	608	---	---	---	---	---	---	---
4	1890	768	e4200	3320	660	---	---	---	---	---	---	---
5	1260	763	3290	2600	835	---	---	---	---	---	---	---
6	992	763	2490	2430	3810	---	---	---	---	---	---	---
7	855	1540	2090	4850	9600	---	---	---	---	---	---	---
8	754	3730	1800	4890	---	---	---	---	---	---	---	---
9	725	3780	1660	3520	---	---	---	---	---	---	---	---
10	1650	2500	1850	2590	---	---	---	---	---	---	---	---
11	3670	6640	3320	2080	---	---	---	---	---	---	---	---
12	2450	4760	3680	1770	---	---	---	---	---	---	---	---
13	1770	4630	4630	1550	---	---	---	---	---	---	---	---
14	1440	4540	4150	2020	---	---	---	---	---	---	---	---
15	1310	3710	3340	2600	---	---	---	---	---	---	---	---
16	1490	3300	2710	3140	---	---	---	---	---	---	---	---
17	1710	2840	2330	2370	---	---	---	---	---	---	---	---
18	2130	3060	2110	1880	---	---	---	---	---	---	---	---
19	1680	2690	1920	1650	---	---	---	---	---	---	---	---
20	1470	2440	1750	1460	---	---	---	---	---	---	---	---
21	1360	2260	1620	1320	---	---	---	---	---	---	---	---
22	1240	2150	1500	1160	---	---	---	---	---	---	---	---
23	1100	2320	1410	1090	---	---	---	---	---	---	---	---
24	1000	3090	1330	1020	---	---	---	---	---	---	---	---
25	953	4880	1270	951	---	---	---	---	---	---	---	---
26	1510	4470	1220	885	---	---	---	---	---	---	---	---
27	1310	4500	1180	837	---	---	---	---	---	---	---	---
28	1140	14700	1150	803	---	---	---	---	---	---	---	---
29	1020	10700	1380	762	---	---	---	---	---	---	---	---
30	946	e9000	2340	667	---	---	---	---	---	---	---	---
31	882	---	4950	647	---	---	---	---	---	---	---	---
TOTAL	42869	112945	86870	65082	---	---	---	---	---	---	---	---
MEAN	1383	3765	2802	2099	---	---	---	---	---	---	---	---
MAX	3670	14700	8500	4890	---	---	---	---	---	---	---	---
MIN	635	763	1150	647	---	---	---	---	---	---	---	---
AC-FT	85030	224000	172300	129100	---	---	---	---	---	---	---	---
CFSM	3.69	10.0	7.47	5.60	---	---	---	---	---	---	---	---
IN.	4.25	11.20	8.62	6.46	---	---	---	---	---	---	---	---

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1974 - 1996, BY WATER YEAR (WY)

	MEAN	632	1439	1484	1599	1371	1252	1439	1930	2089	1413	844	586
MAX	1383	3765	4095	3177	3083	1663	2236	2653	4317	2520	1287	843	
(WY)	1996	1996	1976	1984	1991	1987	1990	1975	1974	1974	1974	1976	
MIN	318	341	586	640	670	743	895	1395	1037	758	544	447	
(WY)	1988	1988	1986	1985	1994	1985	1975	1991	1992	1987	1994	1994	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## WATER YEARS 1974 - 1996

ANNUAL TOTAL	611380		
ANNUAL MEAN	1675		
HIGHEST ANNUAL MEAN		1286	
LOWEST ANNUAL MEAN		1751	1976
HIGHEST DAILY MEAN	14700	956	1994
LOWEST DAILY MEAN	433	15600	Dec 2 1975
ANNUAL SEVEN-DAY MINIMUM	455	254	Nov 8 1987
ANNUAL RUNOFF (AC-FT)	1213000	263	Nov 4 1987
ANNUAL RUNOFF (CFSM)	4.47	931900	
ANNUAL RUNOFF (INCHES)	60.65	3.43	
10 PERCENT EXCEEDS	2860	46.61	
50 PERCENT EXCEEDS	1350	2450	
90 PERCENT EXCEEDS	658	1070	
		482	

e Estimated

## 12098000 MUD MOUNTAIN LAKE NEAR BUCKLEY, WA

LOCATION.--Lat 47°08'27", long 121°55'48", in NE 1/4 NE 1/4 sec.17, T.19 N., R.7 E., Pierce County, Hydrologic Unit 17110014, on left bank of reservoir just upstream from Mud Mountain Dam on White River, 5 mi southeast of Buckley, 5.6 mi downstream from Clearwater River, and at mile 29.7.

DRAINAGE AREA.--400 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1943 to current year. Daily contents at 0800 hours only October 1944 to September 1987. Monthend contents only October 1943 to September 1944, published in WSP 1316. Prior to October 1970, published as Mud Mountain Reservoir near Buckley.

GAGE.--Nonrecording gage. Datum of gage is sea level (levels by Corps of Engineers).

REMARKS.--Lake, for flood control, is formed by earthfill dam. Embankment completed and storage began on small scale in 1942. Capacity, 106,000 acre-ft between elevations 895 ft, invert of outlet tunnel, and 1,215 ft, spillway crest. Storage is dissipated as soon after a flood as is possible, without creating damaging flows downstream, in order to have the maximum capacity available for any following flood which might develop.

COOPERATION.--Records of lake elevations and capacity table furnished by Corps of Engineers (revised by U.S.G.S. below 917 ft). Table uncertain below about 970 ft, due to siltation. Mud Mountain Lake is considered to have no appreciable storage below 917 ft.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed since dam was completed, 89,245 acre-ft Feb. 9, 1996, elevation, 1,196.1 ft; no contents at times in some years.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 89,245 acre-ft Feb. 9, elevation, 1,196.1 ft; no contents many days during the year.

RESERVOIR STORAGE (ACRE-Feet), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 0800 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	147	214	63105	7870	775	24860	783	772	545	327	107	112
2	130	215	58265	7113	757	23005	1100	757	548	342	136	109
3	340	180	48995	6532	531	22888	1028	615	581	342	107	108
4	371	---	42228	4241	754	23360	798	560	603	---	---	109
5	154	---	33492	641	933	23799	661	557	597	315	138	106
6	121	187	22809	798	1683	24122	654	566	868	---	107	108
7	207	295	11014	1930	13251	24366	950	581	3279	---	101	104
8	194	327	6459	10133	32048	4366	1334	497	2294	282	94	104
9	189	288	---	8787	82220	24530	1516	505	1713	273	97	105
10	198	---	---	3576	88742	25151	1313	502	1086	264	---	106
11	2566	---	736	2519	81587	26038	912	488	569	256	---	106
12	6788	---	3416	1073	71142	25444	705	539	566	256	130	109
13	6328	3343	3682	590	59100	24736	954	545	557	261	126	112
14	---	732	499	757	46020	23321	542	572	560	247	124	---
15	---	275	701	712	33931	21698	548	644	560	258	103	---
16	2956	218	615	1329	25486	20122	677	674	557	233	97	115
17	1701	192	536	694	21435	18633	575	671	545	227	---	123
18	2309	---	545	581	23799	17130	563	677	545	226	---	109
19	864	---	806	575	24162	15867	572	674	531	226	89	108
20	224	157	4306	554	23599	14594	554	667	531	---	82	106
21	---	2913	8472	511	22460	13277	578	654	522	---	81	---
22	---	6518	7467	525	23559	11853	597	667	525	211	81	---
23	138	---	---	525	24082	10427	712	572	525	207	82	102
24	127	5834	---	3370	23479	8900	2668	551	534	220	904	100
25	130	6697	---	6577	23202	7304	2145	557	536	179	1484	99
26	413	8620	394	8712	22731	5793	1329	566	469	179	2063	99
27	288	3652	433	7434	24041	4428	1671	572	420	---	2644	99
28	---	13511	461	5631	26381	3270	1142	566	408	---	2964	---
29	---	39951	491	4010	26684	2229	772	563	327	146	121	---
30	232	56053	560	2540	---	1516	722	557	313	158	124	103
31	222	---	3529	856	---	945	---	545	---	138	118	---
MAX	---	---	---	10133	88742	26038	2668	772	3279	---	---	---
MIN	---	---	---	511	531	945	542	488	313	---	---	---
	931.9	1158	1019	954.6	1092	955.5	953.3	946.9	938.0	921.5	921.2	919.3
	217	60723	6141	802	25444	836	754	545	323	116	114	103
	+48	+60506	-54582	-5339	+24642	-24608	-82	-209	-222	-207	-2	-11

CAL YR 1995 AC-FT† +5846  
WTR YR 1996 AC-FT† -66

†† Monthend elevation, in feet, at 2400 hours.  
† Monthend contents, in acre-feet.  
‡ Change in contents, in acre-feet.

## PUYALLUP RIVER BASIN

## 12098500 WHITE RIVER NEAR BUCKLEY, WA

LOCATION.--Lat 47°09'05", long 121°56'55", in SW 1/4 NW 1/4 sec.8, T.19 N., R.7 E., King County, Hydrologic Unit 17110014, on right bank 0.4 mi upstream from Red Creek, 1.7 mi downstream from Mud Mountain Dam, 3.8 mi east of Buckley, 7.4 mi downstream from Clearwater River and at mile 27.9.

DRAINAGE AREA.--401 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1928 to November 1933, October 1938 to current year.

REVISED RECORDS.--WSP 1247: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is sea level (Corps of Engineers bench mark). Oct. 26 to Dec. 9, 1928, nonrecording gage, and Dec. 9 1928, to Nov. 30, 1933, water-stage recorder at site 3.0 mi upstream at different datum. Nov. 26, 1938, to Feb. 14, 1939, nonrecording gage at present site and datum.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Flow regulated by Mud Mountain Lake (station 12098000) for flood control. Storage is not retained and observed annual runoff closely represents natural runoff of basin. No diversion upstream from station. Chemical analyses July 1981; water temperatures March 1971 to September 1972; sediment records November 1971 to November 1972. U.S. Army Corps of Engineers satellite telemeter at station.

COOPERATION.--Water-stage recorder inspected by employees of Corps of Engineers.

AVERAGE DISCHARGE.--63 years (water years 1929-33, 1939-96), 1,427 ft<sup>3</sup>/s, 48.33 in/yr, 1,034,000 acre-ft/yr, adjusted for storage since December 1943.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,000 ft<sup>3</sup>/s Feb. 26, 1932, gage height, 17.5 ft, site and datum then in use, from rating curve extended above 3,500 ft<sup>3</sup>/s; probably no flow for part of each day Oct. 1, 2, 7, 8, Nov. 14, Dec. 1, 5, 15, 1958; Jan. 3, Mar. 24, June 8, Aug. 19, 1959; minimum daily discharge, 59 ft<sup>3</sup>/s June 25, 1957, Mar. 26, 1958.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in December 1933 reached a stage of 23.4 ft, from floodmarks, at former site, discharge, 28,000 ft<sup>3</sup>/s, from rating curve extended above 3,500 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,200 ft<sup>3</sup>/s Dec. 1, elevation, 807.53 ft; minimum discharge 250 ft<sup>3</sup>/s Nov. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	605	668	10000	3890	951	2170	908	1590	1500	1420	880	614
2	711	649	11500	3830	939	1560	991	1440	1560	1520	850	571
3	1610	638	8840	4910	890	1200	960	1340	1930	1600	800	551
4	1670	635	8120	5370	955	1200	893	1330	2250	1630	746	561
5	952	638	8630	3210	1250	1210	849	1220	2110	1440	767	532
6	753	644	8260	2790	3620	1210	861	1170	1330	1320	720	528
7	709	1380	5590	3470	6580	1280	957	1160	2300	1300	714	502
8	668	3770	4190	5310	2740	1320	1110	1110	2430	1400	756	497
9	646	4080	2410	6160	7040	1310	1370	1050	2260	1500	821	494
10	1240	2330	2380	4370	10700	1320	1600	1010	2010	1390	833	496
11	2450	4950	3110	3240	10500	1790	1540	1090	1730	1300	887	502
12	1820	6060	3700	2690	10200	2090	1400	1350	1660	1350	824	545
13	1910	5490	5550	2160	10100	2170	1440	1810	1650	1400	769	588
14	1480	4510	4480	2780	9460	2230	1310	2280	1660	1450	800	612
15	1400	3130	3510	3410	7800	2200	1280	2480	1650	1480	794	724
16	1570	2600	2910	4200	5810	2090	1560	2500	1600	1360	749	633
17	1540	2130	2490	3320	2460	1940	1480	2430	1490	1200	691	672
18	2070	2320	2280	2660	2820	1830	1390	2370	1390	1080	636	541
19	1540	1960	1130	2370	3780	1770	1310	2290	1260	977	604	524
20	1160	1350	545	2150	3710	1740	1240	2150	1220	862	609	508
21	1010	288	1350	1970	2640	1700	1170	1980	1250	816	584	e480
22	894	915	2410	1720	2040	1670	1190	2070	1290	846	584	e465
23	817	2070	2250	1120	2330	1620	1630	1960	1370	927	563	e450
24	760	2390	2030	447	2220	1570	3030	1820	1460	1010	503	e435
25	717	3400	1700	529	1930	1500	3120	1790	1440	1030	515	e420
26	1190	4830	1210	1310	1400	1430	2610	1900	1420	985	547	e400
27	964	5470	1140	1920	e480	1350	2370	1960	1410	1040	575	e410
28	847	3690	1110	1810	e760	1250	2080	1850	1390	1020	1420	e420
29	777	6750	1460	1690	2010	1150	1770	1800	1360	1020	768	e425
30	727	7090	2510	1510	---	1040	1670	1680	1360	1060	786	e430
31	693	---	3540	1110	---	929	---	1530	---	1000	694	---
TOTAL	35900	86825	120335	87426	118115	48839	45089	53510	48740	37733	22789	15530
MEAN	1158	2894	3882	2820	4073	1575	1503	1726	1625	1217	735	518
MAX	2450	7090	11500	6160	10700	2230	3120	2500	2430	1630	1420	724
MIN	605	288	545	447	480	929	849	1010	1220	816	503	400
AC-FT	71210	172200	238700	173400	234300	96870	89430	106100	96680	74840	45200	30800
MEAN†	1159	3912	2993	2733	4500	1175	1502	1722	1521	1213	735	518
CFSM†	2.89	9.75	7.47	6.82	11.22	2.93	3.75	4.29	4.04	3.03	1.83	1.29
IN.†	3.33	10.88	8.61	7.86	12.11	3.38	4.18	4.95	4.51	3.49	2.11	1.44
AC-FT†	71260	232700	184100	168100	258900	72260	89350	105900	96460	74630	45200	30790

CAL YR 1995 TOTAL 617846 MEAN 1693 MAX 11500 MIN 288 AC-FT 1225000 MEAN† 1700 CFSM† 4.24 IN.† 57.56 AC-FT† 1231000  
WTR YR 1996 TOTAL 720831 MEAN 1969 MAX 11500 MIN 288 AC-FT 1430000 MEAN† 1971 CFSM† 4.91 IN.† 66.86 AC-FT† 1430000

e Estimated

† Adjusted for change in contents in Mud Mountain Lake.

## PUYALLUP RIVER BASIN

161

## 12099000 WHITE RIVER CANAL AT BUCKLEY, WA

LOCATION.--Lat 47°10'19", long 122°01'13", in SE 1/4 SE 1/4 sec.34, T.20 N., R.6 E., Pierce County, Hydrologic Unit 17110014, on right bank 0.8 mi downstream from diversion dam, and 0.8 mi northwest of Buckley.

PERIOD OF RECORD.--February 1913 to September 1938 (monthly runoff only, published in WSP 1316), October 1981 to current year. Records for September 1958 to September 1981 available in files of the Geological Survey. Records prior to October 1961, published as White River flume near Buckley, at site 0.5 mi downstream from White River diversion dam. September 1959 to September 1992 station at site 4.0 mi downstream from diversion dam. October 1992 to current year, gage at site 0.8 mi downstream from diversion dam.

GAGE.--Water-stage recorder. Elevation of gage is 650 ft above sea level, from topographic map.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Flow completely regulated at White River diversion dam about 0.8 mi upstream from gage. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 2,210 ft<sup>3</sup>/s May 16, 1996; no flow on many days during most years.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	492	776	1830	1940	977	1470	791	e.00	892	825	818	e510
2	651	732	1470	1970	980	1020	873	e550	906	751	699	e480
3	1560	689	1240	1990	903	716	848	881	975	711	691	e450
4	1780	657	698	1950	970	799	783	761	960	728	614	e450
5	1110	665	e100	1650	1160	892	722	790	862	941	622	e430
6	805	675	e.00	1580	1390	926	727	790	731	1070	590	e410
7	751	1430	e.00	1560	1480	1060	815	770	1290	991	546	e390
8	667	1880	e.00	1540	622	1180	966	813	959	1130	576	e380
9	612	1190	e.00	1840	e571	1190	1210	896	696	1290	605	e370
10	1140	812	e.00	1680	e.00	1200	1430	854	1090	1140	648	e370
11	1820	1370	e.00	1710	e.00	1470	1410	897	945	1090	724	413
12	1790	1140	e.00	1630	e.00	1740	1290	1200	967	1160	713	450
13	1890	1150	e.00	1430	e.00	1740	1300	1560	1040	1220	629	243
14	1750	1170	e.00	1690	e.00	1770	1190	1610	956	1220	641	e.00
15	1690	870	e.00	1580	e.00	1780	1130	1680	907	1240	614	e.00
16	1800	760	e.00	1580	e.00	1770	1420	1700	832	1250	568	e.00
17	1840	709	e.00	1720	e13	1710	1350	1570	919	1200	496	e.00
18	1910	744	e.00	1700	e119	1640	1280	1600	851	1110	421	e.00
19	1810	682	e.00	1630	216	1630	1300	1590	286	984	378	e.00
20	1460	559	e.00	1530	222	1590	e400	1580	517	817	372	e.00
21	1210	228	e530	1440	e98	1550	e.00	1460	638	682	349	e.00
22	1160	e500	1640	1300	e.00	1520	e.00	1390	642	698	338	e.00
23	1050	e1300	1560	906	e.00	1480	e.00	1230	587	754	256	e.00
24	971	e1450	1440	291	e.00	1440	e.00	925	743	895	200	e.00
25	868	e1550	1250	383	e.00	1380	e.00	896	1020	995	243	e.00
26	1440	e1700	863	1190	e.00	1330	e.00	1140	838	939	275	e.00
27	1240	e1650	773	1780	e.00	1250	e.00	1080	806	958	306	e.00
28	1100	1600	861	1710	e300	1150	e.00	934	811	985	692	e.00
29	997	1890	1260	1620	1270	1050	e.00	1170	782	1000	e280	e.00
30	918	1930	1840	1480	---	941	e.00	966	794	1040	e620	e.00
31	844	---	1940	1140	---	820	---	911	---	993	e580	---
TOTAL	39126	32458	19295.00	47140	11291.00	41204	21235.00	34194.00	25242	30807	16104	5346.00
MEAN	1262	1082	622	1521	389	1329	708	1103	841	994	519	178
MAX	1910	1930	1940	1990	1480	1780	1430	1700	1290	1290	818	510
MIN	492	228	.00	291	.00	716	.00	.00	286	682	200	.00
AC-FT	77610	64380	38270	93500	22400	81730	42120	67820	50070	61110	31940	10600

CAL YR 1995 TOTAL 426304.00 MEAN 1168 MAX 2010 MIN .00 AC-FT 845600  
WTR YR 1996 TOTAL 323442.00 MEAN 884 MAX 1990 MIN .00 AC-FT 641500

e Estimated



## PUYALLUP RIVER BASIN

12099600 BOISE CREEK AT BUCKLEY, WA

LOCATION.--Lat 47°10'34", long 122°01'02", in NE 1/4 SE 1/4 sec.34, T.20 N., R.6 E., King County, Hydrologic Unit 17110014, on left bank at downstream side of county road bridge, 1.0 mi northeast of Buckley, and at mile 0.1.

DRAINAGE AREA.--15.4 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1977 to September 1981, December 1981 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 640 ft above sea level, from topographic map. Prior to January 25, 1984, at site 25 ft upstream at datum 0.91 ft higher. Prior to Mar. 27, 1996 at site 10 ft downstream, at datum 1.00 ft higher.

REMARKS.--Records fair except for estimated daily discharges and discharges above 100 ft<sup>3</sup>/s, which are poor. Flow partly regulated by millpond at mile 5.6. Diversions upstream from station for domestic and industrial use. Interbasin diversion from Scatter Creek of about 2 ft<sup>3</sup>/s during low-flow periods enters Boise Creek upstream from millpond. U.S. Geological Survey satellite telemeter at station. Chemical analyses November 1961 to July 1964.

AVERAGE DISCHARGE.--18 years (1978-81, 1983-96), 32.7 ft<sup>3</sup>/s, 23,670 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,200 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 4.26 ft from rating curve extended above 180 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow 600 ft upstream from station; minimum discharge, 1.7 ft<sup>3</sup>/s Sept. 19, 1979.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	0630	287	2.44	Jan. 7	0730	267	2.48
Nov. 28	2400	492	3.26	Feb. 8	0930	*1,200	*4.26
Dec. 1	0530	428	3.06				

Minimum discharge, 4.0 ft<sup>3</sup>/s Aug. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	13	338	74	37	30	30	35	25	12	7.0	6.3
2	19	12	228	71	34	28	31	30	23	12	8.9	6.0
3	47	12	138	91	*33	48	26	29	21	12	9.1	6.4
4	39	12	109	75	43	48	24	27	22	21	9.3	6.5
5	23	13	87	74	91	42	23	26	20	14	9.4	6.6
6	18	13	71	69	224	44	25	25	20	13	7.2	6.8
7	16	52	64	181	366	37	26	27	18	13	6.6	5.8
8	15	69	57	134	898	35	23	24	18	12	6.2	6.6
9	16	53	61	101	565	32	22	24	17	13	6.6	6.2
10	65	48	64	83	253	39	32	22	17	13	6.5	5.5
11	100	153	67	69	166	42	35	27	17	12	6.6	5.4
12	54	74	62	60	133	35	33	26	16	11	6.7	5.2
13	32	77	64	59	109	29	36	74	15	11	6.4	5.8
14	24	63	67	128	95	26	33	58	17	10	6.1	8.3
15	20	53	61	135	83	24	32	54	16	9.4	6.0	16
16	30	44	54	115	74	23	75	52	15	8.6	5.9	8.2
17	25	37	50	94	91	e22	48	53	16	9.3	6.2	18
18	28	40	61	78	118	e21	40	47	16	11	6.4	10
19	22	34	52	77	128	e23	44	49	14	13	6.2	12
20	23	29	46	107	105	e22	38	48	13	9.5	5.7	12
21	22	27	42	101	96	e21	33	41	12	10	5.7	9.4
22	20	26	38	78	80	e28	40	45	14	9.6	5.4	8.9
23	18	34	36	70	91	e27	89	37	23	8.8	4.7	7.8
24	17	59	33	71	67	e26	93	34	20	8.2	4.6	6.9
25	17	106	31	67	57	e25	76	33	14	7.7	4.9	6.3
26	20	70	30	60	50	e24	73	30	13	7.5	5.1	5.7
27	17	92	28	53	42	e23	61	29	13	7.6	5.1	5.3
28	16	348	27	49	34	22	48	29	18	7.8	5.7	5.1
29	15	417	55	45	32	24	40	29	14	7.4	5.6	5.2
30	14	304	68	39	--	23	37	27	13	6.9	5.6	5.1
31	13	--	80	37	--	23	--	25	--	6.9	6.1	--
TOTAL	817	2384	2269	2545	4195	916	1266	1116	510	328.2	197.5	229.3
MEAN	26.4	79.5	73.2	82.1	145	29.5	42.2	36.0	17.0	10.6	6.37	7.64
MAX	100	417	338	181	898	48	93	74	25	21	9.4	18
MIN	12	12	27	37	32	21	22	22	12	6.9	4.6	5.1
AC-FT	1620	4730	4500	5050	8320	1820	2510	2210	1010	651	392	455

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 1996, BY WATER YEAR (WY)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	13.5	46.5	51.5	56.0	60.1	43.3	39.9	30.6	22.0	14.2	9.18	9.80								
MAX	29.8	124	96.2	162	145	67.1	69.3	57.5	55.1	35.5	16.3	29.5								
(WY)	1986	1991	1978	1984	1996	1989	1991	1984	1990	1983	1993	1978								
MIN	4.65	7.85	23.2	25.5	19.4	25.1	16.5	15.6	8.45	6.20	4.72	3.37								
(WY)	1990	1980	1988	1979	1993	1978	1995	1982	1982	1987	1987	1989								

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

WATER YEARS 1977 - 1996

ANNUAL TOTAL	11906.4	16773.0	
ANNUAL MEAN	32.6	45.8	
HIGHEST ANNUAL MEAN			32.7
LOWEST ANNUAL MEAN			50.4
HIGHEST DAILY MEAN	474	898	22.1
LOWEST DAILY MEAN	6.6	4.6	1991
ANNUAL SEVEN-DAY MINIMUM	6.8	5.1	1994
ANNUAL RUNOFF (AC-FT)	23620	33270	23670
10 PERCENT EXCEEDS	61	91	65
50 PERCENT EXCEEDS	19	27	23
90 PERCENT EXCEEDS	7.9	6.5	6.6

e Estimated

## PUYALLUP RIVER BASIN

163

## 12100000 WHITE RIVER AT BUCKLEY, WA

LOCATION.--Lat 47°10'28", long 122°01'09", in NE 1/4 SE 1/4 sec.34, T.20 N., R.6 E., Pierce County, Hydrologic Unit 17110014, on left bank 500 ft upstream from state highway 410 bridge, 200 ft downstream from Boise Creek, 1.0 mi northeast of Buckley, and at mile 23.3

DRAINAGE AREA.--427 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1910 to November 1911, April 1977 to current year. February 1913 to September 1938 (records not equivalent as they include flow of White River flume, see REMARKS).

REVISED RECORDS.--WSP 1316: Drainage area.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 620 ft above sea level, from topographic map. June 8, 1910, to Nov. 30, 1911, nonrecording gage at site 150 ft upstream at different datum, and Jan. 18, 1913, to Sept. 30, 1938, water-stage recorder at site 100 ft upstream at sea level (levels by Puget Sound Power and Light Co.).

REMARKS.--No estimated daily discharges. Records good except those above 6,000 ft<sup>3</sup>/s, which are fair. Since November 1911, White River Canal (station 12099000) has diverted from left bank 1.0 mi upstream for storage in Lake Tapps (station 12101000). Water is returned to White River 19.7 mi downstream via the Lake Tapps Diversion (station 12101100) after power development at White River powerplant at Dieringer. Since 1942, flow regulated by Mud Mountain Lake (station 12098000) for flood control. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--19 years (water years 1978-96), 531 ft<sup>3</sup>/s, 385,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--During water years 1911-12, 1914-19, 1921-23, 1935-38, maximum discharge, 23,100 ft<sup>3</sup>/s Dec. 18, 1917, during period of combined flows; minimum, not determined. River, excluding canal, since April 1977, maximum discharge, 14,900 ft<sup>3</sup>/s Nov. 24, 1986, gage height, 8.48 ft; minimum discharge, 25 ft<sup>3</sup>/s Nov. 19, 1979, gage height, 2.41 ft; minimum daily discharge, 31 ft<sup>3</sup>/s July 30, 1978.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 13,900 ft<sup>3</sup>/s Dec. 2, gage height, 8.29 ft, from rating curve extended above 6,000 ft<sup>3</sup>/s; minimum discharge, 107 ft<sup>3</sup>/s Oct. 4; minimum daily discharge, 137 ft<sup>3</sup>/s Oct. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	137	146	9630	1990	150	666	165	1660	556	231	219	222
2	153	148	12100	1890	157	596	165	934	593	411	241	215
3	346	149	9140	2870	167	557	157	537	925	580	208	211
4	342	154	8500	3430	173	477	157	541	1240	698	219	214
5	156	155	8650	1780	313	379	161	435	1150	399	222	206
6	165	160	8390	1330	2380	345	165	344	494	204	203	196
7	152	314	5820	2140	5270	273	162	362	881	248	215	196
8	151	2810	4200	3670	3570	194	166	290	1380	244	221	199
9	154	4220	2560	3900	6580	181	160	182	1430	235	267	201
10	310	2270	2330	2660	10600	187	166	165	819	274	239	201
11	1390	4900	3000	1490	10300	280	174	196	687	221	244	214
12	480	5700	3630	1090	9850	381	170	200	623	224	216	218
13	506	5230	5470	829	9640	407	178	476	465	232	215	438
14	150	4570	4310	1180	9450	466	182	1050	546	362	221	700
15	139	3370	3400	1820	8050	435	181	1070	577	389	217	822
16	149	2830	2690	2560	6030	372	194	1230	599	276	211	711
17	142	2340	2360	1590	2540	253	185	975	422	202	212	755
18	583	2500	2230	1030	2810	220	171	929	419	193	212	603
19	199	2110	1240	836	3800	181	176	811	855	200	209	580
20	151	1550	490	800	3690	177	967	638	702	203	214	558
21	251	323	585	745	2680	174	1310	523	669	228	205	509
22	150	510	915	625	2040	174	1290	682	700	222	211	507
23	153	888	879	425	2330	173	1710	748	895	246	241	478
24	148	1210	785	164	2210	174	2990	990	708	215	236	453
25	163	2260	665	166	1860	168	3270	963	212	203	224	429
26	168	3550	565	226	1460	164	2750	921	311	221	219	414
27	155	4570	557	217	565	160	2460	1000	309	261	210	424
28	147	3440	435	198	493	159	2190	978	315	236	739	436
29	142	6950	367	196	723	159	1830	643	217	229	540	460
30	139	7380	780	184	---	156	1700	690	196	225	241	471
31	144	---	1620	167	---	159	---	593	---	200	221	---
TOTAL	7715	76707	108293	42198	109881	8847	25702	21756	19895	8512	7712	12241
MEAN	249	2557	3493	1361	3789	285	857	702	663	275	249	408
MAX	1390	7380	12100	3900	10600	666	3270	1660	1430	698	739	822
MIN	137	146	367	164	150	156	157	165	196	193	203	196
AC-FT	15300	152100	214800	83700	217900	17550	50980	43150	39460	16880	15300	24280

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1977 - 1996, BY WATER YEAR (WY)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	162	621	924	675	970	434	437	483	617	467	355	188								
MAX	510	2557	4014	2888	3789	990	1171	919	1898	1473	825	511								
(WY)	1986	1996	1978	1984	1996	1989	1989	1980	1984	1982	1978	1988								
MIN	48.4	40.9	137	69.8	131	122	89.9	67.6	172	58.2	57.4	45.2								
(WY)	1980	1980	1985	1979	1985	1985	1982	1977	1992	1978	1977	1979								

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1977 - 1996
ANNUAL TOTAL	300312	449459	
ANNUAL MEAN	823	1228	531
HIGHEST ANNUAL MEAN			1228
LOWEST ANNUAL MEAN			200
HIGHEST DAILY MEAN	12100	Dec 2	13500
LOWEST DAILY MEAN	132	Jan 21	31
ANNUAL SEVEN-DAY MINIMUM	134	Jan 21	37
ANNUAL RUNOFF (AC-FT)	595700	891500	385000
10 PERCENT EXCEEDS	2330	3410	1290
50 PERCENT EXCEEDS	202	435	157
90 PERCENT EXCEEDS	144	162	66

## PUYALLUP RIVER BASIN

12100496 WHITE RIVER NEAR AUBURN, WA

LOCATION.--Lat 47°15'58", long 122°13'43", in SE 1/4 NE 1/4 sec.36, T.21 N., R.4 E., King County, Hydrologic Unit 17110014, on left bank 100 ft downstream from railroad bridge, 2.7 mi upstream from the White River Power Plant tailrace, 2.9 mi south of Auburn, and at mile 6.3.

DRAINAGE AREA.--464 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1987 to September 1989, October 1990 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is sea level.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Since November 1911, White River Canal (station 12099000) has diverted from left bank 18.0 mi upstream for storage in Lake Tapps (station 12101000). Water is returned to White River 2.7 mi downstream via the Lake Tapps Diversion (station 12101100) after power development at White River Power Plant at Dieringer. Since 1942, flow regulated by Mud Mountain Lake (station 12098000) for flood control. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--8 years (water years 1988-89, 1991-96), 665 ft<sup>3</sup>/s, 481,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,000 ft<sup>3</sup>/s Feb. 10, 1996, gage height, 83.15 ft; minimum discharge, 89 ft<sup>3</sup>/s Feb. 17, 18, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 15,000 ft<sup>3</sup>/s Feb. 10, gage height, 83.15 ft; minimum discharge, 134 ft<sup>3</sup>/s Oct 21, 30, 31, Nov. 1-3, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	176	151	e11400	e2200	e220	669	261	1810	563	284	281	251
2	196	157	e12500	e2100	e230	621	268	1140	e650	e490	314	249
3	334	154	e10000	e3200	e250	612	244	668	e975	e680	280	238
4	607	159	e9300	e4000	e300	582	234	665	e1330	e800	283	240
5	214	172	e9400	e2000	e2500	511	231	558	e1250	524	291	235
6	205	164	e9100	e1700	3010	478	247	450	e600	281	265	227
7	199	313	e6350	e2500	6690	434	244	436	e1000	305	274	218
8	191	e3000	e4600	e4000	6990	334	235	420	e1480	314	278	219
9	200	e4500	e2800	e4300	7620	305	235	282	e1530	299	311	228
10	283	e2600	e2500	e2700	12800	305	244	248	e950	321	301	228
11	2110	e5400	e3200	e1600	11200	350	255	257	e775	299	308	232
12	535	e7300	e3900	e1100	11000	492	254	299	715	272	274	248
13	845	e6000	e5800	e1000	10700	443	272	e600	e575	297	267	e460
14	220	e4800	e4700	e1400	11400	520	260	e1180	601	392	272	e700
15	194	e4100	e3700	e2000	9420	503	260	e1200	e650	455	278	e850
16	207	e3100	e2800	e3000	7450	482	344	e1350	e700	370	270	e750
17	202	e2500	e2400	e1700	2790	359	300	e1100	528	283	268	e800
18	728	e2600	e2300	e1200	2480	336	284	e1030	e500	275	270	e650
19	e290	e2300	e1300	e900	4320	281	299	858	e950	280	265	e600
20	177	e1800	e550	e860	4560	271	894	726	e800	270	265	575
21	268	e450	e650	e800	3480	266	1250	604	e775	301	258	542
22	172	e600	e1000	e660	2270	273	1210	e800	e800	287	263	546
23	172	e940	e950	e450	2680	268	2120	805	e1000	309	283	532
24	167	e1400	e860	e200	2590	262	3520	e1100	791	285	298	510
25	180	e2300	e720	e210	2080	255	3980	e1080	302	275	294	496
26	210	e3700	e660	e300	1710	249	3450	e1030	379	277	285	481
27	183	e5000	e580	e290	699	244	2940	e1100	392	326	276	479
28	168	e4000	e500	e270	538	237	2560	e1080	389	310	e750	486
29	160	e7400	e400	e260	689	238	2080	679	315	295	e700	501
30	154	e8000	e900	e250	--	231	1850	e750	275	302	291	508
31	154	--	e1800	e230	--	234	--	607	--	259	254	--
TOTAL	10101	85060	117620	47380	132666	11645	30825	24912	22540	10717	9567	13279
MEAN	326	2835	3794	1528	4575	376	1028	804	751	346	309	443
MAX	2110	8000	12500	4300	12800	669	3980	1810	1530	800	750	850
MIN	154	151	400	200	220	231	231	248	275	259	254	218
AC-FT	20040	168700	233300	93980	263100	23100	61140	49410	44710	21260	18980	26340

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1988 - 1996, BY WATER YEAR (WY)

	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	276	984	1160	735	1391	480	735	544	532
MAX	501	2835	3794	1528	4575	1280	1415	918	829
(WY)	1991	1996	1996	1996	1996	1989	1991	1988	1989
MIN	165	168	188	215	176	193	188	170	189
(WY)	1992	1994	1994	1994	1994	1992	1995	1992	1994

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1988 - 1996
ANNUAL TOTAL	358068	516312	
ANNUAL MEAN	981	1411	665
HIGHEST ANNUAL MEAN			1411
LOWEST ANNUAL MEAN			243
HIGHEST DAILY MEAN	12500	Dec 2	12800
LOWEST DAILY MEAN	150	Jun 10	116
ANNUAL SEVEN-DAY MINIMUM	156	Oct 29	129
ANNUAL RUNOFF (AC-FT)	710200	1024000	481800
10 PERCENT EXCEEDS	2760	3920	1540
50 PERCENT EXCEEDS	277	509	255
90 PERCENT EXCEEDS	175	229	163

e Estimated

PUYALLUP RIVER BASIN

165

12101000 LAKE TAPPS NEAR SUMNER, WA

LOCATION.--Lat 47°14'28", long 122°11'26", in NE 1/4 NE 1/4 sec.8, T.20 N., R.5 E., Pierce County, Hydrologic Unit 17110014, 1.7 mi east of Dieringer, and 3.5 mi northeast of Sumner.

PERIOD OF RECORD.--November 1911 to current year. October 1934 to October 1950, change in contents published with records for Puyallup River at Puyallup. Monthend contents only November 1911 to September 1950, published in WSP 1316.

GAGE.--Water-stage recorder. Datum of gage is 0.7 ft above sea level (levels by Puget Sound Power & Light Co.).

REMARKS.--Reservoir is formed by a diked natural lake into which a large part of the low-water flow of White River is diverted. Construction of dike began June 1910; storage began in 1911. Usable capacity (based on 1959 resurvey; capacity table dated July 28, 1959, put into use Oct. 1, 1958), 46,600 acre-ft between gage heights of 515 ft, normal minimum pool, and 543 ft, normal maximum pool. Dead storage unknown. Figures given herein represent usable contents. Reservoir is used for power development at the White River powerplant at Dieringer. U. S. Geological Survey satellite telemeter at station.

COOPERATION.--Prior to October 1, 1990 and July to September 1996 gage-height record furnished by Puget Sound Power & Light Co. Contents curve furnished by Puget Sound Power & Light Co.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 51,710 acre-ft June 30, 1958, gage height, 541.57 ft, capacity table dated Jan. 19, 1920; maximum gage height observed, 543.07 ft July 8, 1990; minimum contents observed, not determined (below normal minimum pool) Apr. 3, 1978, gage height, 514.90 ft; minimum gage height, 505.70 ft June 24, 1912.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 46,353 acre-ft Aug. 7, gage height, 542.88 ft; minimum contents, 9,687 acre-ft Feb. 29, gage height, 524.09 ft.

MONTHEND GAGE HEIGHT AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

	Gage height (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	542.52	45,446	--
Oct. 31.....	537.84	34,305	-11,141
Nov. 30.....	540.50	40,500	+6,195
Dec. 31.....	539.72	38,652	-1,848
CAL YR 1995.....	--	--	-2,230
Jan. 31.....	541.54	43,014	+4,362
Feb. 29.....	524.38	10,084	-32,930
Mar. 31.....	532.58	23,225	+13,141
Apr. 30.....	531.12	20,521	-2,704
May 31.....	542.72	45,950	+25,429
June 30.....	542.60	45,648	-302
July 31.....	542.83	46,227	+579
Aug. 31.....	542.79	46,126	-101
Sept. 30.....	541.97	44,064	-2,062
WTR YR 1996.....	--	--	-1,382

## 12101100 LAKE TAPPS DIVERSION AT DIERINGER, WA

LOCATION.--Lat 47°14'18", long 122°13'37", in SW 1/4 NW 1/4 sec.7, T.20 N., R.5 E., Pierce County, Hydrologic Unit 17110014, on right bank 850 ft downstream from White River powerplant at Dieringer, and 1,400 ft upstream from mouth.

PERIOD OF RECORD.--April 1958 to current year.

GAGE.--Water-stage recorder. Datum of gage is 42.36 ft above sea level (levels by Puget Sound Power and Light Co.). Prior to September 30, 1990, at same site at datum 5.00 ft higher.

REMARKS.--Records good except for discharges below 20 ft<sup>3</sup>/s, which are fair. Flow regulated by White River powerplant. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--38 years (water years 1959-96), 935 ft<sup>3</sup>/s, 677,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,530 ft<sup>3</sup>/s Jan. 29, 1965, gage height, 6.23 ft, datum then in use; maximum gage height, 12.44 ft Dec. 1, 1995 (backwater from White River); no flow many days in July and August 1990, Sept. 29, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,710 ft<sup>3</sup>/s Dec. 9, gage height, 9.08 ft; minimum discharge, 15 ft<sup>3</sup>/s Aug. 20, 21.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	555	1090	e1190	580	1190	1110	1210	19	1140	1010	1140	623
2	1030	1100	e27	782	1700	1120	850	18	1090	992	1110	418
3	1210	1080	e1110	1330	1680	1120	1010	18	1050	993	872	358
4	1210	29	e1610	1560	1630	1120	1030	17	1070	1030	221	382
5	1240	29	e1290	1580	1550	1120	1190	17	1130	994	22	403
6	1240	732	e1550	1650	1640	993	1190	446	1130	994	112	388
7	1230	1040	e1040	1650	e1670	785	68	794	1130	993	357	336
8	1210	1130	912	1660	e632	977	837	789	1130	994	466	288
9	1210	1010	262	1660	e809	1340	1180	334	1130	1110	823	289
10	1210	1250	27	1640	e27	1380	1190	210	1130	1130	1030	283
11	1210	1590	27	1650	e27	1370	1200	47	1130	1130	254	284
12	1210	1470	777	1650	e27	1230	1190	47	1140	1100	312	293
13	1330	1150	45	1650	e27	1130	1200	659	1130	968	535	343
14	1400	1140	44	1650	e27	1400	1200	1090	1130	1060	733	40
15	1520	1210	167	1640	e1230	1240	1190	1080	1130	1100	751	41
16	1520	1220	31	1640	e1540	1130	1190	1080	1130	1090	581	40
17	1520	446	31	1640	1520	1130	1190	978	1110	1090	393	40
18	1560	25	31	1650	1530	1130	1020	702	682	1070	237	40
19	1610	25	31	1650	1540	1090	1190	699	557	924	374	40
20	1620	25	33	1650	1270	1620	1240	1080	554	574	403	32
21	1550	26	261	1650	1130	1630	1230	1070	554	445	364	32
22	1600	29	379	1660	1130	1330	1240	1070	554	508	326	32
23	1640	811	1280	1660	1130	1530	1250	1070	554	778	333	32
24	1640	1170	1160	1670	1140	1630	1250	1060	769	854	20	32
25	1650	66	356	1660	1150	1630	213	1060	1100	801	204	31
26	1650	342	1280	1660	1200	1630	17	1060	1130	870	533	31
27	1660	1220	1230	246	1250	1640	18	1060	1130	955	473	31
28	1640	1580	738	29	1260	1360	23	1060	1130	699	507	31
29	1190	e1430	620	1400	1260	1150	29	1080	1140	1010	161	31
30	1320	e1270	429	1410	---	1210	18	1150	1070	632	682	32
31	1200	---	440	1130	---	1210	---	1140	---	740	532	---
TOTAL	42585	24735	18408	44737	31916	39485	26853	22004	29954	28638	14861	5276
MEAN	1374	824	594	1443	1101	1274	895	710	998	924	479	176
MAX	1660	1590	1610	1670	1700	1640	1250	1150	1140	1130	1140	623
MIN	555	25	27	29	27	785	17	17	554	445	20	31
AC-FT	84470	49060	36510	88740	63310	78320	53260	43640	59410	56800	29480	10460
CAL YR 1995	TOTAL	365459.6	MEAN	1001	MAX	1700	MIN	8.4	AC-FT	724900		
WTR YR 1996	TOTAL	329452	MEAN	900	MAX	1700	MIN	17	AC-FT	653500		

e Estimated



## PUYALLUP RIVER BASIN

167

## 12101500 PUYALLUP RIVER AT PUYALLUP, WA

LOCATION.--Lat 47°12'31", long 122°19'33", in SE 1/4 NW 1/4 sec.20, T.20 N., R.4 E., Pierce County, Hydrologic Unit 17110014, on left bank 0.8 mi upstream from bridge at Clark Creek, 2.0 mi northwest of Puyallup City Hall, and at mile 6.6.

DRAINAGE AREA.--948 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1914 to current year.

REVISED RECORDS.--WSP 832: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to Dec. 3, 1919, at sites 1.2 mi upstream and 900 ft upstream at different datums. Dec. 3, 1919, to Nov. 9, 1935, at site 500 ft upstream at datum 9.61 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are fair. All diverted water returned to river upstream from gage. Large part of flow of White River (a tributary) diverted through Lake Tapps (station 12101000).

Flood flow regulated by Mud Mountain Lake (station 12098000) on White River. Some pondage on tributaries and upper Puyallup River. Diurnal fluctuations caused by powerplants and glacial melt upstream from station. U.S. Geological Survey satellite telemeter at station. Chemical analyses October 1958 to September 1968, October 1970 to September 1972, October 1974 to September 1994. Water temperatures July 1959 to September 1961, August 1965 to September 1966.

Since 1912 the city of Tacoma pipelining diversion from Green River has released as much as 123 ft<sup>3</sup>/s daily, and since 1957 an average of about 15 ft<sup>3</sup>/s per month into Puyallup River 0.5 mi east of McMillin. Monthly mean diversions, in cubic feet per second, for the year are as follows:

October	0.18	January	0	April	3.47	July	0
November	0.60	February	0	May	3.65	August	0
December	0	March	0	June	0	September	1.66

AVERAGE DISCHARGE.--82 years (water years 1915-96), 3,326 ft<sup>3</sup>/s, 2,410,000 acre-ft/yr, adjusted for storage in Lake Tapps since October 1934, and Mud Mountain Lake October 1944 to September 1947.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 57,000 ft<sup>3</sup>/s Dec. 10, 1933, elevation, 31.0 ft, present datum; minimum discharge, 306 ft<sup>3</sup>/s Sept. 25, 1955, elevation, 8.23 ft; minimum daily discharge, 400 ft<sup>3</sup>/s Nov. 30, 1952.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 46,700 ft<sup>3</sup>/s Feb. 9, elevation, 29.77 ft; minimum discharge, 701 ft<sup>3</sup>/s Sept. 11, elevation, 9.38 ft; minimum daily discharge, 753 ft<sup>3</sup>/s Nov. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1590	1940	19400	7010	3320	e3100	e2200	e3500	3100	2380	2340	1660
2	2090	1870	18600	6100	3960	e3150	e2200	e1900	3140	2600	2350	1220
3	4290	1810	16200	8260	3920	e3320	e2220	e1500	3690	2920	2200	1240
4	4670	791	14700	8780	4160	e3100	e2300	e1400	4230	3250	1330	1150
5	3050	753	e13500	6940	4950	e2800	e2400	e1700	4010	2880	1280	1160
6	2540	1490	e12000	6250	11200	e2480	e1800	e2000	3500	2360	1280	1220
7	2430	3410	e9000	10600	24400	e2900	e1100	e2490	3360	2300	1430	1040
8	2260	9510	e6600	11800	37800	e3200	e2000	2480	4170	2440	1580	990
9	2190	11500	e5800	10700	34400	e3500	e2800	1830	4030	2670	1990	1020
10	3230	6560	e7000	8920	21600	e3650	e2700	1520	3500	2600	2300	1010
11	8560	13200	e9400	6600	17200	e3450	e2700	1310	3070	2510	1710	1060
12	5130	12500	e10800	5690	15200	e3300	e2680	1980	3180	2530	1510	1160
13	4120	10600	11500	5160	e14200	e3500	e2720	3770	2770	2550	1600	1310
14	3210	10900	10900	5790	e13500	e3100	e2650	5670	2920	2840	1920	1400
15	3140	7900	9300	7120	e13100	e2800	e2900	5500	2820	3060	1930	1860
16	3500	7080	7550	9340	e12100	e2700	e3200	5270	2900	2810	1700	1830
17	3780	5050	7170	7500	e8750	e2500	e3070	4840	2710	2570	1400	1640
18	4560	4850	7060	6070	e8890	e2550	e3030	4240	2120	2500	1140	1350
19	3650	4360	6580	5570	e10100	e3050	e3070	4390	2330	2320	1210	1340
20	3300	3770	5400	5510	e9270	e3000	e3670	4400	2220	1800	1270	1290
21	3170	2360	4940	5790	e6200	e2700	e4250	3910	2120	1550	1200	1160
22	3050	2050	4560	5340	e6200	e2900	e4170	4070	2160	1650	1180	1180
23	2920	3550	5050	4970	e5600	e3000	e6520	4610	2420	2020	1230	1100
24	2810	5080	4930	4490	e5000	e3050	e9440	4430	3030	2170	992	1010
25	2750	7030	4500	4350	e4500	e3000	e7870	4290	2710	2200	1280	944
26	3950	7790	5320	4170	e3500	e2900	e6720	4250	2610	2130	1770	913
27	3500	8870	4460	2650	e3300	e2500	e5630	3960	2650	2520	1630	953
28	3160	23200	3810	2080	e3300	e2300	e4870	3920	2810	2030	1920	978
29	2450	23300	3840	3090	e3200	e2400	e4220	3590	2640	2420	1770	1030
30	2400	21200	5590	3370	---	e2450	e3860	3540	2430	2280	2110	1060
31	2230	---	7430	3270	---	e2450	---	3270	---	1980	1670	---
TOTAL	103680	224274	262890	193280	312820	90800	108960	105530	89350	74840	50222	36278
MEAN	3345	7476	8480	6235	10790	2929	3632	3404	2978	2414	1620	1209
MAX	8560	23300	19400	11800	37800	3650	9440	5670	4230	3250	2350	1860
MIN	1590	753	3810	2080	3200	2300	1100	1310	2120	1550	992	913
AC-FT	205600	444800	521400	383400	620500	180100	216100	209300	177200	148400	99620	71960
MEAN†	3163	7581	8449	6306	10212	3141	3587	3816	2974	2423	1618	1175
CFSM†	3.34	8.00	8.91	6.65	10.77	3.31	3.78	4.03	3.14	2.56	1.71	1.24
IN.†	3.85	8.92	10.28	7.67	11.62	3.82	4.22	4.64	3.50	2.95	1.97	1.38
AC-FT†	194500	451000	519600	387800	587600	193200	213400	234700	176900	149000	99520	69900

CAL YR 1995 TOTAL 1348931 MEAN 3696 MAX 23300 MIN 575 AC-FT 2676000 MEAN† 3693 CFSM† 3.90 IN.† 52.89 AC-FT† 2674000  
WTR YR 1996 TOTAL 1652924 MEAN 4516 MAX 37800 MIN 753 AC-FT 3279000 MEAN† 4517 CFSM† 4.76 IN.† 64.83 AC-FT† 3278000

e Estimated

† Adjusted for change in contents in Lake Tapps.

## PUYALLUP RIVER BASIN

12102075 CLARKS CREEK AT TACOMA ROAD, NEAR PUYALLUP, WA

LOCATION.--Lat 47°11'52", long 122°20'10", in NE 1/4 NE 1/4 sec.30, T.20 N., R.4 E., Pierce County, Hydrologic Unit 17110014, at private bridge at end of Tacoma Road, 1.0 mi northwest of Puyallup, and at mile 1.5.

DRAINAGE AREA.--13.0 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1992 to September 1995 (discharge measurements only). March 1995 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level.

REMARKS.--Records fair except for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--1 year (water year 1996), 59.9 ft<sup>3</sup>/s, 43,510 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined but occurred Feb. 8 or 9, 1996; maximum gage height, 25.60 ft Feb. 8 or 9, 1996, from inside highwater mark, affected by backwater from the Puyallup River; minimum daily discharge, 33 ft<sup>3</sup>/s June 26-29, 1995.

EXTREMES FOR PERIOD.--

WATER YEAR 1995: Maximum daily discharge for period Mar. 1 to Sept. 30, 70 ft<sup>3</sup>/s Aug. 16; minimum daily discharge, 33 ft<sup>3</sup>/s June 26-29.

WATER YEAR 1996: Maximum discharge, not determined but occurred Feb. 8 or 9; maximum gage height, 25.60 ft Feb. 8 or 9, from inside highwater mark, affected by backwater from the Puyallup river; minimum discharge, 35 ft<sup>3</sup>/s July 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	e45	39	43	e36	37	e40	e36
2	---	---	---	---	---	e45	39	49	37	40	e40	e36
3	---	---	---	---	---	e45	40	e43	37	43	e40	e37
4	---	---	---	---	---	e45	40	e43	38	42	e40	e45
5	---	---	---	---	---	e45	40	e43	43	40	e40	e42
6	---	---	---	---	---	e45	41	e43	43	39	e41	e40
7	---	---	---	---	---	e44	48	e43	39	42	e41	e40
8	---	---	---	---	---	e44	48	e43	37	42	e41	e40
9	---	---	---	---	---	e44	44	e43	35	62	e41	e40
10	---	---	---	---	---	e44	49	e43	40	53	e41	e40
11	---	---	---	---	---	e44	49	e43	41	46	e42	e40
12	---	---	---	---	---	e43	55	e42	36	45	e44	e42
13	---	---	---	---	---	e43	59	e42	42	e46	e42	e42
14	---	---	---	---	---	e43	50	e42	41	e44	e49	e43
15	---	---	---	---	---	e43	49	e42	40	e44	e60	e43
16	---	---	---	---	---	e42	49	e42	37	e44	e70	e43
17	---	---	---	---	---	e42	50	e41	40	e44	e47	e43
18	---	---	---	---	---	e42	51	e41	39	e44	e45	43
19	---	---	---	---	---	e42	51	e41	38	e44	e44	42
20	---	---	---	---	---	e42	53	e40	38	e43	e43	42
21	---	---	---	---	---	e41	49	e40	41	e42	e40	42
22	---	---	---	---	---	e41	48	e40	38	e41	e40	42
23	---	---	---	---	---	e41	48	e40	36	e40	e40	42
24	---	---	---	---	---	e41	48	e39	35	e40	e40	42
25	---	---	---	---	---	e40	47	e39	35	e40	e40	43
26	---	---	---	---	---	e40	46	e38	33	e44	e40	44
27	---	---	---	---	---	e39	45	e37	33	e47	e40	47
28	---	---	---	---	---	39	45	e37	33	e45	e40	48
29	---	---	---	---	---	39	50	e37	33	e43	e40	47
30	---	---	---	---	---	39	43	e36	35	e42	e38	51
31	---	---	---	---	---	39	---	e36	---	e41	e37	---
TOTAL	---	---	---	---	---	1311	1413	1271	1129	1349	1326	1267
MEAN	---	---	---	---	---	42.3	47.1	41.0	37.6	43.5	42.8	42.2
MAX	---	---	---	---	---	45	59	49	43	62	70	51
MIN	---	---	---	---	---	39	39	36	33	37	37	36
AC-FT	---	---	---	---	---	2600	2800	2520	2240	2680	2630	2510

e Estimated

## PUYALLUP RIVER BASIN

169

12102075 CLARKS CREEK AT TACOMA ROAD, NEAR PUYALLUP, WA--Continued

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	46	41	96	e53	47	e62	e66	75	e54	e40	46	56
2	48	41	89	52	44	e63	e66	73	e53	e39	49	56
3	48	40	71	59	45	e64	e65	72	e53	40	50	59
4	46	42	69	51	50	e64	e62	71	e52	42	51	60
5	45	43	60	51	63	63	e68	71	e52	40	51	60
6	45	43	58	54	89	62	e70	e70	e52	39	49	59
7	45	69	56	83	116	63	e72	e69	e52	38	50	59
8	46	68	54	61	e180	63	e74	e68	e52	38	50	59
9	46	51	61	53	e190	62	e76	e68	e52	40	50	58
10	66	52	66	49	e140	65	e77	e67	e51	40	51	59
11	67	76	78	47	e130	67	e78	e67	e51	40	51	59
12	48	52	70	47	e120	e64	e77	e66	e50	39	51	59
13	45	59	70	49	e110	e64	e76	e66	e50	39	51	60
14	45	53	69	58	e103	e64	e72	e65	e49	39	51	62
15	44	53	63	76	e100	e65	e80	e65	e48	40	51	66
16	49	50	56	64	e96	e64	88	e64	e48	41	51	61
17	50	51	56	54	e90	e64	77	e64	e47	43	52	60
18	46	54	66	51	e82	e63	79	e64	e47	51	52	60
19	44	51	57	61	e80	e61	81	e63	e46	49	51	63
20	49	49	55	75	e78	e60	79	e62	e46	45	50	62
21	46	50	54	79	e76	e59	78	e60	e46	44	51	61
22	44	51	52	65	e74	e60	84	e60	e45	44	51	60
23	44	58	51	60	e72	e60	131	e60	e44	43	51	61
24	44	60	50	63	e70	e61	115	e60	e44	43	52	61
25	48	62	49	60	e68	e62	97	e59	e43	43	52	61
26	46	56	48	53	e68	e64	91	e58	e43	43	53	61
27	43	57	49	51	e66	e68	82	e57	e43	43	54	61
28	43	88	51	51	e64	e69	79	e56	e42	44	55	60
29	43	130	63	50	e63	e68	77	e55	e42	45	54	61
30	43	100	59	47	---	e66	76	e55	e41	45	56	61
31	42	---	e54	47	---	e65	---	e54	---	45	56	---
TOTAL	1454	1750	1900	1774	2574	1969	2393	1984	1438	1304	1593	1805
MEAN	46.9	58.3	61.3	57.2	88.8	63.5	79.8	64.0	47.9	42.1	51.4	60.2
MAX	67	130	96	83	190	69	131	75	54	51	56	66
MIN	42	40	48	47	44	59	62	54	41	38	46	56
AC-FT	2880	3470	3770	3520	5110	3910	4750	3940	2850	2590	3160	3580

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 1996, BY WATER YEAR (WY)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
MEAN	46.9	58.3	61.3	57.2	88.8	52.9	63.4	52.5	42.8	42.8	47.1	51.2
MAX	46.9	58.3	61.3	57.2	88.8	63.5	79.8	64.0	47.9	43.5	51.4	60.2
(WY)	1996	1996	1996	1996	1996	1996	1996	1996	1996	1995	1996	1996
MIN	46.9	58.3	61.3	57.2	88.8	42.3	47.1	41.0	37.6	42.1	42.8	42.2
(WY)	1996	1996	1996	1996	1996	1995	1995	1995	1995	1996	1995	1995

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1995 - 1996

ANNUAL TOTAL	21938		
ANNUAL MEAN	59.9	59.9	1996
HIGHEST ANNUAL MEAN		59.9	1996
LOWEST ANNUAL MEAN		59.9	1996
HIGHEST DAILY MEAN	190	Feb 9	1996
LOWEST DAILY MEAN	38	Jul 7	1995
ANNUAL SEVEN-DAY MINIMUM	39	Jul 6	1995
ANNUAL RUNOFF (AC-FT)	43510		43510
10 PERCENT EXCEEDS	78		71
50 PERCENT EXCEEDS	57		49
90 PERCENT EXCEEDS	43		40

e Estimated

## PUYALLUP RIVER BASIN

12102140 CLEAR CREEK AT PIONEER WAY, BELOW FISH HATCHERY, NEAR TACOMA, WA

LOCATION.--Lat 47°13'10", long 122°22'25", in NW 1/4 SW 1/4 sec.13, T.20 N., R.3 E., Pierce County, Hydrologic Unit 17110019, at Pioneer Way crossing, 3.8 mi southeast of Tacoma.

DRAINAGE AREA.--3.09 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1989 to September 1991, April 1995 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to April 1995, at datum 3.33 ft lower.

REMARKS.--Records good, except those above 150 ft<sup>3</sup>/s and estimated daily discharges, which are poor. Water is diverted for operation of fish hatchery upstream from station.

AVERAGE DISCHARGE.--3 years (water years 1990-91, 1996), 10.9 ft<sup>3</sup>/s, 47.92 in/yr, 7,890 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 276 ft<sup>3</sup>/s Feb. 8, 1996, from slope-area measurement, gage height, 12.98 ft, (backwater from flood control activities downstream); minimum discharge, 4.8 ft<sup>3</sup>/s Sept. 15, 1995, July 12, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 276 ft<sup>3</sup>/s Feb. 8, gage height, 12.98 ft; minimum discharge, 4.8 ft<sup>3</sup>/s July 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.1	5.8	32	e9.0	e8.5	e11	9.3	10	8.9	9.1	8.9	8.5
2	6.2	5.9	23	8.3	e8.2	e10	9.0	10	9.0	9.1	9.0	8.6
3	6.0	5.9	14	11	e8.2	e9.8	8.8	10	9.0	9.1	8.9	8.7
4	5.6	5.9	13	8.7	9.5	e10	8.7	10	8.9	9.1	9.0	8.6
5	5.8	6.0	9.8	8.5	17	e10	8.7	9.8	8.9	9.1	9.0	8.9
6	5.8	6.0	9.2	9.3	42	e10	8.9	9.7	8.8	9.1	8.9	8.5
7	5.8	6.8	8.9	26	69	9.7	8.8	9.7	9.0	9.0	8.7	8.6
8	5.8	6.8	8.5	15	e180	9.7	8.8	9.6	8.8	9.0	9.0	8.6
9	5.9	6.3	9.6	10	e120	9.6	8.8	9.6	8.8	9.2	9.0	8.6
10	6.6	6.5	14	9.1	e80	9.7	9.0	9.5	9.0	9.0	9.1	8.6
11	6.6	8.5	22	8.8	e50	10	8.9	9.5	9.0	8.9	9.0	8.6
12	6.1	6.8	16	8.7	e37	9.7	8.9	9.6	9.0	8.7	8.9	8.5
13	6.1	6.8	14	8.7	e30	9.7	8.9	11	8.9	8.9	9.0	8.5
14	6.1	6.4	13	11	e25	9.5	8.9	9.7	9.0	8.8	8.9	8.6
15	5.9	6.1	11	23	e20	9.5	9.0	9.5	9.1	8.7	8.9	8.7
16	6.1	6.1	9.3	17	e17	9.2	12	9.6	9.1	8.9	8.9	8.4
17	6.1	6.1	9.0	12	e16	9.2	9.9	9.5	8.8	9.0	8.9	8.5
18	6.0	6.1	13	10	e25	9.3	10	10	8.8	9.0	8.9	8.4
19	5.9	6.1	10	11	e30	9.2	11	10	9.0	9.1	8.9	8.6
20	6.2	6.1	9.0	28	e34	9.2	10	10	9.1	9.2	8.9	8.4
21	6.0	6.1	8.9	28	e24	9.1	10	9.4	9.1	9.2	9.0	8.5
22	5.8	6.1	8.7	18	e20	9.2	11	9.4	9.1	9.1	9.1	8.5
23	6.0	6.3	8.6	14	e25	9.1	49	9.2	9.3	9.1	9.0	8.1
24	6.1	6.3	8.4	14	e21	9.0	27	9.4	9.2	9.1	8.8	8.5
25	6.2	6.9	8.2	13	e18	8.9	17	9.2	9.1	9.0	8.7	8.5
26	6.1	6.6	8.2	11	e15	9.0	16	9.3	9.1	9.0	8.7	8.4
27	6.0	6.6	8.1	10	e14	8.9	12	9.4	9.2	9.0	8.6	8.2
28	5.9	13	8.0	e9.7	e12	8.8	11	9.6	9.0	9.0	8.5	8.2
29	5.8	70	11	e9.4	e11	8.7	11	9.1	9.1	9.1	8.6	8.2
30	5.9	54	12	e9.1	---	8.7	11	8.9	9.0	8.8	8.6	8.2
31	5.9	---	e10	e8.8	---	8.9	---	9.0	---	8.8	8.5	---
TOTAL	186.4	308.9	368.4	398.1	986.4	292.3	361.3	298.2	270.1	279.2	274.8	254.7
MEAN	6.01	10.3	11.9	12.8	34.0	9.43	12.0	9.62	9.00	9.01	8.86	8.49
MAX	6.6	70	32	28	180	11	49	11	9.3	9.2	9.1	8.9
MIN	5.6	5.8	8.0	8.3	8.2	8.7	8.7	8.9	8.8	8.7	8.5	8.1
AC-FT	370	613	731	790	1960	580	717	591	536	554	545	505
CFSM	1.95	3.33	3.85	4.16	11.0	3.05	3.90	3.11	2.91	2.91	2.87	2.75
IN.	2.24	3.72	4.44	4.79	11.88	3.52	4.35	3.59	3.25	3.36	3.31	3.07

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1989 - 1996, BY WATER YEAR (WY)

	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	7.94	11.5	11.1	13.5	19.9	10.2	12.3	8.93
MAX	9.28	15.5	11.9	16.5	34.0	11.4	16.2	10.5
(WY)	1991	1991	1996	1990	1996	1991	1991	1990
MIN	6.01	8.81	10.6	11.1	12.3	9.43	8.76	6.70
(WY)	1996	1990	1991	1991	1990	1996	1990	1995

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1989 - 1996

ANNUAL TOTAL	4278.8	
ANNUAL MEAN	11.7	10.9
HIGHEST ANNUAL MEAN		11.7
LOWEST ANNUAL MEAN		10.0
HIGHEST DAILY MEAN	180	Feb 8
LOWEST DAILY MEAN	5.6	Oct 4
ANNUAL SEVEN-DAY MINIMUM	5.8	Oct 3
ANNUAL RUNOFF (AC-FT)	8490	7890
ANNUAL RUNOFF (CFSM)	3.78	3.53
ANNUAL RUNOFF (INCHES)	51.51	47.92
10 PERCENT EXCEEDS	16	12
50 PERCENT EXCEEDS	9.0	9.0
90 PERCENT EXCEEDS	6.1	6.3

e Estimated

## PUYALLUP RIVER BASIN

171

12102190 SWAN CREEK AT 80TH STREET EAST, NEAR TACOMA, WA

LOCATION.--Lat 47°11'05", long 122°23'33", in SW 1/4 NW 1/4 sec.26, T.20 N., R.3 E., Pierce County, Hydrologic Unit 17110014, on right bank, downstream from 80th Street East crossing, 1.5 mi south-southeast of Tacoma.

DRAINAGE AREA.--2.35 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1989 to September 1991, October 1994 to current year.

GAGE.--Water-stage recorder. Datum of gage is 395 ft above sea level, from topographic map. Prior to November 1994, at datum 5.00 ft lower.

REMARKS.--Records fair except those above 100 ft<sup>3</sup>/s and estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--4 years (water years 1990-91, 1995-96), 4.47 ft<sup>3</sup>/s, 25.83 in/yr, 3,240 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined but occurred Feb. 8, 1996, gage height, 10.61 ft; no flow many days each year.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, not determined but occurred Feb. 8, gage height, 10.61 ft; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.64	.10	34	e5.6	1.9	e1.5	11	2.4	2.2	.10	.00	.00
2	.20	.09	26	5.4	1.7	1.4	6.7	1.9	1.9	.12	.00	.00
3	.33	.09	13	14	1.5	6.7	2.6	1.7	1.8	.11	.00	.00
4	.17	.09	13	6.1	5.1	6.4	1.8	1.5	1.8	.14	.00	.00
5	.07	.10	6.1	5.9	30	5.1	e1.7	1.2	1.6	.13	.00	.00
6	.02	.12	4.0	9.6	73	4.3	e1.5	1.0	1.2	.10	.00	.00
7	.00	9.7	3.2	48	77	3.0	e1.4	.89	1.3	.08	.00	.00
8	.00	15	2.5	15	225	2.9	e1.3	.87	1.4	.07	.00	.00
9	.00	5.1	7.6	7.4	39	2.4	e1.2	.74	.95	.05	.00	.00
10	4.6	4.4	22	5.0	10	4.7	e2.2	.63	.65	.04	.00	.00
11	7.7	23	32	3.6	6.4	9.3	3.0	.77	.49	.01	.00	.00
12	2.0	5.7	18	2.9	4.5	4.6	3.7	1.7	.57	.00	.00	.00
13	.56	9.0	17	3.2	3.5	2.9	3.2	13	.51	.00	.00	.00
14	.20	6.9	16	11	2.8	2.1	2.0	6.6	.33	.00	.00	.00
15	.12	3.6	11	39	2.4	1.7	2.2	3.9	.09	.00	.00	.35
16	.77	2.8	5.7	18	2.0	1.4	19	2.9	.09	.00	.00	.30
17	1.6	2.0	4.6	8.4	9.9	1.2	7.0	4.7	.08	.00	.00	.14
18	1.1	4.7	18	5.3	16	1.1	8.5	8.1	.09	.04	.00	.02
19	.40	3.4	8.6	9.1	21	1.1	9.8	8.4	.09	.77	.00	.00
20	1.2	2.1	5.0	48	12	.99	e7.0	6.2	.08	.51	.00	.01
21	1.2	1.5	3.7	37	10	.84	e6.0	3.5	.07	.26	.00	.01
22	.50	1.5	2.8	17	7.2	2.0	e10	3.7	.07	.11	.00	.00
23	.27	8.0	2.1	12	15	1.8	e70	2.4	.17	.07	.00	.00
24	.20	12	1.8	14	7.4	1.5	32	1.9	.27	.02	.00	.00
25	.73	14	1.5	12	4.4	1.0	18	1.6	.24	.00	.00	.00
26	1.4	8.9	1.3	6.3	3.3	.85	16	1.2	.16	.00	.00	.00
27	.41	7.6	1.3	4.7	2.5	.75	7.1	2.5	.18	.00	.00	.00
28	.20	31	2.1	4.0	1.9	.65	4.3	5.2	.58	.00	.00	.00
29	.13	95	18	3.5	e1.6	.72	3.2	4.3	.28	.00	.00	.00
30	.13	35	15	2.6	---	.75	2.5	3.2	.14	.00	.00	.00
31	.11	---	e9.0	2.2	---	1.3	---	2.7	---	.00	.00	---
TOTAL	26.96	312.49	325.9	385.8	598.0	76.95	265.9	101.30	19.38	2.73	0.00	0.83
MEAN	.87	10.4	10.5	12.4	20.6	2.48	8.86	3.27	.65	.088	.000	.028
MAX	7.7	95	34	48	225	9.3	70	13	2.2	.77	.00	.35
MIN	.00	.09	1.3	2.2	1.5	.65	1.2	.63	.07	.00	.00	.00
AC-FT	53	620	646	765	1190	153	527	201	38	5.4	.00	1.6
CFSM	.37	4.43	4.47	5.30	8.77	1.06	3.77	1.39	.27	.04	.00	.01
IN.	.43	4.95	5.16	6.11	9.47	1.22	4.21	1.60	.31	.04	.00	.01

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 1996, BY WATER YEAR (WY)

	MEAN	.44	7.36	9.66	10.3	13.3	4.95	5.50	1.27	1.35	.090	.034	.032
MAX	.87	13.7	14.6	15.8	20.6	7.16	10.0	3.27	4.38	.13	.082	.078	
(WY)	1996	1991	1995	1990	1996	1991	1996	1990	1996	1990	1995	1991	1995
MIN	.072	1.94	6.20	5.47	9.74	2.48	1.41	.46	.067	.022	.000	.002	
(WY)	1990	1990	1990	1995	1990	1996	1990	1995	1995	1991	1996	1990	1990

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1990 - 1996

	ANNUAL TOTAL	1414.52	2116.24	
ANNUAL MEAN		3.88	5.78	
HIGHEST ANNUAL MEAN				4.47
LOWEST ANNUAL MEAN				5.78
HIGHEST DAILY MEAN	124	Feb 19	225	Feb 8
LOWEST DAILY MEAN	.00	Jun 28	.00	Oct 7
ANNUAL SEVEN-DAY MINIMUM	.00	Jun 28	.00	Jul 25
ANNUAL RUNOFF (AC-FT)	2810		4200	
ANNUAL RUNOFF (CFSM)	1.65		2.46	
ANNUAL RUNOFF (INCHES)	22.39		33.50	
10 PERCENT EXCEEDS	10		14	
50 PERCENT EXCEEDS	.78		1.5	
90 PERCENT EXCEEDS	.00		.00	

e Estimated



## HYLEBOS CREEK BASIN

12103020 HYLEBOS CREEK AT HIGHWAY 99, AT PIPE, WA

LOCATION.--Lat 47°14'39", long 122°20'13", in SE/4 SE 1/4 sec.6, T.20 N., R.4 E., Pierce County, Hydrologic Unit 17110019, at Highway 99, in Pipe, 4.0 mi east of Tacoma.

DRAINAGE AREA.--16.8 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1995 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level.

REMARKS.--Records fair.

AVERAGE DISCHARGE.--1 year (water year 1996), 30.1 ft<sup>3</sup>/s 24.39 in/yr, 21,850 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 413 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 14.32 ft; minimum discharge, 3.2 ft<sup>3</sup>/s June 28, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 413 ft<sup>3</sup>/s Feb. 8, gage height, 14.32 ft; minimum discharge, 4.6 ft<sup>3</sup>/s Nov. 2-4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	5.3	169	e24	17	e16	41	23	11	8.4	6.2	6.1
2	18	4.9	151	20	16	17	31	19	11	8.4	7.9	6.0
3	24	4.6	108	39	15	29	17	17	11	8.5	7.2	8.5
4	22	4.8	90	22	26	25	14	16	11	9.7	7.2	7.4
5	17	5.0	66	19	48	21	13	15	10	8.6	7.0	8.9
6	15	5.4	44	26	103	19	28	15	11	8.2	6.8	10
7	15	45	26	89	174	18	23	14	10	8.2	6.6	7.7
8	15	72	18	98	323	19	15	13	9.9	8.2	6.2	7.4
9	18	67	30	73	367	18	16	13	9.7	7.8	5.9	7.3
10	51	45	61	51	245	28	17	13	9.6	7.9	5.9	7.0
11	67	95	97	31	142	41	18	14	9.4	7.7	6.0	6.8
12	35	84	94	23	99	26	17	20	9.2	7.6	6.2	7.1
13	14	62	85	23	75	20	15	55	8.9	7.3	6.1	7.6
14	9.5	41	80	57	57	17	14	40	8.8	7.5	6.1	9.7
15	7.8	26	71	97	42	16	17	23	8.8	7.6	6.2	15
16	11	20	51	117	31	15	48	20	8.6	7.5	6.3	11
17	16	14	34	86	49	15	29	26	9.1	8.4	6.4	8.8
18	12	17	57	62	57	15	36	35	8.7	11	6.4	8.6
19	7.7	12	50	57	64	15	43	42	8.4	11	6.4	11
20	19	9.9	32	82	57	14	34	28	8.0	9.0	6.5	9.9
21	13	8.5	22	124	49	14	26	22	7.9	8.3	6.6	9.0
22	8.4	11	17	118	40	22	33	21	8.0	7.7	6.3	8.3
23	7.1	32	14	91	53	16	129	20	14	7.2	6.0	7.8
24	6.5	44	12	81	38	14	209	17	16	7.0	5.8	7.5
25	12	52	11	73	28	12	157	15	14	6.5	5.9	7.1
26	15	39	9.6	55	24	12	123	14	12	6.5	6.3	6.8
27	8.1	31	9.6	39	21	12	86	14	10	6.3	6.6	6.9
28	6.8	50	12	32	19	12	59	13	10	6.2	6.4	6.9
29	6.1	141	42	26	e17	12	38	13	9.8	6.2	6.0	7.3
30	5.6	192	52	20	---	12	26	12	8.9	6.3	6.4	7.6
31	5.3	---	e35	18	---	16	---	12	---	6.3	6.3	---
TOTAL	501.9	1240.4	1650.2	1773	2296	558	1372	634	302.7	243.0	198.1	247.0
MEAN	16.2	41.3	53.2	57.2	79.2	18.0	45.7	20.5	10.1	7.84	6.39	8.23
MAX	67	192	169	124	367	41	209	55	16	11	7.9	15
MIN	5.3	4.6	9.6	18	15	12	13	12	7.9	6.2	5.8	6.0
AC-FT	996	2460	3270	3520	4550	1110	2720	1260	600	482	393	490
CFSM	.96	2.46	3.17	3.40	4.71	1.07	2.72	1.22	.60	.47	.38	.49
IN.	1.11	2.75	3.65	3.93	5.08	1.24	3.04	1.40	.67	.54	.44	.55

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1995 - 1996, BY WATER YEAR (WY)

MEAN	16.2	41.3	53.2	57.2	79.2	18.0	45.7	13.4	7.84	6.52	6.08	8.49
MAX	16.2	41.3	53.2	57.2	79.2	18.0	45.7	20.5	10.1	7.84	6.39	8.75
(WY)	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1995
MIN	16.2	41.3	53.2	57.2	79.2	18.0	45.7	6.42	5.58	5.21	5.77	8.23
(WY)	1996	1996	1996	1996	1996	1996	1996	1995	1995	1995	1995	1996

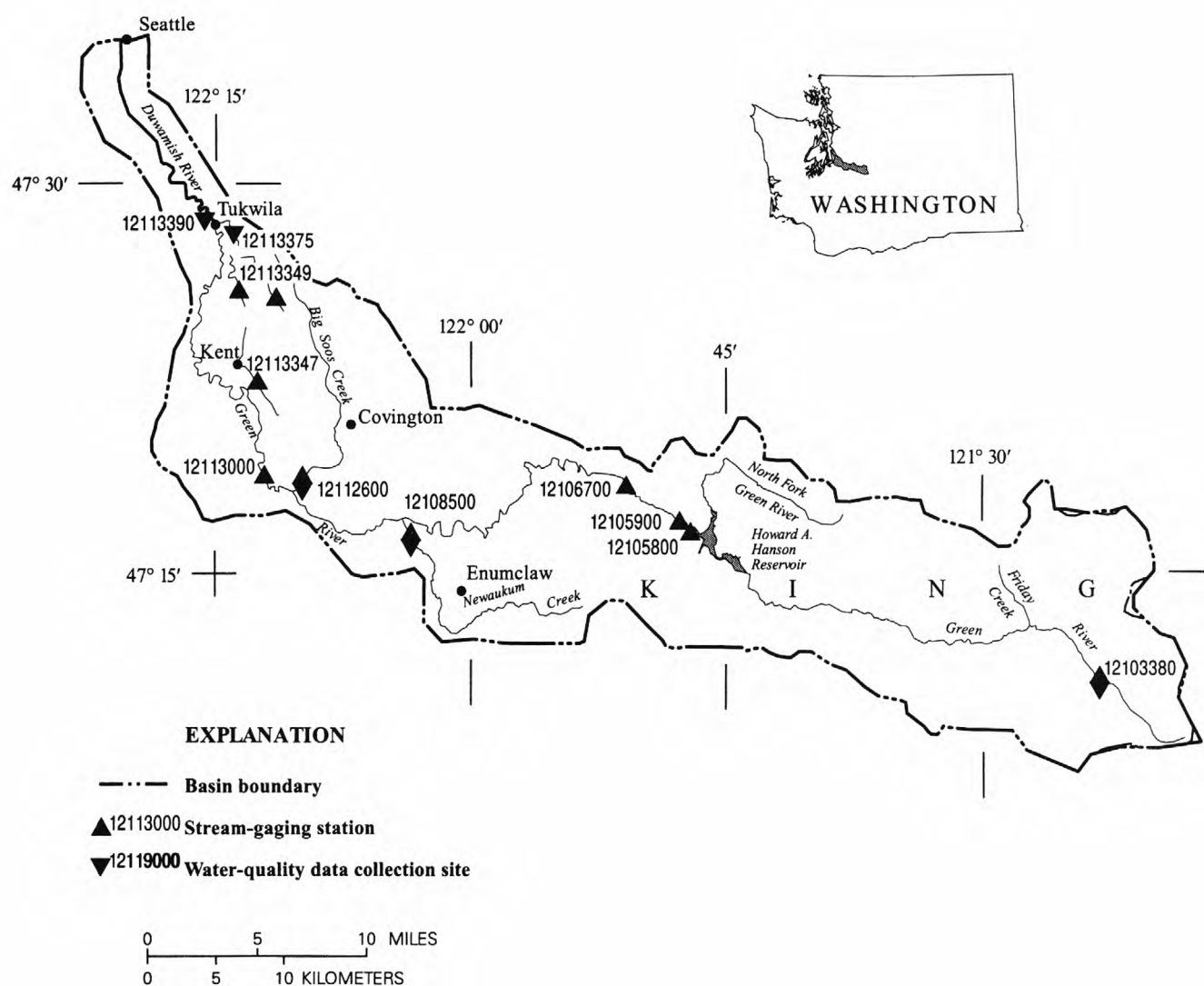
## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

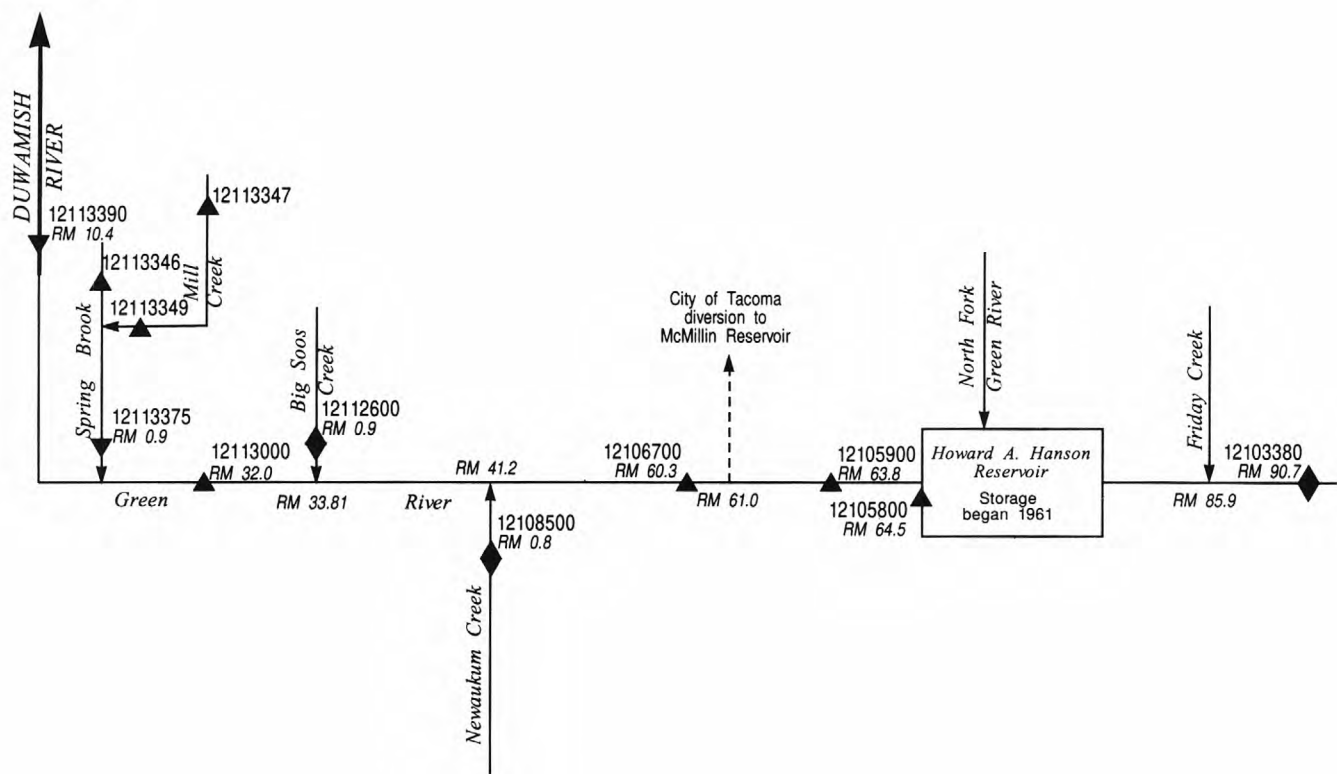
## WATER YEARS 1995 - 1996

ANNUAL TOTAL	11016.3		
ANNUAL MEAN	30.1		
HIGHEST ANNUAL MEAN		30.1	1996
LOWEST ANNUAL MEAN		30.1	1996
HIGHEST DAILY MEAN	367	Feb 9	1996
LOWEST DAILY MEAN	4.6	Nov 3	1995
ANNUAL SEVEN-DAY MINIMUM	5.0	Oct 31	1995
ANNUAL RUNOFF (AC-FT)	21850		21850
ANNUAL RUNOFF (CFSM)	1.79		1.79
ANNUAL RUNOFF (INCHES)	24.39		24.39
10 PERCENT EXCEEDS	73		57
50 PERCENT EXCEEDS	15		9.6
90 PERCENT EXCEEDS	6.4		4.7

e Estimated



**Figure 39.** Location of surface-water stations in the Duwamish River Basin.



### EXPLANATION

- ▲12106700 Stream-gaging station
- ▼14142500 Water-quality data collection site
- ▲12396000 Crest-stage gaging station
- RM 60.3 River mile
- Stream—Arrow shows direction of flow
- Tunnel or pipe—Arrow shows direction of flow

**Figure 40.** Schematic diagram showing surface-water stations in the Duwamish River Basin.

12103380 GREEN RIVER ABOVE TWIN CAMP CREEK, NEAR LESTER, WA

LOCATION.--Lat. 47°10'55", long 121°23'15", in NW 1/4 NE 1/4 sec.34, T.20 N., R.11 E., Pierce County, Hydrologic Unit 17110013, Snoqualmie National Forest, on left bank, 0.1 mi upstream from Twin Camp Creek, 5.2 mi southeast of Lester, and at mile 90.7.

DRAINAGE AREA.--16.5 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1992 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,040 ft above sea level, from topographic map.

REMARKS.--Records good. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--4 years (water years 1993-96), 53.9 ft<sup>3</sup>/s, 44.36 in/yr, 39,030 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,650 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 7.35 ft, from rating curve extended above 160 ft<sup>3</sup>/s, on basis of slope-area measurement at peak flow; minimum discharge, 4.3 ft<sup>3</sup>/s Oct. 8-13, 1994.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 280 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	1000	586	5.80	Feb. 7	0545	654	5.88
Nov. 29	0715	1,410	7.08	Feb. 8	2230	*1,650	*7.35

Minimum discharge, 5.4 ft<sup>3</sup>/s Oct. 2.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.3	39	394	163	e30	46	33	89	55	17	8.2	5.8
2	12	36	232	159	e28	43	35	81	57	17	9.0	5.7
3	22	33	173	230	e26	44	32	73	68	17	8.9	6.2
4	15	32	138	188	e25	48	32	66	73	16	8.9	6.3
5	12	31	110	148	26	46	34	61	66	16	10	7.3
6	11	29	94	119	117	45	42	57	59	15	8.9	6.7
7	15	42	82	157	538	45	64	54	56	14	8.3	6.1
8	13	174	71	205	1220	46	106	51	53	14	8.0	6.0
9	12	199	64	176	880	52	138	48	49	13	7.7	5.8
10	44	139	59	149	315	65	141	45	44	13	7.6	5.6
11	91	456	54	123	201	78	127	48	40	12	7.5	5.6
12	92	319	62	104	153	88	108	52	38	12	7.4	5.6
13	77	280	94	93	123	84	93	75	36	11	7.3	5.7
14	60	297	92	121	109	79	82	104	34	11	7.2	6.1
15	49	237	81	169	111	85	80	115	32	11	7.1	7.9
16	54	189	72	192	115	81	105	117	30	11	7.0	7.2
17	72	153	65	159	123	74	108	111	28	11	6.9	6.9
18	95	136	59	128	172	70	98	105	28	11	6.9	6.2
19	80	121	53	107	184	68	87	97	26	11	6.9	6.7
20	68	106	49	91	161	64	75	89	24	11	6.8	6.7
21	60	93	45	78	132	60	69	82	22	10	6.7	6.4
22	53	84	41	68	110	57	65	81	21	10	6.5	8.3
23	47	88	39	61	95	54	78	76	22	9.7	6.3	7.3
24	43	114	37	55	80	50	124	73	23	9.4	6.2	6.4
25	44	208	34	50	70	45	141	78	22	9.2	6.1	6.0
26	61	207	32	46	64	43	140	91	21	8.9	6.0	5.8
27	59	191	31	42	57	40	120	92	20	8.8	6.1	5.7
28	56	1090	29	e39	52	38	105	79	20	8.7	6.0	5.6
29	51	1290	32	e36	48	37	96	72	18	8.6	5.8	5.6
30	47	820	61	e34	---	35	93	63	18	8.4	5.8	5.6
31	43	---	181	e32	---	33	---	57	---	8.2	5.8	---
TOTAL	1464.3	7233	2660	3522	5365	1743	2651	2382	1103	363.9	223.8	188.8
MEAN	47.2	241	85.8	114	185	56.2	88.4	76.8	36.8	11.7	7.22	6.29
MAX	95	1290	394	230	1220	88	141	117	73	17	10	8.3
MIN	6.3	29	29	32	25	33	32	45	18	8.2	5.8	5.6
AC-FT	2900	14350	5280	6990	10640	3460	5260	4720	2190	722	444	374
CFSM	2.86	14.6	5.20	6.89	11.2	3.41	5.36	4.66	2.23	.71	.44	.38
IN.	3.30	16.31	6.00	7.94	12.10	3.93	5.98	5.37	2.49	.82	.50	.43

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1993 - 1996, BY WATER YEAR (WY)

MEAN	21.2	83.7	53.8	64.2	100	69.5	92.2	97.3	36.0	16.2	9.94	6.57
MAX	47.2	241	85.8	114	185	77.6	117	133	47.0	26.2	18.0	8.48
(WY)	1996	1996	1996	1996	1996	1994	1994	1993	1993	1993	1993	1993
MIN	6.97	8.82	20.5	37.7	24.4	56.2	69.9	65.4	27.3	11.7	7.08	5.53
(WY)	1994	1994	1994	1995	1994	1996	1995	1994	1994	1996	1994	1995

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1993 - 1996

ANNUAL TOTAL	26489.5	28899.8	
ANNUAL MEAN	72.6	79.0	53.9
HIGHEST ANNUAL MEAN			79.0
LOWEST ANNUAL MEAN			36.5
HIGHEST DAILY MEAN	1290	Nov 29	1290
LOWEST DAILY MEAN	4.7	Sep 24	5.6
ANNUAL SEVEN-DAY MINIMUM	4.8	Sep 20	5.8
ANNUAL RUNOFF (AC-FT)	52540	57320	39030
ANNUAL RUNOFF (CFSM)	4.40	4.79	3.26
ANNUAL RUNOFF (INCHES)	59.72	65.16	44.36
10 PERCENT EXCEEDS	143	154	116
50 PERCENT EXCEEDS	48	49	33
90 PERCENT EXCEEDS	6.6	6.8	6.7

e Estimated

12103380 GREEN RIVER ABOVE TWIN CAMP CREEK, NEAR LESTER, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: April to September 1996.

WATER TEMPERATURE: April to September 1996.

INSTRUMENTATION.--Water-quality monitor since April 1996. Electronic data logger with fifteen-minute recording interval.

REMARKS.--Due to an unacceptable degree of variability in the recorded values only the mean daily specific conductance values are being published. Additional data available in the files of the Tacoma field office.

EXTREMES FOR PERIOD APRIL TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum mean daily, 55 microsiemens Sept. 9, 27; minimum mean daily, 35 microsiemens Apr. 11, June 4, 5.

WATER TEMPERATURE: Maximum recorded, 16.0°C July 29; minimum recorded, 3.5°C several days in April and May.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	---	---	---	---	---	38
2	---	---	---	---	---	---	---	---	---	---	---	38
3	---	---	---	---	---	---	---	---	---	---	---	39
4	---	---	---	---	---	---	---	---	---	---	---	38
5	---	---	---	---	---	---	---	---	---	---	---	39
6	---	---	---	---	---	---	---	---	---	---	---	38
7	---	---	---	---	---	---	---	---	---	---	---	38
8	---	---	---	---	---	---	---	---	---	---	---	39
9	---	---	---	---	---	---	---	---	---	---	---	39
10	---	---	---	---	---	---	---	---	---	---	---	41
11	---	---	---	---	---	---	---	---	35	---	---	45
12	---	---	---	---	---	---	---	---	36	---	---	44
13	---	---	---	---	---	---	---	---	36	---	---	42
14	---	---	---	---	---	---	---	---	38	---	---	40
15	---	---	---	---	---	---	---	---	38	---	---	41
16	---	---	---	---	---	---	---	---	37	---	---	42
17	---	---	---	---	---	---	---	---	36	---	---	43
18	---	---	---	---	---	---	---	---	36	---	---	42
19	---	---	---	---	---	---	---	---	38	---	---	42
20	---	---	---	---	---	---	---	---	38	---	---	42
21	---	---	---	---	---	---	---	---	38	---	---	43
22	---	---	---	---	---	---	---	---	38	---	---	40
23	---	---	---	---	---	---	---	---	38	---	---	42
24	---	---	---	---	---	---	---	---	38	---	---	42
25	---	---	---	---	---	---	---	---	37	---	---	42
26	---	---	---	---	---	---	---	---	37	---	---	41
27	---	---	---	---	---	---	---	---	37	---	---	40
28	---	---	---	---	---	---	---	---	38	---	---	40
29	---	---	---	---	---	---	---	---	39	---	---	40
30	---	---	---	---	---	---	---	---	39	---	---	40
31	---	---	---	---	---	---	---	---	---	---	---	41
MONTH	---	---	---	---	---	---	---	---	---	---	---	41
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	---	---	40	---	---	46	---	---	48	---	---	52
2	---	---	40	---	---	46	---	---	47	---	---	51
3	---	---	38	---	---	46	---	---	48	---	---	51
4	---	---	35	---	---	46	---	---	47	---	---	51
5	---	---	35	---	---	46	---	---	48	---	---	51
6	---	---	36	---	---	46	---	---	48	---	---	52
7	---	---	36	---	---	46	---	---	48	---	---	53
8	---	---	36	---	---	48	---	---	49	---	---	54
9	---	---	37	---	---	47	---	---	51	---	---	55
10	---	---	37	---	---	47	---	---	52	---	---	54
11	---	---	38	---	---	47	---	---	52	---	---	53
12	---	---	39	---	---	48	---	---	52	---	---	53
13	---	---	41	---	---	48	---	---	52	---	---	53
14	---	---	40	---	---	49	---	---	52	---	---	52
15	---	---	41	---	---	49	---	---	53	---	---	53
16	---	---	42	---	---	49	---	---	50	---	---	53
17	---	---	41	---	---	49	---	---	51	---	---	53
18	---	---	41	---	---	49	---	---	51	---	---	51
19	---	---	43	---	---	49	---	---	50	---	---	52
20	---	---	44	---	---	49	---	---	50	---	---	53
21	---	---	45	---	---	50	---	---	51	---	---	54
22	---	---	45	---	---	50	---	---	51	---	---	52
23	---	---	46	---	---	49	---	---	51	---	---	53
24	---	---	46	---	---	48	---	---	51	---	---	53
25	---	---	45	---	---	49	---	---	51	---	---	53
26	---	---	44	---	---	48	---	---	51	---	---	53
27	---	---	45	---	---	48	---	---	52	---	---	55
28	---	---	44	---	---	48	---	---	53	---	---	54
29	---	---	45	---	---	48	---	---	52	---	---	53
30	---	---	46	---	---	48	---	---	53	---	---	54
31	---	---	---	---	---	49	---	---	52	---	---	---
MONTH	---	---	41	---	---	48	---	---	51	---	---	53



## GREEN RIVER BASIN

177

12103380 GREEN RIVER ABOVE TWIN CAMP CREEK, NEAR LESTER, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	---	---	---	5.5	4.5	5.0
2	---	---	---	---	---	---	---	---	---	5.5	4.0	4.5
3	---	---	---	---	---	---	---	---	---	6.0	4.0	4.5
4	---	---	---	---	---	---	---	---	---	7.0	4.0	5.0
5	---	---	---	---	---	---	---	---	---	8.0	3.5	5.5
6	---	---	---	---	---	---	---	---	---	7.0	4.0	5.5
7	---	---	---	---	---	---	---	---	---	5.5	4.0	4.5
8	---	---	---	---	---	---	---	---	---	6.0	4.0	5.0
9	---	---	---	---	---	---	---	---	---	6.5	4.0	5.0
10	---	---	---	---	---	---	---	---	---	7.5	3.5	5.5
11	---	---	---	---	---	---	5.5	4.0	4.5	6.0	4.5	5.5
12	---	---	---	---	---	---	5.0	3.5	4.0	7.5	5.5	6.5
13	---	---	---	---	---	---	6.5	4.0	5.0	7.5	6.0	6.5
14	---	---	---	---	---	---	6.5	4.0	5.0	7.0	5.5	6.5
15	---	---	---	---	---	---	6.5	5.0	5.5	6.5	5.5	6.0
16	---	---	---	---	---	---	7.0	4.5	5.5	7.5	5.0	6.0
17	---	---	---	---	---	---	6.0	4.0	5.0	7.5	5.5	6.0
18	---	---	---	---	---	---	5.5	4.0	4.5	7.0	5.0	6.0
19	---	---	---	---	---	---	5.0	3.5	4.5	7.0	5.0	6.0
20	---	---	---	---	---	---	6.5	4.0	5.0	7.0	5.0	6.0
21	---	---	---	---	---	---	6.5	3.5	5.0	6.0	4.5	5.5
22	---	---	---	---	---	---	5.5	4.0	5.0	6.0	5.0	5.5
23	---	---	---	---	---	---	6.0	5.0	5.5	8.0	5.0	6.0
24	---	---	---	---	---	---	5.0	4.0	4.5	9.5	5.5	7.0
25	---	---	---	---	---	---	4.5	4.0	4.0	10.0	6.0	8.0
26	---	---	---	---	---	---	5.0	4.0	4.5	9.5	6.0	7.5
27	---	---	---	---	---	---	6.0	4.0	4.5	7.0	6.0	6.5
28	---	---	---	---	---	---	6.0	3.5	5.0	7.0	5.0	6.0
29	---	---	---	---	---	---	7.5	5.0	6.0	6.5	5.5	6.0
30	---	---	---	---	---	---	7.5	5.0	6.0	6.5	5.5	6.0
31	---	---	---	---	---	---	---	---	---	9.0	5.5	7.0
MONTH	---	---	---	---	---	---	---	---	---	10.0	3.5	5.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	9.5	5.5	7.5	13.0	8.5	10.5	14.0	11.0	12.5	12.0	10.0	11.0
2	10.5	7.0	8.5	11.0	9.5	10.5	12.5	11.5	12.0	11.5	10.0	11.0
3	10.5	7.5	9.0	12.5	9.5	10.5	11.5	10.5	11.0	11.0	9.5	10.5
4	8.5	7.5	8.0	10.5	9.5	10.0	11.0	10.5	10.5	10.5	9.0	9.5
5	10.0	6.5	8.0	11.5	8.0	9.5	11.0	10.0	10.5	9.5	9.0	9.5
6	10.5	7.0	8.5	12.0	8.0	10.0	12.5	10.0	11.0	10.5	9.0	10.0
7	11.0	7.0	8.5	13.0	9.0	11.0	13.0	10.0	11.5	11.0	10.0	10.5
8	10.0	7.0	8.5	14.0	10.0	12.0	14.0	11.0	12.5	11.5	10.5	11.0
9	8.5	7.0	7.5	12.5	10.5	11.5	14.5	11.0	12.5	12.0	10.5	11.0
10	9.5	6.5	8.0	13.0	9.0	11.0	15.0	12.0	13.5	12.0	10.0	11.0
11	10.0	7.0	8.0	14.0	9.5	11.5	13.5	12.0	12.5	12.5	10.5	11.5
12	10.5	6.0	8.0	14.5	11.0	12.5	13.5	11.0	12.0	11.5	11.0	11.5
13	11.0	7.0	8.5	15.0	11.0	13.0	14.0	11.0	12.5	11.5	10.5	11.0
14	11.0	7.5	9.0	15.5	12.0	13.5	14.5	12.0	13.0	11.0	10.5	10.5
15	10.5	7.0	8.5	15.5	12.5	14.0	14.0	11.5	12.5	10.5	9.5	10.0
16	9.5	7.5	8.5	14.0	12.0	13.0	13.5	11.0	12.5	10.0	9.5	9.5
17	8.0	7.0	7.5	12.5	10.5	11.0	12.5	11.0	11.5	10.0	9.0	9.5
18	8.0	6.5	7.0	10.5	9.5	10.0	11.5	10.5	11.0	9.5	8.0	9.0
19	10.5	6.0	8.0	10.0	9.5	10.0	12.0	10.0	11.0	10.0	9.0	9.5
20	11.0	6.5	9.0	10.5	9.0	10.0	12.0	11.0	11.5	9.5	9.0	9.0
21	11.5	7.5	9.0	13.0	10.0	11.5	12.0	9.5	11.0	9.0	8.5	9.0
22	9.5	8.5	9.0	14.0	10.5	12.0	12.5	10.0	11.0	8.5	7.5	8.0
23	9.0	8.0	8.5	15.0	11.5	13.5	13.0	10.5	11.5	8.0	6.5	7.5
24	10.0	8.0	8.5	15.5	12.5	14.0	13.5	11.0	12.5	8.5	7.0	7.5
25	10.5	7.5	9.0	15.5	12.0	14.0	14.0	11.5	13.0	8.5	6.5	7.5
26	9.5	7.5	8.5	15.5	12.0	13.5	13.0	12.0	12.5	8.5	7.0	8.0
27	9.0	8.5	9.0	15.5	12.5	14.0	13.5	12.5	12.5	9.0	7.5	8.5
28	8.5	8.0	8.5	15.0	12.5	13.5	14.0	12.0	13.0	9.5	8.0	9.0
29	11.5	7.5	9.5	16.0	12.5	14.0	14.5	12.0	13.0	9.5	8.0	9.0
30	12.0	8.5	10.0	15.5	13.0	14.0	13.5	12.0	12.5	10.0	9.0	9.5
31	---	---	---	14.5	12.0	13.5	12.5	11.5	12.0	---	---	---
MONTH	12.0	5.5	8.4	16.0	8.0	12.0	15.0	9.5	12.0	12.5	6.5	9.6

## 12105800 HOWARD A. HANSON RESERVOIR NEAR PALMER, WA

LOCATION.--Lat 47°16'38", long 121°47'03", in NE 1/4 SE 1/4 sec.28, T.21 N., R.8 E., King County, Hydrologic Unit 17110013, near left bank on outlet gate structure, just upstream from Howard A. Hanson Dam on Green River, 1.4 mi upstream from Bear Creek, 5.1 mi southeast of Palmer, and at mile 64.5.

DRAINAGE AREA.--220 mi<sup>2</sup>, approximately.

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

GAGE.--Nonrecording gage. Datum of gage is sea level, supplementary adjustment of 1947.

REMARKS.--Reservoir is formed by earth-fill dam; completed Mar. 31, 1962; storage began Dec. 5, 1961. Capacity, 1054630 acre-ft between elevations 1,035 ft, invert of outlet tunnel, and 1,206 ft, top of spillway gates. Storage is not retained but is dissipated as soon after a flood as possible without creating damaging flows downstream in order to have the maximum capacity available for any following flood which might develop.

COOPERATION.--Elevations and capacity table furnished by Corps of Engineers.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 68,811 acre-ft Feb. 10, 1996, elevation, 1,182.0 ft; minimum contents observed, 34 acre-ft Nov. 2, 1962, elevation, 1,037.6 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 68,811 acre-ft Feb. 10, elevation, 1,182.0 ft; minimum contents observed, 603 acre-ft Feb. 29, elevation, 1,062.6 ft.

Capacity table (elevation, in feet, and total contents, in acre-feet)  
(Based on conic method by Corps of Engineers in 1984)

1,045	13	1,080	2,422	1,140	24,622
1,050	64	1,090	4,081	1,150	32,982
1,055	201	1,100	6,313	1,160	42,804
1,060	439	1,110	9,271	1,170	53,902
1,065	777	1,120	13,140	1,180	66,186
1,070	1,220	1,130	18,126	1,190	79,912

REVISIONS.--The maximum and minimum observed contents observed have been revised for water years 1985-1995 based on an elevation-capacity table dated November 1984. These values supercede those previously published in reports for water years 1985 to 1995.

Water Year	Maximum Contents (acre-feet)	Elevation (feet)	Date	Minimum Contents (acre-feet)	Elevation (feet)	Date
1985	25,375	1141.0	June 18-20 June 26-29 July 5-8	262	1056.5	Nov. 24
1986	24,996	1140.5	June 8, 9	327	1057.9	Nov. 8
1987	19,221	1131.9	July 10	322	1057.8	Nov. 23
1988	28,929	1145.4	May 31	1,038	1068.1	Apr. 27
1989	29,271	1145.8	May 18	82	1050.9	Nov. 6
1990	29,614	1146.2	May 7	1,103	1068.8	Nov. 22
1991	38,307	1155.6	Nov. 26	890	1066.4	Nov. 8
1992	38,046	1146.7	May 5	731	1064.4	Jan. 31
1993	27,510	1143.7	June 14, 15	915	1066.7	Jan. 7
1994	27,921	1144.2	June 6	1,020	1067.9	Dec. 6
1995	26,702	1142.7	June 23-25	1,190	1069.7	Dec. 12, Jan. 3

RESERVOIR STORAGE (ACRE-FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 08:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12878	1686	50454	13675	3220	801	2161	25071	26782	23174	20130	14463
2	12791	1721	50908	13184	3025	958	2337	25759	26149	22963	20007	14228
3	13540	1793	45150	11195	2744	976	2609	26306	25528	22824	19884	13949
4	15235	1793	36451	9170	2522	1364	2790	26862	25375	22685	19762	13721
5	15986	1769	26463	5209	2324	1066	2836	27346	25299	22547	19701	13495
6	16347	1781	17192	2929	2161	1180	2867	27674	25299	22479	19640	13361
7	16347	2030	9825	3528	7836	1322	3154	28004	25299	22342	19520	13184
8	16295	2536	4519	7425	21936	1311	3835	28422	25299	22342	19400	12695
9	16191	5889	3458	6313	59758	1353	4835	28675	25147	22274	19221	12748
10	16191	6011	3041	3725	68811	1594	6086	28844	24921	22274	19044	12535
11	18126	7339	2161	2043	63367	2121	7339	29015	24846	22206	18868	12283
12	18810	10662	1526	3025	54839	1582	8548	29271	24846	22206	18695	12034
13	19221	5816	1866	3743	43545	1132	9545	29614	24771	22138	18522	11790
14	18238	4707	2551	3928	33532	1084	9967	30046	24771	22003	18351	11509
15	16713	3089	2714	3707	25759	1200	10699	29959	24696	22003	18126	11351
16	14942	2056	2609	4986	19520	1291	11470	29959	24622	21869	17903	11234
17	14558	1395	2201	5299	15088	1270	12535	29873	24548	21802	17737	11195
18	15783	1526	1605	3835	12577	1094	13405	29786	24548	21736	17518	11157
19	16765	1582	1291	3563	12075	1170	14181	29614	24473	21669	17300	11079
20	16607	1460	1141	3304	11312	1029	14749	29700	24473	21669	17085	11002
21	14942	1628	1594	2744	9545	1170	15137	29614	24400	21669	16925	10926
22	13096	1878	1928	2351	7599	1515	15433	29786	24253	21537	16713	10850
23	11079	2043	2255	2324	6677	1805	16191	29959	24106	21405	16503	10774
24	8937	2961	2422	1709	5119	1966	17463	29786	24106	21340	16295	10737
25	5624	4602	2450	2269	3372	2056	19340	29786	24033	21209	16089	10624
26	1311	6161	2393	2977	1651	2134	21471	29786	23961	21080	15834	10475
27	1364	4581	2422	3321	816	2201	22754	29528	23888	20951	15582	10328
28	1460	9204	2422	3510	832	2214	23244	29185	23744	20823	15383	10110
29	1428	29614	2551	3634	603	2214	23816	28760	23600	20632	15186	9896
30	1230	43970	2790	3581	---	2241	24473	28254	23386	20442	14893	9684
31	1438	---	5816	3372	---	2161	---	27428	---	20317	14701	---
MEAN	12370	5776	9554	4696	17316	1502	11509	28764	24706	21826	17759	11781
MAX	19221	43970	50908	13675	68811	2241	24473	30046	26782	23174	20130	14463
MIN	1230	1395	1141	1709	603	801	2161	25071	23386	20317	14701	9684
††	1073.9	1165.5	1116.6	1085.3	1065.4	1078.1	1140.1	1143.1	1138.1	1133.5	1123.0	1110.8
†	1639	48769	11709	3237	808	2161	24696	27022	23244	20192	14510	9545
†	-11282	+47130	-37060	-8472	-2429	+1353	+22535	+2326	-3778	-3052	-5682	-4965

CAL YR 1995 MEAN 12282 MAX 50908 MIN 1141 AC-FT† a+9952  
WTR YR 1996 MEAN 13951 MAX 68811 MIN 603 AC-FT† a-3376

†† Monthend elevation, in feet, at 2400 hours.

† Monthend contents, in acre-feet.

† Change in contents, in acre-feet.

a Computed on basis of revised capacity table dated November 1984.

## 12105900 GREEN RIVER BELOW HOWARD A. HANSON RESERVOIR, WA

LOCATION.--Lat 47°17'02", long 121°47'48", in NE 1/4 NW 1/4 sec.28, T.21 N., R.8 E., King County, Hydrologic Unit 17110013, on right bank 0.7 mi upstream from Bear Creek, 0.7 mi downstream from Howard A. Hanson Dam, 5.0 mi southeast of Palmer, and at mile 63.8.

DRAINAGE AREA.--221 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1960 (monthly discharge only), November 1960 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 990 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by Howard A. Hanson Reservoir (station 12105800) for flood control and during summer months to augment the natural river flow. U.S. Army Corps of Engineers satellite telemeter at station.

AVERAGE DISCHARGE.--36 years (water years 1961-96), 999 ft<sup>3</sup>/s, 61.39 in/yr, 723,800 acre-ft/yr, adjusted for storage in Howard A. Hanson Reservoir since December 1961.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,200 ft<sup>3</sup>/s Feb. 21, 1961, gage height, 14.40 ft; minimum discharge, 87 ft<sup>3</sup>/s Dec. 29, 1961, gage height, 3.49 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,540 ft<sup>3</sup>/s Nov. 28, gage height, 13.10 ft; minimum discharge, 229 ft<sup>3</sup>/s July 7, 8, gage height, 4.25 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	246	552	7550	2030	708	726	593	961	1060	398	236	243
2	246	521	7610	4660	698	705	589	869	1060	361	236	241
3	284	502	7930	5310	686	716	576	776	914	339	236	240
4	321	502	7770	5640	672	931	609	726	750	339	236	239
5	333	502	7430	4110	804	886	625	726	680	309	236	239
6	406	502	6200	2870	3140	841	628	682	616	273	236	239
7	466	1270	4760	2690	7200	919	641	633	616	273	237	242
8	466	2520	2650	4950	5030	932	669	633	616	256	239	244
9	466	3100	1610	5030	4010	943	682	633	616	235	239	244
10	843	3040	1530	3820	7550	979	666	633	554	239	239	242
11	1860	4660	1500	2300	7560	1370	666	633	494	239	239	241
12	1880	6690	1410	1380	8060	1550	664	633	478	238	239	239
13	1740	5350	1340	1650	7360	1250	956	828	456	239	239	239
14	1900	4610	1770	2430	6060	1080	721	1210	433	239	239	239
15	1860	3650	1920	3340	5370	1040	713	1380	424	239	239	240
16	1450	2640	1750	3530	4510	1050	700	1340	433	239	239	242
17	914	1940	1680	3510	3720	1040	712	1300	415	239	238	242
18	963	1580	1440	2640	3500	915	722	1230	387	239	236	241
19	1270	1570	1190	2000	3470	903	729	1160	387	239	236	241
20	1710	1360	884	1890	3410	831	735	1130	357	239	236	241
21	1960	1130	737	1700	3120	710	736	1060	377	239	234	239
22	1910	1070	720	1310	2530	659	715	1050	400	239	237	239
23	1850	1070	686	1350	2220	680	851	1200	401	239	238	239
24	2170	1390	694	966	2300	693	1120	1200	389	239	236	239
25	3120	2760	696	621	2090	657	1210	1130	371	239	236	239
26	1370	4240	661	650	1590	630	1470	1130	388	239	238	239
27	879	4710	633	708	1050	616	1680	1130	400	239	239	245
28	886	7490	605	717	922	601	1480	1120	400	239	239	248
29	883	5220	723	720	792	593	1170	1200	400	239	237	248
30	687	7960	835	718	---	592	1050	1290	400	237	241	244
31	541	---	992	712	---	592	---	1150	---	236	244	---
TOTAL	35880	84101	77906	75952	100132	26630	25078	30776	15672	8035	7369	7237
MEAN	1157	2803	2513	2450	3453	859	836	993	522	259	238	241
MAX	3120	7960	7930	5640	8060	1550	1680	1380	1060	398	244	248
MIN	246	502	605	621	672	592	576	633	357	235	234	239
AC-FT	71170	166800	154500	150700	198600	52820	49740	61040	31090	15940	14620	14350
MEAN†	974	3596	1909	2312	3410	881	1215	1030	459	210	145	158
CFSM†	4.41	16.27	8.64	10.46	15.43	3.99	5.50	4.66	2.08	0.95	0.66	0.71
IN.†	5.08	18.15	9.96	12.06	16.65	4.60	6.13	5.38	2.32	1.09	0.76	0.80
AC-FT†	59890	213900	117400	142200	196200	54170	72280	63370	27310	12890	8940	9380

CAL YR 1995 TOTAL 399567 MEAN 1095 MAX 7960 MIN 236 AC-FT 792500 MEAN† 1108 CFSM† 5.01 IN.† 68.09 AC-FT† 802500  
WTR YR 1996 TOTAL 494768 MEAN 1352 MAX 8060 MIN 234 AC-FT 981400 MEAN† 1348 CFSM† 6.10 IN.† 82.98 AC-FT† 978000

† Adjusted for change in contents in Howard A. Hanson Reservoir.

## DUWAMISH RIVER BASIN

## 12106700 GREEN RIVER AT PURIFICATION PLANT, NEAR PALMER, WA

LOCATION.--Lat 47°18'19", long 121°50'58", in NE 1/4 SE 1/4 sec.13, T.21 N., R.7 E., King County, Hydrologic Unit 17110013, on left bank at city of Tacoma purification plant, 0.7 mi downstream from diversion dam, 2 mi southeast of Palmer, and at mile 60.3.

DRAINAGE AREA.--231 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1963 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 859.53 ft above sea level. Prior to Oct. 1, 1987, water-stage recorder at site 0.1 mi upstream at same datum.

REMARKS.--Records good. Since Dec. 5, 1961, flow regulated by Howard A. Hanson Reservoir (station 12105800), 4.1 mi upstream for flood control and during summer months to augment the natural river flow. City of Tacoma diverted an average daily discharge of about 83 ft<sup>3</sup>/s upstream from station for municipal supply, of which a small amount is returned to the river 300 ft upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--33 years (water years 1964-96), 957 ft<sup>3</sup>/s, 693,200 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 12,500 ft<sup>3</sup>/s Feb. 12, 1981, gage height, 12.05 ft, at site then in use; minimum discharge, 20 ft<sup>3</sup>/s part or all of each day Oct. 26, 27, Nov. 3, 4, 6, 1974, gage height, 3.90 ft, at site then in use.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Nov. 23, 1959, had a discharge of 27,800 ft<sup>3</sup>/s, on basis of slope-area measurement at site 0.5 mi downstream from present gage.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 8,990 ft<sup>3</sup>/s Nov. 28, gage height, 11.14 ft; minimum discharge, 125 ft<sup>3</sup>/s July 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	169	518	7810	1910	616	733	529	e924	979	278	133	137
2	187	461	7770	4460	595	697	585	e818	964	251	136	136
3	289	438	7850	5060	581	711	524	e713	828	230	135	137
4	288	442	7630	5380	567	933	533	e662	645	233	135	135
5	276	438	7130	3980	713	895	540	e662	575	205	135	136
6	326	439	5860	2860	3000	835	541	e612	502	170	133	135
7	385	1250	4530	2740	7240	901	551	540	501	166	135	147
8	386	2660	2660	4750	6120	905	573	539	499	154	135	140
9	390	3290	1620	4860	4650	921	599	536	497	133	132	137
10	934	3180	1540	3770	7430	967	617	534	442	136	132	137
11	2020	4740	1510	2400	7370	1330	620	536	383	135	132	135
12	2000	6780	1450	1410	7820	1530	602	536	366	134	131	135
13	1730	5510	1360	1600	7080	1260	926	745	344	133	131	133
14	1860	4710	1770	2340	5740	1090	683	1130	320	133	131	134
15	1820	3810	1940	3340	5010	1010	658	1310	312	133	131	141
16	1490	2800	1750	3580	4250	990	629	1260	321	132	131	137
17	916	2110	1670	3500	3590	965	632	1230	307	134	131	156
18	967	1710	1460	2660	3430	874	632	1180	278	136	131	141
19	1320	1650	1240	1980	3420	842	644	1130	274	140	130	150
20	1670	1420	933	1830	3350	829	660	1090	249	137	130	149
21	1930	1160	716	1680	3070	640	662	1010	260	136	129	144
22	1880	1090	678	1300	2520	546	653	1010	286	134	129	145
23	1820	1100	650	1310	2170	566	853	1150	289	133	130	140
24	2110	1460	666	998	2250	579	1030	1160	280	134	129	138
25	3150	2820	665	605	2050	564	1310	1070	259	134	129	139
26	3110	4250	601	577	1600	533	1380	1060	272	133	130	142
27	865	4730	541	637	1080	515	1630	1060	283	133	133	148
28	863	7900	516	641	932	509	1510	1050	284	133	133	151
29	855	7210	638	650	804	504	1180	1140	281	133	131	147
30	659	8180	813	642	---	494	1020	1230	281	133	135	144
31	479	---	1110	629	---	494	---	1090	---	133	138	---
TOTAL	37144	88256	77077	74079	99048	25162	23506	28717	12361	4772	4096	4226
MEAN	1198	2942	2486	2390	3415	812	784	926	412	154	132	141
MAX	3150	8180	7850	5380	7820	1530	1630	1310	979	278	138	156
MIN	169	438	516	577	567	494	524	534	249	132	129	133
AC-FT	73680	175100	152900	146900	196500	49910	46620	56960	24520	9470	8120	8380

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1996, BY WATER YEAR (WY)

	MEAN	469	1252	1587	1616	1514	1166	1319	1218	670	305	165	237
MAX	1198	4074	4591	3225	3481	3801	2376	2605	2514	809	306	757	
(WY)	1996	1991	1976	1984	1982	1972	1985	1972	1974	1972	1974	1968	
MIN	66.2	82.7	371	399	367	432	286	381	129	118	98.6	109	
(WY)	1975	1988	1986	1979	1969	1981	1992	1994	1987	1965	1969	1979	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1963 - 1996
ANNUAL TOTAL	380883	478444	
ANNUAL MEAN	1044	1307	957
HIGHEST ANNUAL MEAN			1562
LOWEST ANNUAL MEAN			577
HIGHEST DAILY MEAN	8180	Nov 30	10900
LOWEST DAILY MEAN	137	Aug 31	20
ANNUAL SEVEN-DAY MINIMUM	139	Jul 31	22
ANNUAL RUNOFF (AC-FT)	755500	949000	693200
10 PERCENT EXCEEDS	2130	3520	2090
50 PERCENT EXCEEDS	557	647	584
90 PERCENT EXCEEDS	153	134	133

e Estimated

LOCATION.--Lat 47°16'33", long 122°03'30", in NW 1/4 SW 1/4 sec.28, T.21 N., R.6 E., King County, Hydrologic Unit 17110013, on right bank 0.1 mi downstream from West Whitney Hill bridge, 0.8 mi upstream from mouth, and 3.5 mi southwest of Black Diamond.

WATER-DISCHARGE RECORDS

REMARKS.--Records fair. Many small diversions upstream from station for irrigation and domestic use. No regulation. U.S. Army Corps of Engineers' furnished partial gage-height record intermittently throughout the year, which was used to compute discharge.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,640 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 3.95 ft from rating curve extended above 1,260 ft<sup>3</sup>/s; minimum discharge, 8.0 ft<sup>3</sup>/s Oct. 13, 14, 1952.

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	0715	599	2.61	Feb. 8	2400	*a2,640	*3.95
Dec. 1	0730	690	2.70	Apr. 24	0130	504	3.34

Minimum discharge, 11 ft<sup>3</sup>/s Sept. 23-30.  
a From rating curve extended above 1,260 ft<sup>3</sup>/s.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	18	20	570	91	77	72	62	68	40	27	17	12
2	20	20	373	86	74	70	66	63	40	26	19	12
3	33	19	275	137	72	94	56	60	39	26	20	13
4	35	20	230	101	87	106	52	58	36	31	19	13
5	21	20	137	119	181	93	e51	55	36	26	19	13
6	18	21	103	109	362	93	e52	48	38	26	18	13
7	17	74	87	279	524	84	53	45	37	25	17	12
8	16	103	79	254	1480	82	e51	45	36	24	17	12
9	17	88	86	155	1670	75	e48	42	35	23	16	12
10	51	63	105	121	981	84	e54	35	34	24	15	12
11	94	158	126	101	356	90	58	39	33	23	15	12
12	67	113	97	90	213	78	60	48	34	22	16	12
13	44	105	89	87	154	71	62	126	35	22	15	12
14	33	95	91	225	113	66	55	125	34	22	15	13
15	28	78	92	282	74	63	52	95	33	21	14	20
16	38	72	79	270	53	60	129	79	33	21	14	12
17	37	58	76	181	77	59	82	77	32	23	14	16
18	41	67	100	134	134	56	70	71	33	24	14	13
19	31	62	88	126	163	57	80	96	33	29	14	14
20	35	51	79	210	103	56	76	80	32	24	14	13
21	34	46	74	275	82	54	63	69	31	23	14	12
22	30	44	67	215	51	61	71	70	30	22	14	12
23	26	53	62	155	115	58	290	64	35	21	15	12
24	25	83	58	159	119	55	313	59	35	20	15	12
25	24	138	55	155	102	52	191	55	30	19	14	11
26	30	107	53	136	96	51	176	48	29	19	13	12
27	25	103	52	118	86	50	124	44	29	19	13	12
28	23	234	54	104	78	e51	89	43	29	18	13	12
29	22	496	92	94	74	e52	77	43	28	18	12	12
30	22	417	116	86	--	e51	69	41	28	18	12	12
31	21	--	113	80	--	e52	--	40	--	18	12	--
TOTAL	976	3028	3758	4735	7751	2096	2732	1931	1007	704	469	380
MEAN	31.5	101	121	153	267	67.6	91.1	62.3	33.6	22.7	15.1	12.7
MAX	94	496	570	282	1670	106	313	126	40	31	20	20
MIN	16	19	52	80	51	50	48	35	28	18	12	11
AC-FT	1940	6010	7450	9390	15370	4160	5420	3830	2000	1400	930	754
CFSM	1.15	3.68	4.42	5.57	9.75	2.47	3.32	2.27	1.23	.83	.55	.46
IN.	1.33	4.11	5.10	6.43	10.52	2.85	3.71	2.62	1.37	.96	.64	.55

MEAN	24.9	64.5	96.8	115	107	88.1	70.3	48.6	39.2	25.9	20.0	20.0
MAX	58.9	215	225	252	267	215	134	97.0	98.1	40.1	32.2	39.2
(WY)	1956	1991	1956	1975	1966	1950	1991	1984	1990	1948	1976	1959
MIN	9.35	9.99	11.1	37.4	34.4	40.7	40.0	31.0	20.7	16.8	12.5	11.1
(WY)	1953	1993	1953	1977	1977	1992	1977	1992	1992	1995	1958	1994

ANNUAL TOTAL	19521		29567			
ANNUAL MEAN	53.5		80.8		59.8	
HIGHEST ANNUAL MEAN					85.9	1956
LOWEST ANNUAL MEAN					34.3	1977
HIGHEST DAILY MEAN	570	Dec 1	1670	Feb 9	1670	Feb 9 1996
LOWEST DAILY MEAN	10	Sep 16	11	Sep 25	8.3	Oct 11 1952
ANNUAL SEVEN-DAY MINIMUM	10	Sep 19	12	Sep 21	8.3	Oct 11 1952
ANNUAL RUNOFF (AC-FT)	38720		58650		43320	
ANNUAL RUNOFF (CFSM)	1.95		2.95		2.18	
ANNUAL RUNOFF (INCHES)	26.50		40.14		29.65	
10 PERCENT EXCEEDS	96		137		116	
50 PERCENT EXCEEDS	39		52		41	
90 PERCENT EXCEEDS	12		14		17	

e Estimated



## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD---

SPECIFIC CONDUCTANCE: June to September 1996.

WATER TEMPERATURE: June to September 1996.

INSTRUMENTATION.--Water-quality monitor since June 1996. Electronic data logger with fifteen-minute recording interval.

COOPERATION.--Water-quality monitor was also inspected by employees of the City of Kent.

EXTREMES FOR PERIOD JUNE TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 207 microsiemens, July 19; minimum recorded, 144 microsiemens July 19.

WATER TEMPERATURE: Maximum recorded, 19.5°C July 14; minimum recorded, 8.5°C Sept. 23.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, JUNE TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	159	156	158	160	157	158	164	161	162
2	---	---	---	159	145	157	160	156	157	164	161	162
3	---	---	---	156	154	155	188	160	168	164	160	162
4	---	---	---	161	149	153	173	158	162	164	158	162
5	---	---	---	155	150	152	160	158	159	165	154	162
6	---	---	---	160	153	156	160	157	159	165	162	164
7	---	---	---	160	154	156	162	159	160	166	162	164
8	---	---	---	157	154	155	163	161	162	166	162	164
9	---	---	---	156	153	155	165	161	162	165	162	164
10	---	---	---	155	153	154	164	161	162	166	164	165
11	---	---	---	156	153	155	165	162	163	166	164	165
12	---	---	---	157	154	155	165	160	163	167	164	165
13	---	---	---	157	153	155	163	161	162	165	163	165
14	---	---	---	158	154	156	165	161	163	166	159	164
15	---	---	---	157	154	155	165	161	163	182	149	162
16	---	---	---	156	152	154	164	161	163	180	166	169
17	---	---	---	155	152	154	164	161	162	184	147	170
18	---	---	---	158	153	156	163	160	161	183	157	164
19	---	---	---	207	144	165	163	159	161	175	158	161
20	---	---	---	170	159	161	163	161	162	196	164	175
21	---	---	---	161	159	159	163	161	162	167	165	166
22	---	---	---	161	158	160	164	162	163	171	166	167
23	---	---	---	164	157	159	165	163	164	188	168	175
24	---	---	---	160	156	158	166	163	164	169	166	167
25	---	---	---	161	157	159	166	163	164	169	167	168
26	---	---	---	160	156	158	170	163	166	171	168	169
27	---	---	---	159	156	157	168	162	165	170	169	170
28	---	---	---	159	157	158	168	161	164	172	170	171
29	---	---	---	160	156	158	164	162	163	181	166	170
30	160	157	158	160	156	158	164	162	163	182	164	174
31	---	---	---	159	156	158	165	160	163	---	---	---
MONTH	---	---	---	207	144	157	188	156	162	196	147	166

## WATER TEMPERATURE, DEGREES CELSIUS, JUNE TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	17.0	12.5	14.5	16.0	13.5	14.5	15.5	12.5	14.0
2	---	---	---	16.0	13.5	14.5	15.5	14.0	14.5	15.0	12.0	13.5
3	---	---	---	14.5	13.0	13.5	15.0	13.5	14.0	14.0	12.5	13.5
4	---	---	---	14.5	12.5	13.5	14.0	13.5	13.5	14.5	12.0	13.0
5	---	---	---	16.0	12.0	13.5	15.5	13.0	14.0	14.0	12.0	13.0
6	---	---	---	16.0	11.5	14.0	16.5	12.5	14.5	14.0	12.0	13.0
7	---	---	---	17.0	12.5	14.5	17.0	13.0	15.0	15.0	13.0	14.0
8	---	---	---	18.0	13.5	15.5	18.0	13.5	15.5	15.5	14.0	14.5
9	---	---	---	15.5	13.5	14.5	18.0	14.0	16.0	15.5	13.5	14.5
10	---	---	---	16.5	11.5	14.0	18.5	14.5	16.5	15.0	12.0	13.5
11	---	---	---	17.5	12.5	15.0	16.5	15.0	15.5	15.0	12.5	14.0
12	---	---	---	18.5	14.0	16.0	17.5	13.5	15.5	14.5	13.0	14.0
13	---	---	---	18.5	14.0	16.5	17.5	13.5	15.5	14.0	13.0	13.5
14	---	---	---	19.5	15.0	17.0	18.0	14.5	16.0	14.0	13.0	13.5
15	---	---	---	19.0	15.5	17.0	17.5	14.0	15.5	14.0	12.5	13.0
16	---	---	---	17.5	14.5	16.0	15.5	14.0	15.0	14.0	12.0	13.0
17	---	---	---	15.5	13.0	14.0	15.5	13.5	14.0	13.5	12.0	13.0
18	---	---	---	14.0	12.0	13.0	15.0	12.5	13.5	12.5	10.5	11.5
19	---	---	---	13.5	12.5	13.0	15.0	12.0	13.5	12.5	11.5	12.0
20	---	---	---	14.0	12.5	13.0	15.0	13.5	14.0	12.0	11.0	11.5
21	---	---	---	17.0	13.0	14.5	15.5	12.0	13.5	12.0	11.0	11.5
22	---	---	---	18.0	13.5	15.5	16.0	12.0	14.0	12.0	10.5	11.0
23	---	---	---	18.5	14.5	16.5	16.5	12.5	14.5	11.5	8.5	10.0
24	---	---	---	19.0	15.0	17.0	17.0	13.5	15.0	12.0	9.5	10.5
25	---	---	---	19.0	15.0	17.0	16.0	14.0	15.0	11.5	9.0	10.5
26	---	---	---	19.0	15.0	17.0	15.5	14.0	15.0	12.0	9.5	10.5
27	---	---	---	18.5	15.5	17.0	14.5	14.0	14.5	12.5	10.0	11.0
28	---	---	---	18.5	15.5	16.5	16.5	13.5	15.0	13.0	11.0	11.5
29	---	---	---	19.0	15.0	17.0	17.5	14.0	15.5	12.5	11.0	11.5
30	16.0	12.0	14.0	18.5	15.0	16.5	16.5	14.5	15.5	12.5	11.0	11.5
31	---	---	---	17.5	14.0	16.0	16.0	14.0	15.0	---	---	---
MONTH	---	---	---	19.5	11.5	15.3	18.5	12.0	14.8	15.5	8.5	12.5

## DUWAMISH RIVER BASIN

183

12112600 BIG SOOS CREEK ABOVE HATCHERY, NEAR AUBURN, WA

LOCATION.--Lat 47°18'45", long 122°09'51", on west line NW 1/4 sec.15, T.21 N., R.5 E., King County, Hydrologic Unit 17110013, on left bank 0.2 mi upstream from fish hatchery, 2.7 mi east of Auburn, and at mile 0.9.

DRAINAGE AREA.--66.7 mi<sup>2</sup>, excludes 3.67 mi<sup>2</sup> in vicinity of Youngs Lake (flow from which has been diverted to Cedar River since about 1935).

## WATER-DISCHARGE RECORDS

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

GAGE.--Water-stage recorder. Datum of gage is 77.2 ft above sea level.

REMARKS.--No estimated daily discharges. Records good except for period Feb. 8-11, which are poor. City of Seattle diverts probably less than 2 ft<sup>3</sup>/s from Youngs Lake into Little Soos Creek, a tributary, during low flows. Prior to October 1966, fish hatchery 0.5 mi upstream from station diverted up to 19 ft<sup>3</sup>/s which was returned downstream from the station. Chemical analyses October 1962 to September 1971, at site 1.0 mi upstream.

AVERAGE DISCHARGE.--30 years (water years 1967-96), 123 ft<sup>3</sup>/s, 25.12 in/yr, 89,330 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,200 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 8.88 ft, from slope-area measurement of peak flow; minimum discharge, 11 ft<sup>3</sup>/s Sept. 5, 1963, gage height, 1.07 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 440 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 1	0800	751	5.90	Feb. 9	1015	*4,200	*8.88
Jan. 16	0200	540	5.23	Apr. 24	0900	705	5.64
Jan. 21	1700	558	5.29				

Minimum discharge, 27 ft<sup>3</sup>/s Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	34	721	169	189	199	153	235	93	48	31	29
2	34	33	684	158	176	193	163	220	90	46	35	28
3	40	33	541	175	165	198	144	213	89	46	43	31
4	37	33	514	160	176	204	133	202	86	46	41	32
5	32	34	415	148	215	199	126	197	83	45	37	31
6	29	35	341	148	362	194	140	189	82	43	34	32
7	28	78	291	313	482	185	145	181	80	42	33	31
8	28	148	258	334	1460	180	133	175	80	40	32	30
9	29	133	252	280	3580	173	126	169	76	39	31	30
10	69	108	296	237	1670	178	124	165	74	39	31	28
11	107	205	382	206	1000	189	128	164	70	37	31	28
12	88	176	367	186	768	183	131	172	69	38	30	28
13	65	156	343	177	579	173	130	258	68	37	30	29
14	49	135	337	257	478	164	126	254	66	36	30	32
15	42	118	325	400	410	158	126	219	64	35	29	40
16	43	111	282	511	360	152	182	199	63	34	29	35
17	46	100	251	416	355	147	170	195	62	36	30	33
18	47	98	257	340	376	144	167	216	62	39	30	33
19	42	93	238	306	407	142	173	209	61	44	29	41
20	47	84	216	375	384	141	167	160	58	43	29	38
21	52	79	197	517	359	137	154	142	57	40	29	36
22	50	81	180	498	328	148	155	141	55	38	29	36
23	43	100	165	431	329	148	353	136	60	36	29	32
24	40	131	154	410	301	142	580	128	63	35	28	31
25	40	172	145	384	273	135	494	119	60	34	29	30
26	42	170	137	341	249	130	440	113	55	33	28	30
27	39	168	131	303	232	124	369	109	56	33	28	29
28	38	215	129	275	218	121	315	104	52	33	28	29
29	37	516	161	252	206	119	276	101	51	32	27	30
30	36	683	200	227	--	122	248	99	50	31	27	31
31	34	--	192	203	--	124	--	95	--	31	28	--
TOTAL	1382	4260	9102	9137	16087	4946	6271	5279	2035	1189	955	953
MEAN	44.6	142	294	295	555	160	209	170	67.8	38.4	30.8	31.8
MAX	107	683	721	517	3580	204	580	258	93	48	43	41
MIN	28	33	129	148	165	119	124	95	50	31	27	28
AC-FT	2740	8450	18050	18120	31910	9810	12440	10470	4040	2360	1890	1890
CFSM	.67	2.13	4.40	4.42	8.32	2.39	3.13	2.55	1.02	.58	.46	.48
IN.	.77	2.38	5.08	5.10	8.97	2.76	3.50	2.94	1.13	.66	.53	.53

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1996, BY WATER YEAR (WY)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
MEAN	42.0	105	208	245	248	205	155	95.7	71.0	43.8	32.8	33.9																			
MAX	77.2	433	401	407	555	453	343	174	150	71.3	46.8	57.9																			
(WY)	1982	1991	1976	1967	1996	1972	1991	1984	1990	1981	1976	1978																			
MIN	25.9	33.1	58.0	84.3	73.6	103	80.5	57.0	34.7	26.4	22.8	20.4																			
(WY)	1988	1994	1977	1977	1985	1977	1985	1985	1992	1985	1994	1995																			

## SUMMARY STATISTICS

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1967 - 1996
ANNUAL TOTAL	41737	61596	
ANNUAL MEAN	114	168	123
HIGHEST ANNUAL MEAN			195
LOWEST ANNUAL MEAN			63.5
HIGHEST DAILY MEAN	721	Dec 1	3580
LOWEST DAILY MEAN	18	Sep 16	27
ANNUAL SEVEN-DAY MINIMUM	18	Sep 18	28
ANNUAL RUNOFF (AC-FT)	82790	122200	89330
ANNUAL RUNOFF (CFSM)	1.71	2.52	1.85
ANNUAL RUNOFF (INCHES)	23.28	34.35	25.12
10 PERCENT EXCEEDS	251	359	272
50 PERCENT EXCEEDS	77	125	80
90 PERCENT EXCEEDS	21	30	30

## DUWAMISH RIVER BASIN

12112600 BIG SOOS CREEK ABOVE HATCHERY, NEAR AUBURN, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March to September 1996.

WATER TEMPERATURE: March to September 1996.

INSTRUMENTATION.--Water-quality monitor since February 1996. Electronic data logger with fifteen-minute recording interval.

COOPERATION.--Water-quality monitor was also inspected by employees of the City of Kent.

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 158 microsiemens Sept. 1; minimum recorded, 88 microsiemens Apr. 23, 24.

WATER TEMPERATURE: Maximum recorded, 20.0°C July 14, 24-27, 29; minimum recorded, 4.5°C Mar. 1, 2.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	116	113	115	124	116	121	---	---	---
2	---	---	---	116	114	115	119	116	117	---	---	---
3	---	---	---	115	110	113	122	118	120	---	---	---
4	---	---	---	113	110	112	124	122	123	---	---	---
5	---	---	---	112	110	111	125	124	124	---	---	---
6	---	---	---	113	111	112	125	121	123	---	---	---
7	---	---	---	113	112	113	124	123	123	---	---	---
8	---	---	---	114	112	113	126	124	125	---	---	---
9	---	---	---	114	112	113	127	125	126	---	---	---
10	---	---	---	115	113	114	128	126	127	---	---	---
11	---	---	---	115	112	113	128	125	126	---	---	---
12	---	---	---	115	113	115	127	125	126	---	---	---
13	---	---	---	116	115	115	128	125	126	---	---	---
14	---	---	---	117	115	116	129	127	128	---	---	---
15	---	---	---	118	116	117	129	118	126	115	113	115
16	---	---	---	119	117	118	118	111	113	118	115	117
17	---	---	---	120	117	119	119	115	117	120	116	118
18	---	---	---	120	118	119	120	117	119	121	111	117
19	---	---	---	121	118	119	119	116	117	120	116	118
20	---	---	---	121	119	120	122	118	121	118	114	116
21	---	---	---	122	119	120	123	121	122	117	113	115
22	---	---	---	121	118	119	124	115	122	121	115	117
23	---	---	---	121	119	120	132	88	108	121	117	119
24	---	---	---	123	120	121	95	88	91	121	118	119
25	---	---	---	123	121	122	101	95	99	122	118	120
26	---	---	---	124	122	123	106	100	104	125	120	121
27	---	---	---	123	120	121	111	106	109	124	121	122
28	---	---	---	122	121	122	---	---	---	126	122	123
29	---	---	---	122	120	121	---	---	---	125	120	123
30	---	---	---	125	121	123	---	---	---	125	121	123
31	---	---	---	126	124	125	---	---	---	129	123	126
MONTH	---	---	---	126	110	117	---	---	---	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	129	124	126	---	---	---	137	136	136	158	152	155
2	130	125	127	---	---	---	141	135	136	154	149	152
3	131	126	129	---	---	---	142	135	138	153	146	150
4	131	126	129	---	---	---	144	140	142	149	144	147
5	131	126	129	---	---	---	141	138	140	153	147	151
6	131	127	130	---	---	---	141	137	139	151	147	149
7	132	129	130	---	---	---	140	137	138	153	149	151
8	131	129	130	---	---	---	143	139	140	156	150	154
9	135	130	132	---	---	---	143	140	141	152	148	150
10	135	132	133	---	---	---	145	141	143	150	145	147
11	132	128	129	---	---	---	147	141	145	150	145	148
12	129	127	128	---	---	---	146	143	145	151	146	148
13	132	127	129	---	---	---	145	140	142	152	146	149
14	133	130	132	---	---	---	145	141	143	152	145	149
15	133	130	131	---	---	---	146	144	145	150	144	148
16	134	131	133	---	---	---	146	143	145	151	148	150
17	133	131	132	135	133	134	147	143	145	150	144	147
18	133	131	131	134	125	132	152	146	150	148	145	146
19	135	132	133	133	130	131	151	146	149	150	140	145
20	135	132	133	135	131	134	149	142	145	146	142	144
21	135	132	133	137	135	136	148	143	146	149	137	140
22	135	132	134	137	135	136	151	145	148	154	149	152
23	---	---	---	136	134	135	152	148	150	153	142	147
24	---	---	---	136	134	135	154	148	151	148	139	142
25	---	---	---	137	135	136	157	150	155	148	144	146
26	---	---	---	137	135	136	154	149	152	147	142	145
27	---	---	---	138	135	137	150	144	147	150	141	145
28	---	---	---	139	136	138	150	146	148	149	142	146
29	---	---	---	139	137	138	153	147	150	150	144	147
30	---	---	---	138	135	137	147	145	146	150	145	148
31	---	---	---	137	135	136	153	147	149	---	---	---
MONTH	---	---	---	---	---	---	157	135	145	158	137	148

## DUWAMISH RIVER BASIN

185

12112600 BIG SOOS CREEK ABOVE HATCHERY, NEAR AUBURN, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	6.5	4.5	5.5	10.0	8.5	9.5	11.5	10.5	11.0
2	---	---	---	7.0	4.5	6.0	9.5	8.5	9.0	11.0	10.0	10.5
3	---	---	---	7.0	6.0	6.5	10.5	7.0	9.0	11.0	10.0	10.5
4	---	---	---	8.0	6.5	7.5	12.0	8.0	10.0	11.0	9.5	10.5
5	---	---	---	7.5	7.0	7.0	12.5	9.5	11.0	11.5	10.0	10.5
6	---	---	---	8.5	7.0	7.5	12.0	11.0	11.5	11.5	10.5	11.0
7	---	---	---	8.5	7.0	8.0	15.0	11.0	12.5	11.5	10.5	11.0
8	---	---	---	10.0	8.0	9.0	15.0	12.0	13.5	11.0	10.5	10.5
9	---	---	---	10.0	9.0	9.5	13.5	12.0	13.0	11.5	10.0	10.5
10	---	---	---	10.5	9.5	10.0	12.0	11.5	11.5	11.5	10.5	11.0
11	---	---	---	10.0	9.5	10.0	11.5	10.5	11.0	11.5	11.0	11.0
12	---	---	---	9.5	8.0	8.5	10.5	10.0	10.0	12.0	11.0	11.5
13	---	---	---	10.0	8.0	9.0	13.0	10.0	11.0	13.5	12.0	12.5
14	---	---	---	10.5	7.0	9.0	13.5	9.5	11.5	13.5	12.5	13.0
15	---	---	---	10.0	8.5	9.5	13.0	11.0	12.0	13.0	12.5	13.0
16	---	---	---	9.0	7.5	8.0	13.0	11.0	12.0	13.0	12.5	12.5
17	---	---	---	10.0	8.0	9.0	11.5	10.0	11.0	13.0	12.5	13.0
18	---	---	---	10.5	7.0	8.5	10.5	9.0	10.0	13.0	12.5	13.0
19	---	---	---	10.5	9.0	9.5	10.0	8.5	9.5	13.5	12.5	13.0
20	---	---	---	10.0	8.0	9.0	11.5	8.5	10.0	13.5	12.0	13.0
21	---	---	---	10.5	7.5	9.0	12.0	8.5	10.5	13.0	12.0	12.5
22	---	---	---	9.5	8.5	9.0	11.0	10.0	10.5	12.5	12.0	12.0
23	---	---	---	9.5	8.0	8.5	11.5	10.5	11.0	13.0	12.0	12.5
24	---	---	---	9.5	7.0	8.5	11.5	10.0	10.5	14.0	12.0	13.0
25	---	---	---	9.5	6.0	8.0	10.5	10.0	10.0	14.5	13.0	14.0
26	---	---	---	9.5	6.5	8.0	11.0	9.5	10.0	15.0	13.5	14.5
27	---	---	---	9.5	8.0	8.5	11.5	9.5	10.5	14.5	13.5	14.0
28	---	---	---	10.0	6.0	8.0	11.0	9.0	10.0	14.0	13.0	13.5
29	---	---	---	9.5	8.0	8.5	12.5	10.5	11.5	13.5	13.0	13.0
30	---	---	---	9.0	7.0	8.0	12.0	11.0	11.5	13.5	12.5	13.0
31	---	---	---	9.5	8.0	8.5	---	---	---	14.5	12.5	13.5
MONTH	---	---	---	10.5	4.5	8.4	15.0	7.0	10.8	15.0	9.5	12.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	15.0	13.5	14.0	17.5	12.5	14.5	17.0	13.0	14.5	16.0	12.5	14.0
2	16.0	14.5	15.0	17.0	13.0	14.5	16.0	14.0	14.5	15.5	11.5	13.5
3	16.0	15.0	15.5	15.0	13.0	14.0	15.0	13.5	14.0	14.5	12.5	13.5
4	16.0	15.0	15.5	15.0	13.0	13.5	15.0	13.5	14.0	15.0	12.0	13.0
5	16.0	14.5	15.0	16.5	12.0	14.0	16.0	13.0	14.5	14.0	12.0	13.0
6	16.0	14.5	15.5	17.0	11.5	14.0	17.5	12.5	14.5	14.0	12.0	13.0
7	16.0	15.0	15.5	18.0	12.0	14.5	18.5	13.0	15.0	15.0	12.5	13.5
8	15.5	14.0	15.0	18.5	13.0	15.5	18.5	13.5	15.5	16.0	13.5	14.0
9	15.0	14.5	15.0	15.0	13.5	14.0	19.0	13.5	16.0	15.5	13.0	14.0
10	15.0	12.5	14.0	17.0	12.0	14.0	19.5	14.0	16.5	15.5	11.5	13.5
11	14.5	11.5	12.5	18.0	12.5	15.0	17.5	14.5	15.5	15.0	12.0	13.5
12	15.0	10.0	12.5	19.0	13.5	16.0	18.0	13.0	15.5	14.5	12.5	13.5
13	14.5	11.0	12.5	19.5	13.5	16.0	18.5	13.0	15.5	14.0	12.5	13.5
14	15.5	11.0	13.0	20.0	14.5	17.0	18.5	13.5	16.0	14.5	12.5	13.5
15	15.5	10.5	13.0	19.5	15.0	17.0	18.0	13.0	15.5	14.5	12.5	13.5
16	13.5	11.0	12.0	17.5	14.0	15.5	15.0	13.5	14.5	14.0	12.0	13.0
17	12.5	11.0	11.5	14.5	13.0	14.0	16.0	13.0	14.0	14.0	12.0	13.0
18	13.5	10.5	11.5	14.0	12.5	13.0	15.5	12.5	14.0	12.5	10.0	11.5
19	15.5	10.5	12.5	13.5	12.5	13.0	16.0	12.0	14.0	12.5	11.5	12.0
20	16.0	10.5	13.0	14.5	12.5	13.5	15.5	13.5	14.0	12.0	11.0	11.5
21	15.5	11.5	13.0	18.0	13.0	15.0	16.0	11.5	14.0	12.5	11.5	12.0
22	13.0	12.0	12.5	18.5	13.0	15.5	17.0	11.5	14.0	12.5	10.0	11.0
23	13.0	11.5	12.0	19.5	14.0	16.5	17.5	12.5	14.5	12.0	8.5	10.5
24	14.0	12.0	13.0	20.0	14.5	16.5	17.5	13.0	15.0	12.5	9.5	10.5
25	15.5	12.0	13.5	20.0	14.5	17.0	17.0	13.5	15.0	12.0	9.0	10.5
26	16.5	12.0	14.0	20.0	14.5	17.0	16.0	13.5	15.0	12.5	9.0	10.5
27	14.0	13.0	13.5	20.0	15.0	17.0	14.5	14.0	14.5	13.0	9.5	11.0
28	13.5	12.5	13.0	18.5	15.0	16.5	16.5	13.5	15.0	13.5	10.5	12.0
29	15.5	11.0	13.0	20.0	15.0	17.0	18.0	13.5	15.5	12.5	11.0	11.5
30	16.5	11.5	14.0	19.0	14.5	16.5	17.0	14.0	15.0	13.0	11.0	12.0
31	---	---	---	18.5	13.5	15.5	16.5	14.0	15.0	---	---	---
MONTH	16.5	10.0	13.5	20.0	11.5	15.2	19.5	11.5	14.8	16.0	8.5	12.5

12113000 GREEN RIVER NEAR AUBURN, WA

LOCATION.--Lat 47°18'45", long 122°12'10", in NW 1/4 NW 1/4 sec.17, T.21 N., R.5 E., King County, Hydrologic Unit 17110013, on left bank 1.2 mi east of Auburn, 1.8 mi downstream from Big Soos Creek, and at mile 32.0.

DRAINAGE AREA.--399 mi<sup>2</sup>, excludes 3.67 mi<sup>2</sup> in the vicinity of Youngs Lake, flow from which has been diverted to Cedar River basin since about 1935.

PERIOD OF RECORD.--August 1936 to current year.

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to Oct. 19, 1936, nonrecording gage at same site and datum.

REMARKS.--No estimated daily discharges. Records good except for period July 9 to August 1, which are fair. Since Dec. 5, 1961, flow regulated by Howard A. Hanson Reservoir (station 12105800), 32.5 mi upstream from station, for flood control and during summer months, to augment the natural river flow. City of Tacoma diverted an average daily discharge of about 79 ft<sup>3</sup>/s from river at headworks near Palmer, 29 mi upstream from station, for municipal use. Minor diversions on upstream tributaries for domestic use. U.S. Geological Survey satellite telemeter at station. Water temperatures March 1952 to September 1986.

AVERAGE DISCHARGE.--25 years (water years 1937-61), 1,346 ft<sup>3</sup>/s, 974,500 acre-ft/yr, unregulated.  
35 years (water years 1962-96), 1,326 ft<sup>3</sup>/s, 961,000 acre-ft/yr, regulated.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,100 ft<sup>3</sup>/s Nov. 23, 1959, elevation, 69.75 ft; minimum discharge, 81 ft<sup>3</sup>/s Sept. 23, 1952; minimum elevation, 52.76 ft Oct. 22, 29-31, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Elevation (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Elevation (ft)
Nov. 12	1145	7,550	60.47	Jan. 8	2215	6,620	59.79
Dec. 1	1030	11,200	62.89	Feb. 8	1300	*12,400	*63.62
Jan. 4	0245	6,950	60.04	Feb. 11	0600	11,400	63.30

Minimum discharge, 247 ft<sup>3</sup>/s Aug. 24-27, 29-31, Sept. 3, 12, 13, elevation, 53.00 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	284	703	10800	1930	1330	1490	991	1510	1300	516	268	257
2	290	669	10200	5200	1280	1410	1060	1380	1280	507	287	254
3	384	614	9980	5530	1250	1430	988	1290	1240	464	302	263
4	465	607	9760	6630	1270	1570	944	1150	1020	482	295	263
5	425	605	9360	5450	1420	1620	945	1130	959	462	290	270
6	401	609	7910	3980	2870	1500	975	1100	860	402	280	280
7	513	1020	6280	3810	8940	1510	989	998	841	386	272	264
8	528	2870	4410	5780	11100	1510	976	986	833	406	273	281
9	539	3800	2720	6280	9800	1500	990	967	828	419	269	264
10	838	3720	2660	5140	9700	1550	1000	950	809	428	267	255
11	2150	4580	2740	3890	10600	1750	1030	949	717	403	264	253
12	2640	7320	2720	2200	9720	2140	1040	974	678	385	266	251
13	1930	6620	2340	2320	9550	1850	1220	1220	666	365	261	252
14	2150	5490	2710	3080	7920	1660	1160	1550	629	356	259	263
15	2080	4820	3110	4720	6740	1530	1070	1770	607	340	256	304
16	1990	3560	2750	5040	5850	1500	1240	1680	598	322	257	281
17	1220	2830	2600	4880	5030	1460	1170	1670	614	320	258	290
18	1150	2180	2490	4150	4750	1400	1160	1630	569	315	258	287
19	1370	2090	2160	3160	4770	1300	1190	1670	553	370	256	302
20	1710	1890	1850	3130	4600	1330	1180	1550	543	357	255	306
21	2220	1540	1480	3310	4330	1170	1140	1500	503	334	255	286
22	2170	1420	1400	2750	3790	1080	1140	1430	543	309	252	282
23	2090	1440	1300	2440	3190	1080	1680	1500	572	287	253	272
24	2180	1710	1290	2410	3290	1070	2260	1590	584	279	249	265
25	3020	2880	1260	1800	3030	1050	2240	1440	540	275	251	259
26	2590	4700	1160	1600	2620	991	2250	1420	522	270	250	260
27	1150	5270	1110	1600	2000	958	2430	1410	539	269	255	262
28	1080	7680	1100	1560	1740	940	2230	1390	538	268	257	270
29	1050	9650	1220	1490	1610	920	1830	1420	530	269	250	270
30	992	10300	1530	1420	---	920	1630	1530	524	266	248	271
31	695	---	1730	1360	---	913	---	1460	---	265	257	---
TOTAL	42294	103187	114130	108040	144090	42102	40148	42214	21539	11096	8170	8137
MEAN	1364	3440	3682	3485	4969	1358	1338	1362	718	358	264	271
MAX	3020	10300	10800	6630	11100	2140	2430	1770	1300	516	302	306
MIN	284	605	1100	1360	1250	913	944	949	503	265	248	251
AC-FT	83890	204700	226400	214300	285800	83510	79630	83730	42720	22010	16210	16140

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1996, BY WATER YEAR (WY)

MEAN	623	1546	2151	2291	2180	1704	1796	1537	944	507	315	378
MAX	1364	5045	5654	3908	4969	4994	3023	2896	2849	1069	514	955
(WY)	1996	1991	1976	1975	1996	1972	1989	1972	1974	1974	1974	1968
MIN	173	194	765	703	720	891	601	603	330	262	227	210
(WY)	1988	1988	1986	1988	1977	1963	1992	1994	1987	1987	1989	1989

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1962 - 1996
ANNUAL TOTAL	538232	685147	
ANNUAL MEAN	1475	1872	1326
HIGHEST ANNUAL MEAN			2071
LOWEST ANNUAL MEAN			785
HIGHEST DAILY MEAN	10800	Dec 1	11600
LOWEST DAILY MEAN	213	Sep 1	152
ANNUAL SEVEN-DAY MINIMUM	225	Aug 29	157
ANNUAL RUNOFF (AC-FT)	1068000		961000
10 PERCENT EXCEEDS	2870		2700
50 PERCENT EXCEEDS	964		950
90 PERCENT EXCEEDS	249		269



## DUWAMISH RIVER BASIN

187

12113346 SPRING BROOK CREEK NEAR ORILLIA, WA

LOCATION.--Lat 47°25'53", Long 122°13'35", in SW 1/4 SW 1/4 sec.31, T.23 N., R.5 E., King County, Hydrologic Unit 17110013, on right bank 50 ft upstream from 84th Avenue South (East Valley Highway), 1.2 mi upstream from confluence with Mill Creek, and 1.0 mi southeast of Orillia.

DRAINAGE AREA.--8.44 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1993 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is sea level (City of Kent benchmark). U.S. Geological Survey satellite telemeter at station.

REMARKS.--No estimated daily discharges. Records poor. Natural flow affected by urbanization and construction of flood-control catchments.

AVERAGE DISCHARGE.--3 years (water year 1994-96), 9.46 ft<sup>3</sup>/s, 15.23 in/yr, 6,850 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 450 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 19.55 ft; minimum discharge, 0.74 ft<sup>3</sup>/s Aug. 2-5, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 450 ft<sup>3</sup>/s Feb. 9, gage height, 19.55 ft; minimum discharge, 1.4 ft<sup>3</sup>/s Oct. 7, 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.4	1.7	85	11	8.2	5.0	19	6.8	3.2	2.4	2.4	2.5
2	16	1.6	52	14	7.3	5.0	8.4	6.4	3.2	2.5	14	1.8
3	9.9	1.8	42	17	9.1	12	5.0	6.2	3.1	2.9	69	15
4	3.2	2.0	47	10	14	8.6	4.3	4.6	3.0	4.1	8.6	6.5
5	2.0	2.6	17	12	40	6.8	4.0	4.3	3.1	2.7	4.4	4.0
6	1.6	2.7	13	20	58	5.2	13	4.0	3.2	2.3	4.0	11
7	1.5	91	11	83	50	5.1	6.4	3.9	3.1	2.0	3.9	2.9
8	3.9	80	10	23	303	5.1	4.7	3.7	2.8	2.4	3.9	2.6
9	4.9	13	33	15	249	5.6	5.7	3.6	2.8	2.3	3.9	2.2
10	69	28	60	12	55	13	5.1	3.4	2.6	2.3	3.6	2.1
11	73	106	68	11	19	15	7.8	5.8	2.5	2.3	3.7	2.1
12	18	17	38	9.8	14	7.6	6.9	18	2.6	2.4	3.4	2.1
13	6.4	19	34	12	12	6.0	4.6	50	2.8	2.3	3.4	2.9
14	4.5	9.2	47	35	10	5.5	4.0	10	2.6	2.3	3.4	5.9
15	4.7	15	21	100	9.4	5.1	9.2	7.0	2.6	2.3	3.1	12
16	9.9	8.8	15	40	8.8	5.0	24	5.5	2.5	2.2	3.1	5.1
17	12	8.9	15	23	18	4.7	7.8	9.5	2.8	4.4	3.2	12
18	9.0	14	37	16	24	4.8	10	21	2.8	13	2.9	6.5
19	4.5	6.8	16	25	25	7.3	9.8	11	2.5	19	2.8	14
20	24	5.4	12	55	17	5.0	7.0	7.4	2.4	4.6	2.6	6.3
21	10	5.2	11	60	14	5.0	5.1	7.4	2.4	3.0	2.6	5.1
22	5.1	14	9.7	28	14	9.2	17	10	2.2	2.7	2.5	6.2
23	3.9	42	8.9	21	15	5.1	126	7.1	8.2	2.2	2.5	3.5
24	3.4	41	8.7	33	10	4.6	52	5.0	4.2	2.3	2.3	3.1
25	6.0	45	7.8	19	8.5	4.0	28	4.4	3.1	2.3	2.3	2.9
26	5.7	18	7.6	15	7.6	4.2	19	4.1	2.9	2.8	2.3	2.7
27	2.9	26	7.9	13	6.6	6.0	12	3.9	2.8	2.5	2.2	2.7
28	2.4	54	9.9	12	5.7	4.1	9	3.7	2.7	2.4	2.1	2.7
29	2.2	159	37	11	5.2	4.2	8.2	3.6	2.5	2.4	2.0	2.7
30	1.9	68	26	9.0	---	4.0	7.4	3.4	2.4	2.2	2.4	2.8
31	1.8	---	13	8.7	---	11	---	3.3	---	2.2	3.8	---
TOTAL	325.7	906.7	820.5	773.5	1037.4	198.8	450.8	248.0	89.6	107.7	176.3	153.9
MEAN	10.5	30.2	26.5	25.0	35.8	6.41	15.0	8.00	2.99	3.47	5.69	5.13
MAX	73	159	85	100	303	15	126	50	8.2	19	69	15
MIN	1.5	1.6	7.6	8.7	5.2	4.0	4.0	3.3	2.2	2.0	2.0	1.8
AC-FT	646	1800	1630	1530	2060	394	894	492	178	214	350	305
CFSM	1.24	3.58	3.14	2.96	4.24	.76	1.78	.95	.35	.41	.67	.61
IN.	1.44	4.00	3.62	3.41	4.57	.88	1.99	1.09	.39	.47	.78	.68

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
MEAN	7.25	15.4	17.8	13.8	20.4	9.73	9.79	5.25	3.53	3.41	4.12	3.74
MAX	10.5	30.2	26.5	25.0	35.8	12.1	15.0	8.00	4.13	4.15	5.69	5.13
(WY)	1996	1996	1996	1996	1996	1994	1996	1996	1994	1995	1996	1996
MIN	4.45	5.08	9.73	7.46	10.9	6.41	5.81	3.34	2.99	2.59	2.14	2.70
(WY)	1994	1994	1994	1994	1994	1996	1995	1995	1996	1994	1994	1995

## SUMMARY STATISTICS

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1994 - 1996
ANNUAL TOTAL	3790.93	5288.9	
ANNUAL MEAN	10.4	14.5	9.46
HIGHEST ANNUAL MEAN			14.5
LOWEST ANNUAL MEAN			6.22
HIGHEST DAILY MEAN	159	303	303
LOWEST DAILY MEAN	.74	1.5	.74
ANNUAL SEVEN-DAY MINIMUM	.87	1.9	.87
ANNUAL RUNOFF (AC-FT)	7520	10490	6850
ANNUAL RUNOFF (CFSM)	1.23	1.71	1.12
ANNUAL RUNOFF (INCHES)	16.71	23.31	15.23
10 PERCENT EXCEEDS	22	36	19
50 PERCENT EXCEEDS	4.8	6.0	4.4
90 PERCENT EXCEEDS	1.4	2.4	1.9

## 12113347 MILL CREEK AT EARTHWORKS PARK, AT KENT, WA

LOCATION.--Lat 47°23'00", long 122°13'25", in SW 1/4 NW 1/4 sec.19, T.22 N., R.5 E., King County, Hydrologic Unit 17110013, at control-manhole of flood-detention basin in Earthworks Park, 250 ft upstream from Titus St., and 0.6 mi east of Kent City Hall.

DRAINAGE AREA.--2.49 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1994 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is sea level (City of Kent benchmark).

REMARKS.--Records fair except for estimated daily discharges, which are poor. Natural flow affected by urbanization and construction of flood-control catchments. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--2 years (water year 1995-96), 4.77 ft<sup>3</sup>/s, 26.05 in/yr, 3,460 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined, occurred Feb. 9, 1996, gage height, 47.52 ft, affected by backwater from debris caught on downstream culvert grates; maximum daily discharge, 97 ft<sup>3</sup>/s Feb. 9, 1996; maximum gage height, 48.05 ft May 13, affected by backwater from debris caught on downstream culvert grates; minimum discharge, 0.31 ft<sup>3</sup>/s July 5, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, not determined, occurred Feb. 9, gage height, 47.52 ft, affected by backwater from debris caught on downstream culvert grates; maximum daily discharge, 97 ft<sup>3</sup>/s Feb. 9; maximum gage height, 48.05 ft May 13, affected by backwater from debris caught on downstream culvert grates; minimum discharge, 0.52 ft<sup>3</sup>/s Oct. 31, Nov. 1-3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.91	.66	34	7.7	5.6	e5.1	e13	e3.1	e1.3	e1.0	.93	.89
2	4.2	.70	35	8.2	5.3	e3.3	e6.0	e2.6	e1.3	1.0	3.0	.86
3	3.0	.69	33	8.1	6.1	e7.8	e3.0	e2.6	e1.2	1.1	6.4	2.4
4	1.2	.80	22	5.3	8.3	e6.0	e1.9	e2.2	e1.2	1.3	1.5	1.2
5	.92	.99	15	5.9	15	e4.5	e1.5	e2.1	e1.2	1.0	1.1	2.3
6	.84	1.1	11	7.3	25	e3.6	e6.2	e2.1	e1.2	.99	1.0	1.4
7	.80	18	8.1	25	29	e3.3	e3.6	e2.0	e1.2	.98	.95	.95
8	1.7	16	5.7	18	e87	e3.3	e3.1	e1.9	e1.2	.97	.93	.99
9	1.9	4.9	11	14	e97	e3.3	e3.6	e1.8	e1.1	.96	.90	.89
10	12	8.9	18	9.6	e43	e9.0	e3.6	e1.8	e1.1	.96	.90	.89
11	13	28	22	7.1	e22	e11	e4.2	e2.1	e1.1	.96	.88	.88
12	4.3	8.9	16	6.1	e19	e5.7	e4.5	e4.3	e1.1	.96	.88	.88
13	1.7	7.5	15	8.6	e17	e4.5	e2.9	e22	e1.0	.96	.87	1.0
14	1.2	3.4	16	20	e15	e3.6	e2.5	e4.0	e1.0	.95	.87	2.2
15	1.2	5.0	12	33	e14	e2.6	e6.0	e3.3	e1.0	.93	.86	4.2
16	3.0	2.8	8.4	17	e11	e2.3	e12	e2.8	e1.0	.92	.88	1.2
17	3.4	3.1	7.7	15	e17	e2.2	e5.7	e2.9	e1.2	1.8	.88	2.9
18	2.7	2.9	13	14	e19	e2.1	e7.2	e5.1	e1.0	3.6	.88	2.3
19	1.3	1.9	7.5	14	e20	e4.2	e7.2	e4.0	e1.2	2.6	.87	4.5
20	4.9	1.7	5.8	19	e16	e4.2	e5.1	e2.8	e1.4	1.1	.87	1.6
21	2.1	1.6	5.1	22	e15	e3.9	e3.6	e2.7	e1.4	1.0	.87	1.1
22	1.3	4.0	4.7	18	e12	e6.0	e8.4	e2.7	e1.0	.99	.87	.98
23	1.1	8.6	4.3	14	e16	e3.3	e43	e2.3	e1.0	.95	.86	.95
24	.98	10	4.0	16	e11	e2.8	e28	e1.9	e4.0	.95	.85	.93
25	2.1	11	3.7	15	e8.4	e2.3	e16	e1.8	e2.1	.93	.85	.92
26	1.3	5.5	3.5	13	e6.9	e2.2	e14	e1.7	e1.3	.98	.85	.91
27	.96	7.5	3.7	11	e5.7	e2.9	e9.0	e1.6	e1.1	1.0	.89	.91
28	.89	15	4.9	8.1	e6.6	e2.3	e6.9	e1.5	e1.0	.90	.85	.91
29	.83	38	13	6.7	e8.4	e2.1	e5.1	e1.5	e.96	.90	.84	.91
30	.80	26	15	6.4	---	e2.0	e4.1	e1.4	e.96	.89	1.0	.91
31	.70	---	11	6.1	---	e5.4	---	e1.3	---	.89	1.7	---
TOTAL	77.23	245.14	389.1	399.2	581.3	126.8	240.9	95.9	43.22	35.42	36.78	43.86
MEAN	2.49	8.17	12.6	12.9	20.0	4.09	8.03	3.09	1.44	1.14	1.19	1.46
MAX	13	38	35	33	97	11	43	22	6.4	3.6	6.4	4.5
MIN	.70	.66	3.5	5.3	2.0	1.5	1.3	.96	.89	.89	.84	.86
AC-FT	153	486	772	792	1150	252	478	190	86	70	73	87
CFSM	1.00	3.28	5.04	5.17	8.05	1.64	3.22	1.24	.58	.46	.48	.59
IN.	1.15	3.66	5.81	5.96	8.68	1.89	3.60	1.43	.65	.53	.55	.66

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
MEAN	2.05	5.53	10.6	8.67	10.8	4.46	4.42	1.82	1.22	1.01	1.04	1.28
MAX	2.49	8.17	12.6	12.9	20.0	4.98	8.03	3.09	1.44	1.14	1.34	1.46
(WY)	1996	1996	1996	1996	1996	1995	1996	1996	1996	1996	1995	1996
MIN	1.62	2.88	8.59	4.46	3.86	4.09	2.21	1.08	1.08	.88	.59	.96
(WY)	1995	1995	1995	1995	1994	1996	1995	1995	1995	1994	1994	1994

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1994 - 1996

	1995 CALENDAR YEAR	1996 WATER YEAR	WATER YEARS 1994 - 1996
ANNUAL TOTAL	1482.78	2314.85	
ANNUAL MEAN	4.06	6.32	4.77
HIGHEST ANNUAL MEAN			6.32
LOWEST ANNUAL MEAN			3.22
HIGHEST DAILY MEAN	38 Nov 29	97 Feb 9	97 Feb 9 1996
LOWEST DAILY MEAN	.62 Jul 21	.66 Nov 1	.44 Oct 24 1994
ANNUAL SEVEN-DAY MINIMUM	.68 Sep 20	.74 Oct 29	.47 Aug 26 1994
ANNUAL RUNOFF (AC-FT)	2940	4590	3460
ANNUAL RUNOFF (CFSM)	1.63	2.54	1.92
ANNUAL RUNOFF (INCHES)	22.15	34.58	26.05
10 PERCENT EXCEEDS	11	16	10
50 PERCENT EXCEEDS	1.8	2.8	1.7
90 PERCENT EXCEEDS	.72	.89	.68

e Estimated

## DUWAMISH RIVER BASIN

189

12113349 MILL CREEK NEAR MOUTH, AT ORILLIA, WA

LOCATION.--Lat 47°26'20", long 122°14'26", in SE 1/4 NW 1/4 sec.36, T.23 N., R.4 E., King County, Hydrologic Unit 17110013, on left bank 15 ft upstream from Burlington-Northern railroad trestle, in Orillia.

DRAINAGE AREA.--6.03 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1994 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is sea level (City of Kent benchmark).

REMARKS.--No estimated daily discharges. Records fair except for those above 200 ft<sup>3</sup>/s, which are poor. Natural flow affected by urbanization. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--2 year (water year 1995-96), 16.4 ft<sup>3</sup>/s, 11,850 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 376 ft<sup>3</sup>/s Feb. 9, 1996, from rating curve extended above 133 ft<sup>3</sup>/s, gage height, 18.77 ft; minimum discharge, 0.77 ft<sup>3</sup>/s Oct. 6-8, 13, 1994.

EXTREMES CURRENT YEAR.--Maximum discharge, 376 ft<sup>3</sup>/s Feb. 9, from rating curve extended above 133 ft<sup>3</sup>/s, gage-height, 18.77 ft; minimum discharge, 1.1 ft<sup>3</sup>/s Sept. 27-29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.0	1.9	70	17	13	17	44	12	4.0	2.5	1.4	3.5
2	20	1.7	58	21	11	11	22	10	3.7	2.3	13	2.9
3	15	1.7	50	29	14	26	12	12	3.8	2.8	45	15
4	5.6	1.7	60	16	26	20	8.9	8.2	3.8	5.0	5.9	6.6
5	2.7	2.4	39	17	48	15	7.8	7.2	3.2	2.6	3.1	4.9
6	2.3	2.8	33	28	75	12	28	6.7	3.1	2.4	2.5	6.9
7	2.2	58	29	99	67	11	15	6.2	3.0	2.4	2.4	2.7
8	4.9	67	24	41	290	11	9.7	5.5	3.0	2.5	2.2	2.5
9	5.6	29	38	31	323	11	10	5.3	3.0	2.1	2.1	2.3
10	55	23	60	24	142	30	10	4.9	2.8	2.2	3.3	2.7
11	65	88	73	19	75	37	14	9.3	3.4	2.1	3.1	2.6
12	28	35	49	16	64	19	15	24	3.3	2.0	3.0	2.4
13	9.0	30	49	18	57	15	9.7	65	2.8	2.1	3.2	2.4
14	5.7	17	54	46	51	12	8.3	21	3.0	2.1	3.2	7.6
15	5.1	22	37	113	45	8.5	20	11	3.2	1.9	3.2	20
16	14	13	27	64	38	7.7	41	8.1	2.8	1.8	2.9	3.2
17	16	11	25	42	56	7.3	19	20	3.4	5.6	3.0	15
18	12	18	49	33	63	7.1	24	32	2.9	12	2.9	6.6
19	4.5	7.8	27	45	68	14	24	25	2.8	18	2.7	21
20	24	6.1	21	61	54	14	17	13	4.1	4.3	2.6	3.6
21	12	5.3	17	71	49	13	12	12	3.6	2.4	2.6	4.2
22	4.8	17	14	46	41	20	28	17	2.5	2.0	2.6	4.0
23	3.7	39	13	40	53	11	142	9.5	16	1.8	2.4	1.5
24	3.2	39	11	50	37	9.3	94	7.0	10	2.2	2.5	1.3
25	7.9	45	10	40	28	7.7	53	6.1	5.2	1.9	2.5	1.2
26	7.9	26	9.3	32	23	7.5	45	5.3	3.3	1.7	2.4	1.2
27	3.2	29	9.6	26	19	9.6	30	4.8	2.8	1.8	2.3	1.1
28	2.7	42	14	24	22	7.6	23	4.4	2.6	1.6	2.2	1.1
29	2.4	137	47	20	28	7.1	17	4.6	2.4	1.6	2.1	1.1
30	2.2	66	41	15	---	6.7	13	5.1	2.4	1.4	2.7	1.2
31	2.0	---	24	14	---	18	---	4.4	---	1.4	4.4	---
TOTAL	351.6	882.4	1081.9	1158	1880	423.1	816.4	386.6	115.9	98.5	139.4	152.3
MEAN	11.3	29.4	34.9	37.4	64.8	13.6	27.2	12.5	3.86	3.18	4.50	5.08
MAX	65	137	73	113	323	37	142	65	16	18	45	21
MIN	2.0	1.7	9.3	14	11	6.7	7.8	4.4	2.4	1.4	1.4	1.1
AC-FT	697	1750	2150	2300	3730	839	1620	767	230	195	276	302

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
MEAN	9.36	22.4	33.7	27.1	46.6	17.0	15.9	7.12	3.87	2.81	3.78	3.83
MAX	11.3	29.4	34.9	37.4	64.8	19.6	27.2	12.5	4.13	3.29	5.56	5.08
(WY)	1996	1996	1996	1996	1996	1995	1996	1996	1994	1995	1995	1996
MIN	7.37	15.3	32.5	16.9	27.7	13.6	8.77	3.75	3.62	1.95	1.29	2.87
(WY)	1995	1995	1995	1995	1995	1996	1995	1995	1995	1994	1994	1994

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1994 - 1996

ANNUAL TOTAL	5089.33	7486.1	16.4
ANNUAL MEAN	13.9	20.5	20.5
HIGHEST ANNUAL MEAN			12.2
LOWEST ANNUAL MEAN			323
HIGHEST DAILY MEAN	137	Nov 29	323
LOWEST DAILY MEAN	.96	Sep 22	1.1
ANNUAL SEVEN-DAY MINIMUM	1.1	Sep 19	1.2
ANNUAL RUNOFF (AC-FT)	10090	14850	11850
10 PERCENT EXCEEDS	39	50	38
50 PERCENT EXCEEDS	6.2	11	5.9
90 PERCENT EXCEEDS	1.6	2.2	1.3

12113349 MILL CREEK NEAR MOUTH, AT ORILLIA, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--October 1994 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1994 and March to April 1995, October 1995 to September 1996.

pH: October 1994 to current year.

WATER TEMPERATURE: October 1994 to current year.

DISSOLVED OXYGEN: February to May 1995, inspection data only, April to September.

INSTRUMENTATION.--Water-quality monitor since October 1994. Electronic data logger with fifteen-minute recording interval. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Water-quality monitor was also inspected by employees of the City of Kent.

REMARKS.--Data for Specific Conductance and Dissolved Oxygen for water year 1996 are available in the files of the Tacoma field office.

EXTREMES FOR PERIOD OF RECORD.--

pH: Maximum, 7.8 units May 10, 1995; minimum, 3.6 units Nov. 7, 8, 11, 1995.

WATER TEMPERATURE: Maximum 23.5°C July 19 20, 1995; minimum, 1.0°C Jan. 30, 31, 1996.

EXTREMES FOR CURRENT YEAR.--

pH: Maximum, 7.3 units Nov. 22, minimum, 5.6 units Nov. 7, 8, 11.

WATER TEMPERATURE: Maximum, 23.0°C July 14, 15; minimum, 1.0°C Jan. 30, 31.

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	6.1	6.0	6.0	6.2	6.2	6.2	5.9	5.8	5.9	6.1	6.1	6.1
2	6.1	5.8	5.9	6.2	6.2	6.2	6.0	5.9	5.9	6.1	6.0	6.1
3	6.0	5.8	5.9	6.3	6.2	6.3	6.0	5.9	6.0	6.2	6.0	6.1
4	6.1	6.0	6.0	6.3	6.2	6.3	6.0	5.8	5.9	6.3	6.2	6.2
5	6.2	6.0	6.1	6.3	6.2	6.2	6.0	6.0	6.0	6.3	6.2	6.3
6	6.2	6.2	6.2	6.3	6.2	6.2	6.0	6.0	6.0	6.2	6.2	6.2
7	6.3	6.2	6.3	6.2	5.6	5.8	6.0	6.0	6.0	6.2	5.9	6.1
8	6.3	6.1	6.2	5.8	5.6	5.7	6.0	6.0	6.0	6.2	6.1	6.2
9	6.1	6.0	6.1	6.0	5.8	5.9	6.0	5.8	6.0	6.3	6.2	6.2
10	6.0	5.7	5.8	6.0	5.7	5.9	5.9	5.8	5.8	6.3	6.2	6.2
11	5.8	5.7	5.8	5.8	5.6	5.7	5.9	5.8	5.9	6.3	6.2	6.3
12	5.9	5.8	5.8	5.9	5.8	5.8	5.9	5.8	5.9	6.4	6.3	6.3
13	6.0	5.9	6.0	5.9	5.8	5.9	5.9	5.9	5.9	6.4	6.3	6.4
14	6.0	6.0	6.0	5.9	5.9	5.9	5.9	5.8	5.9	6.4	6.2	6.2
15	6.1	6.0	6.1	5.9	5.7	5.8	6.1	5.9	5.9	6.2	6.1	6.2
16	6.1	5.8	5.9	5.9	5.7	5.8	6.1	6.1	6.1	6.3	6.1	6.2
17	5.9	5.8	5.8	6.3	5.9	5.9	6.1	6.1	6.1	6.3	6.2	6.3
18	5.8	5.7	5.8	6.0	5.9	5.9	6.1	5.9	6.0	6.3	6.3	6.3
19	5.9	5.8	5.9	6.0	5.9	6.0	6.1	6.0	6.1	6.3	6.1	6.3
20	6.0	5.7	5.8	6.1	6.0	6.1	6.1	6.1	6.1	6.2	6.1	6.1
21	5.9	5.7	5.8	6.1	6.1	6.1	6.2	6.1	6.1	6.1	6.1	6.1
22	6.0	5.9	6.0	7.3	5.8	6.1	6.2	6.2	6.2	6.2	6.1	6.2
23	6.0	6.0	6.0	5.8	5.7	5.8	6.2	6.2	6.2	6.2	6.2	6.2
24	6.1	6.0	6.1	5.8	5.7	5.8	6.2	6.2	6.2	6.2	6.1	6.2
25	6.1	5.9	6.1	5.8	5.7	5.8	6.3	6.2	6.2	6.2	6.1	6.2
26	6.0	5.9	5.9	6.0	5.8	5.9	6.3	6.3	6.3	6.3	6.2	6.2
27	6.1	5.9	6.0	6.0	5.9	6.0	6.3	6.3	6.3	6.3	6.3	6.3
28	6.2	6.1	6.1	6.0	5.7	5.9	6.4	6.3	6.4	6.3	6.3	6.3
29	6.2	6.2	6.2	5.8	5.7	5.8	6.4	5.9	5.9	6.3	6.3	6.3
30	6.2	6.1	6.2	5.9	5.8	5.9	6.0	5.9	6.0	6.3	6.3	6.3
31	6.2	6.2	6.2	---	---	---	6.1	6.0	6.1	6.3	6.3	6.3
MAX	6.3	6.2	6.3	7.3	6.2	6.3	6.4	6.3	6.4	6.4	6.3	6.4
MIN	5.8	5.7	5.8	5.8	5.6	5.7	5.9	5.8	5.8	6.1	5.9	6.1

## DUWAMISH RIVER BASIN

191

12113349 MILL CREEK NEAR MOUTH, AT ORILLIA, WA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
	FEBRUARY			MARCH			APRIL			MAY		
1	6.3	6.3	6.3	6.7	6.6	6.6	6.0	5.9	6.0	6.3	6.3	6.3
2	6.3	6.2	6.3	6.7	6.6	6.7	6.1	6.0	6.1	6.6	6.3	6.6
3	6.3	6.3	6.3	6.7	6.0	6.5	6.1	6.1	6.1	6.6	6.6	6.6
4	6.3	6.1	6.1	6.2	6.1	6.1	6.1	6.1	6.1	6.6	6.6	6.6
5	6.2	6.0	6.2	6.2	6.2	6.2	6.4	6.1	6.2	6.6	6.6	6.6
6	6.1	6.0	6.1	6.2	6.2	6.2	6.4	6.2	6.2	6.6	6.5	6.5
7	6.1	6.0	6.1	6.3	6.2	6.3	6.3	6.2	6.2	6.5	6.5	6.5
8	6.0	5.8	5.8	6.3	6.3	6.3	6.3	6.3	6.3	6.5	6.5	6.5
9	5.9	5.8	5.8	6.4	6.3	6.4	6.4	6.3	6.3	6.5	6.5	6.5
10	6.0	5.9	6.0	6.4	6.0	6.0	6.3	6.2	6.3	6.6	6.5	6.5
11	6.1	6.0	6.0	6.0	5.9	6.0	6.3	6.2	6.2	6.5	6.4	6.5
12	6.1	6.1	6.1	6.2	6.0	6.1	6.2	6.2	6.2	6.4	6.1	6.4
13	6.1	6.1	6.1	6.2	6.2	6.2	6.3	6.2	6.2	6.2	6.1	6.1
14	6.1	6.1	6.1	6.2	6.2	6.2	6.3	6.3	6.3	6.2	6.1	6.2
15	6.2	6.1	6.1	6.3	6.2	6.2	6.3	6.0	6.1	6.3	6.2	6.3
16	6.2	6.0	6.2	6.3	6.2	6.2	6.2	6.0	6.1	6.3	6.3	6.3
17	6.1	5.9	6.0	6.3	6.2	6.2	6.3	6.2	6.2	6.4	6.2	6.3
18	6.0	5.9	5.9	6.3	6.2	6.3	6.2	6.1	6.2	6.4	5.9	6.4
19	6.0	6.0	6.0	6.3	6.1	6.2	6.3	6.1	6.2	6.4	6.0	6.3
20	6.1	6.0	6.0	6.2	6.1	6.2	6.3	6.2	6.3	6.4	6.3	6.4
21	6.1	6.0	6.0	6.3	6.2	6.3	6.3	6.3	6.3	6.4	6.3	6.4
22	6.2	6.0	6.1	6.3	6.1	6.2	6.3	6.1	6.3	6.3	6.2	6.2
23	6.2	6.1	6.1	6.3	6.1	6.2	6.1	5.9	6.0	6.3	6.2	6.3
24	6.1	6.1	6.1	6.3	6.3	6.3	6.2	6.0	6.1	6.3	6.1	6.2
25	6.2	6.1	6.1	6.4	6.3	6.4	6.2	6.1	6.2	6.2	6.1	6.1
26	6.2	6.2	6.2	6.4	6.4	6.4	6.3	6.1	6.2	6.2	6.1	6.2
27	6.3	6.2	6.3	6.5	6.4	6.5	6.3	6.2	6.3	6.2	6.1	6.1
28	6.5	6.3	6.4	6.5	6.4	6.5	6.3	6.3	6.3	6.1	6.1	6.1
29	6.6	6.5	6.6	6.4	6.3	6.4	6.3	6.3	6.3	6.2	6.1	6.1
30	---	---	---	6.3	6.3	6.3	6.3	6.3	6.3	6.1	6.0	6.0
31	---	---	---	6.3	6.0	6.3	---	---	---	6.2	6.0	6.0
MAX	6.6	6.5	6.6	6.7	6.6	6.7	6.4	6.3	6.3	6.6	6.6	6.6
MIN	5.9	5.8	5.8	6.0	5.9	6.0	6.0	5.9	6.0	6.1	5.9	6.0

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	6.2	6.2	6.2	7.0	6.9	7.0	7.0	6.5	6.6	6.7	6.6	6.7
2	6.2	6.1	6.2	7.1	7.0	7.0	7.0	6.4	6.7	6.8	6.7	6.8
3	6.2	6.2	6.2	7.2	7.1	7.2	6.5	6.3	6.3	6.8	6.2	6.7
4	6.2	6.2	6.2	7.1	6.8	6.9	6.6	6.3	6.5	6.5	6.3	6.5
5	6.2	6.2	6.2	7.0	7.0	7.0	6.8	6.6	6.7	6.6	6.4	6.5
6	6.2	6.2	6.2	7.1	7.0	7.1	6.8	6.8	6.8	6.5	6.4	6.4
7	6.3	6.2	6.2	7.2	7.0	7.1	6.8	6.8	6.8	6.6	6.4	6.6
8	6.3	6.2	6.3	7.1	7.0	7.1	6.8	6.8	6.8	6.7	6.5	6.6
9	6.4	6.3	6.4	7.1	7.0	7.0	6.9	6.8	6.8	6.6	6.6	6.6
10	6.4	6.3	6.4	7.1	7.0	7.1	6.9	6.8	6.9	6.7	6.6	6.7
11	6.4	6.4	6.4	7.1	7.0	7.0	6.9	6.9	6.9	6.8	6.7	6.8
12	6.4	6.3	6.4	7.1	6.9	7.0	7.0	6.9	6.9	6.9	6.8	6.8
13	6.5	6.4	6.4	7.0	6.9	7.0	7.0	6.9	6.9	6.8	6.5	6.8
14	6.5	6.4	6.4	7.0	6.9	7.0	7.0	6.9	7.0	6.5	6.3	6.4
15	6.5	6.4	6.5	7.1	6.9	7.0	7.1	7.0	7.0	6.3	6.1	6.1
16	6.6	6.5	6.5	7.2	7.0	7.1	7.1	7.0	7.0	6.3	6.2	6.2
17	6.7	6.5	6.6	7.2	6.8	7.1	7.1	7.0	7.1	6.4	6.0	6.2
18	6.6	6.5	6.5	6.8	6.3	6.7	7.2	7.1	7.1	6.2	6.0	6.2
19	6.7	6.5	6.6	6.9	5.9	6.3	7.2	7.1	7.1	6.1	5.9	6.0
20	6.8	6.6	6.8	6.1	6.0	6.1	7.2	7.1	7.1	6.2	6.0	6.1
21	6.8	6.7	6.8	6.2	6.1	6.2	7.2	7.0	7.1	6.4	6.2	6.3
22	6.8	6.7	6.8	6.4	6.2	6.3	7.1	7.0	7.0	6.3	6.1	6.2
23	6.8	6.4	6.6	6.4	6.4	6.4	7.1	6.9	7.0	6.4	6.2	6.3
24	6.6	6.4	6.6	6.5	6.4	6.4	7.1	6.9	7.0	6.5	6.4	6.5
25	6.6	6.4	6.5	6.4	6.3	6.4	7.1	6.9	7.0	6.6	6.5	6.6
26	6.8	6.6	6.8	6.4	6.3	6.4	7.0	6.8	6.9	6.7	6.6	6.6
27	7.0	6.8	6.9	6.4	6.3	6.4	6.9	6.9	6.9	6.7	6.6	6.7
28	7.0	7.0	7.0	6.4	6.3	6.4	6.9	6.8	6.9	6.7	6.7	6.7
29	7.0	6.9	7.0	6.5	6.4	6.5	6.9	6.8	6.8	6.7	6.7	6.7
30	7.0	6.9	7.0	6.5	6.5	6.5	6.8	6.6	6.8	6.7	6.7	6.7
31	---	---	---	6.5	6.5	6.5	6.7	6.5	6.6	---	---	---
MAX	7.0	7.0	7.0	7.2	7.1	7.2	7.2	7.1	7.1	6.9	6.8	6.8
MIN	6.2	6.1	6.2	6.1	5.9	6.1	6.5	6.3	6.3	6.1	5.9	6.0

YEAR	MAX		MAXIMUM 7.3	MINIMUM 5.8
	MIN		MAXIMUM 7.1	MINIMUM 5.6
	MEDIAN		MAXIMUM 7.2	MINIMUM 5.7



## DUWAMISH RIVER BASIN

12113349 MILL CREEK NEAR MOUTH, AT ORILLIA, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	15.0	13.5	14.0	7.0	6.0	6.5	10.5	9.5	10.0	8.5	8.0	8.5
2	14.5	14.0	14.5	6.0	5.0	5.5	9.5	8.5	8.5	10.0	8.5	9.0
3	15.0	14.5	15.0	5.5	4.5	5.0	8.5	7.5	8.0	9.5	8.5	9.0
4	15.0	13.5	14.0	6.0	4.5	5.0	7.5	7.0	7.0	8.5	8.0	8.0
5	14.0	12.5	13.0	8.0	6.0	6.5	7.0	6.0	6.5	8.0	7.0	7.5
6	14.0	12.5	13.5	8.0	7.5	8.0	6.0	5.0	5.5	8.5	7.0	7.5
7	14.0	13.5	14.0	11.5	7.5	9.0	5.0	4.5	5.0	9.5	8.5	9.0
8	15.0	13.5	14.0	12.0	11.5	12.0	4.5	4.0	4.5	9.0	8.0	8.5
9	14.5	13.5	14.0	11.5	9.5	10.0	5.0	4.0	4.5	8.0	7.5	8.0
10	14.0	13.5	13.5	9.5	8.5	9.0	6.5	5.0	5.5	8.5	7.5	8.0
11	13.5	12.5	13.0	11.0	9.0	10.5	8.0	6.5	7.5	8.0	7.0	7.5
12	13.0	12.0	12.5	10.5	10.0	10.0	8.5	7.5	8.0	7.0	6.0	6.5
13	13.0	12.0	12.5	11.0	10.0	10.5	8.5	8.0	8.5	8.0	6.5	7.0
14	13.0	11.5	12.0	11.5	11.0	11.5	8.0	7.5	8.0	8.5	8.0	8.5
15	14.0	11.0	12.0	11.5	10.5	11.0	8.0	7.5	7.5	9.0	8.5	8.5
16	14.5	13.5	14.0	11.5	10.5	11.0	7.5	7.0	7.5	8.5	7.5	8.0
17	14.0	13.0	13.5	12.0	10.5	11.0	7.5	7.0	7.5	7.5	6.5	7.0
18	13.5	12.0	12.5	12.0	11.0	11.5	7.5	7.0	7.5	7.0	5.5	6.0
19	12.0	10.5	11.5	11.0	10.0	10.0	8.0	7.5	8.0	5.5	4.5	5.0
20	12.0	11.5	12.0	10.0	8.5	9.0	7.5	7.0	7.5	5.5	5.0	5.0
21	12.5	11.5	12.0	10.0	8.5	9.0	7.0	6.0	6.5	5.5	5.0	5.0
22	11.5	10.0	11.0	12.0	10.0	11.0	6.0	5.5	6.0	5.5	5.0	5.0
23	11.5	10.5	11.0	12.0	11.5	11.5	5.5	4.5	5.0	5.5	5.0	5.5
24	11.5	11.0	11.0	12.5	11.5	12.0	5.0	4.0	4.5	5.5	4.5	5.0
25	12.0	10.5	11.0	12.5	10.5	11.5	4.5	4.0	4.0	5.5	5.0	5.0
26	12.0	11.0	11.5	10.5	10.0	10.0	4.0	3.5	3.5	5.5	5.0	5.5
27	11.5	10.0	11.0	10.0	9.5	10.0	6.0	4.0	5.0	5.0	4.5	5.0
28	10.0	9.0	9.5	12.5	10.0	11.0	7.0	6.0	6.5	4.5	4.0	4.5
29	9.0	8.0	8.5	12.5	12.0	12.5	7.5	5.5	6.5	4.0	2.5	3.5
30	8.0	7.5	8.0	12.0	10.5	11.0	8.0	7.5	7.5	2.5	1.0	2.0
31	7.5	6.5	7.0	---	---	---	8.5	8.0	8.0	2.5	1.0	2.0
MONTH	15.0	6.5	12.1	12.5	4.5	9.7	10.5	3.5	6.6	10.0	1.0	6.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	3.5	1.5	2.5	7.5	5.0	6.0	11.0	9.5	10.0	13.5	11.5	12.5
2	3.0	2.0	2.5	8.0	5.5	6.5	12.0	9.5	10.5	14.0	11.0	12.5
3	3.5	1.5	2.5	8.0	7.0	7.5	12.5	8.5	10.5	14.5	11.0	12.5
4	5.0	2.0	3.5	9.0	7.5	8.0	13.5	10.0	11.5	14.5	11.0	13.0
5	7.0	4.5	6.0	8.0	7.0	7.5	14.0	11.5	13.0	15.0	11.0	13.0
6	8.5	6.5	7.0	9.5	7.5	8.5	14.0	12.0	13.0	15.5	12.5	14.0
7	8.5	8.0	8.5	9.5	8.0	9.0	17.0	13.0	14.5	14.5	12.0	13.5
8	10.5	8.5	10.0	11.0	9.0	10.0	17.0	14.5	16.0	14.0	11.5	13.0
9	10.0	8.0	9.0	11.5	10.0	11.0	16.5	14.0	15.0	15.0	11.5	13.5
10	8.0	6.5	7.0	12.0	11.0	11.5	14.0	13.0	13.5	15.5	12.5	14.0
11	7.5	6.5	7.0	11.5	11.0	11.0	13.0	11.5	12.5	14.5	13.5	14.0
12	7.5	6.5	7.0	11.0	10.0	10.5	11.5	10.5	11.0	17.5	13.5	15.0
13	7.5	6.5	7.0	11.5	9.5	10.5	13.5	10.5	11.5	17.0	15.5	16.0
14	7.5	6.0	7.0	12.0	9.0	10.5	15.0	11.0	13.0	17.0	15.0	15.5
15	8.0	6.5	7.0	11.5	10.5	11.0	14.5	12.5	13.5	15.5	14.0	15.0
16	7.5	6.5	7.0	10.5	9.0	9.5	13.5	12.0	13.0	16.0	13.5	15.0
17	10.0	7.5	8.5	11.5	9.0	10.0	13.5	11.5	12.5	16.5	14.5	15.5
18	10.0	9.5	9.5	12.0	9.0	10.5	12.5	10.5	11.5	16.0	14.0	15.0
19	9.5	8.5	9.0	11.5	10.5	11.0	11.0	10.0	10.5	16.5	14.5	15.5
20	9.0	8.0	8.5	12.0	9.5	10.5	14.0	9.5	11.5	17.0	13.5	15.5
21	8.0	7.0	7.5	12.5	9.5	11.0	14.0	10.5	12.0	15.5	13.5	14.0
22	7.5	6.0	7.0	11.5	9.5	10.0	13.0	11.5	12.5	16.0	13.5	14.5
23	7.0	5.5	6.0	11.0	8.5	9.5	12.5	11.5	12.0	15.5	14.0	15.0
24	7.0	6.0	6.5	10.5	8.5	9.5	12.5	11.0	12.0	18.5	13.5	16.0
25	7.5	6.0	6.5	10.0	7.0	8.5	12.0	11.0	11.5	19.0	15.5	17.5
26	7.0	5.5	6.5	11.0	8.0	9.5	12.0	10.0	11.0	20.0	16.0	18.0
27	6.5	5.0	6.0	10.5	9.0	10.0	13.0	10.5	11.5	18.5	16.0	17.0
28	6.0	4.0	5.0	11.0	7.5	9.5	12.0	10.0	11.0	17.5	15.0	16.0
29	7.0	4.0	5.5	10.0	8.5	9.5	15.0	11.0	13.0	17.0	15.5	16.5
30	---	---	---	10.0	7.5	9.0	14.0	12.0	13.0	18.0	14.5	16.5
31	---	---	---	10.5	9.0	9.5	---	---	---	19.5	15.5	17.5
MONTH	10.5	1.5	6.6	12.5	5.0	9.5	17.0	8.5	12.3	20.0	11.0	14.9



## DUWAMISH RIVER BASIN

12113375 SPRINGBROOK CREEK AT TUKWILA, WA

## WATER-QUALITY RECORDS

LOCATION.--Lat 47°27'57", long 122°13'25", in SE 1/4 NE 1/4 sec.24, T.23 N., R.4 E., King County, Hydrologic Unit 17110013, on upstream right bank wing wall of bridge, at southwest 16th Street, and at mile 1.5.

DRAINAGE AREA.--20 mi<sup>2</sup>.

PERIOD OF RECORD.--February to September 1996.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: February to September 1996.

WATER TEMPERATURE: February to September 1996.

DISSOLVED OXYGEN: February to September 1996.

INSTRUMENTATION.--Water-quality monitor since February 1996. Electronic data logger with fifteen-minute recording interval.

EXTREMES FOR PERIOD FEBRUARY TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 451 microsiemens July 30, but may have been higher during period of missing record; minimum recorded, 74 microsiemens Aug. 3, but may have been lower during period of missing record.

WATER TEMPERATURE: Maximum recorded, 20.5°C July 14, 15; minimum recorded, 4.5°C Feb. 28, 29.

DISSOLVED OXYGEN: Maximum recorded, 8.5 mg/l Aug. 18, 19, but may have been higher during periods of missing record; minimum recorded, 2.1 mg/l July 2, but may have been lower during periods of missing record.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, FEBRUARY TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	---	---	---	---	---	---	427	413	422	338	304	321
2	---	---	---	---	---	---	420	155	284	389	338	364
3	---	---	---	---	---	---	155	74	96	409	127	295
4	---	---	---	---	---	---	234	107	176	264	151	205
5	---	---	---	---	---	---	305	234	274	321	264	303
6	---	---	---	---	---	---	346	305	328	288	251	264
7	---	---	---	---	---	---	361	346	356	308	262	282
8	---	---	---	---	---	---	375	361	371	373	308	345
9	---	---	---	---	---	---	379	367	375	400	373	388
10	---	---	---	---	---	---	381	360	372	413	400	405
11	---	---	---	---	---	---	374	345	359	411	396	401
12	---	---	---	---	---	---	354	346	349	401	399	400
13	---	---	---	395	384	388	360	351	355	413	323	402
14	---	---	---	405	390	402	358	351	354	330	200	247
15	---	---	---	413	401	408	355	345	349	200	102	126
16	---	---	---	413	402	408	361	350	358	226	127	184
17	---	---	---	410	280	349	366	358	362	234	108	156
18	---	---	---	295	179	257	365	359	362	187	119	160
19	---	---	---	179	134	151	370	361	367	151	106	122
20	---	---	---	257	170	214	372	369	370	222	127	177
21	---	---	---	323	257	293	375	369	371	283	222	259
22	---	---	---	361	323	349	374	368	371	268	206	224
23	---	---	---	383	361	378	373	366	369	306	237	277
24	---	---	---	397	382	394	380	371	375	341	306	326
25	---	---	---	407	387	400	379	372	376	363	341	354
26	---	---	---	399	388	393	377	372	375	373	363	369
27	---	---	---	401	391	396	373	369	372	381	371	376
28	---	---	---	409	393	402	373	367	371	383	378	380
29	---	---	---	403	392	399	375	368	372	388	380	384
30	---	---	---	451	395	433	377	356	369	389	382	385
31	---	---	---	448	417	437	358	306	337	---	---	---
MONTH	---	---	---	---	---	---	427	74	345	413	102	296

## DUWAMISH RIVER BASIN

195

12113375 SPRINGBROOK CREEK AT TUKWILA, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, FEBRUARY TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	---	---	---	7.5	5.0	6.0	10.5	9.0	10.0	13.0	11.0	12.0
2	---	---	---	8.0	5.5	6.5	11.0	9.5	10.5	13.5	11.0	12.0
3	---	---	---	7.5	7.0	7.5	11.5	8.5	10.0	13.0	11.0	12.0
4	---	---	---	9.0	7.5	8.0	12.5	10.0	11.0	13.5	11.0	12.0
5	---	---	---	8.0	7.5	7.5	13.0	11.0	12.0	14.0	11.0	12.5
6	---	---	---	9.0	7.5	8.5	13.0	12.0	12.5	14.5	12.0	13.0
7	---	---	---	9.5	8.5	9.0	16.0	12.5	14.0	13.5	11.5	12.5
8	---	---	---	10.5	9.0	10.0	16.0	13.5	15.0	13.0	11.0	12.0
9	---	---	---	11.5	10.0	10.5	15.5	13.5	14.0	14.0	10.5	12.0
10	---	---	---	12.0	11.0	11.5	13.5	12.5	13.0	14.0	11.5	12.5
11	---	---	---	11.5	10.5	11.0	12.5	11.5	12.0	13.0	12.0	12.5
12	---	---	---	10.5	9.5	10.0	11.5	10.5	11.0	16.0	12.5	13.5
13	---	---	---	11.0	9.5	10.0	13.0	10.0	11.0	16.0	14.5	15.0
14	8.0	6.5	7.0	11.5	9.0	10.0	14.0	11.0	12.5	15.0	13.5	14.5
15	8.0	6.5	7.0	11.0	10.5	10.5	13.5	12.5	13.0	14.5	13.0	13.5
16	8.0	6.5	7.5	10.5	9.0	9.5	13.0	11.5	12.5	14.5	12.5	13.5
17	9.5	8.0	8.5	11.5	9.0	10.0	12.5	11.0	12.0	14.5	13.0	14.0
18	10.0	9.5	9.5	11.5	9.0	10.5	11.5	10.0	11.0	14.5	13.0	13.5
19	9.5	8.5	9.0	11.5	10.0	10.5	11.0	10.0	10.5	14.5	13.0	13.5
20	8.5	8.0	8.5	11.5	9.5	10.5	13.0	9.5	11.0	15.0	12.5	13.5
21	8.0	7.0	7.5	12.0	9.5	10.5	13.5	10.5	12.0	14.0	12.0	12.5
22	7.5	6.5	7.0	11.0	9.5	10.0	12.5	11.5	12.0	14.5	12.0	13.0
23	7.0	5.5	6.0	10.5	8.5	9.5	12.0	11.0	11.5	14.0	12.5	13.0
24	7.0	6.0	6.5	10.0	8.5	9.0	12.5	10.5	11.5	16.5	12.0	14.0
25	7.5	6.0	7.0	10.0	7.0	8.5	12.0	10.5	11.0	17.0	13.5	15.0
26	7.5	6.0	6.5	10.5	8.0	9.0	12.0	10.0	11.0	17.0	14.0	15.5
27	6.5	5.0	6.0	10.5	9.0	9.5	12.5	10.5	11.5	16.0	14.0	14.5
28	6.0	4.5	5.5	10.5	8.0	9.0	12.0	10.0	11.0	15.0	13.0	14.0
29	6.5	4.5	5.5	10.0	8.5	9.5	14.0	11.0	12.0	15.0	13.0	14.0
30	---	---	---	10.0	8.0	9.0	13.5	12.0	12.5	14.5	12.5	13.5
31	---	---	---	10.0	9.0	9.5	---	---	---	17.0	13.5	15.0
MONTH	---	---	---	12.0	5.0	9.4	16.0	8.5	11.8	17.0	10.5	13.3

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	17.0	14.5	15.5	18.5	15.5	17.0	18.5	16.0	17.0	17.5	16.0	16.5
2	18.5	15.0	16.5	18.5	16.5	17.5	18.0	16.0	17.0	17.0	15.0	16.0
3	18.5	16.0	17.0	18.0	16.5	16.5	17.5	16.0	16.5	17.0	15.0	16.0
4	18.5	15.5	17.0	17.0	15.5	16.5	16.5	16.0	16.5	16.5	15.5	16.0
5	18.5	15.5	17.0	18.0	15.0	16.0	16.5	15.0	16.0	16.0	14.5	15.0
6	18.0	15.5	16.5	18.0	15.5	16.5	17.5	15.0	16.0	16.5	15.0	16.0
7	17.5	15.5	16.5	19.0	15.5	17.0	18.0	15.5	16.5	16.5	15.0	15.5
8	17.5	14.5	16.0	20.0	16.5	18.0	18.5	16.0	17.0	17.0	15.5	16.0
9	17.5	15.5	16.0	20.0	16.5	17.5	18.5	16.5	17.5	17.0	15.5	16.0
10	16.5	14.5	15.5	18.0	15.0	16.5	19.0	17.0	18.0	16.5	15.0	15.5
11	16.5	14.5	15.5	18.5	15.5	17.0	19.0	17.0	18.0	16.5	15.0	15.5
12	17.0	14.0	15.0	19.5	16.5	18.0	18.5	16.0	17.0	16.0	15.0	15.5
13	17.0	14.5	16.0	20.0	17.0	18.5	18.5	16.0	17.0	15.5	15.0	15.0
14	17.5	14.5	16.0	20.5	17.5	19.0	18.5	16.5	17.5	16.0	15.5	15.5
15	17.5	14.5	16.0	20.5	18.0	19.0	18.5	16.5	17.5	16.0	15.0	15.5
16	17.5	14.5	15.5	20.0	17.0	18.0	18.0	16.5	16.5	16.0	14.5	15.0
17	15.5	14.0	14.5	18.0	16.0	16.5	16.5	15.5	16.0	15.5	14.5	15.0
18	16.5	13.5	14.5	16.5	15.0	15.5	16.5	15.0	15.5	14.5	13.5	14.0
19	17.5	14.5	15.5	16.5	15.5	16.0	16.5	15.0	15.5	14.5	14.5	14.5
20	18.0	14.5	16.0	16.5	15.0	15.5	16.0	15.5	15.5	14.5	13.5	14.0
21	17.5	15.0	16.5	18.5	15.5	16.5	16.5	14.5	15.5	14.0	13.0	13.5
22	17.5	15.5	15.5	19.0	16.5	17.5	17.0	15.0	15.5	14.0	13.0	13.5
23	16.5	14.5	15.5	19.5	17.0	18.0	17.5	15.5	16.0	13.5	12.0	12.5
24	17.0	15.5	16.0	20.0	17.5	18.5	17.5	16.0	16.5	13.5	12.0	12.5
25	18.5	15.5	17.0	20.0	17.5	19.0	17.5	16.0	17.0	13.0	11.5	12.5
26	19.5	16.0	17.5	20.0	18.0	19.0	17.5	16.5	17.0	13.0	11.5	12.5
27	19.0	16.5	17.0	20.0	18.0	19.0	17.0	16.0	16.5	13.5	12.0	12.5
28	17.0	15.0	16.0	20.0	18.0	19.0	17.5	15.5	16.0	14.0	12.5	13.0
29	17.5	14.5	15.5	20.0	18.0	19.0	18.0	16.0	17.0	14.0	13.0	13.0
30	18.0	15.0	16.0	20.0	17.5	18.5	18.0	17.0	17.5	14.0	12.5	13.0
31	---	---	---	19.0	17.0	18.0	18.0	16.5	17.5	---	---	---
MONTH	19.5	13.5	16.0	20.5	15.0	17.5	19.0	14.5	16.6	17.5	11.5	14.5

## DUWAMISH RIVER BASIN

12113375 SPRINGBROOK CREEK AT TUKWILA, WA--Continued

OXYGEN DISSOLVED (MG/L), FEBRUARY TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	4.0	2.3	3.1	---	---	---	6.2	3.2	4.6
2	---	---	---	3.9	2.1	2.8	---	---	---	6.7	3.2	4.7
3	---	---	---	4.8	2.2	3.0	---	---	---	7.2	3.6	5.6
4	---	---	---	5.4	3.2	4.2	---	---	---	5.9	3.9	4.9
5	---	---	---	5.3	2.7	3.6	---	---	---	6.5	3.5	4.5
6	---	---	---	5.6	3.3	4.1	---	---	---	5.3	3.6	4.6
7	---	---	---	5.9	3.0	4.1	---	---	---	5.1	3.7	4.3
8	---	---	---	5.8	2.5	3.8	---	---	---	5.1	2.9	3.8
9	---	---	---	5.3	2.3	3.2	6.1	3.2	4.4	5.2	2.5	3.6
10	---	---	---	6.0	2.9	3.9	6.4	2.9	4.5	5.3	2.7	3.8
11	---	---	---	6.0	3.2	4.2	6.5	3.1	4.5	5.5	2.8	3.9
12	---	---	---	6.1	2.7	4.2	7.8	3.2	5.1	5.5	2.8	4.0
13	---	---	---	6.0	3.2	4.3	7.8	3.9	5.5	5.4	2.2	3.3
14	---	---	---	5.7	2.6	3.9	7.8	3.7	5.5	5.2	3.0	4.0
15	---	---	---	5.7	2.4	3.7	7.9	3.5	5.5	6.1	3.9	5.4
16	---	---	---	---	---	---	7.7	3.6	5.1	---	---	---
17	---	---	---	---	---	---	7.9	4.1	5.5	---	---	---
18	---	---	---	---	---	---	8.5	4.7	6.3	---	---	---
19	---	---	---	---	---	---	8.5	4.9	6.4	---	---	---
20	---	---	---	---	---	---	8.1	5.0	6.3	---	---	---
21	---	---	---	---	---	---	8.4	4.7	6.4	---	---	---
22	---	---	---	---	---	---	8.3	4.6	6.3	---	---	---
23	---	---	---	---	---	---	7.7	4.4	5.8	---	---	---
24	---	---	---	---	---	---	7.4	3.9	5.4	---	---	---
25	---	---	---	---	---	---	7.2	3.5	5.1	---	---	---
26	---	---	---	---	---	---	7.0	3.1	4.8	---	---	---
27	---	---	---	---	---	---	6.0	2.9	4.2	---	---	---
28	---	---	---	---	---	---	7.4	3.2	4.5	---	---	---
29	4.2	2.4	3.2	---	---	---	7.4	3.9	5.4	---	---	---
30	4.1	2.7	3.3	---	---	---	7.2	3.9	5.4	---	---	---
31	---	---	---	---	---	---	6.4	3.5	4.8	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---



12113390 DUWAMISH RIVER AT GOLF COURSE, AT TUKWILA, WA

## WATER-QUALITY RECORDS

LOCATION.--Lat 47°28'45", long 122°15'27", in NE 1/4 SW 1/4 sec.14, T.23 N., R.4 E., King County, Hydrologic Unit 17110012, on left bank at footbridge, 0.5 mi downstream from Black River confluence, 8.5 mi upstream from mouth.

DRAINAGE AREA.--461 mi<sup>2</sup>.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March to September 1996.

WATER TEMPERATURE: March to September 1996.

INSTRUMENTATION.--Water-quality monitor since March 1996. Electronic data logger with sixty-minute recording interval.

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum, 328 microsiemens Aug. 27, 28; minimum, 67 microsiemens Mar. 13.

WATER TEMPERATURE: Maximum, 23.5°C July 25; minimum, 7.0°C Mar. 16.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	135	105	113	98	82	90
2	---	---	---	---	---	---	110	102	105	106	86	95
3	---	---	---	---	---	---	117	102	110	111	92	101
4	---	---	---	---	---	---	124	109	114	122	96	108
5	---	---	---	---	---	---	124	106	113	127	109	116
6	---	---	---	---	---	---	121	104	112	126	107	114
7	---	---	---	---	---	---	116	104	108	138	107	120
8	---	---	---	---	---	---	122	104	110	138	116	122
9	---	---	---	105	91	97	120	100	107	136	113	121
10	---	---	---	104	88	95	117	98	106	135	111	118
11	---	---	---	100	86	90	115	96	103	135	110	119
12	---	---	---	88	68	75	112	95	102	135	111	120
13	---	---	---	83	67	75	110	93	101	116	91	97
14	---	---	---	93	74	83	98	73	82	100	85	93
15	---	---	---	102	84	92	113	89	100	92	72	81
16	---	---	---	102	87	91	109	90	95	85	71	77
17	---	---	---	104	87	94	107	94	100	88	75	82
18	---	---	---	105	88	93	109	99	104	88	77	83
19	---	---	---	115	90	104	104	96	101	85	75	79
20	---	---	---	111	91	99	107	97	101	92	80	85
21	---	---	---	124	95	110	112	99	104	96	83	88
22	---	---	---	131	112	122	115	101	107	98	84	94
23	---	---	---	124	112	116	102	79	85	97	85	90
24	---	---	---	125	108	115	83	79	81	95	78	84
25	---	---	---	125	108	114	87	78	82	100	78	88
26	---	---	---	133	109	118	91	81	86	101	87	90
27	---	---	---	134	114	121	87	79	81	103	88	93
28	---	---	---	132	115	121	82	75	79	105	87	92
29	---	---	---	135	114	120	90	76	82	104	86	91
30	---	---	---	131	111	117	94	80	87	100	79	85
31	---	---	---	135	115	123	---	---	---	96	79	84
MONTH	---	---	---	---	---	---	135	73	99	138	71	97

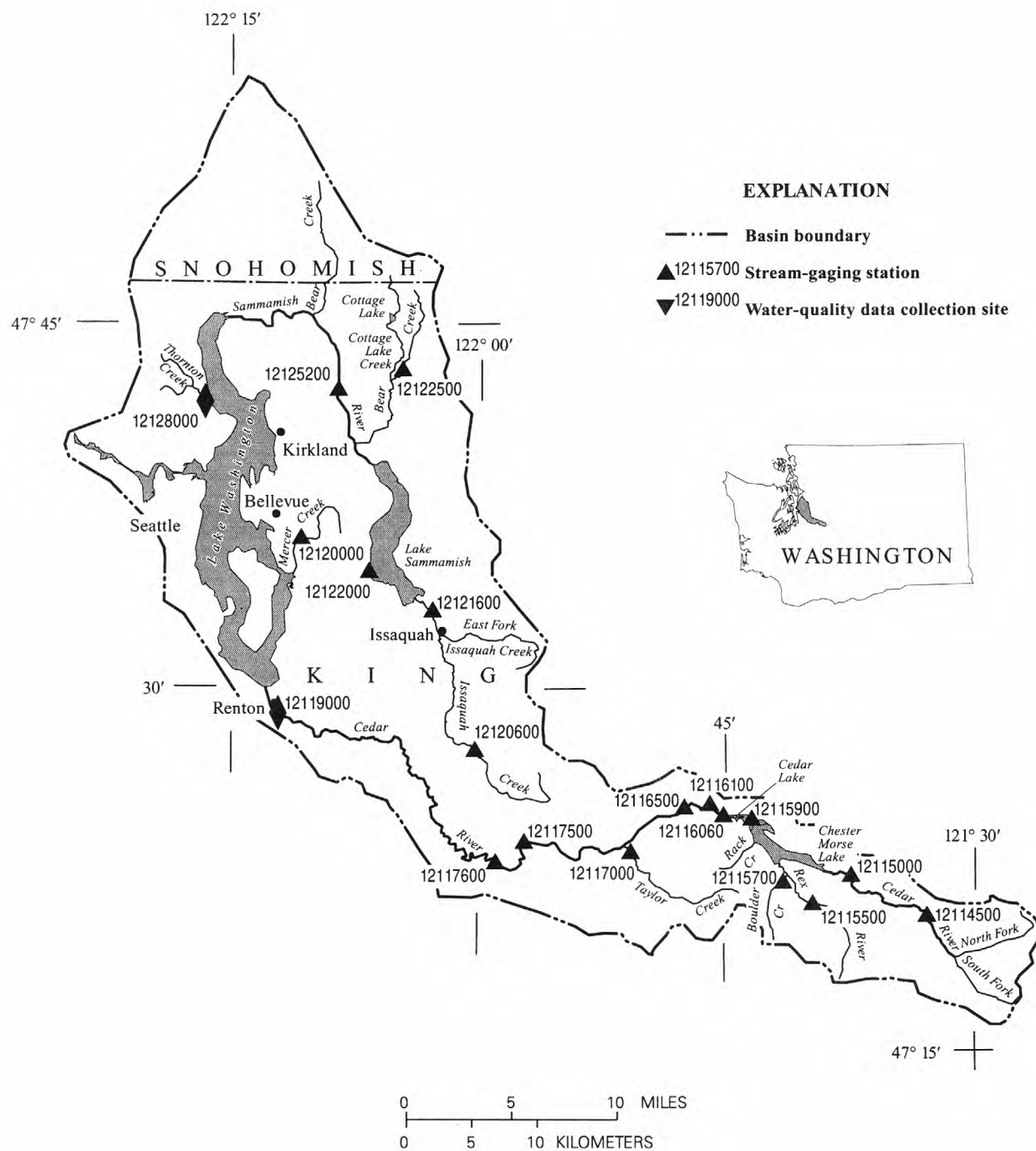
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	109	83	95	162	128	136	321	159	191	224	155	173
2	110	93	97	199	130	142	321	159	183	191	156	172
3	110	88	95	182	135	150	170	121	139	193	157	171
4	142	88	113	174	140	154	208	129	152	187	143	155
5	146	117	124	176	130	149	183	148	161	186	155	167
6	144	119	130	177	137	155	176	148	161	187	141	160
7	152	130	135	202	157	173	192	150	164	179	149	163
8	146	124	129	190	163	174	195	155	170	189	149	166
9	140	119	124	216	159	177	203	162	176	188	148	160
10	143	118	122	282	177	190	224	166	180	195	152	165
11	156	119	132	207	171	185	201	165	177	182	156	167
12	176	132	145	241	174	188	201	167	179	191	157	167
13	178	136	144	220	177	191	202	165	178	217	157	179
14	168	136	145	214	173	186	202	171	182	194	168	178
15	179	140	152	206	171	181	228	165	180	176	157	166
16	170	142	150	219	173	186	222	167	181	168	156	160
17	170	132	145	214	170	179	213	168	182	176	166	170
18	168	130	144	197	160	176	220	164	180	171	149	158
19	180	142	152	170	146	152	208	165	180	159	141	151
20	183	142	154	168	141	155	214	166	177	152	142	146
21	189	143	159	179	153	165	218	166	184	163	145	154
22	179	147	154	205	157	176	218	165	179	172	148	158
23	179	135	148	210	162	177	226	167	177	163	147	154
24	144	126	133	194	168	175	252	168	177	172	147	153
25	151	129	139	209	163	177	203	166	177	172	147	153
26	170	141	148	221	163	183	326	165	185	173	147	154
27	162	133	144	194	164	172	328	162	186	182	143	152
28	184	129	140	203	161	172	328	161	192	161	141	146
29	156	127	135	208	158	176	327	159	194	156	136	143
30	167	128	141	322	160	180	327	165	201	150	134	141
31	---	---	---	321	160	190	324	164	191	---	---	---
MONTH	189	83	136	322	128	172	328	121	178	224	134	160

12113390 DUWAMISH RIVER AT GOLF COURSE, AT TACOMA, WA--Continued

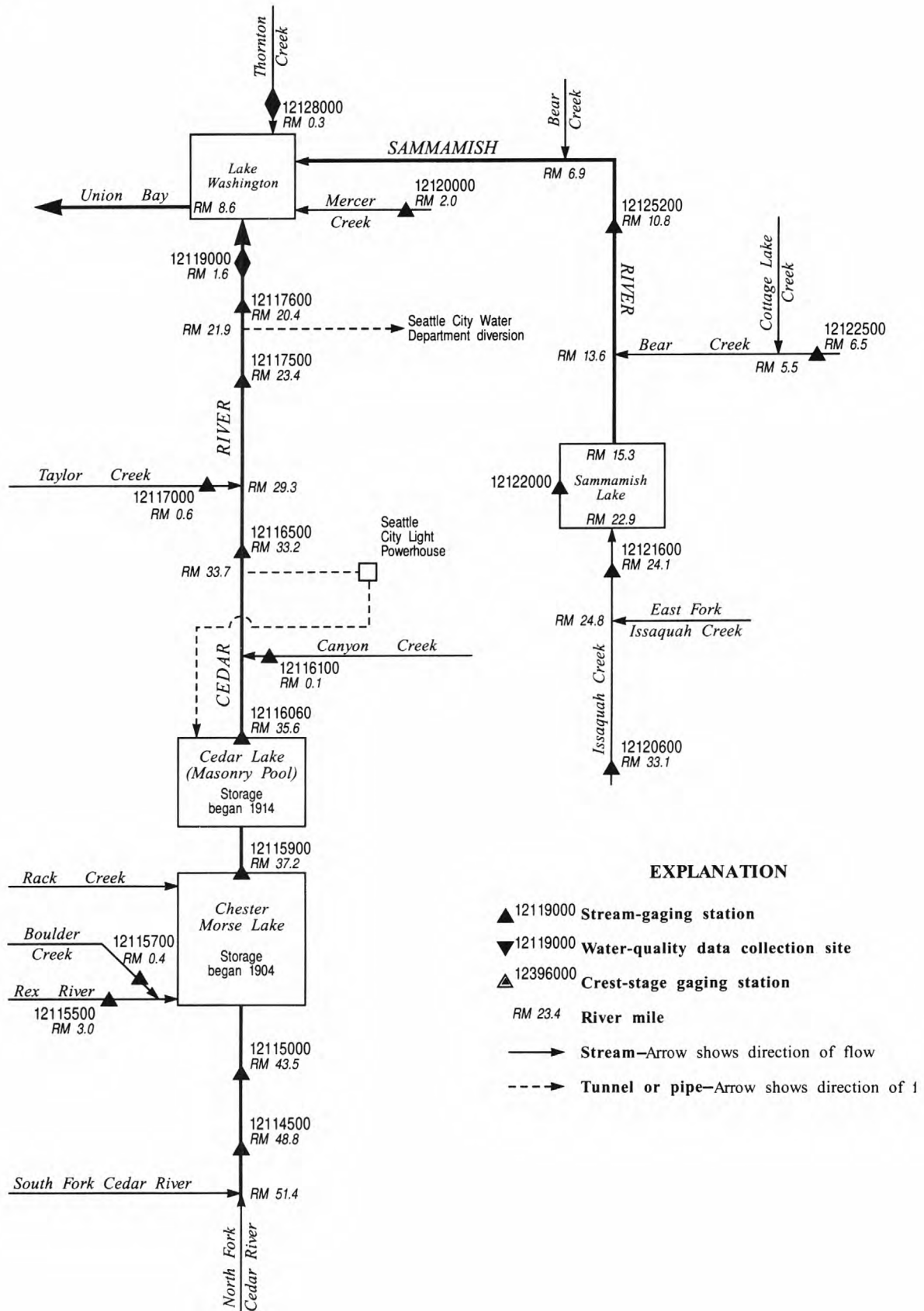
WATER TEMPERATURE, DEGREES CELSIUS, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	9.0	8.0	8.5	10.0	9.5	10.0
2	---	---	---	---	---	---	9.5	8.5	9.0	10.0	9.5	9.5
3	---	---	---	---	---	---	9.0	8.0	8.5	10.5	9.5	10.0
4	---	---	---	---	---	---	10.0	8.5	9.5	10.5	9.5	10.0
5	---	---	---	---	---	---	10.5	9.5	10.0	11.0	10.0	10.5
6	---	---	---	---	---	---	11.0	10.0	10.5	11.5	10.5	11.0
7	---	---	---	---	---	---	12.5	10.5	11.5	11.0	10.0	10.5
8	---	---	---	---	---	---	13.5	12.0	13.0	11.0	10.0	10.5
9	---	---	---	8.5	8.0	8.5	13.0	12.5	12.5	11.0	9.5	10.5
10	---	---	---	9.0	8.5	9.0	12.5	11.0	11.5	11.5	10.5	11.0
11	---	---	---	9.5	8.5	9.0	11.0	10.0	10.5	11.0	10.0	10.5
12	---	---	---	9.0	7.5	8.0	10.0	9.5	9.5	11.5	10.0	10.5
13	---	---	---	8.0	7.5	7.5	10.0	9.5	9.5	12.5	11.5	12.0
14	---	---	---	8.5	7.5	8.0	10.5	10.0	10.0	12.0	11.0	11.5
15	---	---	---	9.0	8.0	8.5	11.0	10.0	11.0	11.5	10.5	11.0
16	---	---	---	8.5	7.0	7.5	11.0	10.5	11.0	11.0	10.5	11.0
17	---	---	---	8.0	7.5	7.5	11.0	10.0	10.5	11.5	11.0	11.0
18	---	---	---	8.0	7.5	8.0	10.0	9.0	10.0	11.0	11.0	11.0
19	---	---	---	9.0	8.0	8.5	9.0	8.5	9.0	11.5	11.0	11.5
20	---	---	---	9.0	8.0	8.5	10.0	8.5	9.0	12.0	11.0	11.5
21	---	---	---	8.5	8.0	8.5	10.5	9.5	10.0	12.0	9.5	11.0
22	---	---	---	9.0	8.0	8.5	10.5	9.5	10.0	11.0	9.5	10.5
23	---	---	---	8.5	8.0	8.0	10.0	9.5	10.0	11.5	10.5	11.0
24	---	---	---	8.0	7.5	8.0	10.5	9.5	10.0	12.5	11.0	11.5
25	---	---	---	8.0	7.5	7.5	10.0	9.0	9.5	13.5	12.5	13.0
26	---	---	---	8.0	7.5	8.0	9.5	8.5	9.0	14.0	13.0	13.5
27	---	---	---	8.5	7.5	8.0	9.5	9.0	9.5	13.5	11.5	12.5
28	---	---	---	8.5	7.5	8.0	9.5	8.0	9.0	11.5	11.5	11.5
29	---	---	---	8.5	7.5	8.0	10.5	9.0	10.0	12.0	11.5	11.5
30	---	---	---	8.0	7.5	7.5	10.5	10.0	10.5	11.5	11.0	11.0
31	---	---	---	8.5	7.5	8.0	---	---	---	13.0	11.5	12.0
MONTH	---	---	---	---	---	---	13.5	8.0	10.1	14.0	9.5	11.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	14.0	13.0	13.5	20.0	16.5	18.5	21.5	19.0	20.0	19.5	17.5	18.5
2	14.5	13.0	14.0	20.0	17.5	19.0	19.5	18.0	18.5	19.0	17.0	18.0
3	15.5	14.0	14.5	19.5	17.0	18.0	18.5	17.0	18.0	18.5	16.5	17.0
4	15.5	14.0	14.5	17.5	15.5	16.5	18.0	16.5	17.0	17.0	15.5	16.5
5	15.0	13.5	14.5	19.0	15.5	17.0	17.5	16.0	17.0	16.5	15.5	16.0
6	15.5	14.5	15.0	19.0	15.5	17.5	19.0	16.0	17.5	16.5	15.0	15.5
7	16.0	15.0	15.0	20.0	16.5	18.5	20.5	17.5	19.0	17.0	15.5	16.0
8	15.5	13.5	14.5	21.0	18.0	19.5	21.0	18.5	19.5	18.0	16.0	17.0
9	15.0	14.0	14.5	21.0	18.0	19.0	21.0	19.0	20.0	18.5	16.5	17.5
10	14.5	13.5	14.0	19.0	17.0	18.0	22.0	19.5	21.0	18.5	16.5	17.5
11	16.0	14.0	14.5	20.5	17.0	19.0	22.0	19.5	21.0	18.0	17.0	17.5
12	16.5	14.0	15.0	21.5	18.5	20.0	21.0	19.0	20.0	17.5	16.5	17.0
13	17.0	14.0	15.5	22.5	20.0	21.0	21.0	18.5	20.0	16.5	16.0	16.5
14	17.5	14.5	16.0	23.0	20.5	22.0	21.5	19.5	20.5	16.5	15.5	16.0
15	18.0	14.5	16.0	23.0	21.0	22.5	21.5	19.5	20.5	16.5	15.5	16.0
16	16.5	14.5	15.5	22.5	20.0	21.0	21.0	19.0	20.0	16.5	15.5	16.0
17	15.0	13.0	14.5	21.0	17.5	19.0	19.0	17.5	18.0	16.5	15.0	15.5
18	15.5	12.5	14.0	17.5	16.0	16.5	19.0	17.0	18.0	16.0	14.0	14.5
19	16.5	13.5	15.0	16.0	15.0	15.5	18.5	17.0	17.5	14.5	13.5	14.0
20	18.0	14.5	16.0	16.0	14.5	15.5	18.5	17.0	17.5	13.5	13.0	13.5
21	18.5	15.0	17.0	19.0	15.5	17.0	19.0	17.0	18.0	14.0	13.0	13.5
22	18.0	15.0	16.0	21.0	17.5	19.0	19.0	16.5	18.0	14.0	12.5	13.5
23	16.0	14.0	14.5	22.0	19.0	20.5	20.0	17.5	18.5	13.5	12.0	13.0
24	15.5	13.5	14.5	23.0	20.5	21.5	20.5	18.0	19.5	13.5	12.5	13.0
25	17.5	14.5	16.0	23.5	21.0	22.0	20.5	19.0	19.5	13.5	12.0	13.0
26	19.0	15.5	17.5	23.0	21.0	22.5	20.0	18.5	19.5	14.0	12.5	13.5
27	18.5	16.0	17.0	23.0	21.0	22.5	19.0	17.5	18.0	14.5	13.0	13.5
28	17.0	15.0	16.0	23.0	21.5	22.5	19.0	17.0	18.0	15.0	13.5	14.0
29	16.5	14.0	15.5	23.0	21.0	22.0	20.5	18.0	19.0	14.5	14.0	14.0
30	18.5	15.0	17.0	22.5	20.5	22.0	20.5	19.0	20.0	14.5	13.5	14.0
31	---	---	---	22.5	20.0	21.5	20.0	19.0	19.5	---	---	---
MONTH	19.0	12.5	15.2	23.5	14.5	19.6	22.0	16.0	19.0	19.5	12.0	15.4



**Figure 41.** Location of surface-water and water-quality stations in the Lake Washington and Sammamish River Basins.



**Figure 42.** Schematic diagram showing surface-water and water-quality stations in the Lake Washington and Sammamish River Basins.

## 12114500 CEDAR RIVER BELOW BEAR CREEK, NEAR CEDAR FALLS, WA

LOCATION---Lat 47°20'32", long 121°32'52", in SE 1/4 SE 1/4 sec.32, T.22 N., R.10 E., King County, Hydrologic Unit 17110012, on right bank 500 ft downstream from Bear Creek, and 12.2 mi southeast of town of Cedar Falls.

DRAINAGE AREA--25.4 mi<sup>2</sup>.

PERIOD OF RECORD--October 1945 to December 1963, October 1975 to current year.

REVISED RECORDS--WSP 1716: 1956-57(M), 1959(M).

GAGE--Water-stage recorder. Elevation of gage is 1,880 ft above sea level, from topographic map. Prior to Sept. 16, 1960, at site 90 ft upstream at datum 2.35 ft higher.

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--39 years (water years 1946-63, 1976-96), 165 ft<sup>3</sup>/s, 88.09 in/yr, 119,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD--Maximum discharge, 7,620 ft<sup>3</sup>/s Nov. 22, 1959, gage height, 6.98 ft site and datum then in use, from rating curve extended above 890 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum discharge, 12 ft<sup>3</sup>/s Nov. 27, 1952.

EXTREMES FOR CURRENT YEAR--Peak discharges greater than base discharge of 700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1500	1,960	5.26	Jan. 3	0800	1,090	4.37
Nov. 11	0500	1,570	4.90	Jan. 7	1000	801	3.94
Nov. 13	2100	846	4.02	Jan. 15	2200	872	4.06
Nov. 25	0700	759	3.88	Feb. 7	0400	1,620	4.95
Nov. 29	0100	*3,920	*6.53	Feb. 8	1800	3,640	6.38

Minimum daily discharge, 18 ft<sup>3</sup>/s Sept. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	39	122	942	449	e82	139	106	201	171	63	27	e20
2	68	109	620	441	e79	137	129	182	201	62	32	e19
3	262	99	427	901	e77	138	115	164	239	59	34	e19
4	171	93	343	588	e76	142	108	148	217	58	31	22
5	117	97	273	379	e83	139	111	139	181	53	45	29
6	94	95	232	300	429	139	130	132	179	50	35	29
7	94	384	199	704	1260	137	216	130	180	49	31	23
8	81	1320	170	686	2550	137	308	127	163	48	e27	e21
9	81	775	155	498	1310	138	341	120	144	47	e26	e20
10	401	461	148	396	632	155	317	112	126	44	e25	e19
11	562	1090	146	323	403	179	283	114	123	43	e24	e19
12	383	673	158	276	303	197	252	123	114	41	e23	e18
13	281	655	220	249	256	188	224	211	110	40	e23	e19
14	217	698	236	446	232	178	200	261	107	38	e22	23
15	174	519	226	702	244	188	194	253	101	37	e22	37
16	210	379	205	710	261	179	235	238	94	36	e22	32
17	249	296	182	464	300	166	226	230	86	37	e21	29
18	273	293	163	335	532	155	203	230	83	38	e21	26
19	221	261	150	276	522	153	184	247	76	42	e21	29
20	189	228	e140	233	407	146	165	235	74	37	e21	37
21	184	200	e130	198	320	139	152	216	74	35	e21	35
22	164	188	e120	172	265	138	154	231	73	34	e20	54
23	147	229	e113	159	228	135	377	280	74	33	e20	44
24	134	331	e107	147	194	134	534	264	76	32	e20	39
25	155	691	e100	e132	169	128	428	272	73	31	e20	35
26	285	617	e96	e122	155	121	369	273	74	30	e20	33
27	248	614	e92	e114	147	113	312	243	71	30	e20	32
28	216	2370	e90	e106	142	104	256	202	72	29	e19	30
29	183	2860	e105	e98	141	102	223	216	66	29	e19	29
30	158	1360	194	e90	---	97	205	197	65	28	e19	28
31	138	---	569	e85	---	94	---	175	---	28	e20	---
TOTAL	6179	18107	7051	10779	11799	4435	7057	6166	3487	1261	751	849
MEAN	199	604	227	348	407	143	235	199	116	40.7	24.2	28.3
MAX	562	2860	942	901	2550	197	534	280	239	63	45	54
MIN	39	93	90	85	76	94	106	112	65	28	19	18
AC-FT	12260	35920	13990	21380	23400	8800	14000	12230	6920	2500	1490	1680
CFSM	7.85	23.8	8.95	13.7	16.0	5.63	9.26	7.83	4.58	1.60	.95	1.11
IN.	9.05	26.52	10.33	15.79	17.28	6.50	10.34	9.03	5.11	1.85	1.10	1.24

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1996, BY WATER YEAR (WY)

	MEAN	96.6	224	210	168	176	140	237	308	240	98.5	36.8	40.8
MAX	262	697	496	459	407	237	387	599	608	352	92.0	231	
(WY)	1960	1991	1976	1953	1996	1986	1989	1956	1950	1955	1955	1959	
MIN	15.3	16.5	27.9	49.9	43.9	49.4	102	110	38.8	30.4	21.9	18.3	
(WY)	1988	1953	1953	1952	1956	1955	1955	1992	1992	1992	1958	1987	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1946 - 1996

ANNUAL TOTAL	67510	77921	
ANNUAL MEAN	185	213	165
HIGHEST ANNUAL MEAN			234
LOWEST ANNUAL MEAN			104
HIGHEST DAILY MEAN	2860	Nov 29	3880
LOWEST DAILY MEAN	22	Sep 22	13
ANNUAL SEVEN-DAY MINIMUM	22	Sep 20	14
ANNUAL RUNOFF (AC-FT)	133900		119300
ANNUAL RUNOFF (CFSM)	7.28		6.48
ANNUAL RUNOFF (INCHES)	98.87	8.38	88.09
10 PERCENT EXCEEDS	326	433	360
50 PERCENT EXCEEDS	123	140	110
90 PERCENT EXCEEDS	31	27	28

e Estimated



## LAKE WASHINGTON BASIN

12115000 CEDAR RIVER NEAR CEDAR FALLS, WA

LOCATION.--Lat 47°22'13", long 121°37'26", in SE 1/4 SW 1/4 sec.23, T.22 N., R.9 E., King County, Hydrologic Unit 17110012, Snoqualmie National Forest, on left bank 1.4 mi upstream from Chester Morse Lake, 8.3 mi southeast of town of Cedar Falls, and at mile 43.5.

DRAINAGE AREA.--40.7 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1286: 1946-48, 1950(P), 1951. WSP 1516: 1946(M), 1947-48(P), 1950-51(M), 1953-54(P), 1955(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,560 ft above sea level, from topographic map. Prior to Oct. 26, 1957, at site 80 ft downstream at same datum.

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.--51 years (water years 1946-96), 260 ft<sup>3</sup>/s, 86.70 in/yr, 188,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 9,490 ft<sup>3</sup>/s Nov. 22, 1959, gage height, 11.34 ft, from high-water mark in well, from rating curve extended above 4,300 ft<sup>3</sup>/s, on basis of slope-area measurements at gage heights 10.16 ft and 11.34 ft; maximum gage height, 11.4 ft Feb. 11, 1951, backwater from Chester Morse Lake; minimum discharge, 19 ft<sup>3</sup>/s Oct. 23-26, 29-31, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1645	3,220	7.75	Jan. 3	0830	1,800	6.57
Nov. 11	0645	3,080	7.65	Jan. 15	2300	1,450	6.19
Nov. 13	1945	1,250	5.93	Feb. 7	0415	3,220	7.75
Nov. 25	0800	1,210	5.88	Feb. 8	1915	unknown	(a)9.07
Nov. 29	0315	*unknown	(a)9.08				

Minimum discharge, 33 ft<sup>3</sup>/s Sept. 2, 3, 11-13.  
(a) Backwater from Chester Morse Lake.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	180	e1500	714	e118	176	149	e305	e260	97	43	35
2	105	162	e980	636	e112	167	182	e280	e305	95	53	34
3	423	147	710	1450	e110	182	160	e260	e370	91	59	34
4	303	139	580	910	e109	198	152	e240	e340	91	52	35
5	203	144	457	e580	e118	180	156	e200	e290	84	69	43
6	161	147	382	e470	707	186	185	e185	e290	80	60	49
7	153	603	331	e1010	2490	182	304	e180	e290	77	51	39
8	133	2270	285	e1000	e4000	184	428	e175	e260	75	47	38
9	128	1320	258	e710	e2500	208	480	e170	e230	74	45	37
10	586	719	242	604	1520	255	455	e160	e210	71	44	35
11	940	1970	248	491	659	286	414	e170	e200	68	43	34
12	612	1030	271	413	502	303	e360	e180	e185	66	42	33
13	436	939	405	371	426	287	e310	e295	e180	64	41	33
14	328	1030	444	659	391	269	e290	e395	e175	62	40	38
15	262	739	422	1050	402	276	e280	e390	e170	60	40	61
16	311	568	365	1130	428	266	e320	e350	e160	58	39	55
17	372	450	317	699	476	249	e315	e340	e150	60	39	51
18	438	440	281	513	810	231	e290	e340	e130	62	39	45
19	348	397	250	418	799	228	e260	e360	e120	72	39	48
20	294	342	227	353	646	217	e220	e350	e115	63	39	61
21	278	300	206	304	513	204	e210	e300	113	58	38	60
22	249	280	189	263	420	205	e215	e340	111	55	37	93
23	222	334	175	244	365	193	e570	e410	115	53	36	80
24	202	490	162	222	310	185	e790	e380	117	51	36	68
25	208	1090	152	199	273	170	e620	e400	111	50	35	61
26	408	925	142	184	245	161	e520	e405	115	48	34	57
27	359	945	135	171	221	154	e460	e370	115	47	35	53
28	314	3690	130	164	200	145	e400	e295	115	46	35	50
29	268	e4300	149	150	187	146	e330	e310	103	46	34	48
30	232	e2700	288	131	--	139	e310	e290	100	45	34	47
31	204	--	901	e120	--	135	--	e270	--	44	35	--
TOTAL	9544	28790	11584	16333	20057	6367	10135	9095	5545	2013	1313	1455
MEAN	308	960	374	527	692	205	338	293	185	64.9	42.4	48.5
MAX	940	4300	1500	1450	4000	303	790	410	370	97	69	93
MIN	64	139	130	120	109	135	149	160	100	44	34	33
AC-FT	18930	57100	22980	32400	39780	12630	20100	18040	11000	3990	2600	2890
CFSM	7.56	23.6	9.18	12.9	17.0	5.05	8.30	7.21	4.54	1.60	1.04	1.19
IN.	8.72	26.31	10.59	14.93	18.33	5.82	9.26	8.31	5.07	1.84	1.20	1.33

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1996, BY WATER YEAR (WY)

MEAN	149	336	352	307	303	239	353	453	353	151	59.3	67.8
MAX	403	1269	780	722	692	698	580	834	874	472	150	365
(WY)	1948	1991	1976	1953	1996	1972	1989	1956	1974	1955	1964	1959
MIN	20.1	27.1	63.5	91.7	81.9	99.1	160	170	62.6	49.6	32.5	25.4
(WY)	1988	1953	1953	1979	1969	1955	1967	1992	1992	1977	1987	1987

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1946 - 1996

ANNUAL TOTAL	103644	122231	
ANNUAL MEAN	284	334	260
HIGHEST ANNUAL MEAN			373
LOWEST ANNUAL MEAN			158
HIGHEST DAILY MEAN	4300	Nov 29	6400
LOWEST DAILY MEAN	30	Sep 23	19
ANNUAL SEVEN-DAY MINIMUM	31	Sep 20	34
ANNUAL RUNOFF (AC-FT)	205600	242400	188100
ANNUAL RUNOFF (CFSM)	6.98	8.21	6.38
ANNUAL RUNOFF (INCHES)	94.73	111.72	86.70
10 PERCENT EXCEEDS	498	671	548
50 PERCENT EXCEEDS	186	207	182
90 PERCENT EXCEEDS	43	44	44

e Estimated

## 12115500 REX RIVER NEAR CEDAR FALLS, WA

LOCATION.--Lat 47°21'03", long 121°39'43", in NE 1/4 NW 1/4 sec.33, T.22 N., R.9 E., King County, Hydrologic Unit 17110012, Snoqualmie National Forest, on right bank 3.0 mi upstream from mouth and Chester Morse Lake, and 7.5 mi southeast of town of Cedar Falls.

DRAINAGE AREA.--13.4 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1945 to current year.

REVISED RECORDS.--WSP 1286: 1946, 1948(P), 1949(M), 1950(P), 1952(M). WSP 1446: 1946(M), 1951, 1953-55(M). WSP 1932: Drainage area. WDR WA-74-1: 1973.

GAGE.--Water-stage recorder. Elevation of gage is 1,600 ft above sea level, from topographic map.

REMARKS.--Records fair. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--51 years (water years 1946-96), 102 ft<sup>3</sup>/s, 103.07 in/yr, 73,640 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,200 ft<sup>3</sup>/s Nov. 22, 1959, gage height, 8.20 ft, from rating curve extended above 1,600 ft<sup>3</sup>/s on basis of contracted-opening measurement at gage height 7.19 ft and slope-area measurement at gage height 8.20 ft; maximum gage height, Nov. 19, 1962, backwater from debris; minimum discharge, 3.0 ft<sup>3</sup>/s Sept. 6-8, 1986, gage height, 3.23 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1500	1,220	6.10	Jan. 3	0600	886	5.67
Nov. 11	0400	1,850	6.75	Jan. 7	0900	830	5.59
Nov. 28	0300	2,320	7.16	Feb. 8	1500	*2,530	*7.33
Dec. 31	0600	865	5.64				

Minimum discharge, 6.5 ft<sup>3</sup>/s Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	36	56	575	302	e33	44	61	116	71	21	e9.7	8.7
2	120	51	313	285	e32	40	78	101	64	20	17	7.8
3	357	46	221	602	e31	62	58	92	59	19	22	7.9
4	180	43	210	310	e29	67	59	80	55	21	19	8.7
5	111	49	155	205	e32	58	63	72	49	18	32	25
6	82	48	127	185	605	64	93	66	44	17	18	21
7	91	451	96	605	1270	61	136	65	40	16	15	12
8	66	823	81	408	2060	77	137	62	37	16	13	13
9	66	408	76	272	823	107	135	57	34	15	12	11
10	356	295	89	218	298	142	152	51	32	15	12	9.5
11	428	888	137	164	186	141	150	56	31	14	11	8.5
12	252	348	173	127	138	124	138	65	28	14	11	8.2
13	168	419	245	119	121	102	139	142	26	13	10	9.1
14	124	343	249	308	118	90	119	132	24	12	e10	15
15	98	233	215	417	136	97	112	130	23	12	e9.7	34
16	137	168	163	381	143	84	145	111	21	12	9.3	30
17	191	132	124	236	189	74	119	106	21	12	9.2	43
18	194	159	100	173	350	69	103	106	28	13	9.0	25
19	142	139	81	131	308	73	96	147	21	23	8.8	38
20	119	114	70	107	228	65	89	127	18	15	9.1	37
21	118	96	62	88	167	60	79	111	17	13	9.2	36
22	98	94	55	73	125	60	93	176	17	12	8.4	69
23	82	129	51	69	102	56	290	243	22	e11	7.9	47
24	69	208	e46	65	82	51	336	175	24	e11	7.6	36
25	87	452	e43	57	71	45	282	140	21	e10	7.4	31
26	153	396	e39	52	63	43	244	114	32	e10	7.0	28
27	125	604	e36	50	60	40	198	93	30	e10	7.3	24
28	105	1930	34	e48	59	37	157	78	36	e10	7.4	22
29	89	1390	77	e40	52	37	134	133	27	e9.9	6.9	20
30	72	921	244	e36	---	35	118	95	24	e9.9	7.1	19
31	62	---	588	e34	---	36	---	80	---	e9.8	11	---
TOTAL	4378	11433	4775	6167	7911	2141	4113	3322	976	434.6	354.0	704.4
MEAN	141	381	154	199	273	69.1	137	107	32.5	14.0	11.4	23.5
MAX	428	1930	588	605	2060	142	336	243	71	23	32	69
MIN	36	43	34	34	29	35	58	51	17	9.8	6.9	7.8
AC-FT	8680	22680	9470	12230	15690	4250	8160	6590	1940	862	702	1400
CFSM	10.5	28.4	11.5	14.8	20.4	5.15	10.2	8.00	2.43	1.05	.85	1.75
IN.	12.15	31.74	13.26	17.12	21.96	5.94	11.42	9.22	2.71	1.21	.98	1.96

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1996, BY WATER YEAR (WY)

MEAN	70.9	149	151	133	122	90.3	136	159	115	45.5	18.6	31.0
MAX	171	489	357	326	281	250	248	280	354	174	62.4	189
(WY)	1948	1991	1976	1953	1982	1972	1989	1971	1974	1955	1964	1959
MIN	6.26	7.90	28.9	32.6	20.6	28.7	50.7	41.7	17.1	12.2	6.73	6.54
(WY)	1953	1953	1986	1957	1969	1955	1967	1992	1992	1958	1986	1967

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1946 - 1996
ANNUAL TOTAL	40473.6	46709.0	
ANNUAL MEAN	111	128	102
HIGHEST ANNUAL MEAN			146
LOWEST ANNUAL MEAN			62.8
HIGHEST DAILY MEAN	1930	2060	2750
LOWEST DAILY MEAN	9.5	6.9	3.1
ANNUAL SEVEN-DAY MINIMUM	9.7	7.2	3.8
ANNUAL RUNOFF (AC-FT)	80280	92650	73640
ANNUAL RUNOFF (CFSM)	8.28	9.52	7.59
ANNUAL RUNOFF (INCHES)	112.36	129.67	103.07
10 PERCENT EXCEEDS	219	291	219
50 PERCENT EXCEEDS	62	66	65
90 PERCENT EXCEEDS	14	11	13

e Estimated

## LAKE WASHINGTON BASIN

12115700 BOULDER CREEK NEAR CEDAR FALLS, WA

LOCATION.--Lat 47°21'59", long 121°41'30", in NW 1/4 NW 1/4 sec.29, T.22 N., R.9 E., King County, Hydrologic Unit 17110012, Snoqualmie National Forest, on right bank 5.8 mi southeast of Cedar Falls, and at mile 0.4.

DRAINAGE AREA.--4.64 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1983 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,610 ft above sea level, from topographic map.

REMARKS.--Records fair except for estimated daily discharges and flows above 150 ft<sup>3</sup>/s, which are poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--13 years (water years 1984-96), 23.8 ft<sup>3</sup>/s, 69.81 in/yr, 17,270 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,800 ft<sup>3</sup>/s Nov. 23, 1986, gage height, 4.16 ft; maximum gage height, 5.37 ft Feb. 8, 1996; minimum discharge, no flow for many days during August through October most years.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 310 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1615	369	4.55	Nov. 28	2100	1,160	5.31
Nov. 8	1415	718	4.97	Feb. 8	unknown	*1,260	*5.37
Nov. 11	0415	807	5.05				

Minimum discharge, no flow many days during July through September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	6.2	11	e180	80	e16	20	22	18	21	2.9	e.00	e.00
2	19	9.9	e120	71	e16	19	26	16	19	2.5	e1.0	e.00
3	80	9.1	e74	112	e15	24	23	14	17	2.4	3.7	e.00
4	43	8.8	e50	78	e15	26	22	13	16	3.2	1.7	e.50
5	24	9.5	e43	55	e17	24	22	12	15	2.5	4.5	e3.0
6	17	9.2	e37	53	e120	26	25	11	13	2.0	1.9	e2.0
7	16	180	e32	141	e450	26	32	11	13	1.7	e.50	e1.0
8	13	408	28	98	e850	27	32	10	12	1.4	e.10	e1.5
9	14	169	26	67	e340	31	32	9.4	11	1.2	e.00	e1.0
10	154	104	28	50	e120	41	36	8.7	10	1.2	e.00	e.40
11	160	381	39	40	e75	42	39	9.0	9.0	1.0	e.00	e.00
12	68	98	54	35	e60	38	39	9.4	7.9	.76	e.00	e.00
13	40	110	73	41	e46	33	41	23	7.1	.57	e.00	e.50
14	27	93	68	64	43	30	38	26	6.3	e.30	e.00	e2.5
15	21	58	61	e85	44	30	35	25	5.6	e.25	e.00	e5.8
16	28	39	47	e75	44	27	42	23	5.0	e.20	e.00	e4.6
17	40	29	38	e58	54	25	37	22	5.0	.50	e.00	e7.3
18	44	32	33	e46	85	24	34	22	7.1	.89	e.00	e3.7
19	31	27	29	e41	80	24	32	27	5.3	3.6	e.00	e6.6
20	27	22	26	e36	65	23	31	25	4.3	1.9	e.00	e5.8
21	24	18	24	e31	51	22	28	23	3.8	1.1	e.00	e5.1
22	20	18	22	e27	42	22	29	32	3.6	.68	e.00	e11
23	17	23	20	e25	36	21	62	44	5.7	e.30	e.00	e8.5
24	15	43	19	e24	31	20	53	35	6.1	e.20	e.00	e6.0
25	18	99	18	e23	28	19	43	29	5.7	e.00	e.00	e5.0
26	26	73	17	e21	26	18	38	24	4.9	e.00	e.00	e4.0
27	21	177	16	e20	24	18	31	21	4.3	e.00	e.00	e3.5
28	18	817	16	e19	22	16	25	19	7.1	e.00	e.00	e3.0
29	16	434	24	e18	21	17	21	32	4.5	e.00	e.00	e2.7
30	14	225	52	e17	---	15	18	26	3.6	e.00	e.00	e2.5
31	13	---	109	e17	---	15	---	23	---	e.00	e.00	---
TOTAL	1074.2	3734.5	1423	1568	2836	763	988	642.5	258.9	33.25	13.40	97.50
MEAN	34.7	124	45.9	50.6	97.8	24.6	32.9	20.7	8.63	1.07	.43	3.25
MAX	160	817	180	141	850	42	62	44	21	3.6	4.5	11
MIN	6.2	8.8	16	17	15	15	18	8.7	3.6	.00	.00	.00
AC-FT	2130	7410	2820	3110	5630	1510	1960	1270	514	66	27	193
CFSM	7.47	26.8	9.89	10.9	21.1	5.30	7.10	4.47	1.86	.23	.09	.70
IN.	8.61	29.94	11.41	12.57	22.74	6.12	7.92	5.15	2.08	.27	.11	.78

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	13.6	52.5	32.6	34.9	37.0	29.3	35.9	27.1	14.2	5.86	1.57	3.03		
MAX	42.0	124	55.6	73.2	97.8	48.9	70.7	47.7	32.8	27.8	5.22	12.2		
(WY)	1986	1996	1995	1984	1996	1993	1985	1984	1990	1983	1993	1983		
MIN	.000	2.07	5.92	9.96	10.9	9.34	16.3	9.21	2.03	.22	.000	.000		
(WY)	1988	1988	1986	1985	1994	1992	1995	1992	1992	1987	1987	1987		

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1983 - 1996

ANNUAL TOTAL	11713.40	13432.25	
ANNUAL MEAN	32.1	36.7	23.8
HIGHEST ANNUAL MEAN			36.7
LOWEST ANNUAL MEAN			15.6
HIGHEST DAILY MEAN	840	Feb 19	850
LOWEST DAILY MEAN	.68	Sep 24	.00
ANNUAL SEVEN-DAY MINIMUM	.77	Sep 20	.00
ANNUAL RUNOFF (AC-FT)	23230	26640	17270
ANNUAL RUNOFF (CFSM)	6.92	7.91	5.14
ANNUAL RUNOFF (INCHES)	93.91	107.69	69.81
10 PERCENT EXCEEDS	57	73	52
50 PERCENT EXCEEDS	15	20	13
90 PERCENT EXCEEDS	1.9	.07	.30

e Estimated

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1548.60	1550.98	1566.76	1553.53	1550.00	1555.45	1557.78	1562.20	1562.76	1558.62	1552.15	1549.24
2	1548.54	1550.57	1564.75	1554.15	1550.11	1555.33	1557.93	1562.19	1562.78	1558.46	1551.98	1549.15
3	1549.10	1550.25	1561.45	1554.62	1550.00	1555.25	1557.98	1562.25	1562.80	1558.25	1551.97	1549.30
4	1550.23	1549.95	1559.05	1556.39	1550.00	1555.30	1558.03	1562.12	1562.94	1558.05	1551.75	1548.92
5	1550.52	1549.50	1558.00	1556.30	1550.05	1555.38	1558.10	1562.05	1562.87	1557.90	1551.70	1548.90
6	1550.51	1549.40	1557.48	1555.77	1550.10	1555.47	1558.12	1561.98	1562.71	1557.75	1551.60	1548.98
7	1550.50	1549.35	1557.53	1555.80	1554.02	1555.50	1558.33	1561.85	1562.68	1557.58	1551.47	1548.92
8	1550.45	1551.55	1557.60	1557.30	1558.85	1555.35	1558.65	1561.85	1562.66	1557.44	1551.31	1548.80
9	1550.40	1554.60	1557.20	1557.60	1565.83	1555.40	1559.05	1561.90	1562.62	1557.20	1551.13	1548.84
10	1550.50	1555.15	1556.85	1557.40	1564.80	1555.55	1559.54	1561.95	1562.55	1557.05	1551.02	1548.72
11	1551.98	1556.85	1556.55	1556.70	1561.95	1555.60	1560.01	1561.92	1562.42	1556.85	1550.84	1548.62
12	1552.25	1558.40	1556.15	1556.15	1560.00	1555.87	1560.33	1561.97	1562.34	1556.65	1550.69	1548.55
13	1552.17	1558.55	1555.90	1555.34	1558.75	1556.11	1560.62	1562.15	1562.22	1556.40	1550.65	1548.50
14	1552.06	1559.14	1555.76	1554.80	1558.05	1556.35	1560.85	1562.35	1562.12	1556.13	1550.40	1548.45
15	1552.80	1559.11	1555.77	1555.00	1557.65	1556.70	1561.01	1562.52	1561.89	1555.88	1550.27	1548.43
16	1551.65	1558.74	1555.51	1556.00	1557.55	1556.84	1561.15	1562.54	1561.75	1555.58	1550.23	1548.51
17	1551.60	1558.27	1555.85	1556.70	1558.10	1557.02	1561.35	1562.55	1561.55	1555.30	1550.18	1548.52
18	1551.87	1557.67	1554.47	1556.70	1558.74	1557.33	1561.51	1562.48	1561.34	1555.20	1550.12	1548.52
19	1552.05	1557.12	1553.85	1556.20	1559.00	1557.42	1561.62	1562.55	1561.12	1554.82	1550.08	1548.49
20	1552.03	1556.50	1553.65	1555.44	1559.05	1557.55	1561.70	1562.50	1560.89	1554.65	1550.05	1548.51
21	1552.02	1556.00	1552.97	1554.40	1558.50	1557.45	1561.75	1562.48	1560.57	1554.70	1550.01	1548.52
22	1551.95	1555.30	1552.20	1553.85	1557.76	1557.55	1561.82	1562.50	1560.35	1554.45	1549.98	1548.65
23	1551.80	1554.30	1551.51	1553.15	1557.51	1557.94	1561.26	1562.98	1560.25	1554.15	1549.93	1548.72
24	1551.73	1554.60	1550.85	1552.90	1557.69	1557.95	1561.47	1562.95	1559.95	1554.15	1549.82	1548.80
25	1551.45	1554.93	1550.42	1552.85	1557.52	1558.01	1562.00	1562.82	1559.75	1553.85	1549.88	1548.82
26	1551.50	1555.55	1550.20	1552.70	1557.20	1558.00	1562.12	1562.86	1559.51	1553.63	1549.68	1548.85
27	1551.60	1555.75	1550.08	1552.10	1556.60	1557.48	1561.90	1562.84	1559.37	1553.35	1549.62	1548.80
28	1551.61	1559.20	1550.02	1551.55	1556.25	1557.73	1561.39	1562.78	1559.14	1553.10	1549.52	1548.30
29	1551.52	1564.85	1550.10	1551.05	1555.75	1557.75	1561.55	1562.77	1558.97	1552.75	1549.48	1548.05
30	1551.40	1567.05	1550.40	1550.65	--	1557.82	1561.86	1562.87	1558.80	1552.62	1549.34	1547.72
31	1551.25	--	1551.60	1550.35	--	1557.79	--	1562.88	--	1552.35	1549.30	--
MAX	1552.80	1567.05	1566.76	1557.60	1565.83	1558.01	1562.12	1562.98	1562.94	1558.62	1552.15	1549.30
MIN	1548.54	1549.35	1550.02	1550.35	1550.00	1555.25	1557.78	1561.85	1558.80	1552.35	1549.30	1547.72
CAL YR 1995	MAX 1567.05		MIN 1548.54									
WTR YR 1996	MAX 1567.05		MIN 1547.72									

## LAKE WASHINGTON BASIN

12116060 CEDAR LAKE (MASONRY POOL) NEAR CEDAR FALLS, WA

LOCATION.--Lat 47°24'43", long 121°45'04", in NE 1/4 NW 1/4 sec.11, T.22 N., R.8 E., King County, Hydrologic Unit 17110012, at Masonry Dam, 1.6 mi southeast of town of Cedar Falls, and at mile 35.6.

DRAINAGE AREA.--78.4 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Non-recording gage. Datum of gage is 7.39 ft above sea level (levels by city of Seattle).

REMARKS.--Reservoir is formed by masonry gravity dam. Usable capacity, 40,285 acre-ft between gage heights 1,530.0 ft, normal minimum regulating pool, and 1,554.6 ft, normal maximum regulating pool. Unused storage below gage height 1,530.0 ft, 36,000 acre-ft. Water is used by city of Seattle for municipal water supply and power production.

COOPERATION.--Gage-height record furnished by city of Seattle Water Department.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 1,568.53 ft Nov. 25, 1990; minimum not determined (during period Aug. 2 to Sept. 19, 1978, while the pool was drained for maintenance).

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 1,566.85 ft Nov. 30; minimum observed, 1,523.16 ft Oct. 1.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 08:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1523.16	1549.55	1566.75	1552.95	1548.00	1555.42	1557.72	1562.15	1562.71	1558.55	1551.78	1531.55
2	1523.34	1548.40	1564.42	1553.70	1548.47	1555.33	1557.90	1562.19	1562.75	1558.35	1551.61	1531.25
3	1527.15	1547.23	1561.15	1554.20	1548.40	1555.15	1557.96	1562.15	1562.80	1558.22	1551.55	1530.95
4	1530.08	1546.60	1558.56	1555.78	e1548.45	1555.30	1558.02	1562.02	1562.88	1558.05	1551.45	1530.66
5	1532.65	1546.32	1557.98	1555.80	1548.51	1555.32	1558.03	1561.98	1562.82	1557.85	1551.35	1530.45
6	1534.19	1546.57	1557.48	1555.30	1548.26	1555.46	1558.08	1561.87	1562.68	1557.70	1551.24	1530.27
7	1533.34	1546.43	1557.50	1555.17	1552.91	1555.50	1558.20	1561.85	1562.62	1557.52	1551.13	1530.05
8	1532.48	1548.30	1557.50	1556.75	1558.82	1555.35	1558.58	1561.85	1562.61	1557.38	1550.96	1529.92
9	1531.61	1554.10	1556.75	1557.12	1565.60	1555.34	1559.00	1561.86	1562.55	1557.15	1550.77	1529.71
10	1531.45	1554.75	1556.45	1556.81	1564.75	1555.50	1559.45	1561.88	1562.51	1557.00	1550.68	1529.72
11	1538.24	1556.55	1556.16	1556.25	1561.85	1555.53	1559.96	1561.88	1562.40	1556.75	1550.46	1530.49
12	1548.80	1558.25	1555.60	1555.55	1559.85	1555.82	1560.33	1561.95	1562.30	1556.55	1550.31	1530.40
13	1552.12	1558.25	1555.82	1555.12	1558.65	1556.00	1560.60	1562.07	1562.17	1556.35	1550.14	1530.47
14	1551.23	1558.83	1555.20	1554.55	1558.02	1556.25	1560.75	1562.30	1562.05	1556.08	1549.95	1530.47
15	1551.00	1558.87	1555.69	1554.70	1557.55	1556.45	1560.82	1562.46	1561.83	1555.84	1549.70	1530.49
16	1550.72	1558.47	1555.46	1555.90	1557.50	1556.60	1561.05	1562.50	1561.55	1555.55	1547.65	1530.49
17	1550.72	1557.90	1555.85	1556.60	1557.58	1556.90	1561.28	1562.45	1561.46	1555.25	1545.76	1530.35
18	1551.09	1557.40	1554.40	1556.60	1558.65	1557.05	1561.46	1562.45	1561.28	1555.20	1544.30	1529.84
19	1551.65	1556.93	1553.75	1555.55	1558.95	1557.15	1561.55	1562.50	1561.05	1554.82	1542.78	1529.37
20	1551.60	1556.37	1553.18	1555.25	1559.05	1557.30	1561.65	1562.48	1560.83	1554.65	1541.50	1529.28
21	1551.62	1555.66	1551.65	1553.80	1558.45	1557.39	1561.68	1562.42	1560.52	1554.38	1540.81	1528.92
22	1551.55	1555.00	1551.50	1552.88	1557.66	1557.50	1561.65	1562.50	1560.25	1554.15	1539.64	1528.84
23	1551.43	1554.35	1549.50	1552.04	1557.40	1557.65	1561.05	1562.95	1560.08	1554.08	1538.20	1528.65
24	1551.65	1553.89	1546.80	1552.45	1557.55	1557.70	1561.45	1562.92	1559.88	1553.78	1536.92	1528.56
25	1550.93	1554.30	1548.30	1552.45	1557.39	1557.75	1561.95	1562.78	1559.70	1553.60	1535.72	1528.50
26	1550.90	1555.16	1547.75	1552.25	1557.11	1557.75	1562.05	1562.82	1559.48	1553.32	1534.65	1528.45
27	1550.05	1555.20	1548.56	1551.42	1556.58	e1557.72	1561.88	1562.81	1559.31	1553.06	1533.66	1532.00
28	1550.05	1558.85	1548.30	1550.50	1556.16	1557.68	1561.30	1562.72	1559.10	1552.80	1532.83	1534.69
29	1551.00	1564.35	1548.41	1549.25	1555.71	1557.75	1561.55	1562.75	1558.91	1552.58	1532.06	1536.15
30	1550.80	1566.85	1548.35	1549.30	---	1557.75	1561.86	1562.77	1558.75	1552.34	1531.25	1536.13
31	1550.57	---	1551.10	1548.30	---	1557.70	---	1562.75	---	1552.00	1531.66	---
MAX	1552.12	1566.85	1566.75	1557.12	1565.60	1557.75	1562.05	1562.95	1562.88	1558.55	1551.78	1536.15
MIN	1523.16	1546.32	1546.80	1548.30	1548.00	1555.15	1557.72	1561.85	1558.75	1552.00	1531.25	1528.45

CAL YR 1995 MAX 1566.85 MIN 1521.15  
WTR YR 1996 MAX 1566.85 MIN 1523.16

e Estimated



## LAKE WASHINGTON BASIN

207

12116100 CANYON CREEK NEAR CEDAR FALLS, WA

LOCATION.--Lat 47°25'11", long 121°45'55", in NW 1/4 SE 1/4 sec.3, T.22 N., R.8 E., King County, Hydrologic Unit 17110012, Snoqualmie National Forest, on right bank 400 ft upstream from mouth, and 0.8 mi east of town of Cedar Falls.

DRAINAGE AREA.--0.19 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1945 to current year. Prior to October 1960 published in WSP 1932.

GAGE.--Water-stage recorder and wooden control. Elevation of gage is 1,040 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records fair. No regulation or diversion upstream from station. Flow is mostly seepage from Chester Morse Lake.

AVERAGE DISCHARGE.--51 years (water years 1946-96), 15.4 ft<sup>3</sup>/s, 11,140 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 131 ft<sup>3</sup>/s Dec. 7, 1975, gage height, 2.22 ft; minimum daily discharge, 0.22 ft<sup>3</sup>/s Nov. 6-11, 17-22, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 107 ft<sup>3</sup>/s Dec. 4, gage height, 2.05 ft; minimum discharge, 1.2 ft<sup>3</sup>/s Oct. 6-10.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.5	12	43	9.8	9.5	15	10	23	37	27	17	6.3
2	1.5	12	48	9.4	9.0	15	11	24	36	26	17	6.1
3	1.6	12	90	9.2	8.5	14	11	25	36	26	16	5.9
4	1.4	12	100	9.2	7.9	13	10	25	36	26	16	5.6
5	1.3	12	89	8.9	7.4	13	10	25	36	25	16	5.6
6	1.2	12	82	9.2	8.0	12	11	26	36	25	16	5.3
7	1.2	12	62	10	8.4	12	11	26	36	25	15	5.0
8	1.2	12	57	10	11	11	11	26	36	25	15	4.8
9	1.2	12	53	10	9.7	11	11	26	35	25	15	4.5
10	1.6	12	48	11	9.1	10	11	26	35	24	15	4.3
11	1.8	14	44	11	15	10	11	26	35	24	14	4.1
12	1.4	14	42	12	18	9.8	12	25	35	24	14	3.9
13	1.4	16	38	12	21	9.6	12	26	34	24	14	3.9
14	1.4	19	35	12	22	9.6	12	26	34	24	13	3.7
15	1.6	21	33	12	23	9.2	12	26	34	23	13	3.7
16	2.2	21	29	14	23	9.2	12	25	33	23	13	3.5
17	2.8	28	26	14	22	9.2	12	25	33	23	12	3.4
18	3.4	33	24	14	22	9.2	12	25	33	22	12	3.3
19	4.1	36	23	14	21	9.2	15	25	32	22	12	3.2
20	4.8	38	21	14	21	9.2	16	25	32	22	11	3.0
21	5.4	38	20	15	20	9.2	17	25	31	21	11	3.0
22	6.0	37	19	14	20	9.2	18	26	31	21	10	2.8
23	6.7	36	18	14	19	9.5	19	27	30	21	9.9	2.7
24	7.3	35	17	13	18	9.6	21	26	29	20	9.6	2.6
25	8.1	34	15	13	18	9.6	21	27	29	20	9.2	2.5
26	8.7	32	14	12	17	9.6	21	28	28	19	8.7	2.3
27	9.4	31	13	12	16	9.9	22	31	28	19	8.3	2.2
28	9.9	34	12	11	16	10	22	33	28	19	7.8	2.1
29	10	35	11	11	16	10	23	35	28	18	7.2	2.1
30	11	37	11	10	---	10	23	37	27	18	7.0	2.0
31	12	---	10	10	---	10	---	37	---	17	6.8	---
TOTAL	133.1	709	1147	360.7	456.5	326.8	440	838	983	698	381.5	113.4
MEAN	4.29	23.6	37.0	11.6	15.7	10.5	14.7	27.0	32.8	22.5	12.3	3.78
MAX	12	38	100	15	23	15	23	37	37	27	17	6.3
MIN	1.2	12	10	8.9	7.4	9.2	10	23	27	17	6.8	2.0
AC-FT	264	1410	2280	715	905	648	873	1660	1950	1380	757	225

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

	MEAN	2.98	8.23	17.3	16.4	15.9	13.2	13.6	23.5	32.0	23.6	12.9	5.03
MAX	22.5	67.3	58.6	51.5	65.6	47.7	53.8	51.6	73.1	63.9	39.8	18.3	
(WY)	1960	1948	1976	1954	1953	1950	1988	1988	1946	1955	1955	1955	
MIN	.32	.23	.46	1.68	3.12	1.88	4.31	4.82	9.53	5.74	1.55	.53	
(WY)	1988	1988	1953	1988	1985	1962	1956	1963	1963	1978	1987	1978	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1945 - 1996
ANNUAL TOTAL	6237.1	6587.0	
ANNUAL MEAN	17.1	18.0	15.4
HIGHEST ANNUAL MEAN			29.3
LOWEST ANNUAL MEAN			6.25
HIGHEST DAILY MEAN	100	Dec 4	120
LOWEST DAILY MEAN	1.2	Oct 6	.22
ANNUAL SEVEN-DAY MINIMUM	1.3	Oct 3	.22
ANNUAL RUNOFF (AC-FT)	12370	13070	11140
10 PERCENT EXCEEDS	23	35	35
50 PERCENT EXCEEDS	19	14	11
90 PERCENT EXCEEDS	3.1	3.9	1.5



## LAKE WASHINGTON BASIN

209

12117000 TAYLOR CREEK NEAR SELLECK, WA

LOCATION.--Lat 47°23'12", long 121°50'42", in NW 1/4 NW 1/4 sec.19, T.22 N., R.8 E., King County, Hydrologic Unit 17110012, Snoqualmie National Forest, on left bank 0.6 mi upstream from mouth, and 1.3 mi northeast of Selleck.

DRAINAGE AREA.--17.2 mi<sup>2</sup>.

PERIOD OF RECORD.--June to October 1945, August 1956 to current year.

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 940 ft above sea level, from topographic map. June to October 1945 on right bank 350 ft downstream at different datum.

REMARKS.--Records good except those above 900 ft<sup>3</sup>/s and estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--40 years (water years 1957-96), 97.1 ft<sup>3</sup>/s, 76.68 in/yr, 70,320 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,130 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 5.53 ft from rating curve extended above 900 ft<sup>3</sup>/s; minimum discharge, 15 ft<sup>3</sup>/s Oct. 3, 4, 7-14, 1979, Oct. 28-31, Nov. 3-10, 1987.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 450 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1600	476	3.65	Jan. 7	0800	604	3.80
Nov. 11	0515	582	3.78	Feb. 6	1945	1,040	4.25
Nov. 27	2315	762	3.97	Feb. 8	1845	*3,130	*5.53
Nov. 29	0115	1,140	4.34				

Minimum discharge, 20 ft<sup>3</sup>/s Sept. 11-14, 28-30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	27	44	597	208	93	145	95	117	84	e38	e29	21
2	50	42	454	195	91	142	99	107	80	e38	e33	21
3	137	41	336	291	91	139	84	102	77	e37	e47	21
4	75	41	325	246	89	138	79	96	74	e62	e40	21
5	51	42	262	201	125	138	77	92	71	e55	e43	25
6	42	43	226	209	463	134	80	88	68	e47	e38	26
7	39	180	201	453	590	126	81	85	66	e43	e35	22
8	38	296	181	317	2190	126	76	83	65	e40	e33	22
9	38	232	173	243	1200	125	76	80	64	e38	e32	22
10	210	183	181	201	555	129	91	77	63	e38	e31	21
11	227	388	201	173	377	127	100	78	61	e35	e29	21
12	130	223	196	155	313	124	103	77	59	e33	e28	20
13	91	228	208	148	278	117	112	112	59	e32	e27	20
14	71	217	238	218	257	111	102	101	57	e31	e26	23
15	60	181	228	255	242	106	96	102	55	e31	e25	29
16	75	149	199	271	224	101	122	94	e53	e30	e25	24
17	85	129	180	220	235	99	104	95	e51	e30	24	37
18	87	133	169	189	282	94	102	97	e54	e36	24	24
19	71	116	154	171	283	96	102	104	e50	e47	23	35
20	71	105	144	170	244	93	96	96	e48	e42	23	32
21	66	97	135	164	217	90	90	92	e47	e39	23	31
22	59	98	127	145	203	93	97	120	e47	e37	23	37
23	56	112	120	141	184	88	185	126	e55	e35	22	30
24	53	142	115	134	170	85	244	114	e57	e34	22	26
25	54	217	110	122	166	82	216	102	e53	e33	21	23
26	64	179	105	117	163	79	210	94	e48	e32	21	22
27	53	290	102	112	158	77	179	88	e45	e31	21	21
28	50	628	99	108	154	75	150	85	e43	e30	21	21
29	48	864	137	102	150	77	130	112	e42	e30	21	20
30	47	753	163	99	--	74	118	93	e41	e29	21	20
31	45	--	236	97	--	75	--	88	--	e29	22	--
TOTAL	2270	6393	6302	5875	9787	3305	3496	2997	1737	1142	853	738
MEAN	73.2	213	203	190	337	107	117	96.7	57.9	36.8	27.5	24.6
MAX	227	864	597	453	2190	145	244	126	84	62	47	37
MIN	27	41	99	97	89	74	76	77	41	29	21	20
AC-FT	4500	12680	12500	11650	19410	6560	6930	5940	3450	2270	1690	1460
CFSM	4.26	12.4	11.8	11.0	19.6	6.20	6.78	5.62	3.37	2.14	1.60	1.43
IN.	4.91	13.83	13.63	12.71	21.17	7.15	7.56	6.48	3.76	2.47	1.84	1.60

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1956 - 1996, BY WATER YEAR (WY)

MEAN	47.5	113	150	167	155	125	123	101	74.0	47.0	32.1	34.4
MAX	132	317	291	277	337	313	174	158	171	91.3	56.3	128
(WY)	1960	1991	1976	1971	1996	1972	1991	1971	1964	1993	1968	1959
MIN	16.5	21.0	63.5	62.3	55.2	68.5	68.5	52.5	34.4	25.6	19.6	18.9
(WY)	1988	1988	1986	1988	1977	1992	1995	1992	1992	1958	1958	1989

SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

WATER YEARS 1956 - 1996

ANNUAL TOTAL	33790	44895	
ANNUAL MEAN	92.6	123	97.1
HIGHEST ANNUAL MEAN			141
LOWEST ANNUAL MEAN			59.5
HIGHEST DAILY MEAN	864	Nov 29	2190
LOWEST DAILY MEAN	17	Sep 21	20
ANNUAL SEVEN-DAY MINIMUM	17	Sep 20	21
ANNUAL RUNOFF (AC-FT)	67020	89050	70320
ANNUAL RUNOFF (CFSM)	5.38	7.13	5.64
ANNUAL RUNOFF (INCHES)	73.08	97.10	76.68
10 PERCENT EXCEEDS	182	229	184
50 PERCENT EXCEEDS	66	90	77
90 PERCENT EXCEEDS	23	25	26

e Estimated

## LAKE WASHINGTON BASIN

12117500 CEDAR RIVER NEAR LANDSBURG, WA

LOCATION.--Lat 47°23'38", long 121°57'12", on west line NW 1/4 SW 1/4 sec.17, T.22 N., R.7 E., King County, Hydrologic Unit 17110012, on left bank 1.8 mi upstream from intake of Seattle water-supply system near Landsburg, 4.0 mi east of Maple Valley, 5.9 mi downstream from Taylor Creek, and at mile 23.4.

DRAINAGE AREA.--121 mi<sup>2</sup>, excludes Walsh Lake diversion which enters Cedar River at mile 19.5, and excludes 1.9 mi<sup>2</sup> of Walsh Lake drainage in Cedar River basin which is normally diverted into Issaquah Creek.

PERIOD OF RECORD.--August 1895 to current year (prior to October 1948, flow of Rock Creek included). Monthly discharge only for some periods, published in WSP 1316. Published as "near Seattle" 1895-98, "near Maple Valley" 1902, and as "near Ravensdale" 1898-1901, 1903-12.

REVISED RECORDS.--WSP 313: 1895-98, 1902-09. WSP 1286: 1912. WSP 1316: 1896-98(M), 1902-11(M). WSP 1736: 1960. WSP 1932: 1947, drainage area.

GAGE.--Water-stage recorder. Datum of gage is 565.9 ft above sea level. Prior to Oct. 1, 1898, nonrecording gage at site 2.2 mi downstream at different datum. Mar. 24, 1901, to May 15, 1913, nonrecording gage at site 2 mi downstream at datum 535.84 ft above sea level (levels by city of Seattle). Apr. 30, 1914, to Oct. 22, 1928, water-stage recorder 0.2 mi downstream at different datum.

REMARKS.--No estimated daily discharges. Records good. All diversions except Rock Creek returned to river upstream from station. Rock Creek, a tributary which entered naturally just upstream from station prior to 1932, is diverted during summer months to enter river at a point about 3.9 mi downstream from station. Some regulation by Chester Morse Lake (station 12115900) and Cedar Lake (station 12116060), 12.2 mi upstream. Chemical analyses July 1959 to July 1960. Water temperatures published August 1953 to September 1985. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--101 years (water years 1896-96), 689 ft<sup>3</sup>/s, 499,200 acre-ft/yr, unadjusted, includes data published in WSP 1316.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,200 ft<sup>3</sup>/s Nov. 19, 1911, gage height, 10.0 ft, from graph based on gage readings, site and datum then in use, by computation of peak flow over dam, peak caused by failure of flashboards at Chester Morse Lake; minimum discharge observed, 83 ft<sup>3</sup>/s Sept. 19, 1898.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,580 ft<sup>3</sup>/s Nov. 30, gage height, 7.43 ft; minimum discharge, 257 ft<sup>3</sup>/s Sept. 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	391	651	6110	945	628	804	443	670	556	412	328	297
2	397	649	5820	1110	538	680	465	789	543	404	338	295
3	464	639	5190	1480	534	702	436	801	533	406	331	296
4	383	570	3540	1790	517	685	426	755	560	413	315	295
5	321	543	2390	1820	599	654	419	653	615	371	319	302
6	329	494	1350	1830	1640	654	424	600	581	363	305	300
7	417	757	1090	2210	2240	719	429	558	495	359	298	294
8	417	1130	1160	2100	4240	685	414	481	459	361	302	295
9	426	1490	1250	2000	5470	651	412	456	451	372	293	289
10	751	1400	1240	1900	5510	719	433	440	455	372	287	273
11	868	1900	1360	1840	4570	769	473	439	469	400	284	266
12	695	1750	1620	1810	2990	660	529	436	465	383	281	263
13	621	1790	1650	1800	2480	578	656	527	473	395	281	273
14	584	1900	1660	1920	1500	555	641	645	485	414	280	275
15	559	1830	1630	1920	1910	493	610	779	471	414	287	289
16	574	1690	1580	1840	907	471	630	775	470	414	317	278
17	586	1530	1530	1640	1010	464	599	774	472	404	317	318
18	596	1460	1500	1620	1600	447	589	780	496	416	317	296
19	570	1380	1470	1860	2020	446	593	819	522	427	317	307
20	578	1360	1430	1870	2090	445	581	864	518	420	313	313
21	568	1340	1420	1880	2130	437	569	772	517	408	282	300
22	555	1340	1430	1740	1880	453	885	736	510	386	331	319
23	548	1360	1410	1420	988	441	1700	983	524	350	331	300
24	542	1410	1130	902	1030	432	1640	1170	515	358	328	287
25	541	1570	806	860	1130	424	1600	974	484	358	326	280
26	554	1500	728	1010	1190	420	1660	816	478	362	324	280
27	550	1650	571	1200	1220	416	1810	792	487	371	324	307
28	535	3080	530	1190	1180	409	1350	778	473	370	323	306
29	529	5590	581	1060	1010	410	612	759	443	367	316	321
30	529	6250	623	820	---	407	563	782	423	367	292	362
31	581	---	809	751	---	404	---	711	---	360	300	---
TOTAL	16559	50003	54608	48138	54751	16934	22591	22314	14943	11977	9587	8876
MEAN	534	1667	1762	1553	1888	546	753	720	498	386	309	296
MAX	868	6250	6110	2210	5510	804	1810	1170	615	427	338	362
MIN	321	494	530	751	517	404	412	436	423	350	280	263
AC-FT	32840	99180	108300	95480	108600	33590	44810	44260	29640	23760	19020	17610

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1895 - 1996, BY WATER YEAR (WY)

	MEAN	388	720	950	971	909	790	779	795	748	484	349	321
MAX	1015	2371	3126	2198	2009	2233	1498	1412	1795	1077	735	716	
(WY)	1960	1991	1934	1918	1982	1972	1897	1897	1917	1917	1954	1959	
MIN	141	141	179	369	368	360	335	306	320	262	124	127	
(WY)	1905	1896	1953	1988	1988	1941	1941	1915	1992	1898	1898	1898	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1895 - 1996

ANNUAL TOTAL	263099	331281		
ANNUAL MEAN	721	905		
HIGHEST ANNUAL MEAN			682	
LOWEST ANNUAL MEAN			1066	1897
HIGHEST DAILY MEAN	6250	Nov 30	6250	Nov 30
LOWEST DAILY MEAN	230	Sep 20	263	Sep 12
ANNUAL SEVEN-DAY MINIMUM	238	Sep 15	274	Sep 10
ANNUAL RUNOFF (AC-FT)	521900		657100	
10 PERCENT EXCEEDS	1490		1810	
50 PERCENT EXCEEDS	440		565	
90 PERCENT EXCEEDS	271		307	

## LAKE WASHINGTON BASIN

211

## 12117600 CEDAR RIVER BELOW DIVERSION, NEAR LANDSBURG, WA

LOCATION.--Lat 47°22'47", long 121°58'56", in SE 1/4 NW 1/4 sec.24, T.22 N., R.6 E., King County, Hydrologic Unit 17110012, on right bank 0.8 mi northeast of the Issaquah-Ravensdale road bridge, 0.9 mi northwest of Landsburg, and at mile 20.4.

DRAINAGE AREA.--124 mi<sup>2</sup>, excludes Walsh Lake diversion, which enters Cedar River at mile 19.5, and excludes 1.9 mi of Walsh Lake drainage in Cedar River basin, which is normally diverted into Issaquah Creek.

PERIOD OF RECORD.--December 1991 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 490 ft above sea level, from topographic map.

REMARKS.--Records good. Flow is regulated by Chester Morse Lake (station 12115900) and Cedar Lake (station 12116060) 15 mi upstream for operation of powerplant at Cedar Falls 13.1 mi upstream from station. Seattle City Water diversion 1.5 mi upstream from the gage diverted an average discharge of about 145 ft<sup>3</sup>/s during the water year. U.S. Geological Survey telemeter at station.

AVERAGE DISCHARGE.--4 years (water years 1993-96), 475 ft<sup>3</sup>/s, 344,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,560 ft<sup>3</sup>/s Nov. 30, 1995, gage height, 10.32 ft, from rating curve extended above 2,000 ft<sup>3</sup>/s; maximum gage height, 10.70 ft Nov. 30, 1995, from outside highwater mark; minimum discharge, 45 ft<sup>3</sup>/s Sept. 9, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,560 ft<sup>3</sup>/s Nov. 30, gage height, 10.32 ft, from rating curve extended above 2,000 ft<sup>3</sup>/s; maximum gage height, 10.70 ft Nov. 30, from outside highwater mark; minimum discharge, 79 ft<sup>3</sup>/s Aug. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	209	535	6070	829	532	594	267	465	477	207	141	111
2	240	532	5790	1020	422	462	256	556	463	214	114	111
3	448	524	5260	1490	421	487	268	571	454	213	104	113
4	381	439	3670	1810	416	473	280	555	455	214	94	110
5	322	402	2530	1770	487	435	288	475	487	210	95	113
6	273	358	1420	1730	1550	474	293	418	458	209	93	109
7	247	592	1060	2220	2250	578	291	391	371	212	112	110
8	254	968	1000	2140	4500	555	291	352	334	211	94	110
9	259	1390	1040	1900	5770	518	296	353	329	207	100	106
10	611	1190	1020	1750	5720	589	295	337	330	206	104	114
11	768	1730	1240	1680	4730	651	298	338	343	209	105	118
12	542	1530	1660	1640	3080	508	317	305	337	216	100	129
13	469	1510	1680	1630	2570	374	446	368	342	221	100	138
14	436	1650	1630	1760	1520	353	434	524	359	223	100	145
15	411	1550	1570	1760	1960	332	404	692	345	221	107	158
16	439	1430	1510	1700	959	360	422	690	355	219	109	163
17	454	1300	1460	1460	962	351	389	691	355	216	106	181
18	473	1240	1430	1440	1610	314	401	697	350	207	104	171
19	455	1160	1390	1730	2080	297	462	737	336	206	106	180
20	460	1140	1350	1770	2150	289	476	794	332	202	106	197
21	450	1130	1340	1790	2200	291	461	697	327	202	188	197
22	439	1120	1350	1640	1930	291	796	659	318	199	105	218
23	435	1170	1280	1330	838	279	1730	901	298	202	108	200
24	429	1210	1000	812	803	290	1660	1070	282	201	110	e184
25	423	1360	627	777	901	300	1530	834	279	205	115	e172
26	442	1300	552	915	962	312	1600	641	280	212	114	179
27	438	1410	400	1110	993	309	1770	635	271	209	111	211
28	428	3000	384	1090	960	305	1240	649	255	210	105	212
29	421	5660	436	970	801	293	476	630	223	210	106	211
30	418	6170	495	723	---	290	416	680	202	209	110	212
31	464	---	673	658	---	294	---	635	---	203	112	---
TOTAL	12938	44700	52317	45044	54077	12248	18553	18340	10347	6505	3378	4683
MEAN	417	1490	1688	1453	1865	395	618	592	345	210	109	156
MAX	768	6170	6070	2220	5770	651	1770	1070	487	223	188	218
MIN	209	358	384	658	416	279	256	305	202	199	93	106
AC-FT	25660	88660	103800	89340	107300	24290	36800	36380	20520	12900	6700	9290

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	306	659	883	679	906
MAX	417	1490	1688	1453	1865
(WY)	1996	1996	1996	1996	1995
MIN	256	329	383	430	295
(WY)	1995	1994	1994	1994	1992

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1992 - 1996
ANNUAL TOTAL	210474	283130	
ANNUAL MEAN	577	774	475
HIGHEST ANNUAL MEAN			774
LOWEST ANNUAL MEAN			322
HIGHEST DAILY MEAN	6170	Nov 30	6170
LOWEST DAILY MEAN	80	Aug 7	78
ANNUAL SEVEN-DAY MINIMUM	85	Sep 4	85
ANNUAL RUNOFF (AC-FT)	417500	561600	344000
10 PERCENT EXCEEDS	1350	1690	962
50 PERCENT EXCEEDS	322	435	312
90 PERCENT EXCEEDS	107	114	123

e Estimated



## LAKE WASHINGTON BASIN

## 12119000 CEDAR RIVER AT RENTON, WA

LOCATION.--Lat 47°28'58", long 122°12'08", in SW 1/4 NW 1/4 sec.17, T.23 N., R.5 E., King County, Hydrologic Unit 17110012, on left bank 125 ft downstream from bridge on Mill Avenue at Renton, and at mile 1.6.

DRAINAGE AREA.--184 mi<sup>2</sup>, includes 3.67 mi<sup>2</sup> in vicinity of Youngs Lake in Big Soos Creek basin, excludes 1.9 mi<sup>2</sup> from upper Rock Creek, Cedar River basin, normally diverted into Issaquah Creek.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1901 to July 1903 (fragmentary), September 1906 to December 1907 (monthly discharge only), August 1945 to current year.

REVISED RECORD.--WSP 1316: 1901-02. WSP 1932: Drainage area. WDR WA-75-1: 1972-74.

GAGE.--Water-stage recorder. Datum of gage is 15.20 ft above sea level. Prior to Jan. 1, 1908, nonrecording gages within 1 mi of present site, at datum 10.67 ft above sea level. Aug. 7, 1945, to Aug. 15, 1947, water-stage recorder at site 700 ft upstream at datum 20.13 ft above sea level, and Aug. 16, 1947, to Dec. 7, 1950, at datum 19.13 ft above sea level.

REMARKS.--No estimated daily discharges. Records good. Flow partly regulated by Chester Morse Lake and Masonry Dam for operation of powerplant at Cedar Falls 32.1 mi upstream from gage. An average daily discharge of about 153 ft<sup>3</sup>/s was diverted during the year at Landsburg by the city of Seattle for municipal use, computed from data furnished by Seattle Water Department. U.S. Geological Survey satellite telemeter at station. Chemical analyses July 1959 to August 1964, December 1965 to September 1971.

AVERAGE DISCHARGE.--51 years (water years 1946-96), 663 ft<sup>3</sup>/s, 480,400 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,600 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 17.13 ft from outside high-water mark; minimum daily discharge, 30 ft<sup>3</sup>/s July 1, 1962.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,650 ft<sup>3</sup>/s Nov. 30, gage height, 16.04 ft; minimum discharge, 100 ft<sup>3</sup>/s Aug 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	237	611	7070	1100	882	836	402	684	572	230	202	134
2	298	613	6660	1140	733	645	388	780	536	241	166	134
3	470	615	6250	1740	711	655	366	778	525	239	164	151
4	480	534	4710	1920	715	667	373	786	509	255	143	144
5	381	502	3110	2050	798	612	367	704	545	243	136	142
6	330	439	2120	2080	1730	619	395	631	532	237	134	140
7	281	710	1530	2580	2810	695	391	599	442	237	138	137
8	286	1090	1390	2610	5110	729	378	538	395	236	137	136
9	294	1600	1450	2250	7170	651	376	525	375	235	128	135
10	621	1400	1490	2030	6740	710	379	481	370	235	132	132
11	1010	2070	1690	1930	5900	810	391	459	385	235	133	137
12	702	1850	2090	1810	3750	689	395	454	379	235	131	148
13	582	1730	2090	1780	3140	520	514	578	374	245	130	158
14	521	1930	2040	1970	2030	490	529	646	406	250	128	173
15	495	1800	1950	2230	2290	443	517	805	377	248	128	197
16	518	1680	1840	2200	1430	471	594	808	391	245	136	192
17	541	1520	1780	1830	1200	465	533	805	392	250	140	221
18	566	1430	1750	1740	1720	438	534	830	394	262	133	205
19	531	1310	1670	1950	2280	407	585	866	374	267	134	236
20	550	1280	1630	2100	2350	394	616	904	369	254	133	232
21	539	1270	1580	2250	2470	387	587	816	355	244	193	235
22	521	1270	1590	2090	2270	410	690	795	353	240	156	255
23	512	1340	1530	1800	1340	385	2050	921	352	236	132	240
24	510	1400	1370	1340	1040	381	2070	1120	335	234	135	221
25	507	1610	919	1230	1110	385	1850	958	315	231	135	215
26	523	1530	844	1270	1130	394	1850	745	309	245	136	214
27	506	1550	651	1470	1220	391	2070	715	310	242	138	246
28	511	2800	608	1460	1170	392	1690	736	291	243	131	260
29	498	5690	683	1380	1050	379	859	728	269	245	127	259
30	493	7270	799	1080	---	373	689	736	234	241	130	260
31	510	---	884	1020	---	381	---	734	---	239	138	---
TOTAL	15324	50444	65768	55430	66289	16204	23428	22665	11765	7519	4357	5689
MEAN	494	1681	2122	1788	2286	523	781	731	392	243	141	190
MAX	1010	7270	7070	2610	7170	836	2070	1120	572	267	202	260
MIN	237	439	608	1020	711	373	366	454	234	230	127	132
AC-FT	30400	100100	130500	109900	131500	32140	46470	44960	23340	14910	8640	11280

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1946 - 1996, BY WATER YEAR (WY)

	MEAN	345	727	1058	1075	1078	860	778	711	635	296	194	228
MAX	864	2673	2845	1821	2374	2577	1203	1008	1757	785	582	601	
(WY)	1960	1991	1976	1975	1982	1972	1960	1956	1964	1955	1954	1964	
MIN	76.4	61.2	91.2	283	299	389	335	274	168	44.9	41.1	52.9	
(WY)	1953	1953	1953	1988	1988	1992	1973	1992	1958	1958	1958	1958	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1946 - 1996

ANNUAL TOTAL	258169	344882	
ANNUAL MEAN	707	942	663
HIGHEST ANNUAL MEAN			1016
LOWEST ANNUAL MEAN			374
HIGHEST DAILY MEAN	7270	Nov 30	8900
LOWEST DAILY MEAN	122	Aug 26	30
ANNUAL SEVEN-DAY MINIMUM	126	Aug 23	41
ANNUAL RUNOFF. (AC-FT)	512100	684100	480400
10 PERCENT EXCEEDS	1600	2050	1280
50 PERCENT EXCEEDS	385	533	511
90 PERCENT EXCEEDS	141	147	147

LAKE WASHINGTON BASIN  
12119000 CEDAR RIVER AT RENTON, WA--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1959-71, March 1978 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: August 1965 to February 1967, March 1978 to current year.

INSTRUMENTATION.--Temperature recorder for period of daily record.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 24.0°C Aug. 8, 1978; minimum, 0.0°C Dec. 30, 1978 to Jan. 1, 1979, Jan. 29, 1980.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum recorded, 19.5°C July 13-15, 23-25, 27, Aug. 10; minimum, 2.5°C Jan. 31.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	13.0	11.0	12.0	8.0	6.0	7.0	8.5	8.0	8.5	8.0	7.0	7.5
2	13.0	12.0	12.5	7.5	6.0	6.5	8.0	7.5	8.0	8.0	7.5	7.5
3	13.0	11.5	12.5	7.5	6.0	6.5	8.0	7.5	7.5	7.5	6.5	7.0
4	12.0	10.5	11.5	8.0	6.5	7.0	7.5	7.5	7.5	6.5	6.0	6.5
5	12.0	9.5	11.0	8.5	8.0	8.5	7.5	7.0	7.0	6.0	5.5	5.5
6	12.0	10.5	11.5	8.5	8.0	8.5	7.0	6.5	6.5	5.5	5.5	5.5
7	13.0	11.0	12.0	9.5	8.0	8.5	7.0	6.5	6.5	6.5	5.5	6.0
8	12.5	11.5	12.0	10.0	9.0	9.5	7.0	6.0	6.5	6.5	6.0	6.0
9	12.0	11.0	11.5	9.0	8.0	8.0	6.5	6.0	6.0	6.5	6.0	6.0
10	12.0	11.5	12.0	8.5	8.0	8.0	6.5	6.0	6.5	6.5	6.0	6.0
11	11.5	11.0	11.0	9.0	8.5	9.0	7.0	6.5	7.0	6.0	5.5	5.5
12	11.5	10.5	11.0	9.0	8.5	8.5	7.5	7.0	7.0	5.5	5.0	5.5
13	11.5	10.0	11.0	9.5	8.5	9.0	7.5	7.5	7.5	6.0	5.5	5.5
14	12.0	10.0	11.0	9.5	9.0	9.5	7.5	7.0	7.0	6.5	6.0	6.5
15	12.5	10.0	11.0	9.5	8.5	9.0	7.0	7.0	7.0	7.0	6.5	6.5
16	12.5	11.5	12.0	9.5	8.5	9.0	7.0	7.0	7.0	7.0	6.0	6.5
17	12.0	11.5	11.5	9.5	9.0	9.0	7.0	7.0	7.0	6.0	5.5	6.0
18	11.5	10.0	11.0	9.5	9.0	9.5	7.0	7.0	7.0	6.0	5.0	5.5
19	11.0	9.0	10.0	9.0	8.5	8.5	7.0	7.0	7.0	5.0	4.0	4.5
20	11.5	10.5	11.0	9.0	8.0	8.5	7.0	6.5	6.5	5.0	4.5	5.0
21	11.5	10.0	10.5	9.0	8.0	8.5	6.5	6.0	6.5	5.0	4.5	5.0
22	10.0	8.5	9.5	9.5	8.5	9.0	6.5	6.0	6.0	5.0	4.5	5.0
23	10.5	9.5	10.0	9.5	9.0	9.0	6.0	5.5	5.5	5.5	5.0	5.0
24	11.0	10.0	10.5	9.5	9.0	9.5	5.5	5.0	5.0	6.0	5.0	5.5
25	10.0	9.5	10.0	9.5	8.5	9.0	5.5	5.0	5.0	6.0	5.5	5.5
26	11.0	10.0	10.5	9.0	8.5	8.5	5.5	5.0	5.0	6.0	5.5	6.0
27	10.5	9.5	10.0	8.5	8.5	8.5	6.5	5.5	6.0	5.5	5.0	5.0
28	9.5	8.5	9.0	9.5	8.5	9.0	7.0	6.5	6.5	5.0	4.0	4.5
29	9.0	8.0	8.5	9.5	9.0	9.5	7.5	7.0	7.0	4.5	3.5	4.0
30	8.5	7.0	7.5	9.0	8.5	9.0	7.5	7.5	7.5	4.0	3.0	3.5
31	8.0	6.5	7.0	---	---	---	8.0	7.5	8.0	4.0	2.5	3.0
MONTH	13.0	6.5	10.7	10.0	6.0	8.6	8.5	5.0	6.7	8.0	2.5	5.6



## LAKE WASHINGTON BASIN

215

12120000 MERCER CREEK NEAR BELLEVUE, WA

LOCATION.--Lat 47°36'11", long 122°10'47", in NW 1/4 NW 1/4 sec.4, T.24 N., R.5 E., King County, Hydrologic Unit 17110012, on left bank 40 ft upstream from Burlington Northern Railroad trestle, 1.2 mi southeast of Bellevue, and 2.0 mi upstream from mouth.

DRAINAGE AREA.--12.0 mi<sup>2</sup>.

PERIOD OF RECORD.--June to October 1945, June 1955 to current year.

REVISED RECORDS.--WSP 1446: Drainage area. WDR WA-83-1: 1977-79(P).

GAGE.--Water-stage recorder. Datum of gage is 17.11 ft above sea level (levels by Municipality of Metropolitan Seattle engineers). Prior to June 5, 1959, at site 600 ft downstream at different datums.

REMARKS.--No estimated daily discharges. Records good. Natural flow affected by urbanization and construction of flood-control catchments.

AVERAGE DISCHARGE.--41 years (water years 1956-96), 22.2 ft<sup>3</sup>/s, 25.15 in/yr, 16,090 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 832 ft<sup>3</sup>/s Jan. 18, 1986, gage height, 6.50 ft; maximum gage height, 8.68 ft Mar. 6, 1972 caused by backwater from plugged culvert; minimum discharge, 1.9 ft<sup>3</sup>/s Aug. 6, 1958.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 250 ft<sup>3</sup>/s (revised) and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	0345	319	3.55	Jan. 7	1015	290	3.34
Nov. 11	0600	308	3.47	Jan. 15	1845	322	3.57
Nov. 29	1600	279	3.26	Feb. 8	1445	*547	*4.97
Dec. 4	0400	311	3.49	Apr. 23	1745	388	4.01
Dec. 11	0200	274	3.22				

Minimum discharge, 5.7 ft<sup>3</sup>/s Aug. 25, Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17	7.5	94	19	13	14	67	44	9.8	7.3	7.0	7.2
2	57	7.4	53	19	12	14	56	20	10	7.4	34	6.5
3	32	7.4	43	21	14	24	20	34	9.9	7.7	24	38
4	12	8.0	155	19	43	18	16	16	9.0	17	9.4	53
5	8.7	12	37	20	99	22	14	14	8.8	8.5	17	18
6	8.0	8.1	24	44	100	15	31	13	8.7	7.8	9.0	9.4
7	7.7	97	18	149	72	15	17	25	8.4	7.4	8.1	8.3
8	11	178	16	39	386	14	14	17	8.5	7.3	7.5	8.7
9	8.1	33	54	24	264	14	13	13	8.0	7.3	7.1	7.7
10	101	33	128	18	72	32	12	12	7.8	7.3	6.7	7.3
11	88	155	174	16	40	38	18	13	8.3	7.3	6.6	7.4
12	16	28	76	15	29	18	20	39	8.1	6.9	6.8	7.5
13	11	36	94	29	24	15	24	97	8.1	6.8	6.8	7.7
14	9.1	18	107	55	21	14	13	24	7.8	6.8	6.7	12
15	8.5	27	56	202	19	16	26	17	7.7	6.7	6.6	67
16	35	17	29	81	18	13	72	15	7.4	6.8	7.0	11
17	40	18	26	51	49	13	27	27	8.1	19	7.0	70
18	17	25	78	28	85	13	22	46	10	25	6.9	14
19	10	16	28	50	82	24	17	28	8.5	31	6.9	35
20	34	12	21	97	51	15	15	16	7.9	11	10	12
21	23	11	18	127	49	13	13	16	7.9	9.3	8.0	12
22	11	28	16	58	43	32	32	114	7.8	8.4	7.1	12
23	9.7	61	14	44	65	16	285	66	26	8.0	6.8	8.8
24	9.1	61	13	69	30	13	119	24	14	7.6	6.4	8.2
25	10	97	13	37	23	12	63	18	9.8	7.3	6.3	7.7
26	13	35	12	27	20	12	36	14	8.8	7.2	6.6	7.4
27	15	63	12	23	18	12	22	13	8.4	7.0	6.8	7.4
28	8.7	158	17	22	16	12	18	12	8.0	6.8	7.0	7.3
29	8.1	228	96	17	15	18	16	15	7.8	7.0	6.7	7.4
30	8.0	68	55	15	---	13	16	12	7.5	6.7	7.0	7.4
31	7.9	---	29	14	---	37	---	10	---	6.8	14	---
TOTAL	654.6	1553.4	1606	1449	1772	551	1134	844	276.8	294.4	283.8	493.3
MEAN	21.1	51.8	51.8	46.7	61.1	17.8	37.8	27.2	9.23	9.50	9.15	16.4
MAX	101	228	174	202	386	38	285	114	26	31	34	70
MIN	7.7	7.4	12	14	12	12	12	10	7.4	6.7	6.3	6.5
AC-FT	1300	3080	3190	2870	3510	1090	2250	1670	549	584	563	978
CFSM	1.76	4.31	4.32	3.90	5.09	1.48	3.15	2.27	.77	.79	.76	1.37
IN.	2.03	4.82	4.98	4.49	5.49	1.71	3.52	2.62	.86	.91	.88	1.53

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

	MEAN	15.7	30.6	39.7	39.2	34.8	29.6	22.3	14.3	12.2	8.71	8.45	11.0
MAX	44.4	60.5	69.9	61.6	61.1	67.5	39.9	27.2	23.8	15.4	18.7	22.3	
(WY)	1982	1984	1974	1959	1996	1972	1991	1996	1985	1981	1976	1978	
MIN	7.47	11.0	16.5	15.9	10.2	15.4	12.5	8.42	5.34	3.22	3.25	5.05	
(WY)	1988	1977	1977	1977	1993	1965	1962	1958	1958	1958	1945	1955	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1945 - 1996

ANNUAL TOTAL	8930.9	10912.3											
ANNUAL MEAN	24.5	29.8											
HIGHEST ANNUAL MEAN													1996
LOWEST ANNUAL MEAN													1994
HIGHEST DAILY MEAN	228	Nov 29				386	Feb 8		407	Jan 18	1986		
LOWEST DAILY MEAN	5.4	Sep 23				6.3	Aug 25		2.5	Jul 16	1958		
ANNUAL SEVEN-DAY MINIMUM	5.7	Sep 20				6.7	Aug 23		2.8	Jul 23	1958		
ANNUAL RUNOFF (AC-FT)	17710					21640			16090				
ANNUAL RUNOFF (CFSM)	2.04					2.48			1.85				
ANNUAL RUNOFF (INCHES)	27.69					33.83			25.15				
10 PERCENT EXCEEDS	56					69			46				
50 PERCENT EXCEEDS	13					15			14				
90 PERCENT EXCEEDS	6.2					7.3			6.5				

## LAKE WASHINGTON BASIN

12120600 ISSAQUAH CREEK NEAR HOBART, WA

LOCATION.--Lat 47°27'27", long 122°00'14", in NE 1/4 NW 1/4 sec.26, T.23 N., R.6 E., King County, Hydrologic Unit 17110012, on left bank 20 ft downstream from highway bridge, 2.9 mi northwest of Hobart, and 10.2 mi upstream from mouth, 1.6 mi northwest of Issaquah, and at mile 33.1 (continuation of Sammamish River).

DRAINAGE AREA.--17.6 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1986 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 300 ft above sea level, from topographic map.

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

AVERAGE DISCHARGE.--10 years (water years 1987-96), 46.3 ft<sup>3</sup>/s, 35.75 in/yr, 33,550 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,360 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 9.90 ft; minimum discharge, 5.3 ft<sup>3</sup>/s, Sept. 17-20, 1992.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 280 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	0445	504	7.26	Jan. 15	1545	404	6.92
Nov. 29	1615	955	8.54	Feb. 6	2015	567	7.46
Dec. 3	2400	287	6.49	Feb. 8	1430	*1,240	*9.73
Jan. 7	0830	297	6.53				

Minimum discharge, 11 ft<sup>3</sup>/s several days in October, August, and September.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	12	13	461	76	e53	49	54	65	38	17	13	12
2	19	12	303	73	e48	47	59	58	35	17	19	11
3	35	12	207	83	e45	56	46	66	33	17	20	12
4	19	12	191	74	e55	56	42	55	31	30	15	12
5	14	12	133	69	142	52	39	50	30	20	16	13
6	12	12	106	71	357	53	47	46	28	18	15	13
7	12	82	91	204	461	51	47	43	27	17	14	12
8	12	190	80	148	1000	48	40	41	26	16	14	12
9	12	139	87	107	609	46	38	37	26	16	14	12
10	91	103	102	89	271	51	43	35	25	16	14	11
11	119	303	121	78	164	51	51	36	24	16	13	11
12	64	171	102	72	123	47	51	40	24	16	13	11
13	36	152	100	74	100	44	59	99	23	15	13	11
14	24	142	125	133	87	42	52	69	23	15	14	13
15	19	126	109	248	77	40	50	61	22	15	14	17
16	20	109	91	221	71	38	95	54	21	15	14	13
17	23	96	82	160	77	37	69	60	22	15	14	13
18	22	90	80	127	89	35	68	70	23	16	14	13
19	18	79	73	113	102	39	67	75	21	21	14	20
20	24	70	67	181	89	36	62	61	20	17	14	15
21	23	64	62	231	85	35	54	56	20	16	14	14
22	19	64	59	187	76	49	59	81	20	15	13	16
23	18	83	56	171	79	44	192	106	24	15	13	13
24	17	96	53	177	72	39	209	79	23	14	12	12
25	17	138	51	144	66	36	145	65	21	14	12	12
26	17	115	49	126	62	35	134	56	20	14	12	12
27	16	139	48	e106	59	33	106	51	20	14	12	11
28	15	368	48	e91	54	33	85	47	20	14	12	11
29	14	849	65	e79	52	34	72	55	19	14	11	11
30	14	515	79	e68	---	33	64	48	18	13	11	11
31	13	---	82	e59	---	34	---	43	---	13	12	---
TOTAL	790	4356	3363	3840	4625	1323	2199	1808	727	501	425	380
MEAN	25.5	145	108	124	159	42.7	73.3	58.3	24.2	16.2	13.7	12.7
MAX	119	849	461	248	1000	56	209	106	38	30	20	20
MIN	12	12	48	59	45	33	38	35	18	13	11	11
AC-FT	1570	8640	6670	7620	9170	2620	4360	3590	1440	994	843	754
CFSM	1.45	8.25	6.16	7.04	9.06	2.42	4.16	3.31	1.38	.92	.78	.72
IN.	1.67	9.21	7.11	8.12	9.78	2.80	4.65	3.82	1.54	1.06	.90	.80

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1987 - 1996, BY WATER YEAR (WY)

	MEAN	17.4	81.5	72.6	80.2	79.8	66.9	57.6	33.6	29.9	16.4	12.1	10.5
MAX	35.0	245	125	130	159	118	98.4	58.3	69.3	29.3	18.2	13.0	
(WY)	1991	1991	1991	1991	1996	1989	1991	1996	1990	1993	1993	1993	
MIN	8.55	12.6	36.3	43.8	25.5	35.6	31.9	21.5	14.2	10.4	8.94	8.53	
(WY)	1988	1988	1988	1994	1993	1992	1990	1992	1992	1995	1994	1992	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1987 - 1996
ANNUAL TOTAL	17777.9	24337	
ANNUAL MEAN	48.7	66.5	46.3
HIGHEST ANNUAL MEAN			80.9
LOWEST ANNUAL MEAN			28.0
HIGHEST DAILY MEAN	849	Nov 29	1000
LOWEST DAILY MEAN	8.0	Aug 4	11
ANNUAL SEVEN-DAY MINIMUM	8.2	Jul 30	11
ANNUAL RUNOFF (AC-FT)	35260	48270	33550
ANNUAL RUNOFF (CFSM)	2.77	3.78	2.63
ANNUAL RUNOFF (INCHES)	37.58	51.44	35.75
10 PERCENT EXCEEDS	101	135	98
50 PERCENT EXCEEDS	27	43	29
90 PERCENT EXCEEDS	9.0	13	9.7

e Estimated



## 12121600 ISSAQUAH CREEK NEAR MOUTH, NEAR ISSAQUAH, WA

LOCATION.--Lat 47°33'09", long 122°02'48", in SE 1/4 NW 1/4 sec.21, T.24 N., R.6 E., King County, Hydrologic Unit 17110012, on right bank 30 ft downstream from S.E. 56th Street bridge, 0.7 mi downstream from North Fork, 1.2 mi upstream from mouth, 1.6 mi northwest of Issaquah, and at mile 24.1 (continuation of Sammamish River).

DRAINAGE AREA.--56.6 mi<sup>2</sup>, includes 1.9 mi<sup>2</sup> of Cedar River drainage from upper Rock Creek which normally is diverted into Issaquah Creek.

PERIOD OF RECORD.--September 1963 to current year.

REVISED RECORDS.--WDR WA-77-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 35.99 ft above sea level.

REMARKS.--Records fair. Many minor diversions for irrigation and domestic use upstream from station. Chemical analyses November 1964 to September 1971, October 1973 to September 1974. Water temperatures September 1970 to September 1971. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--33 years (water years 1964-96), 132 ft<sup>3</sup>/s, 31.72 in/yr, 95,740 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,200 ft<sup>3</sup>/s Jan. 9, 1990, gage height, 13.50 ft; minimum discharge, 10 ft<sup>3</sup>/s Aug. 12, 1984, Sept. 29, 1994.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	0915	1,080	8.73	Jan. 15	2000	1,060	8.85
Nov. 29	1900	2,160	12.11	Feb. 8	1830	*2,420	*12.84
Dec. 4	0330	803	7.86				

Minimum discharge, 17 ft<sup>3</sup>/s Oct. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	35	27	1080	179	109	163	168	178	113	e43	24	22
2	56	26	821	168	100	156	162	105	105	e40	40	21
3	76	25	580	193	96	175	154	170	100	39	44	25
4	50	25	635	168	118	182	141	150	95	78	33	27
5	30	25	439	156	227	174	134	139	92	52	34	31
6	24	26	336	164	588	169	146	131	89	42	31	29
7	21	196	276	485	804	162	146	125	e85	39	28	25
8	22	549	236	393	1870	158	132	120	e82	37	27	24
9	23	321	245	286	1790	152	128	113	e78	36	25	24
10	194	197	308	222	950	167	129	107	e75	35	24	22
11	263	779	402	184	625	177	146	106	e72	34	23	22
12	140	406	347	159	453	164	149	119	e68	33	24	22
13	79	303	319	157	349	155	164	242	e65	31	24	22
14	56	271	389	267	294	147	154	182	61	30	23	25
15	44	224	359	643	257	141	151	161	59	29	22	41
16	50	192	286	715	231	137	261	146	56	28	23	30
17	59	161	243	435	241	132	204	155	57	31	23	31
18	54	150	238	303	286	128	203	188	59	42	22	28
19	43	129	204	255	340	136	196	211	55	57	22	46
20	58	114	179	362	311	129	187	176	51	44	22	40
21	61	103	163	507	301	125	167	159	48	37	22	34
22	51	102	146	398	267	149	174	253	52	34	22	45
23	44	142	134	333	282	141	516	337	61	32	21	34
24	42	172	123	340	247	129	612	254	64	30	21	29
25	40	294	116	275	223	122	410	203	52	30	20	27
26	41	251	109	224	208	120	358	171	47	29	21	26
27	37	287	105	193	193	116	278	153	47	27	22	25
28	34	782	105	170	180	113	226	140	47	26	22	24
29	31	1990	153	148	171	118	194	143	51	27	21	26
30	29	1340	196	129	---	116	170	133	45	25	21	25
31	27	---	194	119	---	118	---	124	---	24	24	---
TOTAL	1814	9609	9466	8730	12111	4471	6387	5151	2031	1121	775	852
MEAN	58.5	320	305	282	418	144	213	166	67.7	36.2	25.0	28.4
MAX	263	1990	1080	715	1870	182	612	337	113	78	44	46
MIN	21	25	105	119	96	113	128	106	45	24	20	21
AC-FT	3600	19060	18780	17320	24020	8870	12670	10220	4030	2220	1540	1690
CFSM	1.03	5.66	5.39	4.98	7.38	2.55	3.76	2.94	1.20	.64	.44	.50
IN.	1.19	6.32	6.22	5.74	7.96	2.94	4.20	3.39	1.33	.74	.51	.56

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1964 - 1996, BY WATER YEAR (WY)

	MEAN	52.5	156	245	272	232	193	155	93.7	76.9	44.6	32.9	38.0
MAX	151	440	520	472	546	420	280	166	179	77.0	56.4	85.5	
(WY)	1976	1991	1976	1964	1982	1972	1991	1996	1964	1972	1976	1978	
MIN	19.6	24.6	96.2	108	70.7	86.2	81.5	56.0	29.8	25.2	16.6	19.1	
(WY)	1988	1980	1988	1994	1993	1992	1977	1992	1992	1995	1994	1987	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1964 - 1996

ANNUAL TOTAL	46067		62518									
ANNUAL MEAN	126		171									
HIGHEST ANNUAL MEAN										132		
LOWEST ANNUAL MEAN										197		1972
HIGHEST DAILY MEAN	1990									73.8		1994
LOWEST DAILY MEAN	15	Nov 29								2350	Nov 24	1986
ANNUAL SEVEN-DAY MINIMUM	16	Sep 24								13	Aug 28	1994
ANNUAL RUNOFF (AC-FT)	91370									14	Aug 27	1994
ANNUAL RUNOFF (CFSM)	2.23									95740		
ANNUAL RUNOFF (INCHES)	30.28									2.33		
10 PERCENT EXCEEDS	258									41.09		
50 PERCENT EXCEEDS	79									278		
90 PERCENT EXCEEDS	20									86		
										27		

e Estimated

LOCATION.--Lat 47°34'47", long 122°06'38", in NE 1/4 SW 1/4 sec.12, T.24 N., R.5 E., King County, Hydrologic Unit 17110012, on west shore 5.6 mi above lake outlet, and 6.5 mi south of Redmond.

DRAINAGE AREA.--99.6 mi<sup>2</sup>, includes 1.9 mi<sup>2</sup> of Cedar River drainage from upper Rock Creek, which normally is diverted into Issaquah Creek.

PERIOD OF RECORD.--January 1939 to current year.

REVISED RECORDS.--WSP 1446: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 24.04 ft above sea level. Prior to June 22, 1942, nonrecording gage at different site at datum 1.00 ft higher. June 22, 1942, to Aug. 22, 1951, nonrecording gage at different site at datum 1.00 ft higher and Aug. 23, 1951, to Apr. 29, 1965, at present datum.

REMARKS.--Minor regulation on tributaries. Many small diversions from tributaries for irrigation and domestic use.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 9.40 ft Feb. 12, 1951 (present datum); minimum observed, 1.09 ft Aug. 25-27, 1951.

EXTREMES OUTSIDE PERIOD OF RECORD.-A stage of 10.83 ft, present datum, was observed on Dec. 22, 1933, from information provided by Corps of Engineers.

EXTREMES FOR CURRENT YEAR.-Maximum gage height, 5.94 ft Feb. 10; minimum, 1.47 ft Sept. 3.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.53	2.02	5.03	3.13	3.36	3.21	2.51	3.35	2.99	2.06	1.74	1.50
2	1.58	2.00	5.13	3.11	3.27	3.14	2.58	3.30	2.94	2.04	1.75	1.49
3	1.65	1.98	5.06	3.08	3.19	3.09	2.59	3.27	2.89	2.02	1.77	1.50
4	1.67	1.97	5.12	3.07	3.17	3.06	2.58	3.23	2.83	2.04	1.75	1.55
5	1.68	1.96	5.02	3.05	3.18	3.03	2.56	3.18	2.79	2.03	1.75	1.56
6	1.67	1.96	4.85	3.04	3.37	2.99	2.58	3.12	2.74	2.01	1.74	1.55
7	1.67	2.05	4.66	3.20	3.64	2.95	2.58	3.07	2.70	2.00	1.73	1.55
8	1.67	2.37	4.48	3.35	4.35	2.91	2.57	3.03	2.65	1.99	1.72	1.54
9	1.67	2.54	4.32	3.38	5.63	2.87	2.55	2.98	2.60	1.98	1.72	1.54
10	1.78	2.59	4.30	3.37	5.91	2.87	2.53	2.92	2.56	1.96	1.70	1.53
11	1.95	2.89	4.34	3.33	5.77	2.87	2.53	2.88	2.52	1.94	1.68	1.53
12	2.01	3.07	4.32	3.30	5.50	2.85	2.54	2.87	2.48	1.92	1.67	1.52
13	2.03	3.15	4.31	3.26	5.20	2.83	2.55	3.00	2.45	1.91	1.66	1.52
14	2.03	3.19	4.30	3.27	4.90	2.80	2.55	3.03	2.42	1.90	1.65	1.52
15	2.04	3.21	4.30	3.49	4.62	2.77	2.56	3.02	2.38	1.88	1.64	1.56
16	2.07	3.21	4.21	3.85	4.37	2.74	2.65	3.00	2.34	1.85	1.62	1.57
17	2.10	3.18	4.11	3.97	4.19	2.71	2.69	2.99	2.30	1.84	1.61	1.60
18	2.11	3.17	4.05	3.97	4.09	2.67	2.73	3.00	2.28	1.85	1.59	1.60
19	2.11	3.14	3.98	3.95	4.05	2.66	2.74	3.04	2.26	1.89	1.58	1.63
20	2.12	3.10	3.88	3.94	4.01	2.64	2.75	3.04	2.23	1.89	1.58	1.64
21	2.14	3.05	3.74	4.03	3.95	2.62	2.73	3.02	2.20	1.89	1.58	1.64
22	2.13	3.00	3.64	4.09	3.84	2.62	2.74	3.12	2.17	1.88	1.57	1.65
23	2.13	3.01	3.54	4.06	3.81	2.62	2.99	3.25	2.18	1.87	1.56	1.65
24	2.12	3.04	3.44	4.05	3.73	2.60	3.31	3.30	2.18	1.86	1.56	1.64
25	2.11	3.14	3.35	4.01	3.64	2.57	3.44	3.30	2.17	1.85	1.55	1.64
26	2.10	3.20	3.26	3.98	3.55	2.54	3.51	3.27	2.15	1.84	1.54	1.63
27	2.10	3.24	3.18	3.85	3.46	2.51	3.52	3.23	2.12	1.83	1.53	1.63
28	2.09	3.49	3.12	3.75	3.37	2.48	3.48	3.17	2.10	1.82	1.53	1.63
29	2.07	4.13	3.13	3.66	3.28	2.47	3.43	3.13	2.08	1.81	1.52	1.62
30	2.05	4.78	3.15	3.56	---	2.46	3.37	3.08	2.07	1.79	1.51	1.62
31	2.03	---	3.15	3.45	---	2.45	---	3.04	---	1.77	1.51	---
MEAN	1.94	2.89	4.08	3.57	4.08	2.76	2.81	3.10	2.43	1.91	1.63	1.58
MAX	2.14	4.78	5.13	4.09	5.91	3.21	3.52	3.35	2.99	2.06	1.77	1.65
MIN	1.53	1.96	3.12	3.04	3.17	2.45	2.51	2.87	2.07	1.77	1.51	1.49

## LAKE WASHINGTON BASIN

219

12122500 BEAR CREEK NEAR REDMOND, WA

LOCATION.--Lat 47°43'04", long 122°04'34", in NW 1/4 NW 1/4 sec.29, T.26 N., R.6 E., King County, Hydrologic Unit 17110012, on right bank, 1.0 mi upstream from Cottage Lake Creek and 3.5 mi northeast of Redmond, and at mile 6.5.

DRAINAGE AREA.--13.9 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1945 to October 1949, May 1979 to September 1981, October 1981 to September 1984 (seasonal records), October 1984 to September 1986, October 1986 to September 1989 (seasonal records), October 1989 to September 1991, October 1991 to September 1993 (seasonal records), October 1993 to September 1996 (discontinued).

REVISED RECORD.--WDR WA-79-1: Drainage area. WDR WA-84: Datum.

GAGE.--Water-stage recorder. Datum of gage is 111.0 ft above sea level. June 1945 to October 1949 at different datum.

REMARKS.--Records fair except for estimated daily discharges, which are poor. No known diversion or regulation.

AVERAGE DISCHARGE.--13 years (water years 1946-49, 1980-81, 1985-86, 1990-91, 1994-96), 26.9 ft<sup>3</sup>/s, 26.32 in/yr, 19,510 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 420 ft<sup>3</sup>/s Jan. 18, 1986, gage height, 4.54 ft; minimum discharge, 3.1 ft<sup>3</sup>/s Aug. 22, 1946, gage height, 1.34 ft at datum then is use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 287 ft<sup>3</sup>/s Feb. 9, gage height, 3.49 ft; minimum daily discharge, 5.0 ft<sup>3</sup>/s Aug. 25, 26.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	14	13	129	53	37	32	48	46	18	7.6	5.9	e5.6
2	19	12	109	47	35	31	54	45	16	6.8	16	e5.4
3	35	12	88	44	31	31	43	53	14	6.3	22	e6.4
4	24	12	113	47	35	31	37	39	13	7.7	14	e7.4
5	13	13	88	46	63	29	31	32	12	7.3	17	e8.8
6	16	18	70	58	94	28	34	27	12	6.9	15	e8.4
7	9.8	41	58	113	97	26	33	29	13	6.1	10	e7.5
8	6.0	95	50	102	203	25	26	30	13	5.8	8.2	e6.9
9	9.9	85	55	79	245	24	23	26	12	e5.9	7.2	e6.8
10	32	55	88	66	154	30	21	22	12	e5.8	6.8	e6.6
11	50	106	139	55	104	36	21	24	14	e5.8	e6.6	e6.2
12	32	74	133	47	77	33	22	25	16	e5.7	e6.4	e6.2
13	21	58	126	44	62	28	21	51	15	e5.6	e6.2	e6.5
14	14	46	127	49	52	25	26	42	11	e5.5	e6.4	e7.0
15	18	39	124	95	45	26	23	35	10	e5.5	e5.9	e12
16	23	34	96	118	41	24	49	29	9.1	e5.5	e5.9	e9.4
17	38	30	78	100	45	23	37	29	9.1	5.6	e6.0	e9.4
18	38	30	83	80	65	24	33	32	8.9	8.1	e5.8	e8.3
19	26	26	73	74	75	25	27	32	8.6	13	e5.8	e9.8
20	25	22	62	96	70	24	24	29	8.9	12	e5.8	13
21	29	19	54	128	65	22	20	25	8.7	22	e5.8	9.1
22	23	22	47	114	67	32	20	43	8.8	17	e5.5	9.6
23	19	38	42	95	78	30	99	48	12	12	e5.4	15
24	18	41	37	94	69	26	113	38	13	10	e5.2	9.4
25	16	45	34	80	56	23	86	31	12	8.8	e5.0	6.3
26	33	37	32	68	48	21	78	26	10	7.6	e5.0	5.4
27	28	51	31	59	41	22	91	22	9.8	7.1	e5.2	7.6
28	22	162	32	53	40	21	70	19	9.9	6.4	e5.3	5.7
29	18	171	54	47	36	20	53	22	9.6	6.1	e5.2	5.4
30	16	142	63	49	---	22	41	22	8.5	5.9	e5.5	5.8
31	14	---	61	40	---	30	---	20	---	5.8	e6.0	---
TOTAL	699.7	1549	2376	2240	2130	824	1304	993	347.9	247.2	242.0	236.9
MEAN	22.6	51.6	76.6	72.3	73.4	26.6	43.5	32.0	11.6	7.97	7.81	7.90
MAX	50	171	139	128	245	36	113	53	18	22	22	15
MIN	6.0	12	31	40	31	20	20	19	8.5	5.5	5.0	5.4
AC-FT	1390	3070	4710	4440	4220	1630	2590	1970	690	490	480	470
CFSM	1.62	3.71	5.51	5.20	5.28	1.91	3.13	2.30	.83	.57	.56	.57
IN.	1.87	4.15	6.36	5.99	5.70	2.21	3.49	2.66	.93	.66	.65	.63

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

	MEAN	15.0	34.1	53.2	48.1	50.5	34.7	28.8	18.6	13.9	8.92	7.71	9.37
MAX	39.1	57.5	76.6	72.3	73.4	48.5	53.3	41.2	27.8	15.4	13.1	15.2	
(WY)	1982	1991	1996	1996	1996	1980	1991	1948	1993	1993	1990	1990	
MIN	6.67	11.4	24.1	23.6	28.8	23.3	19.9	10.5	8.18	6.46	5.21	6.57	
(WY)	1988	1980	1986	1985	1985	1985	1986	1947	1987	1945	1946	1989	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1945 - 1996

ANNUAL TOTAL	10405.0	13189.7	
ANNUAL MEAN	28.5	36.0	26.9
HIGHEST ANNUAL MEAN			36.0
LOWEST ANNUAL MEAN			20.1
HIGHEST DAILY MEAN	171	Nov 29	340
LOWEST DAILY MEAN	3.9	Jul 8	3.7
ANNUAL SEVEN-DAY MINIMUM	5.0	Sep 8	4.5
ANNUAL RUNOFF (AC-FT)	20640	26160	19510
ANNUAL RUNOFF (CFSM)	2.05	2.59	1.94
ANNUAL RUNOFF (INCHES)	27.85	35.30	26.32
10 PERCENT EXCEEDS	58	87	50
50 PERCENT EXCEEDS	20	25	14
90 PERCENT EXCEEDS	6.2	6.0	6.5

e Estimated

## LAKE WASHINGTON BASIN

12125200 SAMMAMISH RIVER NEAR WOODINVILLE, WA

LOCATION.--Lat 47°42'15", long 122°08'29", in SW 1/4 SW 1/4 sec.26, T.26 N., R.5 E., King County, Hydrologic Unit 17110012, on right bank 3.9 mi upstream from Bear Creek, 3.6 mi southeast of Woodinville, and at mile 10.8.

DRAINAGE AREA.--159 mi<sup>2</sup>, includes 1.9 mi<sup>2</sup> of Cedar River drainage from upper Rock Creek which is normally diverted into Issaquah Creek.

PERIOD OF RECORD.--January 1965 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level (Corps of Engineers bench mark). Prior to July 7, 1970, auxiliary water-stage recorder 2 mi downstream from base gage at same datum.

REMARKS.--No estimated daily discharges. Records fair. Some regulation at Sammamish Lake. Many small diversions for irrigation and domestic use. Water temperatures August 1965 to February 1967.

AVERAGE DISCHARGE.--31 years (water years 1966-96), 307 ft<sup>3</sup>/s, 26.20 in/yr, 222,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,470 ft<sup>3</sup>/s Feb. 9, 1996, elevation, 25.76 ft; minimum daily discharge, 25 ft<sup>3</sup>/s Aug. 2, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,470 ft<sup>3</sup>/s Feb. 9, elevation, 25.76 ft; minimum discharge, 59 ft<sup>3</sup>/s Sept. 10, 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	95	87	1360	417	475	481	338	566	328	130	85	64
2	114	83	1360	392	439	452	370	531	308	127	110	63
3	167	81	1260	382	410	440	327	557	296	126	124	74
4	121	79	1410	379	441	431	305	489	284	132	101	75
5	92	78	1260	364	548	421	284	444	267	126	104	75
6	83	81	1120	396	766	405	298	409	257	123	97	70
7	79	137	1000	678	836	382	292	396	246	119	91	68
8	76	393	878	663	1660	364	278	384	237	116	87	66
9	73	396	838	588	2430	356	266	356	228	112	83	61
10	167	310	990	541	2230	375	259	340	218	111	81	59
11	243	556	1320	496	2020	396	262	320	213	107	82	61
12	163	487	1220	457	1820	372	263	332	206	105	81	62
13	131	435	1170	439	1610	348	261	484	200	102	78	64
14	114	401	1160	465	1390	332	257	449	190	104	75	73
15	101	379	1180	726	1200	327	264	419	183	102	72	111
16	136	366	988	957	1040	315	368	393	176	99	72	85
17	168	347	873	953	967	303	339	386	173	102	71	84
18	163	345	885	880	1020	291	332	401	176	107	70	81
19	131	321	772	846	1040	291	325	403	171	116	66	97
20	139	301	681	948	980	285	317	379	165	113	68	105
21	155	285	612	1140	926	273	304	363	162	112	68	103
22	131	288	553	1120	900	309	312	463	159	109	66	97
23	120	352	504	1040	953	299	758	515	169	104	64	93
24	116	356	463	1030	836	279	911	479	160	102	65	88
25	110	414	425	949	743	262	781	456	153	99	63	83
26	133	400	393	860	672	249	778	431	148	98	61	79
27	130	449	366	768	610	239	801	409	144	97	63	75
28	115	868	350	703	557	233	691	400	141	97	65	76
29	105	1130	430	636	516	236	615	385	137	93	63	76
30	99	1310	466	568	---	234	554	372	134	89	66	77
31	93	---	453	515	---	255	---	351	---	87	67	---
TOTAL	3863	11515	26740	21296	30035	10235	12510	13062	6029	3366	2409	2345
MEAN	125	384	863	687	1036	330	417	421	201	109	77.7	78.2
MAX	243	1310	1410	1140	2430	481	911	566	328	132	124	111
MIN	73	78	350	364	410	233	257	320	134	87	61	59
AC-FT	7660	22840	53040	42240	59570	20300	24810	25910	11960	6680	4780	4650
CFSM	.78	2.41	5.43	4.32	6.51	2.08	2.62	2.65	1.26	.68	.49	.49
IN.	.90	2.69	6.26	4.98	7.03	2.39	2.93	3.06	1.41	.79	.56	.55

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1965 - 1996, BY WATER YEAR (WY)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	117	303	579	616	558	474	363	235	182	107	72.1	86.2																				
MAX	338	681	1078	946	1066	1214	675	421	373	175	124	189																				
(WY)	1982	1976	1976	1967	1982	1972	1991	1996	1993	1972	1976	1978																				
MIN	49.8	70.1	186	246	200	246	199	150	84.7	59.8	33.1	43.0																				
(WY)	1988	1988	1977	1993	1977	1993	1992	1994	1992	1994	1994	1994																				

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1965 - 1996
ANNUAL TOTAL	112728	143405	
ANNUAL MEAN	309	392	307
HIGHEST ANNUAL MEAN			442
LOWEST ANNUAL MEAN			179
HIGHEST DAILY MEAN	1410	2430	2430
LOWEST DAILY MEAN	54	59	25
ANNUAL SEVEN-DAY MINIMUM	57	63	29
ANNUAL RUNOFF (AC-FT)	223600	284400	222100
ANNUAL RUNOFF (CFSM)	1.94	2.46	1.93
ANNUAL RUNOFF (INCHES)	26.37	33.55	26.20
10 PERCENT EXCEEDS	621	950	664
50 PERCENT EXCEEDS	224	298	218
90 PERCENT EXCEEDS	68	76	66

## LAKE WASHINGTON BASIN

221

12128000 THORNTON CREEK NEAR SEATTLE, WA

LOCATION.--Lat 47°41'45", long 122°16'30", in NW 1/4 SE 1/4 sec.34, T.26 N., R.4 E., King County, Hydrblogic Unit 17110012, on left bank, at highway crossing, 1.5 mi north of Seattle city limits, and at mile 0.25.

DRAINAGE AREA.--12.1 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1945 to September 1946, May 1961 to September 1968, March to September 1996.

GAGE.--Water-stage recorder and concrete control. Elevation of gage is 40 ft above sea level, from topographic map. June 1945 to September 1946 at datum 0.09 ft higher.

REMARKS.--No estimated daily discharges. Records good. Intermittent regulation and diversions.

AVERAGE DISCHARGE.--8 years (water years 1946, 1962-68), 13.1 ft<sup>3</sup>/s, 14.75 in/yr, 9,520 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 261 ft<sup>3</sup>/s Jan. 19, 1967, gage height, 4.28 ft, from rating extended above 44 ft<sup>3</sup>/s on basis of flow-through-culvert computation; minimum discharge, 0.63 ft<sup>3</sup>/s July 31, 1996.

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--Maximum discharge, 113 ft<sup>3</sup>/s Sept. 3, gage height, 2.96 ft; minimum discharge, 0.63 ft<sup>3</sup>/s July 31.

DISCHARGE, CUBIC FEET PER SECOND, MARCH TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	---	---	21	14	5.8	3.9	4.0	4.6
2	---	---	---	---	---	---	14	14	5.6	3.9	8.6	4.5
3	---	---	---	---	---	---	9.2	17	5.3	3.6	4.9	17
4	---	---	---	---	---	---	7.7	9.3	5.0	4.5	3.6	6.7
5	---	---	---	---	---	---	7.2	8.3	5.1	3.5	4.5	5.8
6	---	---	---	---	---	---	12	7.6	5.1	3.5	5.0	5.4
7	---	---	---	---	---	---	7.5	8.3	5.0	3.3	4.9	5.4
8	---	---	---	---	---	8.5	6.7	7.6	5.0	3.2	4.6	5.2
9	---	---	---	---	---	9.7	6.3	7.0	5.1	3.2	4.4	4.9
10	---	---	---	---	---	15	6.3	6.7	4.7	3.1	4.6	4.7
11	---	---	---	---	---	17	8.9	6.7	4.9	2.9	4.5	4.7
12	---	---	---	---	---	10	7.7	12	4.8	2.9	4.3	4.6
13	---	---	---	---	---	9.1	9.1	22	4.9	2.9	4.3	6.1
14	---	---	---	---	---	8.7	6.4	13	4.5	2.8	4.1	12
15	---	---	---	---	---	8.6	8.7	8.4	4.5	2.7	4.0	21
16	---	---	---	---	---	8.4	19	7.4	4.7	2.8	4.4	7.9
17	---	---	---	---	---	8.1	7.9	14	5.6	4.6	4.7	7.7
18	---	---	---	---	---	7.9	6.8	20	5.6	4.0	4.7	8.2
19	---	---	---	---	---	8.0	6.3	9.8	5.1	4.2	4.6	9.5
20	---	---	---	---	---	7.4	6.1	7.5	4.8	3.6	4.5	6.0
21	---	---	---	---	---	7.6	5.9	8.0	4.8	3.3	4.3	7.8
22	---	---	---	---	---	16	16	24	4.6	3.2	4.2	5.8
23	---	---	---	---	---	9.2	55	11	12	3.1	4.2	5.3
24	---	---	---	---	---	8.1	28	7.8	6.4	2.9	4.4	5.1
25	---	---	---	---	---	7.8	28	6.9	5.4	2.7	4.5	5.1
26	---	---	---	---	---	7.8	21	6.4	4.8	2.8	4.4	5.0
27	---	---	---	---	---	8.0	16	6.2	5.7	2.7	4.3	4.9
28	---	---	---	---	---	7.7	12	9.4	5.0	2.7	4.2	5.0
29	---	---	---	---	---	7.5	9.6	7.2	4.2	2.7	4.1	4.9
30	---	---	---	---	---	7.1	11	6.3	4.1	2.7	7.0	4.9
31	---	---	---	---	---	16	---	6.1	---	3.1	4.8	---
TOTAL	---	---	---	---	---	---	387.3	319.9	158.1	101.0	143.6	205.7
MEAN	---	---	---	---	---	---	12.9	10.3	5.27	3.26	4.63	6.86
MAX	---	---	---	---	---	---	55	24	12	4.6	8.6	21
MIN	---	---	---	---	---	---	5.9	6.1	4.1	2.7	3.6	4.5
AC-FT	---	---	---	---	---	---	768	635	314	200	285	408
CFSM	---	---	---	---	---	---	1.07	.85	.44	.27	.38	.57
IN.	---	---	---	---	---	---	1.19	.98	.49	.31	.44	.63

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956
MEAN	10.3	16.6	19.7	21.6	19.4	17.0	13.6	9.35	8.75	6.16	6.47	8.70
MAX	17.9	29.7	30.7	36.2	45.0	34.4	25.8	13.6	14.9	10.1	10.1	17.3
(WY)	1946	1946	1946	1946	1946	1946	1946	1946	1946	1946	1945	1945
MIN	7.87	7.96	15.1	12.9	11.1	10.2	10.3	6.91	5.27	3.26	4.41	5.49
(WY)	1965	1968	1964	1963	1962	1965	1962	1968	1996	1996	1967	1967

## SUMMARY STATISTICS

## WATER YEARS 1945 - 1996

ANNUAL MEAN	13.1
HIGHEST ANNUAL MEAN	23.0
LOWEST ANNUAL MEAN	10.2
HIGHEST DAILY MEAN	92
LOWEST DAILY MEAN	2.4
ANNUAL SEVEN-DAY MINIMUM	2.6
ANNUAL RUNOFF (AC-FT)	9520
ANNUAL RUNOFF (CFSM)	1.09
ANNUAL RUNOFF (INCHES)	14.75
10 PERCENT EXCEEDS	24
50 PERCENT EXCEEDS	9.6
90 PERCENT EXCEEDS	5.0



## WATER-QUALITY RECORDS

PERIOD OF RECORD.--March 1996 to September 1996.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March to September 1996.

WATER TEMPERATURE: March to September 1996.

DISSOLVED OXYGEN: March to September 1996.

INSTRUMENTATION.--Water-quality monitor since March 1996. Electronic data logger with fifteen-minute recording interval.

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 330 microsiemens Aug. 13, but may have been higher during periods of missing record; minimum recorded, 60 microsiemens May 22, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum recorded, 21.5°C July 29; minimum recorded, 5.0°C Mar. 25.

DISSOLVED OXYGEN: Maximum recorded, 12.7 mg/l Mar. 20, but may have been higher during periods of missing record; minimum recorded, 5.0 mg/l Apr. 7, but may have been lower during periods of missing record.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	229	198	221
8	---	---	---	240	234	236	---	---	---	227	208	220
9	---	---	---	240	192	235	---	---	---	238	227	231
10	---	---	---	213	152	183	---	---	---	241	236	237
11	---	---	---	210	107	166	---	---	---	245	239	241
12	---	---	---	230	210	221	---	---	---	246	80	216
13	---	---	---	235	229	231	---	---	---	183	80	137
14	---	---	---	239	234	237	---	---	---	206	151	179
15	---	---	---	239	232	236	---	---	---	229	206	220
16	---	---	---	240	235	237	---	---	---	241	229	235
17	---	---	---	243	233	238	---	---	---	243	136	181
18	---	---	---	243	236	240	---	---	---	182	66	123
19	---	---	---	245	232	240	---	---	---	164	113	142
20	---	---	---	248	233	241	---	---	---	188	164	177
21	---	---	---	248	235	242	---	---	---	207	180	192
22	---	---	---	235	123	186	---	---	---	180	60	106
23	---	---	---	240	214	229	---	---	---	167	115	146
24	---	---	---	247	239	242	---	---	---	189	167	180
25	---	---	---	250	242	246	---	---	---	203	189	197
26	---	---	---	253	242	248	---	---	---	214	203	208
27	---	---	---	253	242	249	---	---	---	219	214	216
28	---	---	---	256	244	250	---	---	---	218	174	197
29	---	---	---	---	---	---	---	---	---	215	194	205
30	---	---	---	---	---	---	---	---	---	226	215	220
31	---	---	---	---	---	---	---	---	---	243	226	230
MONTH	---	---	---	---	---	---	---	---	---	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	243	233	236	258	253	256	272	257	260	265	259	261
2	242	237	238	258	254	256	272	124	203	295	264	267
3	245	241	243	259	241	256	224	126	190	288	94	207
4	247	243	245	250	190	220	248	224	237	273	200	226
5	252	245	247	262	245	253	249	230	240	244	236	240
6	252	247	249	259	257	258	266	235	246	288	244	248
7	254	250	252	261	258	260	278	249	252	252	246	250
8	256	250	253	263	254	259	255	252	253	254	244	249
9	257	252	255	264	254	257	266	253	256	303	246	253
10	257	254	256	283	252	259	258	254	256	323	246	251
11	295	256	262	269	253	257	259	255	257	252	245	249
12	259	256	257	270	244	255	277	256	258	253	249	251
13	261	256	259	257	250	253	330	259	282	254	209	245
14	264	257	259	257	252	255	264	258	261	230	63	191
15	261	257	259	266	250	257	264	256	259	168	63	121
16	260	258	259	272	249	255	260	258	259	200	168	187
17	262	248	259	255	169	216	262	259	260	200	176	188
18	264	244	255	242	221	235	264	261	262	211	143	200
19	269	256	262	234	198	216	267	262	264	199	137	166
20	268	256	263	250	233	242	266	261	264	219	199	210
21	269	258	264	256	249	251	265	264	264	221	164	206
22	268	260	265	256	252	254	266	263	264	223	169	205
23	268	127	208	265	254	256	267	263	265	229	223	226
24	241	182	218	273	252	260	273	263	266	233	229	231
25	253	240	247	293	256	262	269	263	266	235	228	231
26	257	249	254	274	251	258	270	260	266	238	235	237
27	258	197	245	263	258	260	311	266	269	240	238	239
28	250	199	234	261	257	259	304	267	271	243	240	241
29	254	250	252	270	259	262	300	266	271	245	243	244
30	258	253	254	274	258	262	293	191	247	248	243	245
31	---	---	---	262	251	255	259	240	255	---	---	---
MONTH	295	127	250	293	169	252	330	124	256	323	63	225

## LAKE WASHINGTON BASIN

223

12128000 THORNTON CREEK NEAR SEATTLE, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	11.5	9.0	10.0	12.0	10.5	11.0
2	---	---	---	---	---	---	11.0	8.5	9.5	12.5	10.0	11.0
3	---	---	---	---	---	---	11.5	7.0	9.5	13.0	9.5	11.0
4	---	---	---	---	---	---	12.5	8.0	10.5	12.5	9.5	11.0
5	---	---	---	---	---	---	13.0	10.0	11.5	14.0	9.5	11.5
6	---	---	---	---	---	---	12.5	11.5	12.0	12.0	10.5	11.5
7	---	---	---	---	---	---	16.0	11.0	13.5	11.0	10.0	10.5
8	---	---	---	11.0	9.0	10.0	16.0	12.0	13.5	12.0	9.5	10.5
9	---	---	---	11.5	9.5	10.5	13.5	12.0	13.0	12.5	9.0	10.5
10	---	---	---	12.5	10.5	11.0	13.0	11.0	12.0	12.0	9.5	11.0
11	---	---	---	11.0	9.5	10.5	12.0	10.5	11.5	12.5	10.0	11.0
12	---	---	---	10.5	9.0	9.5	11.0	10.0	10.5	14.5	11.5	12.5
13	---	---	---	11.0	8.0	9.5	13.0	10.0	11.0	14.5	13.5	14.0
14	---	---	---	11.5	7.5	9.5	14.5	9.5	11.5	14.0	12.5	13.5
15	---	---	---	10.5	8.5	10.0	14.0	11.5	12.5	13.0	11.5	12.5
16	---	---	---	9.5	7.0	8.5	13.5	11.5	12.5	15.5	11.0	12.5
17	---	---	---	10.5	8.5	9.5	12.5	10.0	11.0	14.0	12.0	13.0
18	---	---	---	11.5	7.0	9.0	12.0	9.5	10.5	14.5	12.0	13.0
19	---	---	---	11.5	9.0	10.0	11.0	9.5	10.5	14.5	12.0	13.0
20	---	---	---	11.0	8.0	9.5	13.5	9.0	11.0	14.5	11.5	12.5
21	---	---	---	11.5	8.0	9.5	13.5	9.0	11.0	12.5	11.0	11.5
22	---	---	---	10.0	8.5	9.0	13.0	10.5	11.5	13.0	11.0	12.0
23	---	---	---	10.5	7.5	9.0	12.5	11.0	12.0	13.5	11.5	12.5
24	---	---	---	9.5	6.5	8.0	13.5	11.0	12.0	15.5	11.0	13.0
25	---	---	---	9.5	5.0	7.5	11.5	10.5	11.0	15.5	12.0	14.0
26	---	---	---	9.5	6.0	8.0	12.5	10.0	11.0	16.0	12.0	14.0
27	---	---	---	10.0	7.5	8.5	12.5	10.5	11.5	13.5	12.5	13.0
28	---	---	---	10.5	6.5	8.5	12.0	9.5	10.5	13.5	12.0	12.5
29	---	---	---	10.0	7.5	8.5	13.0	10.5	11.5	13.0	12.0	12.5
30	---	---	---	10.5	7.0	9.0	12.0	10.5	11.5	13.5	11.5	12.5
31	---	---	---	10.5	8.5	9.0	---	---	---	15.5	11.0	13.0
MONTH	---	---	---	---	---	---	16.0	7.0	11.4	16.0	9.0	12.2

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	16.0	12.5	14.0	18.5	13.5	16.0	17.0	15.0	16.0	17.0	14.5	15.5
2	17.0	13.0	15.0	18.5	15.0	16.5	17.5	15.0	16.5	16.5	13.5	15.0
3	17.0	14.0	15.5	16.5	15.0	15.5	16.5	15.5	16.0	16.5	15.0	16.0
4	16.0	13.5	14.5	16.0	14.5	15.0	16.5	15.0	15.5	15.5	14.0	14.5
5	16.5	13.0	14.5	16.5	13.0	15.0	16.5	15.0	15.5	15.5	14.0	14.5
6	17.0	13.0	15.0	17.5	13.0	15.0	17.5	14.5	16.0	15.0	14.0	14.5
7	15.5	13.5	14.5	18.5	13.5	16.0	18.0	14.5	16.0	16.0	14.5	15.0
8	16.0	12.0	14.0	19.0	15.0	17.0	19.0	15.0	17.0	16.5	15.5	15.5
9	15.5	12.5	14.0	17.0	15.0	15.5	19.0	15.0	17.0	16.5	14.0	15.0
10	15.5	12.0	14.0	18.0	13.5	15.5	19.0	15.5	17.5	16.5	13.5	15.0
11	16.0	13.0	14.0	19.0	14.0	16.5	17.5	16.0	16.5	16.5	14.0	15.0
12	16.0	11.5	14.0	20.0	15.0	17.5	18.5	15.0	16.5	16.0	15.0	15.5
13	16.0	12.5	14.0	20.0	15.5	18.0	19.0	15.0	17.0	15.5	15.0	15.0
14	16.5	12.5	14.0	20.5	16.0	18.5	19.0	15.5	17.0	15.5	15.0	15.5
15	16.5	12.0	14.0	21.0	16.5	19.0	18.0	15.0	16.5	16.0	15.0	15.5
16	14.5	12.0	13.0	18.0	15.5	16.5	17.0	15.5	16.0	16.0	14.0	15.0
17	14.5	12.0	13.5	16.0	14.5	15.0	16.5	14.5	15.5	15.5	14.0	15.0
18	15.0	12.0	13.5	15.5	14.0	14.0	16.5	14.0	15.0	14.5	13.0	13.5
19	16.0	12.0	14.0	15.5	14.0	14.5	16.0	14.0	15.0	14.5	14.0	14.5
20	17.0	12.0	14.5	16.0	14.0	15.0	16.5	15.0	15.5	14.0	13.0	13.5
21	16.5	13.5	14.5	18.0	14.0	16.0	16.5	13.5	15.0	14.0	13.0	13.5
22	15.0	13.5	14.0	19.0	14.5	16.5	17.5	13.5	15.5	13.5	12.0	13.0
23	16.5	13.0	14.5	20.0	15.5	17.5	18.0	14.0	16.0	13.0	10.5	12.0
24	16.5	13.5	15.0	20.0	15.5	18.0	18.0	14.5	16.5	14.0	11.5	12.5
25	17.0	13.5	15.0	20.5	16.5	18.5	18.0	15.5	16.5	13.5	11.0	12.5
26	17.5	13.5	15.5	20.5	16.5	18.5	17.5	16.0	17.0	14.0	11.0	12.5
27	15.5	14.0	14.5	20.0	16.5	18.5	16.5	15.5	16.0	14.5	12.0	13.0
28	15.0	13.5	14.5	20.0	16.5	18.5	18.0	15.5	16.5	14.5	12.5	13.5
29	17.0	13.0	14.5	21.5	17.0	19.0	19.0	15.5	17.5	14.0	12.5	13.5
30	17.5	13.0	15.0	19.0	16.0	17.5	19.0	16.5	17.5	14.5	12.5	13.5
31	---	---	---	19.0	15.0	17.0	17.5	16.0	16.5	---	---	---
MONTH	17.5	11.5	14.3	21.5	13.0	16.7	19.0	13.5	16.3	17.0	10.5	14.3

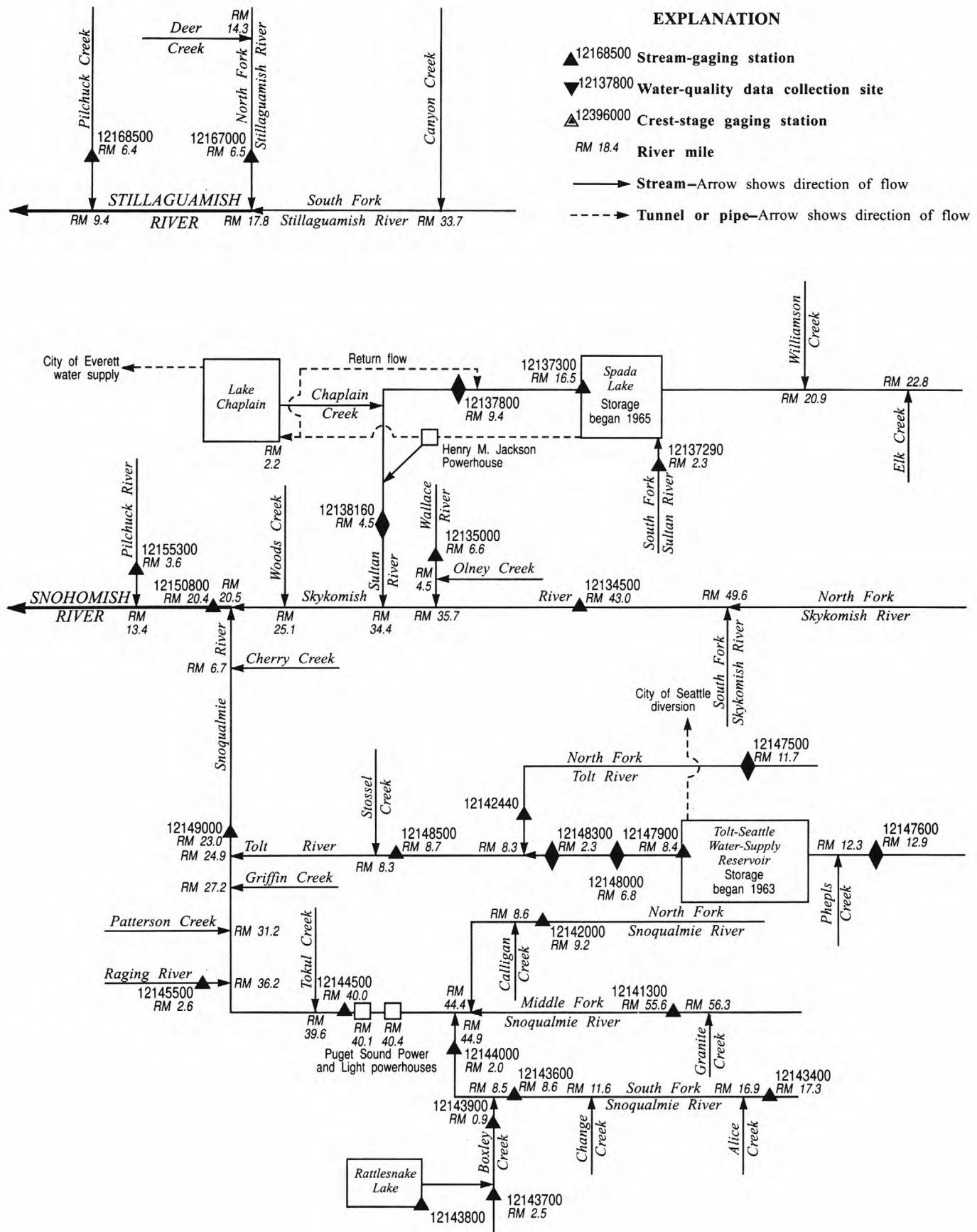
## LAKE WASHINGTON BASIN

12128000 THORNTON CREEK NEAR SEATTLE, WA--Continued

OXYGEN DISSOLVED (MG/L), MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	---	---	---	---	---	---	10.1	9.6	9.9	10.4	9.6	10.0
2	---	---	---	---	---	---	10.8	9.7	10.1	10.4	9.7	10.1
3	---	---	---	---	---	---	11.5	9.6	10.5	10.5	9.5	10.0
4	---	---	---	---	---	---	11.7	9.3	10.4	10.4	9.7	10.0
5	---	---	---	---	---	---	11.9	9.1	10.1	10.5	9.6	10.1
6	---	---	---	---	---	---	10.7	9.1	9.7	10.5	9.5	9.9
7	---	---	---	---	---	---	11.2	5.0	9.6	10.2	9.6	9.9
8	---	---	---	11.9	10.6	11.1	11.1	7.4	9.3	10.5	9.9	10.1
9	---	---	---	12.0	10.3	10.9	11.2	8.6	9.6	10.6	9.9	10.3
10	---	---	---	11.6	10.3	10.8	11.7	8.2	9.9	10.7	10.0	10.3
11	---	---	---	11.0	10.4	10.7	11.3	8.5	9.8	10.7	10.0	10.3
12	---	---	---	11.9	10.7	11.1	11.3	9.3	10.1	10.5	9.5	10.1
13	---	---	---	12.1	10.6	11.2	11.2	9.4	10.0	10.2	9.7	10.0
14	---	---	---	12.2	10.5	11.2	11.7	8.9	10.1	10.4	9.8	10.1
15	---	---	---	12.3	10.6	11.2	10.4	8.5	9.5	10.7	10.2	10.4
16	---	---	---	12.4	10.9	11.5	10.1	9.1	9.5	10.9	9.7	10.3
17	---	---	---	12.5	10.6	11.4	10.8	9.1	9.8	10.1	9.5	9.9
18	---	---	---	12.5	10.3	11.3	11.0	9.1	9.9	10.2	9.7	9.9
19	---	---	---	12.3	10.4	11.1	11.1	9.0	10.1	10.6	9.9	10.2
20	---	---	---	12.7	10.3	11.2	11.3	9.3	10.2	10.7	10.1	10.3
21	---	---	---	12.5	9.8	11.0	11.5	9.2	10.2	10.6	10.0	10.3
22	---	---	---	10.8	9.3	10.2	10.7	9.1	9.7	10.7	9.9	10.3
23	---	---	---	12.1	10.4	11.0	9.9	9.4	9.7	10.8	10.2	10.5
24	---	---	---	12.3	10.6	11.3	10.1	9.6	9.9	10.8	9.8	10.3
25	---	---	---	12.4	10.5	11.4	10.2	9.8	10.0	10.6	9.7	10.1
26	---	---	---	12.5	10.2	11.3	10.3	9.6	10.0	10.6	9.7	10.1
27	---	---	---	12.3	10.3	11.0	10.2	9.6	9.9	10.6	9.5	10.2
28	---	---	---	12.4	10.1	11.1	10.2	9.3	9.8	10.5	9.7	10.1
29	---	---	---	12.2	9.6	10.7	10.1	9.3	9.7	10.5	9.9	10.1
30	---	---	---	12.1	9.5	10.6	10.2	9.4	10.0	10.7	9.8	10.2
31	---	---	---	11.6	9.5	10.3	---	---	---	10.7	9.6	10.2
MONTH	---	---	---	---	---	---	11.9	5.0	9.9	10.9	9.5	10.1
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	10.6	9.6	10.1	9.8	8.7	9.3	---	---	---	9.5	8.9	9.2
2	10.4	9.4	9.9	9.7	8.7	9.1	---	---	---	9.6	8.9	9.2
3	10.3	9.4	9.8	9.4	8.3	8.9	---	---	---	9.2	8.7	9.0
4	10.3	9.1	9.8	9.3	8.1	8.8	---	---	---	9.4	8.9	9.2
5	10.3	9.1	9.7	9.7	8.8	9.2	---	---	---	9.4	9.0	9.3
6	10.3	9.2	9.7	9.5	8.5	9.0	---	---	---	9.5	9.1	9.3
7	10.5	9.3	9.8	9.2	7.8	8.6	---	---	---	9.4	8.7	9.2
8	10.5	9.5	10.0	9.0	7.9	8.5	---	---	---	9.1	8.6	8.9
9	10.5	9.6	10.0	9.2	8.3	8.9	---	---	---	9.4	8.7	9.1
10	10.5	9.7	10.1	9.5	8.4	9.0	---	---	---	9.3	8.7	9.0
11	10.3	9.5	9.8	9.3	8.0	8.7	---	---	---	9.2	8.7	8.9
12	10.3	9.1	9.9	9.1	7.9	8.6	---	---	---	---	---	---
13	10.2	9.1	9.6	9.0	8.0	8.5	---	---	---	---	---	---
14	10.3	9.5	9.8	8.9	7.9	8.4	---	---	---	---	---	---
15	10.3	9.5	9.9	8.7	7.7	8.2	---	---	---	---	---	---
16	10.4	9.6	10.0	9.2	8.1	8.5	---	---	---	---	---	---
17	10.2	8.6	9.7	8.8	8.1	8.4	---	---	---	---	---	---
18	---	---	---	9.2	8.5	8.8	---	---	---	---	---	---
19	---	---	---	9.2	8.5	8.9	---	---	---	---	---	---
20	---	---	---	9.5	8.8	9.1	---	---	---	---	---	---
21	---	---	---	9.5	8.5	9.0	---	---	---	---	---	---
22	---	---	---	9.3	8.1	8.8	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	10.1	8.9	9.6	---	---	---	---	---	---	---	---	---
29	10.1	9.3	9.7	---	---	---	---	---	---	---	---	---
30	10.1	9.0	9.6	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	9.2	8.3	8.9	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	---	---	---





**Figure 44.** Schematic diagram showing surface-water and water-quality stations in the Snohomish and Stillaguamish River Basins.



## 12134500 SKYKOMISH RIVER NEAR GOLD BAR, WA

LOCATION.--Lat 47°50'15", long 121°39'56", in SW 1/4 SW 1/4 sec.9, T.27 N., R.9 E., Snohomish County, Hydrologic Unit 17110009, on right bank 2.0 mi southeast of Gold Bar, 7.3 mi upstream from Wallace River, and at mile 43.0.

DRAINAGE AREA.--535 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1928 to current year.

REVISED RECORDS.--WSP 1316: 1932-35(M), 1944(M).

GAGE.--Water-stage recorder. Datum of gage is 209.26 ft above sea level.

REMARKS.--Records good except those for the period Jan. 26 to Apr. 2 and estimated daily discharges, which are fair. No regulation. Several small diversions upstream from station. Chemical analyses July 1959 to September 1970, October 1977 to June 1980. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--68 years (water years 1929-96), 3,916 ft<sup>3</sup>/s, 99.45 in/yr, 2,837,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 102,000 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 22.49 ft, from rating curve extended above 53,000 ft<sup>3</sup>/s; minimum discharge, 298 ft<sup>3</sup>/s Oct. 30, 1987; minimum gage height, 2.73 ft Dec. 1, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 19,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1545	23,200	11.81	Nov. 25	0200	25,700	12.35
Nov. 8	1530	73,800	19.48	Nov. 29	unknown	*80,400	*20.24
Nov. 11	0630	43,100	15.39	Feb. 7	0545	36,700	14.35
Nov. 14	0015	19,600	11.05	Feb. 8	1830	74,400	19.55
Nov. 23	2000	20,000	11.13				

Minimum discharge, 585 ft<sup>3</sup>/s Sept. 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3010	2660	e35000	e6000	1580	2340	1870	4320	3940	2890	1110	737
2	2110	2330	e23000	e4600	1490	2220	2780	3850	4930	3020	1190	649
3	7400	2100	e15000	e9500	1430	2140	2290	3480	7270	2960	1870	608
4	5090	1950	e9200	e10800	1460	2220	2090	3150	7400	3050	1520	607
5	2920	2130	e8300	e7000	1870	2140	2140	2900	5580	2640	3140	657
6	2140	2640	e7200	e5500	10200	2070	2770	2760	5540	2330	2410	1210
7	2160	12000	e5200	e14800	27600	2040	6150	2700	6290	2260	1750	922
8	2010	58600	e4000	e15300	51000	2010	6900	2660	6000	2430	1470	1150
9	2050	22500	e3200	e12000	34300	2340	7490	2470	5030	2580	1310	1340
10	15500	10500	e4000	e8800	13100	4400	6960	2320	4210	2240	1220	1020
11	14200	27900	e8800	e7000	8320	4880	5750	2230	4290	2130	1150	867
12	9910	13700	e9000	e5400	6350	4570	5060	2500	3980	2220	1090	783
13	6600	12400	e10800	e4200	5690	3800	4280	5760	3880	2260	1030	742
14	4750	17000	e10500	e5500	5790	3350	3740	7260	3900	2230	986	838
15	3910	12800	e8600	e13000	5940	3670	3540	6160	3870	2180	954	1670
16	8830	11200	e7400	e14300	6010	3440	4500	5780	3720	2040	908	2020
17	11400	8200	e5400	e15000	6730	3100	4940	5410	3350	1860	863	1640
18	10600	10400	e4200	e8300	14800	2810	4300	6250	3260	1790	819	1290
19	6670	8050	e3600	e6100	11500	2750	3850	7370	2820	2700	778	1350
20	5150	6230	e3200	e5000	8470	2630	3470	6220	2660	2710	749	1530
21	4910	5150	e2800	e4250	6780	2440	3160	5150	2810	1970	736	1490
22	4370	5560	e2400	e3500	5490	2520	3040	5170	2960	1740	705	1940
23	3650	11900	e2150	e3000	4770	2370	8850	5660	2800	1700	677	1780
24	3400	14800	e2000	2720	4040	2290	14400	5040	2890	1660	659	1460
25	3590	20300	e1850	2440	3570	2110	9570	5670	2910	1600	654	1250
26	12800	13200	e1720	2270	3160	1990	8030	6380	3010	1480	653	1120
27	8700	11400	e1620	2090	2830	1900	7320	5940	3190	1410	652	1020
28	5950	35500	e1580	2010	2560	1810	5950	4980	2950	1370	649	950
29	4530	e65000	e1700	1860	2420	1820	5030	5320	2680	1340	642	886
30	3680	e55000	e2000	1680	--	1780	4580	5050	2740	1280	640	835
31	3100	--	e10600	1640	--	1700	--	4140	--	1210	757	--
TOTAL	185090	483100	216020	205560	259250	81650	154800	144050	120860	65280	33741	34361
MEAN	5971	16100	6968	6631	8940	2634	5160	4647	4029	2106	1088	1145
MAX	15500	65000	35000	15300	51000	4880	14400	7370	7400	3050	3140	2020
MIN	2010	1950	1580	1640	1430	1700	1870	2230	2660	1210	640	607
AC-FT	367100	958200	428500	407700	514200	162000	307000	285700	239700	129500	66930	68160
CFSM	11.2	30.1	13.0	12.4	16.7	4.92	9.64	8.69	7.53	3.94	2.03	2.14
IN.	12.87	33.59	15.02	14.29	18.03	5.68	10.76	10.02	8.40	4.54	2.35	2.39

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

MEAN	2674	4751	4828	4037	3690	3188	4420	6651	6603	3474	1358	1346
MAX	6658	16370	14490	11030	8940	9565	7553	10860	13610	8413	3606	4942
(WY)	1934	1991	1934	1953	1996	1972	1959	1972	1974	1974	1964	1959
MIN	346	534	1231	945	791	1469	1908	3425	1955	971	589	489
(WY)	1988	1937	1986	1937	1929	1955	1975	1941	1992	1941	1992	1987

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1929 - 1996

ANNUAL TOTAL	1874885	1983762	
ANNUAL MEAN	5137	5420	3916
HIGHEST ANNUAL MEAN			5884
LOWEST ANNUAL MEAN			2210
HIGHEST DAILY MEAN	65000	Nov 29	88400
LOWEST DAILY MEAN	524	Sep 26	303
ANNUAL SEVEN-DAY MINIMUM	540	Sep 21	650
ANNUAL RUNOFF (AC-FT)	3719000	3935000	2837000
ANNUAL RUNOFF (CFSM)	9.60	10.1	7.32
ANNUAL RUNOFF (INCHES)	130.37	137.94	99.45
10 PERCENT EXCEEDS	10200	11300	8100
50 PERCENT EXCEEDS	3270	3140	2780
90 PERCENT EXCEEDS	902	1120	852

e Estimated

## SNOHOMISH RIVER BASIN

## 12135000 WALLACE RIVER AT GOLD BAR, WA

LOCATION.--Lat 47°51'51", long 121°40'53", in NE 1/4 NW 1/4 sec.5, T.27 N., R.9 E., Snohomish County, Hydrologic Unit 17110009, on left bank at downstream side of highway bridge, 1.0 mi north of Gold Bar, 2.1 mi upstream from Olney Creek, and at mile 6.6.

DRAINAGE AREA.--18.6 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1928 to September 1933, July 1946 to November 1976, August 1977 to June 1978, July 1980 to September 1988 (seasonal records), October 1988 to September 1991, October 1991 to current year (seasonal records). Monthly discharge only for some periods, published in WSP 1316.

REVISED RECORDS.--WSP 1316: 1930(M), 1932-33(M). WSP 1932: Drainage area. WDR WA-74-1: 1971-73(P). WDR WA-80-1: Drainage area. WDR WA-83-1: 1980.

GAGE.--Water-stage recorder. Datum of gage is 203.00 ft above sea level. December 1928 to Sept. 20, 1933, nonrecording gage 0.8 mi downstream at different datum. July 25, 1946, to June 30, 1978, water-stage recorder 0.8 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow affected by natural storage in Wallace Lake. No diversions upstream from station. Water temperatures July 1955 to September 1972.

AVERAGE DISCHARGE.--38 years (water years 1929-33, 1947-76, 1989-91), 167 ft<sup>3</sup>/s, 119.36 in/yr, 121,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,210 ft<sup>3</sup>/s Feb. 19, 1991, gage height, 7.20 ft; minimum discharge, 5.8 ft<sup>3</sup>/s Aug. 25, 29, 30, 1961.

EXTREMES FOR PERIOD JUNE TO OCTOBER.--Maximum discharge, 1,690 ft<sup>3</sup>/s Oct. 28, gage height, 6.21 ft; minimum discharge, 17 ft<sup>3</sup>/s Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, JUNE TO OCTOBER 1996  
DAILY MEAN VALUES

DAY	JUN	JUL	AUG	SEP	OCT
1	e155	44	e20	24	36
2	e165	42	e35	19	34
3	e170	39	e52	18	33
4	e140	46	e70	25	126
5	e120	42	e225	58	146
6	e110	36	e150	161	63
7	e108	34	e80	54	50
8	e92	33	e58	151	44
9	e82	32	e52	85	40
10	e77	30	e46	49	37
11	e80	28	e42	39	124
12	e74	27	e38	33	86
13	e67	26	e36	31	260
14	e64	25	e33	44	317
15	e62	24	e30	196	461
16	e59	23	e28	135	254
17	e54	24	e26	79	163
18	e76	28	e26	58	263
19	e60	229	e24	98	187
20	e55	100	e24	80	141
21	e53	53	e23	125	163
22	e51	42	e23	134	476
23	e49	36	e21	98	275
24	e52	e33	e20	74	529
25	e52	e31	e19	63	326
26	e47	e28	e19	55	223
27	59	e26	e18	50	169
28	61	e24	18	45	724
29	52	e23	17	42	397
30	46	e22	17	39	226
31	---	e21	27	---	165
TOTAL	2392	1251	1317	2162	6538
MEAN	79.7	40.4	42.5	72.1	211
MAX	170	229	225	196	724
MIN	46	21	17	18	33
AC-FT	4740	2480	2610	4290	12970
CFSM	4.20	2.12	2.24	3.79	11.1
IN.	4.68	2.45	2.58	4.23	12.80

e Estimated

12137290 SOUTH FORK SULTAN RIVER NEAR SULTAN, WA

LOCATION.--Lat 47°56'51", long 121°37'32", in NE 1/4 NE 1/4 sec.3, T.28 N., R.9 E., Snohomish County, Hydrologic Unit 17110009, on left bank, 0.3 mi downstream from bridge, 14 mi northeast of Sultan, and 2 mi upstream from mouth.

DRAINAGE AREA.--11.6 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1991 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,450.53 ft above sea level.

REMARKS.--Records good. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--5 years (water years 1992-96), 112 ft<sup>3</sup>/s, 131.02 in/yr, 81,040 acre-ft/yr.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Nov. 24, 1990, reached a stage of 13.60 ft, discharge, 8,200 ft<sup>3</sup>/s, from slope-area measurement of peak flow.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,420 ft<sup>3</sup>/s Feb. 19, 1995, Nov. 7, 1995, gage height, 11.99 ft; maximum gage height, 12.5 ft (from outside highwater mark) Jan. 25, 1993; minimum discharge, 4.6 ft<sup>3</sup>/s Oct. 9, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	0800	1,570	10.84	Jan. 3	0600	1,380	10.68
Oct. 16	0945	1,330	10.63	Jan. 7	0800	2,340	11.40
Nov. 7	2130	*3,420	*11.99	Feb. 6	1815	2,100	11.24
Nov. 11	0315	1,840	11.06	Feb. 8	1315	3,360	11.96
Nov. 29	0115	3,200	11.88				

Minimum discharge, 9.9 ft<sup>3</sup>/s Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	145	52	319	191	26	35	93	104	118	52	16	15
2	150	44	207	338	25	34	107	94	151	49	46	12
3	376	39	153	797	24	37	64	82	167	46	43	13
4	146	37	133	248	43	39	58	73	127	54	63	14
5	85	53	96	148	173	37	65	68	103	41	268	70
6	77	53	77	333	740	38	181	65	115	37	79	102
7	110	905	66	1280	1170	38	271	67	109	37	47	48
8	132	1290	56	345	2190	61	177	66	88	38	36	133
9	161	315	176	238	581	139	152	61	75	34	30	66
10	1090	211	599	231	218	430	156	56	69	30	26	39
11	502	871	564	154	139	265	135	53	84	29	24	29
12	371	298	393	116	111	170	138	82	70	29	21	25
13	196	325	433	155	110	109	112	271	68	28	20	24
14	132	385	331	688	105	87	93	230	66	26	18	52
15	112	288	204	801	112	91	94	193	63	25	17	163
16	652	205	146	416	108	76	159	158	56	23	16	113
17	640	150	107	187	169	67	146	165	50	24	16	64
18	357	270	107	125	418	59	123	221	71	26	15	48
19	192	157	89	97	230	70	102	216	53	192	15	68
20	143	108	74	81	148	62	91	156	53	84	14	54
21	171	87	64	69	109	54	79	124	54	44	14	109
22	130	224	56	59	88	57	91	197	54	35	13	121
23	100	658	50	54	75	56	449	229	52	31	12	80
24	112	517	45	48	63	51	402	169	60	27	11	57
25	260	440	40	42	55	43	254	168	53	24	11	47
26	448	296	37	38	49	40	204	145	61	22	11	39
27	225	340	35	35	43	37	160	116	63	20	11	34
28	136	1330	38	34	39	34	123	114	68	19	11	30
29	99	1440	95	31	37	34	108	222	53	18	10	27
30	77	421	316	e30	--	32	101	175	51	17	12	25
31	63	--	447	29	--	37	--	123	--	16	23	--
TOTAL	7590	11809	5553	7438	7398	2419	4488	4263	2325	1177	969	1721
MEAN	245	394	179	240	255	78.0	150	138	77.5	38.0	31.3	57.4
MAX	1090	1440	599	1280	2190	430	449	271	167	192	268	163
MIN	63	37	35	29	24	32	58	53	50	16	10	12
AC-FT	15050	23420	11010	14750	14670	4800	8900	8460	4610	2330	1920	3410
CFSM	21.1	33.9	15.4	20.7	22.0	6.73	12.9	11.9	6.68	3.27	2.69	4.95
IN.	24.34	37.87	17.81	23.85	23.72	7.76	14.39	13.67	7.46	3.77	3.11	5.52

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	89.6	190	149	187	145
MAX	245	394	223	240	255
(WY)	1996	1996	1995	1996	1994
MIN	17.1	60.1	64.6	135	57.2
(WY)	1992	1994	1993	1995	1994

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1992 - 1996

ANNUAL TOTAL	52121.9	57150	
ANNUAL MEAN	143	156	
HIGHEST ANNUAL MEAN			112
LOWEST ANNUAL MEAN			156
HIGHEST DAILY MEAN	1470	2190	93.8
LOWEST DAILY MEAN	8.7	10	5.2
ANNUAL SEVEN-DAY MINIMUM	9.1	11	5.5
ANNUAL RUNOFF (AC-FT)	103400	113400	81040
ANNUAL RUNOFF (CFSM)	12.3	13.5	9.64
ANNUAL RUNOFF (INCHES)	167.15	183.27	131.02
10 PERCENT EXCEEDS	317	349	242
50 PERCENT EXCEEDS	85	80	66
90 PERCENT EXCEEDS	19	24	14

e Estimated

## SNOHOMISH RIVER BASIN

12137300 SPADA LAKE NEAR STARTUP, WA

LOCATION.--Lat 47°58'28", long 121°41'10", in NW 1/4 sec.29, T.29 N., R.9 E., Snohomish County, Hydrologic Unit 17110009, Snoqualmie National Forest, on right bank at Culmback Dam on Sultan River, 1.7 mi downstream from South Fork, 7.8 mi north of Startup, and at mile 16.5.

DRAINAGE AREA.--68.3 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1965 to current year.

REVISED RECORDS.--WDR WA-79-1: 1975-76(M). WA-95-1: 1994.

GAGE.--Nonrecording gage. Datum of gage is sea level (levels by Snohomish County P.U.D. No. 1).

REMARKS.--Reservoir is formed by earthfill dam originally completed to elevation 1,408 ft in 1965. Storage began April 5, 1965 for water supply for the city of Everett. During 1983 the dam was raised to elevation 1,470 ft with storage beginning November 1983. Capacity was increased to 153,260 acre-feet at elevation 1,450 ft, crest of spillway. Normal operating pool is between elevations 1,420 ft and 1,460 ft. Figures given herein represent total contents. Spada Lake is used to provide water for the city of Everett, and since June 1, 1984, power generation for Snohomish County Public Utility District No. 1.

COOPERATION.--Elevation at 1200 and 2400 hours and capacity table furnished by Snohomish County Public Utility District No. 1.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents observed, 164,599 acre-ft Nov. 23, 1990, elevation, 1,455.8 ft; minimum contents observed since reservoir was first filled, 4,250 acre-ft Sept. 30, 1967, elevation, 1,301.28 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents observed, 162,058 acre-ft Nov. 28, elevation, 1,454.5 ft; minimum contents observed, 108,383 acre-ft Oct. 1, elevation, 1,423.9 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept.30.....	1,423.3	107,436	--
Oct. 31.....	1,443.1	140,681	+33,245
Nov. 30.....	1,451.8	156,779	+16,098
Dec. 31.....	1,435.4	127,204	-29,575
CAL YR 1995.....			-10,196
Jan. 31.....	1,430.7	119,206	-7,998
Feb. 29.....	1,436.2	128,565	+9,359
Mar. 31.....	1,426.2	112,015	-16,550
Apr. 30.....	1,439.5	134,180	+22,165
May 31.....	1,444.7	143,598	+9,418
June 30.....	1,442.0	138,676	-4,922
July 31.....	1,436.6	129,246	-9,430
Aug. 31.....	1,431.1	119,887	-9,359
Sept.30.....	1,427.2	113,594	-6,293
WTR YR 1996.....	--	--	+6,158

## 12137800 SULTAN RIVER BELOW DIVERSION DAM, NEAR SULTAN, WA

LOCATION---Lat 47°57'34", long 121°47'46", in SE 1/4 NE 1/4 sec.32, T.29 N., R.8 E., Snohomish County, Hydrologic Unit 17110009, on right bank 50 ft upstream from city of Everett diversion dam on Sultan River, 6.8 mi north of Sultan, and at mile 9.4.

DRAINAGE AREA--77.1 mi<sup>2</sup>.

PERIOD OF RECORD--May 1983 to current year.

GAGE--Water-stage recorder and square notch sharp-crested weir in gate of dam. Datum of gage is 600.00 ft above sea level (City of Everett). Prior to Oct. 1, 1989, recording gage at site 350 ft downstream at different datum, Mar. 16 to Sept. 21, 1993, Jan. 7-10, 1994, Feb. 18 to Sept. 21, 1995, Dec. 3-7, 1995, Mar. 14 to Sept. 3, 1996, recording gage at site 1,200 ft downstream, at different datum.

REMARKS--Records good except for estimated daily discharges and those above 400 ft<sup>3</sup>/s, which are poor. Flow regulated at Spada Lake (station 12137300) since Apr. 5, 1965, unadjusted for storage. Since May 1984, water is diverted at Spada Lake through a 10-ft diameter pipeline for power generation at the Jackson Project, and for municipal water supply at Lake Chaplain. Since July 1984, undetermined flows are returned to river at diversion dam by pipeline from Lake Chaplain for maintenance of instream flow requirements.

AVERAGE DISCHARGE--13 years (water years 1984-96), 226 ft<sup>3</sup>/s, 164,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD--Maximum discharge, 19,000 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 63.79 ft, from rating curve, extended above 3,200 ft<sup>3</sup>/s; minimum discharge, 23 ft<sup>3</sup>/s Oct. 30, 1988, result of regulation; minimum daily, 35 ft<sup>3</sup>/s Aug. 23-25, 1983.

EXTREMES FOR CURRENT PERIOD--Maximum discharge, 13,000 ft<sup>3</sup>/s Nov. 29; minimum discharge, 66 ft<sup>3</sup>/s June 18, result of regulation; minimum daily, 69 ft<sup>3</sup>/s June 19

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	193	142	e2000	175	168	220	272	228	138	122	131	110
2	216	121	e900	169	170	224	260	227	129	121	134	109
3	232	121	380	305	169	231	206	229	141	122	129	114
4	192	121	258	289	175	241	206	216	146	125	134	113
5	182	126	243	211	263	222	204	206	145	124	167	121
6	192	129	244	251	441	211	234	203	140	124	125	121
7	186	399	224	506	578	220	270	230	133	124	123	114
8	189	2310	122	249	1000	242	226	243	131	124	126	136
9	208	3460	136	176	967	258	215	228	130	124	125	126
10	615	1280	223	170	773	353	213	212	129	123	129	116
11	384	4580	284	150	328	313	227	205	130	122	128	121
12	317	2830	204	138	171	230	249	209	131	121	127	121
13	190	1310	529	160	171	198	251	294	130	120	127	122
14	191	1880	841	314	169	220	228	287	129	120	126	142
15	195	1270	592	369	170	213	215	238	131	120	126	222
16	381	1010	245	364	169	206	243	225	130	123	126	166
17	472	413	140	198	177	203	229	222	118	125	126	165
18	301	182	135	171	244	205	218	228	95	124	126	163
19	200	146	137	167	292	211	210	227	69	140	127	167
20	192	142	128	167	223	207	231	209	70	122	129	170
21	296	139	122	178	214	206	205	198	71	121	130	231
22	248	124	117	171	214	214	217	262	72	123	130	194
23	201	258	113	170	212	214	325	329	73	124	130	178
24	205	710	115	170	198	212	294	143	75	123	191	174
25	233	2190	114	169	190	206	232	126	115	124	208	173
26	371	1350	113	170	185	204	251	129	144	125	208	176
27	254	880	113	168	180	209	259	131	136	125	200	176
28	191	4470	114	167	178	206	216	140	126	124	200	177
29	183	11600	135	175	192	213	207	243	124	124	184	175
30	189	e4500	187	173	---	212	210	215	123	124	160	176
31	187	---	273	171	---	221	---	161	---	124	118	---
TOTAL	7786	48193	9481	6581	8581	6945	7023	6643	3554	3831	4450	4569
MEAN	251	1606	306	212	296	224	234	214	118	124	144	152
MAX	615	11600	2000	506	1000	353	325	329	146	140	208	231
MIN	182	121	113	138	168	198	204	126	69	120	118	109
AC-FT	15440	95590	18810	13050	17020	13780	13930	13180	7050	7600	8830	9060
CFSM	3.26	20.8	3.97	2.75	3.84	2.91	3.04	2.78	1.54	1.60	1.86	1.98
IN.	3.76	23.25	4.57	3.18	4.14	3.35	3.39	3.21	1.71	1.85	2.15	2.20

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

MEAN	232	525	179	240	252	247	237	266	199	187	123	178
MAX	726	1606	306	898	715	610	483	675	652	983	162	448
(WY)	1986	1996	1996	1984	1984	1984	1984	1984	1983	1983	1985	1983
MIN	159	91.9	93.8	117	166	193	179	178	118	108	60.6	140
(WY)	1988	1988	1988	1988	1988	1988	1987	1988	1996	1988	1983	1984

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1983 - 1996

ANNUAL TOTAL	119686	117637	
ANNUAL MEAN	328	321	226
HIGHEST ANNUAL MEAN			433
LOWEST ANNUAL MEAN			144
HIGHEST DAILY MEAN	11600	Nov 29	16600
LOWEST DAILY MEAN	112	Jan 1	35
ANNUAL SEVEN-DAY MINIMUM	114	Dec 22	75
ANNUAL RUNOFF (AC-FT)	237400	233300	164100
ANNUAL RUNOFF (CFSM)	4.25	4.17	2.94
ANNUAL RUNOFF (INCHES)	57.75	56.76	39.91
10 PERCENT EXCEEDS	320	365	285
50 PERCENT EXCEEDS	202	186	177
90 PERCENT EXCEEDS	120	122	115

e Estimated



## SNOHOMISH RIVER BASIN

## 12138160 SULTAN RIVER BELOW POWERPLANT NEAR SULTAN, WA

LOCATION.--Lat 47°54'27", long 121°48'51", in SW 1/4 SW 1/4 sec.17, T.28 N., R.8 E., Snohomish County, Hydrologic Unit 17110009, on left bank, just downstream from Henry M. Jackson powerplant, 3.2 mi north of Sultan, and at mile 4.5.

DRAINAGE AREA.--94.2 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--October 1983 to current year.

GAGE.--Water-stage recorder. Datum of gage is 267.0 ft above sea level (levels by Snohomish County Public Utility District). Prior to Oct. 1, 1991, at site on right bank, 100 ft downstream at same datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated at Spada Lake (station 12137300) since April 5, 1965; unadjusted for storage. Since May 1984, water is diverted from Spada Lake through a 10 ft diameter, 4 mi long pipeline for power production and returned to the river upstream from the station, at the power plant. Since July 1984, an undetermined flow was returned to river at upstream diversion dam by pipeline from Lake Chaplain for instream flow requirement. Some flows diverted into Lake Chaplain for municipal use by City of Everett.

AVERAGE DISCHARGE.--13 years (water years 1984-96), 712 ft<sup>3</sup>/s, 516,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,300 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 15.03 ft, from rating curve extended above 4,500 ft<sup>3</sup>/s; minimum discharge, 124 ft<sup>3</sup>/s July 14, 15, 1995.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 14,000 ft<sup>3</sup>/s Nov. 29, gage height, 14.12 ft; minimum discharge, 183 ft<sup>3</sup>/s July 31, Aug. 24.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	370	1460	3330	1690	1490	1470	515	823	468	253	200	195
2	386	1290	2480	1650	1350	1480	514	821	442	234	208	195
3	410	1200	1890	1830	889	1480	445	823	445	233	202	202
4	371	1200	1760	1990	794	1500	439	803	486	240	204	193
5	371	1210	1710	1810	904	1230	431	786	623	236	265	205
6	375	1210	1700	1800	1210	913	462	672	614	235	205	213
7	375	1490	1670	2210	2000	916	543	601	596	235	196	199
8	374	3380	1540	1870	2990	837	450	562	592	230	198	219
9	367	4230	1540	1450	2700	680	365	517	586	220	197	216
10	766	2870	1710	1690	2220	810	347	394	584	220	202	200
11	634	5150	1830	1640	1690	790	348	382	577	220	198	442
12	745	3680	1730	1620	1490	685	366	385	503	219	198	718
13	608	2400	2060	1630	1480	640	377	497	414	217	197	717
14	578	2850	2430	1880	1470	634	351	520	334	217	196	571
15	559	2380	2180	1960	1490	581	335	434	292	211	194	412
16	1400	1990	1740	2060	1490	670	380	407	291	205	194	348
17	1910	1560	1620	1770	1510	664	364	399	287	209	194	385
18	1720	1570	1630	1690	1590	667	355	405	290	210	193	380
19	1560	1550	1630	1680	1680	672	340	599	280	233	194	385
20	1530	1490	1620	1680	1590	618	367	689	280	197	196	375
21	1610	1410	1600	1700	1580	523	337	750	295	195	198	397
22	1590	1410	1590	1620	1570	533	338	942	296	196	198	367
23	1530	1630	1590	1580	1590	531	497	1350	299	197	198	397
24	1530	2000	1570	1580	1570	529	745	1010	302	194	202	386
25	1540	3320	1540	1570	1550	520	1060	829	308	196	211	385
26	1740	2610	1540	1560	1550	514	1250	816	295	197	211	387
27	1620	2190	1540	1550	1540	523	1300	815	285	197	194	385
28	1540	5500	1550	1540	1530	506	1230	827	269	196	195	387
29	1520	12100	1590	1570	1500	467	1200	795	265	196	208	390
30	1510	5740	1670	1560	---	429	992	629	263	194	224	385
31	1500	---	1820	1540	---	435	---	523	---	192	207	---
TOTAL	32639	82070	55400	52970	46007	23447	17043	20805	11861	6624	6277	10636
MEAN	1053	2736	1787	1709	1586	756	568	671	395	214	202	355
MAX	1910	12100	3330	2210	2990	1500	1300	1350	623	253	265	718
MIN	367	1200	1540	1450	794	429	335	382	263	192	193	193
AC-FT	64740	162800	109900	105100	91250	46510	33800	41270	23530	13140	12450	21100

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	545	1395	1033	939	909	745	740	767	586	357	220	335	
MAX	1053	3080	1787	1709	1586	1165	1284	1257	1181	684	312	635	
(WY)	1996	1991	1996	1996	1996	1995	1988	1984	1984	1984	1993	1995	
MIN	227	246	261	401	309	344	276	305	256	198	167	203	
(WY)	1984	1988	1986	1985	1985	1985	1992	1995	1992	1987	1985	1985	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1984 - 1996
ANNUAL TOTAL	344625	365779	
ANNUAL MEAN	944	999	712
HIGHEST ANNUAL MEAN			1038
LOWEST ANNUAL MEAN			527
HIGHEST DAILY MEAN	12100	12100	20100
LOWEST DAILY MEAN	194	192	157
ANNUAL SEVEN-DAY MINIMUM	197	194	157
ANNUAL RUNOFF (AC-FT)	683600	725500	516100
10 PERCENT EXCEEDS	1680	1810	1510
50 PERCENT EXCEEDS	490	631	479
90 PERCENT EXCEEDS	217	201	199

## SNOHOMISH RIVER BASIN

233

12138160 SULTAN RIVER BELOW POWERPLANT, NEAR SULTAN, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: June 1984 to current year.

INSTRUMENTATION.--Temperature recorder since June 1984.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 17.5°C Sept. 5-7, 1986; minimum, 1.0°C Feb. 2-5, 1989.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 14.5°C July 29; minimum, 1.5°C Feb. 3.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	12.0	11.0	11.5	8.5	8.5	8.5	7.5	7.0	7.5	5.5	5.5	5.5
2	11.5	11.0	11.5	8.5	8.0	8.5	7.0	6.5	7.0	5.5	5.5	5.5
3	11.5	11.0	11.0	8.0	8.0	8.0	6.5	6.5	6.5	5.5	5.0	5.5
4	11.5	10.5	11.0	8.0	8.0	8.0	6.5	6.5	6.5	5.0	5.0	5.0
5	11.5	10.5	11.0	8.0	7.5	8.0	6.5	6.0	6.5	5.0	4.5	5.0
6	11.5	10.5	11.0	8.0	7.5	8.0	6.0	6.0	6.0	5.0	4.5	5.0
7	11.5	11.0	11.0	8.0	7.0	7.5	6.0	6.0	6.0	5.5	5.0	5.5
8	11.0	10.5	11.0	8.5	7.5	8.0	6.0	5.5	6.0	5.5	5.0	5.0
9	11.0	10.5	10.5	8.0	7.5	7.5	5.5	5.5	5.5	6.0	5.0	5.5
10	10.5	10.0	10.5	7.5	7.0	7.5	5.5	5.5	5.5	5.0	5.0	5.0
11	10.5	10.0	10.0	8.0	7.0	7.5	6.0	5.5	6.0	5.0	5.0	5.0
12	10.0	9.5	9.5	8.0	7.5	8.0	6.0	6.0	6.0	5.0	4.5	4.5
13	9.5	9.0	9.5	8.0	7.5	8.0	6.0	6.0	6.0	5.0	4.5	4.5
14	10.0	9.5	9.5	8.0	8.0	8.0	6.0	6.0	6.0	5.0	5.0	5.0
15	10.0	9.5	10.0	8.0	8.0	8.0	6.0	6.0	6.0	5.5	5.0	5.5
16	11.0	10.0	10.5	8.0	7.5	7.5	6.0	5.5	6.0	5.5	4.5	5.0
17	10.5	10.0	10.5	8.0	7.5	7.5	5.5	5.5	5.5	4.5	4.5	4.5
18	10.0	10.0	10.0	8.0	7.5	7.5	5.5	5.5	5.5	4.5	4.5	4.5
19	11.0	10.0	10.5	7.5	7.5	7.5	5.5	5.5	5.5	4.5	4.0	4.0
20	10.5	10.0	10.5	7.5	7.0	7.5	5.5	5.5	5.5	4.0	4.0	4.0
21	10.0	9.5	10.0	7.5	7.0	7.0	5.5	5.5	5.5	4.0	4.0	4.0
22	9.5	9.5	9.5	7.0	7.0	7.0	5.5	5.0	5.0	4.0	4.0	4.0
23	10.0	9.5	9.5	7.5	7.0	7.5	5.0	5.0	5.0	4.0	4.0	4.0
24	10.0	9.5	9.5	8.0	7.5	7.5	5.0	5.0	5.0	4.0	3.5	3.5
25	9.5	9.5	9.5	8.0	7.5	7.5	5.0	5.0	5.0	4.0	3.5	4.0
26	9.5	9.0	9.5	7.5	7.0	7.5	5.0	4.5	5.0	4.0	3.5	4.0
27	9.5	9.0	9.5	7.0	7.0	7.0	5.0	4.5	5.0	3.5	3.5	3.5
28	9.0	9.0	9.0	8.0	7.0	7.5	5.0	5.0	5.0	3.5	3.0	3.0
29	9.0	9.0	9.0	7.5	7.5	7.5	5.0	5.0	5.0	3.5	3.0	3.5
30	9.0	8.5	9.0	7.5	7.5	7.5	5.0	5.0	5.0	3.5	2.5	3.0
31	9.0	8.5	8.5	---	---	---	5.5	5.0	5.5	2.5	2.0	2.5
MONTH	12.0	8.5	10.1	8.5	7.0	7.7	7.5	4.5	5.7	6.0	2.0	4.5

## SNOHOMISH RIVER BASIN

12138160 SULTAN RIVER BELOW POWERPLANT, NEAR SULTAN, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	February			March			April			May		
1	2.5	2.0	2.5	3.0	3.0	3.0	5.5	5.0	5.5	7.0	6.5	6.5
2	2.5	2.0	2.0	3.0	3.0	3.0	6.0	5.0	5.5	6.5	6.5	6.5
3	2.0	1.5	2.0	3.0	3.0	3.0	5.5	4.5	5.5	7.0	6.5	6.5
4	2.5	2.0	2.5	3.5	3.0	3.5	6.5	5.0	6.0	6.5	6.0	6.5
5	2.5	2.5	2.5	4.0	3.5	3.5	6.5	6.0	6.5	7.5	6.5	7.0
6	3.0	2.5	2.5	4.0	3.5	4.0	7.0	6.0	6.5	7.5	6.5	7.0
7	3.5	3.0	3.5	4.0	4.0	4.0	8.0	7.0	7.5	7.0	6.0	6.5
8	5.0	3.5	4.5	4.5	4.0	4.5	8.0	6.5	7.5	7.5	6.5	7.0
9	4.5	3.5	4.0	5.0	4.5	4.5	7.5	6.5	7.0	7.5	6.0	6.5
10	3.5	3.0	3.5	5.5	5.0	5.0	7.0	6.5	6.5	7.5	6.0	7.0
11	3.5	3.5	3.5	5.5	5.0	5.5	7.0	6.5	6.5	7.0	6.5	7.0
12	3.5	3.5	3.5	5.5	5.0	5.0	6.5	6.0	6.5	8.0	7.0	7.5
13	3.5	3.5	3.5	5.0	4.5	5.0	7.0	6.0	6.5	8.5	7.5	8.0
14	3.5	3.5	3.5	5.0	4.5	5.0	8.0	6.0	7.0	8.5	8.0	8.0
15	3.5	3.5	3.5	5.0	4.5	5.0	8.0	7.5	8.0	8.5	7.5	8.0
16	3.5	3.5	3.5	5.0	4.5	4.5	8.0	7.0	7.5	8.5	7.5	8.0
17	4.0	3.5	4.0	5.0	4.5	4.5	7.5	7.0	7.0	8.5	7.5	8.0
18	4.0	4.0	4.0	5.0	4.0	4.5	7.0	6.5	7.0	8.5	7.5	8.0
19	4.0	4.0	4.0	5.5	5.0	5.0	7.0	6.5	6.5	8.0	7.0	7.5
20	4.0	4.0	4.0	5.0	4.5	5.0	7.5	6.0	7.0	8.0	7.0	7.5
21	4.0	3.5	4.0	5.0	4.5	5.0	8.0	6.5	7.0	7.0	6.5	7.0
22	3.5	3.5	3.5	5.0	5.0	5.0	7.5	6.5	7.0	8.0	6.5	7.0
23	3.5	3.5	3.5	5.0	4.5	5.0	8.0	7.0	7.5	8.0	7.5	7.5
24	3.5	3.5	3.5	5.0	4.5	4.5	7.5	6.0	7.0	9.0	7.5	8.0
25	3.5	3.5	3.5	4.5	4.0	4.5	7.0	6.5	7.0	9.0	8.0	8.5
26	3.5	3.0	3.5	5.0	4.0	4.5	6.5	6.0	6.0	8.5	7.5	8.0
27	3.0	3.0	3.0	5.0	4.5	5.0	7.0	6.0	6.5	8.0	7.0	7.5
28	3.0	3.0	3.0	5.0	4.5	5.0	7.0	6.0	6.5	7.5	7.0	7.5
29	3.0	3.0	3.0	5.0	4.5	5.0	7.0	6.5	7.0	8.0	7.5	8.0
30	---	---	---	5.0	4.5	5.0	7.0	6.0	6.5	8.5	7.5	8.0
31	---	---	---	5.5	4.5	5.0	---	---	---	9.5	8.0	8.5
MONTH	5.0	1.5	3.3	5.5	3.0	4.5	8.0	4.5	6.7	9.5	6.0	7.4
Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
	June			July			August			September		
1	9.5	8.0	9.0	12.0	10.0	11.0	13.5	11.5	12.5	14.0	12.5	13.0
2	10.0	8.5	9.0	12.0	10.5	11.0	13.0	12.0	12.5	14.0	12.5	13.5
3	10.0	9.0	9.5	11.0	10.0	11.0	12.0	11.5	12.0	13.5	13.0	13.5
4	9.0	8.0	8.5	11.5	10.0	10.5	12.0	11.0	11.5	14.0	12.5	13

12141300 MIDDLE FORK SNOQUALMIE RIVER NEAR TANNER, WA

LOCATION.--Lat 47°29'10", long 121°38'48", in SW 1/4 SE 1/4 sec.10, T.23 N., R.9 E., King County, Hydrologic Unit 17110010, on left bank 0.7 mi downstream from Granite Creek, 6.4 mi east of North Bend, and at mile 55.6.

DRAINAGE AREA.--154 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 780 ft above sea level, from topographic map.

REMARKS.--Records good. No regulation or diversion upstream from station. Water temperatures June 1979 to September 1980. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--35 years (water years 1962-96), 1,226 ft<sup>3</sup>/s, 108.13 in/yr, 887,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,200 ft<sup>3</sup>/s Dec. 2, 1977, gage height, 14.93 ft; maximum gage height, 14.97 ft Nov. 24, 1990; minimum discharge, 91 ft<sup>3</sup>/s Oct. 29-31, 1987, gage height, 0.61 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Nov. 23, 1959, reached a stage of 18.7 ft from floodmarks, discharge, 49,000 ft<sup>3</sup>/s by slope-area measurement at site 6 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 8,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1730	8,150	8.57	Nov. 29	0200	*27,400	*14.35
Nov. 8	1415	19,500	12.33	Jan. 7	1000	14,200	10.78
Nov. 11	0530	18,000	11.91	Feb. 7	0415	15,700	11.23
Nov. 13	2000	8,240	8.61	Feb. 8	1730	25,300	13.84

Minimum discharge, 170 ft<sup>3</sup>/s Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	998	581	5510	2160	e390	518	614	1170	1040	714	277	199
2	1100	517	3300	2170	378	499	1070	1040	1280	740	395	182
3	4070	472	2110	5360	381	569	693	1050	1860	715	1070	174
4	1940	453	2010	2890	396	714	596	948	1760	742	611	179
5	1070	535	1430	1730	713	619	624	858	1270	619	1420	241
6	768	674	1130	2060	6490	669	892	805	1280	533	886	317
7	789	4840	956	9340	11100	648	1860	780	1460	517	580	247
8	706	15400	817	4240	19100	728	1840	760	1350	568	465	265
9	698	5490	803	2320	9490	1010	1830	680	1100	626	414	331
10	4790	2610	1750	1790	3360	1500	1780	629	899	533	379	257
11	5080	10100	2930	1390	1990	1440	1600	626	931	503	357	220
12	2800	3560	2480	1120	1530	1270	1430	834	890	537	332	206
13	1710	4510	4010	1070	1520	995	1320	2360	869	541	306	200
14	1190	5280	2820	4210	1560	845	1120	2430	860	537	291	281
15	990	3110	2110	5320	1600	1020	995	1880	858	541	281	828
16	1550	2500	1610	3990	1560	912	1310	1600	831	502	267	822
17	2390	1630	1250	2060	1960	782	1300	1520	741	438	253	618
18	2260	2150	1040	1430	4400	706	1130	1740	707	417	239	437
19	1300	1680	898	1160	3190	694	1050	2070	606	655	226	597
20	1090	1220	790	1030	2130	681	938	1630	563	694	220	929
21	1250	985	705	966	1580	608	828	1350	614	483	220	748
22	1140	1100	635	826	1240	663	793	1930	668	434	208	1210
23	906	2230	577	805	1100	615	3250	2410	688	439	199	908
24	839	3370	531	737	938	574	4290	1660	791	435	194	661
25	855	5550	493	656	812	508	2350	1600	775	420	193	533
26	3220	3880	466	594	729	481	2130	1680	746	374	195	458
27	1790	3800	446	544	646	457	1890	1500	799	356	196	413
28	1200	15500	439	517	583	427	1430	1230	802	349	193	377
29	931	21600	627	481	547	447	1200	1760	701	344	190	343
30	774	10700	1730	419	---	451	1120	1520	682	331	193	315
31	665	---	3930	e405	---	433	---	1130	---	307	206	---
TOTAL	50859	136027	50333	63790	81413	22483	43273	43180	28421	15944	11456	13496
MEAN	1641	4534	1624	2058	2807	725	1442	1393	947	514	370	450
MAX	5080	21600	5510	9340	19100	1500	4290	2430	1860	742	1420	1210
MIN	665	453	439	405	378	427	596	626	563	307	190	174
AC-FT	100900	269800	99840	126500	161500	44600	85830	85650	56370	31620	22720	26770
CFSM	10.7	29.4	10.5	13.4	18.2	4.71	9.37	9.04	6.15	3.34	2.40	2.92
IN.	12.29	32.86	12.16	15.41	19.67	5.43	10.45	10.43	6.87	3.85	2.77	3.26

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1996, BY WATER YEAR (WY)

MEAN	812	1627	1621	1552	1365	1024	1326	1775	1778	954	423	500
MAX	1978	4534	3997	3070	2940	2836	2231	3060	4012	2370	1218	1241
(WY)	1991	1996	1976	1984	1982	1972	1989	1972	1974	1974	1964	1968
MIN	105	298	441	427	387	549	601	996	553	411	170	159
(WY)	1988	1980	1986	1979	1969	1962	1967	1992	1992	1987	1994	1993

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1961 - 1996

ANNUAL TOTAL	509583	560675	
ANNUAL MEAN	1396	1532	1226
HIGHEST ANNUAL MEAN			1832
LOWEST ANNUAL MEAN			839
HIGHEST DAILY MEAN	21600	Nov 29	23100
LOWEST DAILY MEAN	142	Sep 24	91
ANNUAL SEVEN-DAY MINIMUM	149	Sep 20	92
ANNUAL RUNOFF (AC-FT)	1011000	1112000	887900
ANNUAL RUNOFF (CFSM)	9.07	9.95	7.96
ANNUAL RUNOFF (INCHES)	123.09	135.44	108.13
10 PERCENT EXCEEDS	2490	3200	2410
50 PERCENT EXCEEDS	889	850	870
90 PERCENT EXCEEDS	281	331	275

e Estimated

## 12142000 NORTH FORK SNOQUALMIE RIVER NEAR SNOQUALMIE FALLS, WA

LOCATION.--Lat 47°36'54", long 121°42'44", in NW 1/4 NW 1/4 sec.31, T.25 N., R.9 E., King County, Hydrologic Unit 17110010, on left bank 0.6 mi upstream from Calligan Creek, 7.0 mi northeast of town of Snoqualmie Falls, and at mile 9.2.

DRAINAGE AREA.--64.0 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1929 to October 1949, water years 1950-60 (annual maximum), February 1961 to current year.

REVISED RECORDS.--WSP 1346: 1930-31(M), 1932, 1935, 1936-37(M), 1938, 1939-42(M), 1944, 1945-46(P), 1947, 1948(P), 1949(M). WSP 1736: 1932-34(M), 1935, 1938(M), 1943-45(M), 1947(M), drainage area. WSP 1932: 1950-54(M), 1956-57(M), 1959(M).

GAGE.--Water-stage recorder. Elevation of gage is 1,130 ft above sea level, from topographic map. Prior to Oct. 19, 1949, water-stage recorder, and October 1949 to February 1961, crest-stage gage, at site 1,500 ft downstream at different datum.

REMARKS.--Records good. No regulation or diversion upstream from station. Daily water temperatures June 1979 to August 1980. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--55 years (water years 1930-49, 1962-96), 497 ft<sup>3</sup>/s, 105.51 in/yr, 360,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 15,800 ft<sup>3</sup>/s Feb. 26, 1932, gage height, 17.5 ft, site and datum then in use, from rating curve extended above 2,200 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 16.47 ft; minimum discharge observed, 30 ft<sup>3</sup>/s Sept. 17-19, 1929.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1400	4,720	8.10	Jan. 7	1130	5,760	8.75
Nov. 8	1645	8,440	10.24	Feb. 6	2215	8,220	10.13
Nov. 11	0630	7,500	9.76	Feb. 8	2000	12,600	12.10
Nov. 29	0300	*14,500	*12.82				

Minimum discharge, 60 ft<sup>3</sup>/s Aug. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	802	271	2210	892	187	235	305	536	470	229	80	75
2	650	241	1310	870	177	226	694	501	534	224	137	66
3	2410	218	893	2060	173	236	394	483	632	209	578	64
4	929	210	906	989	226	276	322	445	567	224	280	64
5	e517	245	659	649	438	259	356	400	446	192	774	74
6	362	283	536	1000	3350	275	561	382	454	169	441	105
7	362	2820	461	3790	4180	276	1120	365	473	161	275	88
8	350	6760	401	1480	8730	313	783	368	421	159	210	118
9	344	1880	440	839	3680	537	689	334	368	157	175	166
10	2960	969	1540	688	1360	897	744	304	309	141	152	108
11	2120	3550	1840	560	872	748	689	287	332	133	136	e93
12	1140	1170	1330	460	703	618	670	403	308	130	125	85
13	737	1570	1830	440	716	450	623	1190	295	125	117	81
14	520	1780	1240	2280	690	368	535	969	278	118	109	151
15	413	1120	949	2610	662	424	471	795	279	111	103	468
16	780	1000	711	1810	631	385	670	709	264	104	98	398
17	1310	662	562	891	808	329	661	633	242	104	94	292
18	1020	865	504	636	1790	299	578	760	265	118	91	204
19	578	755	456	524	1210	298	528	1070	237	330	88	350
20	508	528	401	465	865	305	479	762	215	377	86	581
21	604	425	358	437	674	268	458	618	222	215	84	413
22	563	532	320	376	541	316	408	847	225	166	80	516
23	426	1280	291	352	477	298	1750	1090	231	142	75	377
24	415	1410	268	332	414	275	1780	771	287	127	71	267
25	425	2150	248	296	360	240	869	694	281	116	69	212
26	1760	1370	232	274	324	224	772	649	252	107	66	179
27	908	1590	221	252	289	210	729	553	366	100	64	157
28	588	6190	226	240	262	196	605	489	289	96	64	142
29	444	9060	310	224	247	202	522	826	246	92	62	129
30	363	3550	774	198	---	199	500	743	235	87	62	120
31	310	---	1530	194	---	194	---	521	---	83	69	---
TOTAL	25618	54454	23957	27108	35036	10376	20265	19497	10023	4846	4915	6143
MEAN	826	1815	773	874	1208	335	675	629	334	156	159	205
MAX	2960	9060	2210	3790	8730	897	1780	1190	632	377	774	581
MIN	310	210	221	194	173	194	305	287	215	83	62	64
AC-FT	50810	108000	47520	53770	69490	20580	40200	38670	19880	9610	9750	12180
CFSM	12.9	28.4	12.1	13.7	18.9	5.23	10.6	9.83	5.22	2.44	2.48	3.20
IN.	14.89	31.65	13.93	15.76	20.36	6.03	11.78	11.33	5.83	2.82	2.86	3.57

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 1996, BY WATER YEAR (WY)

	378	674	712	642	531	467	587	709	624	297	134	212
MEAN	378	674	712	642	531	467	587	709	624	297	134	212
MAX	906	1894	1856	1310	1295	1250	946	1248	1338	733	439	574
(WY)	1935	1991	1934	1934	1982	1972	1932	1936	1974	1972	1964	1941
MIN	38.3	85.4	209	124	201	225	279	327	145	70.3	45.0	44.2
(WY)	1988	1937	1986	1937	1938	1992	1975	1992	1934	1940	1930	1938

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1930 - 1996
ANNUAL TOTAL	222634	242238	
ANNUAL MEAN	610	662	497
HIGHEST ANNUAL MEAN			736
LOWEST ANNUAL MEAN			335
HIGHEST DAILY MEAN	9060	Nov 29	9580
LOWEST DAILY MEAN	45	Sep 24	33
ANNUAL SEVEN-DAY MINIMUM	47	Sep 20	34
ANNUAL RUNOFF (AC-FT)	441600	480500	360100
ANNUAL RUNOFF (CFSM)	9.53	10.3	7.77
ANNUAL RUNOFF (INCHES)	129.41	140.80	105.51
10 PERCENT EXCEEDS	1150	1340	996
50 PERCENT EXCEEDS	400	400	351
90 PERCENT EXCEEDS	100	108	92

e Estimated



## 12143400 SOUTH FORK SNOQUALMIE RIVER ABOVE ALICE CREEK, NEAR GARCIA, WA

LOCATION.--Lat 47°24'55", long 121°35'10", in SW 1/4 SW 1/4 sec.6, T.22 N., R.10 E.0 King County, Hydrologic Unit 17110010, Snoqualmie National Forest, on left bank, 50 ft downstream from bridge, 0.4 mi upstream from Alice Creek, 1.5 mi southeast of Garcia, 11 mi southeast of North Bend, and at mile 17.3.

DRAINAGE AREA.--41.6 mi<sup>2</sup>.

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

REVISED RECORDS.--WDR WA-80-1: 1978.

GAGE.--Water-stage recorder. Datum of gage is 1,437.67 ft above Washington Highway Department datum. Oct. 1, 1960 to Sept. 30, 1987, recording gage at same site at datum 10.00 ft higher.

REMARKS.--Records fair except for estimated daily discharges, which are poor. No regulation or diversion upstream from station. Chemical analyses October to November 1971. Water temperatures May 1979 to September 1980. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--36 years (water years 1961-96), 299 ft<sup>3</sup>/s, 97.62 in/yr, 216,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,450 ft<sup>3</sup>/s Nov. 23, 1986, gage height, 8.33 ft, datum then in use; minimum discharge, 19 ft<sup>3</sup>/s Oct. 30, 31, 1987.

EXTREMES OUTSIDE PERIOD OF RECORD.--Floods in November and December 1959 reached stages of 14.7 ft and 13.4 ft respectively, from flood marks, discharges not determined.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1800	2,320	14.03	Jan. 3	0700	1,710	13.68
Nov. 8	1430	4,900	16.17	Jan. 7	1130	1,830	13.79
Nov. 11	0445	5,090	16.31	Jan. 15	2230	1,590	13.56
Nov. 13	1845	1,930	13.64	Feb. 7	0415	3,460	15.12
Nov. 25	0100	1,890	13.60	Feb. 8	1645	6,500	17.25
Nov. 29	0100	*7,450	*17.84	Feb. 18	1145	1,510	13.19

Minimum discharge, 36 ft<sup>3</sup>/s Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	178	166	1640	678	e115	166	137	400	327	152	42	40
2	293	150	1050	676	e108	155	191	345	420	148	63	38
3	898	138	704	1410	e107	190	149	319	525	135	111	37
4	448	132	591	822	e128	246	137	282	461	135	81	40
5	246	145	454	512	148	209	149	258	342	117	131	73
6	179	152	395	406	874	211	229	246	352	106	135	104
7	183	1000	349	1370	2590	201	575	237	380	102	102	69
8	152	3580	299	1050	4800	197	726	231	337	104	76	64
9	157	1290	271	672	2250	226	715	221	274	102	62	73
10	1270	719	258	539	984	331	612	207	233	90	55	60
11	1210	2510	274	447	627	397	526	203	236	87	51	e53
12	655	1030	359	386	479	405	460	227	226	85	47	50
13	418	1220	699	360	421	342	390	547	224	82	45	48
14	300	1250	620	944	412	309	338	671	224	79	44	60
15	240	845	547	1280	438	359	330	543	218	77	43	e120
16	392	672	470	1160	451	326	460	482	204	70	42	e125
17	590	507	400	664	575	283	427	451	177	67	41	e105
18	550	661	348	497	1350	261	357	474	165	69	41	e86
19	343	522	305	424	1060	257	324	558	142	110	41	e100
20	296	399	272	374	739	250	287	495	139	106	41	e120
21	373	333	242	335	565	228	258	429	151	80	42	e130
22	322	373	217	296	458	235	258	492	152	70	40	e240
23	260	664	195	276	397	210	831	711	158	66	40	e160
24	235	895	175	254	338	198	1240	586	183	63	40	e130
25	291	1400	160	225	297	169	778	587	178	59	40	e105
26	682	926	147	202	266	155	670	587	170	55	38	e92
27	413	928	137	182	233	141	567	495	178	51	38	e82
28	306	4020	133	171	198	132	463	370	179	50	38	e76
29	248	5480	157	157	180	135	404	446	154	49	37	e72
30	211	2690	384	137	--	128	395	428	155	46	36	e66
31	186	--	994	e122	--	120	--	337	--	45	40	--
TOTAL	12525	34797	13246	17028	21588	7172	13383	12865	7264	2657	1723	2618
MEAN	404	1160	427	549	744	231	446	415	242	85.7	55.6	87.3
MAX	1270	5480	1640	1410	4800	405	1240	711	525	152	135	240
MIN	152	132	133	122	107	120	137	203	139	45	36	37
AC-FT	24840	69020	26270	33780	42820	14230	26550	25520	14410	5270	3420	5190
CFSM	9.71	27.9	10.3	13.2	17.9	5.56	10.7	9.98	5.82	2.06	1.34	2.10
IN.	11.20	31.12	11.84	15.23	19.30	6.41	11.97	11.50	6.50	2.38	1.54	2.34

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1996, BY WATER YEAR (WY)

MEAN	168	385	383	357	334	270	386	526	439	184	71.7	89.1
MAX	410	1271	1115	743	764	715	660	849	1208	615	212	234
(WY)	1986	1991	1976	1984	1982	1972	1990	1972	1974	1974	1964	1968
MIN	21.2	61.3	77.7	87.7	77.0	125	171	259	95.6	64.1	34.5	29.9
(WY)	1988	1988	1986	1979	1969	1962	1967	1992	1992	1977	1987	1987

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1961 - 1996

ANNUAL TOTAL	131307	146866	
ANNUAL MEAN	360	401	299
HIGHEST ANNUAL MEAN			430
LOWEST ANNUAL MEAN			201
HIGHEST DAILY MEAN	5480	Nov 29	6950
LOWEST DAILY MEAN	29	Sep 23	19
ANNUAL SEVEN-DAY MINIMUM	30	Sep 20	38
ANNUAL RUNOFF (AC-FT)	260400	291300	216500
ANNUAL RUNOFF (CFSM)	8.65	9.65	7.18
ANNUAL RUNOFF (INCHES)	117.42	131.33	97.62
10 PERCENT EXCEEDS	662	825	635
50 PERCENT EXCEEDS	233	244	205
90 PERCENT EXCEEDS	55	58	51

e Estimated

## 12143600 SOUTH FORK SNOQUALMIE RIVER AT EDGEWICK, WA

LOCATION.--Lat 47°27'10", long 121°43'00", in NE 1/4 NE 1/4 sec.25, T.23 N., R.8 E., King County, Hydrologic Unit 17110010, on left bank at upstream side of highway bridge in Edgewick, 3 mi downstream from Change Creek, and at mile 8.6.

DRAINAGE AREA.--65.9 mi<sup>2</sup>.

PERIOD OF RECORD.--July to October 1962, March 1963 to September 1965, October 1983 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 571.24 ft above sea level. Prior to August 3, 1983, gage at site 45 ft downstream at elevation 5.90 ft higher.

REMARKS.--Records good. Minor regulation at Twin Falls and Weeks hydroelectric project, upstream from station. No diversions.

AVERAGE DISCHARGE.--15 years (water years 1964-65, 1984-96), 434 ft<sup>3</sup>/s, 89.46 in/yr, 314,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,800 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 13.85 ft; minimum discharge, 31 ft<sup>3</sup>/s Oct. 14, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,150 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1915	3,520	10.93	Jan. 3	0815	2,650	10.28
Nov. 8	1600	7,850	12.81	Jan. 7	1130	3,540	10.86
Nov. 11	0615	7,380	12.64	Jan. 15	2330	2,700	10.31
Nov. 13	1945	2,510	10.32	Feb. 7	0530	5,450	11.87
Nov. 25	0200	2,450	10.28	Feb. 8	1615	*9,770	*13.45
Nov. 29	0115	9,670	13.42				

Minimum discharge, 56 ft<sup>3</sup>/s Sept. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	268	244	2540	1080	e233	276	252	535	480	217	84	67
2	377	221	1700	1020	e220	264	347	469	579	213	111	65
3	1340	206	1210	2170	e220	309	280	445	699	200	165	65
4	718	198	1070	1350	270	377	254	404	625	206	126	67
5	388	210	824	934	318	324	266	374	483	174	181	102
6	274	223	684	812	1620	326	351	362	496	161	166	132
7	263	1470	594	2540	4050	315	758	352	531	158	129	94
8	225	5760	517	1840	7620	312	882	334	483	161	112	89
9	225	2150	481	1250	3750	355	886	303	408	162	103	93
10	1750	1090	485	1030	1490	496	786	286	344	145	96	85
11	1910	3800	608	850	999	564	698	287	347	140	93	76
12	970	1390	714	723	776	555	642	325	324	138	90	72
13	624	1500	1250	663	667	469	567	741	323	136	86	71
14	452	1650	1100	1520	635	419	500	827	319	132	83	82
15	357	1070	917	2040	660	476	479	692	309	127	80	189
16	510	850	755	1930	675	438	633	623	290	120	78	202
17	743	635	640	1190	794	382	590	595	262	117	78	172
18	809	764	563	893	1650	352	506	631	249	123	76	133
19	512	645	502	751	1390	355	463	731	220	173	75	148
20	437	496	457	652	1030	344	418	653	218	164	75	190
21	527	410	416	583	807	314	381	581	232	130	75	192
22	495	428	388	512	655	328	387	684	233	127	71	372
23	398	736	358	482	570	303	1130	960	239	114	69	280
24	352	1080	335	458	485	293	1470	744	269	109	68	207
25	353	1940	314	436	425	261	997	745	259	104	67	167
26	904	1260	298	395	380	249	899	747	253	98	67	146
27	576	1310	286	359	343	238	752	648	256	95	67	130
28	440	5950	276	e330	308	224	617	514	246	94	67	122
29	358	8020	322	e300	292	232	543	643	216	92	65	113
30	306	4330	687	e270	---	221	526	610	218	89	66	102
31	273	---	1630	e250	---	211	---	491	---	87	68	---
TOTAL	18134	50036	22921	29613	33332	10582	18260	17336	10410	4306	2837	4025
MEAN	585	1668	739	955	1149	341	609	559	347	139	91.5	134
MAX	1910	8020	2540	2540	7620	564	1470	960	699	217	181	372
MIN	225	198	276	250	220	211	252	286	216	87	65	65
AC-FT	35970	99250	45460	58740	66110	20990	36220	34390	20650	8540	5630	7980
CFSM	8.88	25.3	11.2	14.5	17.4	5.18	9.24	8.49	5.27	2.11	1.39	2.04
IN.	10.24	28.24	12.94	16.72	18.82	5.97	10.31	9.79	5.88	2.43	1.60	2.27

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1962 - 1996, BY WATER YEAR (WY)

MEAN	253	723	476	559	539	426	615	660	500	208	105	109
MAX	610	1792	787	1137	1149	593	921	910	1254	653	282	283
(WY)	1986	1991	1992	1984	1996	1987	1989	1985	1964	1964	1964	1964
MIN	44.1	99.2	138	180	201	255	357	321	132	99.4	62.8	54.1
(WY)	1988	1988	1986	1985	1993	1985	1986	1992	1992	1992	1987	1987

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1962 - 1996

ANNUAL TOTAL	194334	221792	
ANNUAL MEAN	532	606	
HIGHEST ANNUAL MEAN			434
LOWEST ANNUAL MEAN			606
HIGHEST DAILY MEAN			308
LOWEST DAILY MEAN	8020	Nov 29	9520
ANNUAL SEVEN-DAY MINIMUM	63	Sep 23	42
ANNUAL RUNOFF (AC-FT)	64	Sep 20	42
ANNUAL RUNOFF (CFSM)	385500		314300
ANNUAL RUNOFF (INCHES)	8.08		6.58
10 PERCENT EXCEEDS	109.70		89.46
50 PERCENT EXCEEDS	956		858
90 PERCENT EXCEEDS	335		297
	90		75

e Estimated

## SNOHOMISH RIVER BASIN

239

12143700 BOXLEY CREEK NEAR CEDAR FALLS, WA

LOCATION.--Lat 47°25'58", long 121°45'04", in NE 1/4 SW 1/4 sec.35, T.23 N., R.8 E., King County, Hydrologic Unit 17110012, on left bank 1.7 mi northeast of town of Cedar Falls, and 2.5 mi upstream from mouth.

DRAINAGE AREA.--1.57 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1945 to current year. Prior to October 1960 published in WSP 1932.

GAGE.--Water-stage recorder. Elevation of gage is 1,220 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are poor. No regulation or diversion upstream from station. Flow is mostly seepage from Chester Morse Lake.

AVERAGE DISCHARGE.--51 years (water years 1946-96), 24.4 ft<sup>3</sup>/s, 17,650 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 189 ft<sup>3</sup>/s Dec. 19, 1977, gage height, 2.88 ft, maximum gage height, 3.47 ft Nov. 30, Dec. 1, 1990; no flow at times during water years 1967, 1968, and 1988.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 155 ft<sup>3</sup>/s Dec. 5, gage height, unknown; minimum discharge, 1.6 ft<sup>3</sup>/s Oct. 14-25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2.1	4.0	78	e18	e21	e34	18	35	44	38	24	13
2	2.2	4.4	93	e18	e20	e32	19	36	45	37	23	12
3	2.3	5.1	122	e18	e19	e30	19	37	47	37	23	12
4	2.0	6.1	146	e18	e18	e28	19	38	49	36	22	11
5	2.0	6.8	e155	e18	e17	e27	19	39	49	35	22	11
6	1.9	7.2	e152	e19	e16	e25	19	40	49	34	22	11
7	1.9	7.9	e135	e20	e15	e24	19	40	49	33	22	10
8	1.8	9.1	e122	e21	e19	e23	19	41	49	33	21	9.7
9	1.7	9.4	e105	e22	e23	e22	19	41	49	33	21	9.6
10	2.0	9.9	e90	e22	e28	e21	19	41	49	32	21	9.1
11	2.0	11	e80	e22	e34	e20	19	42	49	31	20	8.8
12	1.8	11	e68	e24	e39	e19	19	42	49	30	20	8.5
13	1.7	12	e56	e25	e44	e18	19	43	49	30	20	8.2
14	1.7	13	e47	e27	e48	e17	19	42	49	30	19	7.8
15	1.6	14	e41	e29	e54	e17	20	42	48	30	19	7.6
16	1.6	16	e36	e31	e60	e16	21	41	47	29	19	7.2
17	1.6	21	e33	e33	e66	e16	21	41	47	29	18	6.9
18	1.6	27	e30	e35	e72	e16	21	41	47	29	18	6.6
19	1.6	34	e28	e37	e76	e16	22	41	46	28	18	6.4
20	1.7	42	e26	e39	e75	e16	22	42	45	28	17	6.1
21	1.7	48	e24	e40	e68	e16	23	42	45	28	17	5.8
22	1.6	54	e23	e41	e62	e16	24	43	45	27	17	5.6
23	1.6	59	e22	e38	e56	e16	26	44	44	27	16	5.3
24	1.6	60	e21	e35	e50	e17	27	44	42	26	16	5.1
25	1.8	62	e21	e33	e47	e17	27	44	42	26	16	4.7
26	2.2	61	e20	e30	e43	e18	29	44	41	26	15	4.4
27	2.3	63	e20	e29	e40	e18	29	44	40	25	15	4.2
28	2.5	66	e20	e27	e37	18	31	44	40	25	14	4.1
29	2.7	69	e19	e26	e36	18	32	44	39	25	14	3.9
30	3.1	71	e19	e24	---	18	33	44	39	25	14	3.6
31	3.5	---	e19	e23	---	18	---	44	---	24	13	---
TOTAL	61.4	883.9	1871	842	1203	627	673	1286	1372	926	576	229.2
MEAN	1.98	29.5	60.4	27.2	41.5	20.2	22.4	41.5	45.7	29.9	18.6	7.64
MAX	3.5	71	155	41	76	34	33	44	49	38	24	13
MIN	1.6	4.0	19	18	15	16	18	35	39	24	13	3.6
AC-FT	122	1750	3710	1670	2390	1240	1330	2550	2720	1840	1140	455

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

MEAN	4.01	8.35	24.9	26.9	28.1	22.6	19.1	32.9	49.2	41.7	24.7	9.67
MAX	34.5	78.4	94.5	79.1	103	79.5	68.3	82.2	129	93.0	74.8	40.3
(WY)	1960	1948	1991	1950	1953	1950	1950	1993	1946	1993	1955	1955
MIN	.088	.008	.11	.48	1.88	2.54	1.21	5.99	7.52	11.0	2.18	.29
(WY)	1988	1988	1988	1953	1977	1966	1962	1963	1963	1978	1992	1987

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1945 - 1996

ANNUAL TOTAL	10589.7	10550.5	24.4
ANNUAL MEAN	29.0	28.8	51.9
HIGHEST ANNUAL MEAN			6.75
LOWEST ANNUAL MEAN			177
HIGHEST DAILY MEAN	155	Dec 5	Dec 1
LOWEST DAILY MEAN	1.6	Oct 15	Oct 31
ANNUAL SEVEN-DAY MINIMUM	1.6	Oct 13	Oct 31
ANNUAL RUNOFF (AC-FT)	21000	20930	17650
10 PERCENT EXCEEDS	56	49	61
50 PERCENT EXCEEDS	28	23	16
90 PERCENT EXCEEDS	2.7	4.3	1.2

e Estimated

## SNOHOMISH RIVER BASIN

12143800 RATTLESNAKE LAKE AT CEDAR FALLS, WA

LOCATION.--Lat 47°25'39", long 121°46'29", in SW 1/4 SW 1/4 sec.34, T.23 N., R.8 E., King County, Hydrologic Unit 17110012, on southeast shore, and 0.6 mi northeast of town of Cedar Falls.

DRAINAGE AREA.--1.86 mi<sup>2</sup>.

PERIOD OF RECORD.--November to December 1945 (fragmentary), January 1953 to current year. Extremes prior to October 1960 published in WSP 1932 and daily gage heights are available in files of the Geological Survey.

GAGE.--Nonrecording gage. Datum of gage is 7.25 ft above sea level (levels by city of Seattle).

REMARKS.--No diversions. Inflow is mostly seepage from Chester Morse Lake. Most outflow from lake is seepage; however, when the lake level exceeds 906 ft gage height, surface-water discharge flows through Rattlesnake Ditch toward Boxley Creek.

COOPERATION.--Gage readings furnished by city of Seattle Water Department. Many days estimated by Seattle Water Department during the year.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height observed, 911.80 ft Nov. 25, 26, 1959; minimum observed, 852.80 ft Jan. 9, 1953, but may have been less during Dec. 13, 1965, to Jan. 3, 1966, and Nov. 10 to Dec. 23, 1970, when water was below gage.

EXTREMES FOR CURRENT YEAR.--Maximum gage height observed, 910.00 ft Feb. 11; minimum observed, 883.00 ft Nov. 6.

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 08:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e890.50	883.46	908.00	907.56	e907.00	907.68	904.36	906.10	907.47	905.75	903.15	900.18
2	e890.20	883.35	909.10	907.52	e906.96	907.68	904.36	906.13	907.41	905.68	903.15	900.04
3	e890.30	883.30	909.68	907.70	906.85	907.56	904.26	906.21	907.36	905.48	903.15	899.92
4	e890.00	883.15	909.92	907.72	906.74	907.56	904.19	906.21	907.28	905.56	903.22	899.80
5	e889.90	883.05	e909.90	907.70	906.58	907.46	904.12	906.18	907.25	905.48	903.17	e899.60
6	e889.80	883.00	909.65	907.86	906.60	907.39	904.06	906.16	907.19	905.38	903.06	e899.46
7	e889.70	883.86	909.46	907.96	907.05	907.28	904.03	906.16	907.15	905.25	902.97	e899.35
8	e889.60	883.90	e909.38	908.04	907.73	907.20	903.95	906.16	906.94	905.22	902.87	e899.14
9	e887.80	884.88	e909.08	908.07	909.37	907.09	903.89	906.16	906.87	905.12	902.75	e899.00
10	e887.70	885.60	908.95	908.04	909.90	907.04	903.86	906.15	906.75	905.06	902.64	e898.88
11	e887.60	886.80	908.88	907.97	910.00	906.92	903.82	906.13	906.65	904.98	902.50	e898.75
12	e887.30	888.80	908.80	907.92	909.64	906.84	903.78	906.14	906.61	904.88	902.42	e898.60
13	887.19	889.10	908.80	907.85	909.28	906.74	903.74	906.18	906.54	904.80	902.38	e898.08
14	887.02	889.20	908.75	907.88	908.88	906.60	903.76	906.26	906.47	904.70	902.17	e897.90
15	886.85	e889.50	e908.72	907.92	e908.50	906.50	903.77	906.30	906.35	904.64	902.06	e897.70
16	886.70	e889.90	e908.68	907.96	908.22	906.37	903.82	906.37	906.28	904.55	901.92	897.52
17	886.48	e889.60	908.60	908.00	e908.00	906.25	903.88	906.44	906.22	904.48	901.76	897.40
18	886.20	e889.30	e908.50	907.95	907.84	906.10	903.92	906.55	906.22	904.40	901.70	897.25
19	886.10	894.80	908.38	908.00	907.84	905.98	903.98	906.62	906.19	904.38	901.62	896.88
20	885.83	e895.40	908.27	e907.94	907.86	905.82	903.98	906.67	906.18	904.32	901.48	896.70
21	885.61	895.92	e908.22	908.02	907.90	905.68	904.03	906.74	906.15	904.24	901.39	896.65
22	885.38	896.50	e908.10	907.98	907.95	905.58	904.06	906.80	906.08	904.18	901.28	e896.50
23	885.14	897.10	908.05	907.96	907.96	905.45	904.20	907.02	906.03	904.12	901.18	e896.40
24	884.92	897.72	908.00	907.98	907.94	905.30	904.46	907.14	906.02	904.03	901.06	895.68
25	884.68	898.48	907.85	907.70	907.88	905.18	904.70	907.26	905.98	903.92	900.95	895.82
26	884.48	898.48	907.80	907.69	907.86	905.03	905.06	907.37	905.97	903.84	900.86	e895.00
27	884.28	900.06	907.72	907.58	907.80	904.92	905.36	907.40	905.92	903.75	900.74	e894.90
28	884.02	901.20	907.67	907.52	907.78	904.78	905.62	907.46	905.89	903.64	900.63	e894.70
29	883.88	903.60	907.85	907.46	e907.76	904.68	905.84	907.50	905.85	903.55	900.52	e894.10
30	883.74	906.00	907.60	907.40	---	904.56	905.96	907.50	905.80	903.45	900.39	e894.00
31	883.56	---	907.58	e907.40	---	904.42	---	907.52	---	903.25	900.31	---
MAX	890.50	906.00	909.92	908.07	910.00	907.68	905.96	907.52	907.47	905.75	903.22	900.18
MIN	883.56	883.00	907.58	907.40	906.58	904.42	903.74	906.10	905.80	903.25	900.31	894.00

CAL YR 1995 MAX 909.92 MIN 883.00  
WTR YR 1996 MAX 910.00 MIN 883.00

e Estimated

## SNOHOMISH RIVER BASIN

241

12143900 BOXLEY CREEK NEAR EDGEWICK, WA

LOCATION.--Lat 47°26'56", long 121°43'50", in SW 1/4 SE 1/4 NW 1/4 sec.25, T.23 N., R.8 E., King County, Hydrologic Unit 17110010, on right bank 4.0 mi southeast of North Bend, and at mile 0.9.

DRAINAGE AREA.--3.64 mi<sup>2</sup>.

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

REVISED RECORDS.--WDR WA-90-1: 1982 (M), 1988 (M).

GAGE.--Water-stage recorder. Elevation of gage is 650 ft above sea level, from topographic map.

REMARKS.--Records fair except those for the period Nov. 19 to Feb. 10, which are poor. Many small diversions for domestic use upstream from station. No regulation; flow is mostly seepage from Chester Morse Lake.

AVERAGE DISCHARGE.--15 years (water years 1982-96), 42.3 ft<sup>3</sup>/s, 30,650 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 256 ft<sup>3</sup>/s Dec. 3, 1995, gage height, 5.20 ft; minimum discharge, 8.3 ft<sup>3</sup>/s Nov. 10, 1986.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 256 ft<sup>3</sup>/s Dec. 3, gage height, 5.20 ft; minimum discharge, 14 ft<sup>3</sup>/s Oct. 12-15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	16	19	e83	30	29	57	46	50	68	58	44	33
2	20	19	e100	30	28	56	47	50	70	58	46	32
3	23	20	154	30	27	55	45	51	65	58	44	31
4	18	21	247	29	27	53	45	51	64	59	42	30
5	16	22	240	29	28	48	44	53	63	59	42	30
6	16	24	225	29	50	47	45	53	60	59	41	29
7	15	32	210	65	80	46	44	52	65	58	40	28
8	16	31	196	68	136	46	44	52	74	57	39	28
9	16	30	184	67	161	46	44	52	70	57	39	27
10	24	30	174	57	127	45	45	52	65	57	38	27
11	21	26	158	33	135	44	46	52	62	58	38	27
12	15	22	143	29	125	43	46	53	61	59	38	27
13	14	24	114	29	124	44	47	54	60	60	38	27
14	14	23	98	44	126	47	45	52	60	60	37	28
15	14	23	87	63	121	49	46	53	63	61	37	28
16	16	24	77	70	121	49	48	52	63	62	37	27
17	17	24	62	68	119	50	48	52	62	63	36	27
18	16	28	51	67	118	48	50	55	63	61	36	27
19	16	e35	43	64	115	48	51	56	61	61	36	27
20	18	e45	38	71	107	47	50	56	60	61	37	26
21	18	e50	35	72	107	47	51	55	61	61	37	27
22	17	e55	32	69	106	48	48	69	60	59	37	26
23	17	e60	55	67	103	46	47	73	62	54	37	26
24	16	e63	68	64	100	45	48	70	62	50	37	25
25	17	e65	67	66	96	44	49	66	61	50	37	25
26	18	e65	61	59	88	44	48	68	61	48	36	25
27	18	e70	37	51	77	44	48	67	60	47	36	25
28	18	e73	30	33	64	43	49	68	59	46	35	25
29	18	e75	33	31	56	44	49	74	59	46	35	25
30	18	e75	30	30	---	44	49	69	58	45	34	24
31	18	---	37	29	---	44	---	70	---	45	34	---
TOTAL	534	1173	3169	1543	2701	1461	1412	1800	1882	1737	1180	819
MEAN	17.2	39.1	102	49.8	93.1	47.1	47.1	58.1	62.7	56.0	38.1	27.3
MAX	24	75	247	72	161	57	51	74	74	63	46	33
MIN	14	19	30	29	27	43	44	50	58	45	34	24
AC-FT	1060	2330	6290	3060	5360	2900	2800	3570	3730	3450	2340	1620

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 1996, BY WATER YEAR (WY)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	19.5	24.8	39.0	38.2	48.7	47.8	47.4	60.6	64.7	53.5	38.2	25.6			
MAX	33.9	62.4	121	65.0	93.1	114	85.7	113	106	108	76.9	38.6			
(WY)	1991	1991	1991	1991	1996	1982	1988	1988	1993	1993	1993	1993			
MIN	11.0	11.9	12.9	11.4	15.0	20.8	28.0	27.2	29.8	22.9	16.4	12.2			
(WY)	1988	1988	1988	1988	1988	1985	1992	1992	1992	1992	1992	1987			

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1982 - 1996

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
ANNUAL TOTAL	17817														
ANNUAL MEAN	48.8														
HIGHEST ANNUAL MEAN															
LOWEST ANNUAL MEAN															
HIGHEST DAILY MEAN	247	Dec 4													
LOWEST DAILY MEAN	14	Oct 13													
ANNUAL SEVEN-DAY MINIMUM	15	Oct 12													
ANNUAL RUNOFF (AC-FT)	35340														
10 PERCENT EXCEEDS	69														
50 PERCENT EXCEEDS	44														
90 PERCENT EXCEEDS	18														

e Estimated



## 12144000 SOUTH FORK SNOQUALMIE RIVER AT NORTH BEND, WA

LOCATION.--Lat 47°29'35", long 121°47'20", in SW 1/4 NE 1/4 sec.9, T.23 N., R.8 E., King County, Hydrologic Unit 17110010, on right bank on upstream side of Bendigo Street crossing at North Bend, and at mile 2.0.

DRAINAGE AREA.--81.7 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1907 to September 1926, February 1929 to September 1938, June 1945 to April 1950, October 1960 to August 1974, February 1984 to current year. Monthly and yearly discharge only for water years 1908, 1910 and 1913, published in WSP 1316.

REVISED RECORDS.--WSP 1316: 1918-19(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 439.33 ft above sea level. Prior to April 11, 1950, nonrecording gage or water-stage recorder at several sites within 0.5 mi upstream from present site at various datums. October 1, 1960 to March 10, 1965, at site 0.46 mi upstream at datum 1.86 ft lower. March 10, 1965 to August 31, 1974, at site 0.46 mi upstream at datum 6.86 ft lower.

REMARKS.--No estimated daily discharges. Records good. City of North Bend diverts about 0.8 ft<sup>3</sup>/s daily from Clough Creek for municipal use. Minor regulation at Twin Falls and Weeks Falls projects upstream from station.

AVERAGE DISCHARGE.--57 years (water years 1908-26, 1930-38, 1946-49, 1961-73, 1985-96), 547 ft<sup>3</sup>/s, 90.91 in/yr, 396,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge recorded, 10,900 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 19.09 ft, from rating curve extended above 3,900 ft<sup>3</sup>/s; minimum discharge, 63 ft<sup>3</sup>/s Oct. 22, 1925.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Nov. 22, 1959, reached a stage of 14.49 ft, site and datum then in use, from floodmarks, discharge, 13,000 ft<sup>3</sup>/s, slope-area measurement.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	2030	3,030	12.10	Jan. 3	0945	2,650	11.29
Nov. 8	1615	7,260	16.33	Jan. 7	1215	3,590	12.41
Nov. 11	0745	6,970	16.07	Jan. 15	2345	2,740	11.41
Nov. 13	2200	2,800	11.83	Feb. 7	0615	5,730	14.72
Nov. 25	0300	2,570	11.55	Feb. 8	2045	*10,300	*18.96
Nov. 29	0330	9,960	18.66				

Minimum discharge, 123 ft<sup>3</sup>/s Sept. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	317	298	3240	1280	485	462	373	674	612	321	164	130
2	371	279	2190	1180	471	447	481	612	686	317	188	127
3	1180	261	1640	2210	457	484	411	598	799	302	241	127
4	740	251	1530	1500	455	549	381	551	750	313	208	128
5	439	262	1300	1130	507	494	385	520	611	281	247	159
6	332	281	1160	1020	1700	492	449	504	614	267	248	195
7	313	1170	1070	2640	4380	477	792	491	646	262	210	158
8	281	5390	974	2060	7730	469	924	475	616	262	191	149
9	275	2340	928	1420	4900	497	941	446	544	262	183	151
10	1440	1260	919	1230	1950	617	857	423	477	247	177	146
11	1800	3880	1020	1070	1300	685	782	421	474	239	172	135
12	960	1740	1080	954	1050	679	742	452	453	236	168	129
13	657	1720	1510	895	935	603	678	794	447	231	163	128
14	501	1960	1410	1590	887	553	614	930	441	225	159	138
15	413	1300	1260	2120	888	592	591	802	432	219	155	226
16	514	1100	1110	2110	893	567	727	745	413	211	153	259
17	682	890	996	1380	973	512	698	708	385	207	152	236
18	806	990	923	1110	1770	478	624	746	371	213	150	196
19	545	897	858	988	1510	480	589	834	346	259	148	203
20	477	748	803	932	1190	472	546	770	339	259	147	244
21	539	664	751	890	992	442	508	708	347	223	146	243
22	530	668	711	809	854	457	505	800	348	216	142	401
23	441	931	672	784	789	428	1140	1080	351	202	140	336
24	401	1270	639	751	705	418	1570	883	382	196	137	267
25	379	2140	609	703	639	386	1100	866	369	190	135	229
26	839	1450	581	660	593	373	1030	872	360	185	133	206
27	595	1480	559	626	546	361	891	787	364	180	133	190
28	477	5840	541	602	504	348	763	661	354	177	132	177
29	406	8840	587	567	480	354	686	761	328	174	129	172
30	359	5230	883	506	---	344	663	749	324	170	128	158
31	327	---	1710	492	---	335	---	634	---	166	131	---
TOTAL	18336	55530	34164	36209	40533	14855	21441	21297	13983	7212	5110	5743
MEAN	591	1851	1102	1168	1398	479	715	687	466	233	165	191
MAX	1800	8840	3240	2640	7730	685	1570	1080	799	321	248	401
MIN	275	251	541	492	455	335	373	421	324	166	128	127
AC-FT	36370	110100	67760	71820	80400	29460	42530	42240	27740	14310	10140	11390
CFSM	7.24	22.7	13.5	14.3	17.1	5.87	8.75	8.41	5.71	2.85	2.02	2.34
IN.	8.35	25.28	15.56	16.49	18.46	6.76	9.76	9.70	6.37	3.28	2.33	2.61

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1907 - 1996, BY WATER YEAR (WY)

	MEAN	325	643	700	713	640	598	700	845	734	350	170	171
MAX	843	2164	2267	1579	1398	1516	1171	1271	1763	940	405	421	
(WY)	1934	1991	1934	1934	1996	1972	1932	1949	1974	1974	1964	1933	
MIN	76.5	92.4	213	218	178	190	352	354	210	100	84.8	76.8	
(WY)	1988	1930	1931	1937	1922	1922	1967	1915	1992	1926	1910	1910	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1907 - 1996

ANNUAL TOTAL	237092	274413	
ANNUAL MEAN	650	750	547
HIGHEST ANNUAL MEAN			809
LOWEST ANNUAL MEAN			334
HIGHEST DAILY MEAN	8840	Nov 29	10100
LOWEST DAILY MEAN	87	Sep 24	65
ANNUAL SEVEN-DAY MINIMUM	90	Sep 20	66
ANNUAL RUNOFF (AC-FT)	470300	544300	396000
ANNUAL RUNOFF (CFSM)	7.95	9.18	6.69
ANNUAL RUNOFF (INCHES)	107.95	124.95	90.91
10 PERCENT EXCEEDS	1130	1410	1040
50 PERCENT EXCEEDS	461	513	430
90 PERCENT EXCEEDS	144	169	129

## 12144500 SNOQUALMIE RIVER NEAR SNOQUALMIE, WA

LOCATION.--Lat 47°32'43", long 121°50'28", in SW 1/4 SW 1/4 sec.19, T.24 N., R.8 E., King County, Hydrologic Unit 17110010, on left bank 0.3 mi downstream from Snoqualmie Falls, 0.4 mi upstream from Tokul Creek, 1.5 mi northwest of Snoqualmie, and at mile 40.0.

DRAINAGE AREA.--375 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1898 to July 1899; August to September 1899 (monthly discharge only); January to July 1900, September 1902 to July 1904; August to September 1904 (monthly discharge only); October 1904 to September 1905 and November to December 1906 (gage heights only); August 1907 to May 1926 (monthly discharge only); June 1926 to September 1927; October 1927 to September 1932 (monthly discharge only); August 1958 to current year. Published as "near Snoqualmie Falls" 1904-06.

GAGE.--Water-stage recorder. Elevation of gage is 120 ft above sea level, from river-profile map. Prior to Nov. 3, 1902, and Nov. 1 to Dec. 31, 1906, nonrecording gages upstream and downstream from Snoqualmie Falls at different datum. Nov. 3, 1902, to Sept. 30, 1905, nonrecording gage at site 4 mi upstream and 300 ft downstream from South Fork, at different datum.

REMARKS.--Records good. Medium and low flows affected by powerplant 0.1 mi upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--66 years (water years 1899, 1903-04, 1908-32, 1959-96), 2,582 ft<sup>3</sup>/s, 93.50 in/yr, 1,871,000 acre-ft/yr, includes monthly discharge figures, see period of record.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 78,800 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 21.55 ft, from inside high-water mark; minimum discharge, 9.7 ft<sup>3</sup>/s Aug. 14, 27, 1958, gage height, -0.53 ft; minimum daily discharge, 88 ft<sup>3</sup>/s Aug. 8, 1960.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 51,700 ft<sup>3</sup>/s Feb. 9, gage height, 18.52 ft; minimum discharge, 364 ft<sup>3</sup>/s Aug. 30, 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2840	1490	14000	5290	e1210	1680	1520	3100	2770	1530	627	494
2	2190	1320	8830	4550	e1180	1610	2910	2870	2990	1560	683	460
3	7870	1220	6020	10000	e1170	1690	2100	2860	3870	1490	2190	445
4	4730	1150	5790	6420	e1200	2050	1760	2640	3810	1570	1460	451
5	2730	1250	4450	4290	e1650	1860	1770	2410	2970	1380	2580	521
6	1930	1530	3700	4160	9230	1870	2170	2290	2860	1190	2140	705
7	1820	6690	3220	15700	23100	1870	4290	2200	3110	1140	1410	602
8	1650	28300	2830	9810	34500	1930	4250	2170	2980	1160	1110	579
9	1620	14100	2650	5650	30800	2490	4160	1990	2530	1240	959	751
10	7980	5830	4460	4540	9860	3560	4080	1840	2170	1120	868	625
11	10500	18500	6650	3740	6050	3610	3840	1770	2140	1040	802	554
12	5840	8320	5690	3150	4650	3330	3620	2090	2090	1060	759	516
13	3950	7670	8270	2860	4260	2720	3350	4640	2010	1070	722	495
14	2870	10900	6620	8140	4160	2320	2980	5460	1970	1030	680	570
15	2340	6460	5460	10600	4080	2520	2660	4340	1950	1020	645	1590
16	3100	5690	4330	10100	4020	2460	3340	3950	1870	967	621	1820
17	4430	4040	3580	5570	4340	2140	3410	3540	1730	880	605	1480
18	4980	4550	3130	4100	8930	1960	3050	3970	1660	886	585	1060
19	3100	4110	2810	3450	7450	1900	2830	4810	1520	1240	560	1240
20	2550	3190	2520	3200	5520	1920	2590	4110	1380	1700	551	2190
21	2820	2670	2280	3160	4410	1730	2370	3470	1440	1160	541	1760
22	2840	2640	2080	2760	3610	1860	2210	4150	1510	987	523	2570
23	2270	4430	1900	2610	3280	1780	6090	5820	1530	939	508	2150
24	2080	6450	1750	2480	2880	1680	9580	4390	1790	898	488	1570
25	1910	10800	1630	2240	2540	1500	5610	3990	1770	861	487	1250
26	5910	7680	1530	2030	2310	1410	5060	4040	1640	792	481	1060
27	4100	7020	1440	1870	2080	1340	4530	3640	1880	751	478	941
28	2920	26000	1410	1770	1900	1260	3740	3090	1770	731	473	852
29	2300	45500	1670	1630	1780	1270	3190	3880	1620	721	466	792
30	1940	27600	3370	1430	--	1290	2990	4040	1520	695	460	732
31	1680	--	7680	1290	--	1230	--	3070	--	666	484	--
TOTAL	109790	277100	131750	148590	192150	61840	106050	106630	64850	33474	25946	30825
MEAN	3542	9237	4250	4793	6626	1995	3535	3440	2162	1080	837	1027
MAX	10500	45500	14000	15700	34500	3610	9580	5820	3870	1700	2580	2570
MIN	1620	1150	1410	1290	1170	1230	1520	1770	1380	666	460	445
AC-FT	217800	549600	261300	294700	381100	122700	210400	211500	128600	66400	51460	61140
CFSM	9.44	24.6	11.3	12.8	17.7	5.32	9.43	9.17	5.76	2.88	2.23	2.74
IN.	10.89	27.49	13.07	14.74	19.06	6.13	10.52	10.58	6.43	3.32	2.57	3.06

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

	MEAN	1768	3627	3703	3558	3139	2473	3035	3704	3433	1799	873	1127
MAX	3931	10100	8886	6414	6676	6735	4696	6055	7568	4393	2263	3937	
(WY)	1960	1991	1976	1984	1982	1972	1989	1972	1974	1974	1964	1959	
MIN	348	716	1211	1162	1215	1367	1478	1895	1077	815	456	429	
(WY)	1988	1980	1986	1979	1969	1962	1967	1992	1992	1987	1994	1966	

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1959 - 1996

	ANNUAL TOTAL	1152595	1288995	
ANNUAL MEAN	3158	3522	2682	
HIGHEST ANNUAL MEAN			3939	1972
LOWEST ANNUAL MEAN			1896	1977
HIGHEST DAILY MEAN	45500	Nov 29	54700	Nov 24 1990
LOWEST DAILY MEAN	343	Sep 24	88	Aug 8 1960
ANNUAL SEVEN-DAY MINIMUM	356	Sep 21	274	Oct 9 1991
ANNUAL RUNOFF (AC-FT)	2286000		2557000	1943000
ANNUAL RUNOFF (CFSM)	8.42		9.39	7.15
ANNUAL RUNOFF (INCHES)	114.34		127.87	97.17
10 PERCENT EXCEEDS	5810		6510	5020
50 PERCENT EXCEEDS	2210		2220	2070
90 PERCENT EXCEEDS	623		722	644

e Estimated

## SNOHOMISH RIVER BASIN

12145500 RAGING RIVER NEAR FALL CITY, WA

LOCATION.--Lat 47°32'24", long 121°54'28", on west line sec.27, T.24 N., R.7 E., King County, Hydrologic Unit 17110010, on right bank at highway bridge 2.0 mi southwest of Fall City, and 2.6 mi upstream from mouth.

DRAINAGE AREA.--30.6 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1945 to September 1950, water years 1951, and 1953-63 (annual maximum), December 1963 to June 1973, October 1973 to April 1974, October 1974 to current year.

REVISED RECORDS.--WSP 1316: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 250 ft above sea level, from topographic map. Prior to Oct. 1, 1950, water-stage recorder on left bank at present site and datum. August 1951 and January 1953 to February 1963, crest-stage gage only on left bank at present site and datum.

REMARKS.--No estimated daily discharges. Records good. Some small diversions for irrigation and domestic use upstream from station. No regulation. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--35 years (water years 1946-50, 1965-72, 1975-96), 131 ft<sup>3</sup>/s, 58.39 in/yr, 95,260 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,220 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 6.56 ft; maximum gage height, 6.75 ft Feb. 9, 1951; minimum daily discharge, 4.4 ft<sup>3</sup>/s Aug. 21, 1967.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1345	1,420	4.60	Dec. 1	0545	1,610	4.79
Nov. 11	0415	1,790	4.97	Feb. 6	2030	1,880	5.05
Nov. 29	0200	3,140	6.03	Feb. 8	1330	*3,800	*6.45

Minimum discharge, 10 ft<sup>3</sup>/s Aug. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	38	40	1270	186	60	82	135	156	71	19	15	13
2	69	37	821	156	53	77	218	134	64	19	23	11
3	179	35	496	238	50	105	152	170	59	19	31	12
4	102	34	551	202	72	123	118	136	53	51	22	13
5	60	36	322	160	231	107	98	117	51	29	25	19
6	42	42	222	166	1010	117	100	103	46	23	23	20
7	35	491	167	714	1180	108	102	96	42	21	19	15
8	36	1110	131	458	2690	101	84	89	39	19	17	15
9	42	610	137	274	1530	92	77	78	37	19	15	17
10	442	377	195	192	639	107	86	70	35	19	15	14
11	563	1160	267	146	369	108	123	68	33	18	15	13
12	282	525	223	118	255	99	135	73	31	17	15	12
13	154	496	242	112	200	89	199	188	30	16	14	12
14	105	492	396	274	164	81	160	151	28	16	13	15
15	80	347	338	703	140	75	131	133	27	16	13	35
16	89	262	225	611	123	70	224	116	25	15	13	25
17	115	197	171	333	138	65	173	122	25	15	13	51
18	116	175	147	227	217	61	165	151	27	17	13	29
19	87	139	121	182	311	67	161	186	25	35	13	35
20	104	114	100	308	281	65	149	146	24	27	13	34
21	117	96	85	445	249	58	123	124	22	21	13	30
22	101	98	73	289	203	82	126	290	22	19	12	59
23	85	155	64	245	206	77	511	464	27	18	12	35
24	77	232	57	234	171	66	659	262	32	18	11	26
25	72	464	51	183	146	60	413	184	32	17	11	22
26	80	340	46	145	128	56	389	143	24	16	11	20
27	68	547	43	122	112	52	297	119	22	16	11	19
28	60	1560	41	104	99	48	219	103	22	15	11	17
29	54	2630	99	87	89	51	171	115	22	15	11	16
30	49	1410	166	72	---	51	140	97	21	15	11	16
31	44	---	234	67	---	53	---	82	---	15	13	---
TOTAL	3547	14251	7501	7753	11116	2453	5838	4466	1018	615	467	670
MEAN	114	475	242	250	383	79.1	195	144	33.9	19.8	15.1	22.3
MAX	563	2630	1270	714	2690	123	659	464	71	51	31	59
MIN	35	34	41	67	50	48	77	68	21	15	11	11
AC-FT	7040	28270	14880	15380	22050	4870	11580	8860	2020	1220	926	1330
CFSM	3.74	15.5	7.91	8.17	12.5	2.59	6.36	4.71	1.11	.65	.49	.73
IN.	4.31	17.32	9.12	9.43	13.51	2.98	7.10	5.43	1.24	.75	.57	.81

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

	MEAN	69.9	216	254	267	232	180	152	85.6	63.6	30.4	19.6	33.5
MAX	266	602	472	458	476	389	255	166	158	86.9	51.2	96.7	
(WY)	1948	1991	1976	1971	1972	1950	1950	1948	1964	1983	1976	1964	
MIN	7.77	23.7	105	94.7	53.7	58.4	74.4	38.0	19.0	13.2	7.04	9.71	
(WY)	1988	1988	1986	1985	1977	1992	1983	1947	1992	1967	1967	1987	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1945 - 1996
ANNUAL TOTAL	46815.1	59695	
ANNUAL MEAN	128	163	
HIGHEST ANNUAL MEAN			206
LOWEST ANNUAL MEAN			77.8
HIGHEST DAILY MEAN	2630	Nov 29	3340
LOWEST DAILY MEAN	8.0	Sep 23	4.4
ANNUAL SEVEN-DAY MINIMUM	9.5	Sep 11	4.9
ANNUAL RUNOFF (AC-FT)	92860	118400	95260
ANNUAL RUNOFF (CFSM)	4.19	5.33	4.30
ANNUAL RUNOFF (INCHES)	56.91	72.57	58.39
10 PERCENT EXCEEDS	273	354	302
50 PERCENT EXCEEDS	60	83	78
90 PERCENT EXCEEDS	11	15	14



121475000 NORTH FORK TOLT RIVER NEAR CARNATION, WA--Continued

## WATER QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: February 1995 to current year.

INSTRUMENTATION.--Temperature recorder since February 1995.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 16.0°C July 18, 19, 1995; minimum, 2.5°C Feb. 3, 5, 6, 1996.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 15.5°C July 23, 24; minimum, 2.5°C Jan. 30, 31, Feb. 3, 5, 6.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	11.0	9.5	10.0	6.5	5.0	5.5	7.0	6.5	6.5	6.5	6.0	6.0
2	10.5	9.5	10.0	6.0	5.0	5.5	6.5	6.0	6.5	6.5	6.5	6.5
3	10.5	9.0	10.0	6.0	5.0	5.5	6.5	6.0	6.5	6.5	5.0	6.0
4	10.5	9.0	9.5	6.5	5.0	6.0	6.5	5.5	6.0	5.5	4.5	5.0
5	10.5	8.0	9.0	6.5	5.5	6.0	5.5	5.0	5.5	5.5	4.5	5.0
6	10.0	8.5	9.0	6.5	5.5	6.0	5.5	5.0	5.0	5.5	5.0	5.5
7	10.0	9.0	9.5	7.0	5.5	6.0	5.5	5.0	5.5	6.0	5.0	5.5
8	10.0	9.0	9.5	8.0	6.5	7.5	5.5	4.5	5.0	6.5	6.0	6.0
9	9.5	9.0	9.0	6.5	6.0	6.5	5.5	4.5	5.0	6.5	6.0	6.0
10	9.5	9.0	9.5	6.5	6.0	6.5	5.5	4.0	5.0	6.0	5.5	6.0
11	9.0	8.5	9.0	7.5	6.5	7.0	6.0	5.5	6.0	6.0	5.5	5.5
12	9.0	8.0	8.5	7.5	7.0	7.0	6.5	6.0	6.5	6.0	5.0	5.5
13	9.0	8.0	8.0	8.0	7.0	7.5	6.5	6.0	6.0	6.0	5.5	6.0
14	9.5	8.0	8.5	8.5	7.5	8.0	6.0	6.0	6.0	6.0	5.5	6.0
15	10.0	8.0	9.0	8.0	7.5	7.5	6.5	6.0	6.0	6.5	6.0	6.0
16	9.5	9.0	9.0	8.0	7.5	7.5	6.5	6.0	6.0	6.0	5.0	5.5
17	9.0	8.5	8.5	8.0	7.5	8.0	6.5	6.0	6.0	5.0	5.0	5.0
18	9.0	8.0	8.5	8.0	7.5	8.0	6.5	6.5	6.5	5.0	4.5	4.5
19	8.5	7.0	8.0	7.5	6.5	7.0	7.0	6.0	6.5	5.0	4.0	4.5
20	9.0	8.0	8.5	7.5	6.5	6.5	6.5	6.0	6.5	5.0	5.0	5.0
21	8.5	7.5	8.0	7.5	6.5	7.0	6.0	5.5	6.0	5.0	4.5	4.5
22	8.0	6.5	7.0	7.5	7.5	7.5	6.0	5.0	5.5	5.0	4.5	5.0
23	8.0	7.0	7.5	8.0	7.5	8.0	5.5	5.0	5.0	5.0	4.5	4.5
24	8.5	7.5	8.0	8.0	8.0	8.0	5.0	4.5	4.5	5.0	4.0	4.5
25	8.0	7.5	7.5	8.0	7.0	7.5	5.0	4.5	4.5	5.0	4.0	5.0
26	8.0	7.5	7.5	7.0	6.0	7.0	5.5	4.5	5.0	5.0	4.0	4.5
27	8.0	7.0	7.5	6.5	6.5	6.5	6.0	5.0	5.5	5.0	4.5	4.5
28	7.5	6.5	7.0	7.5	6.5	7.0	6.5	5.5	6.0	4.5	3.5	4.0
29	7.0	6.0	6.5	8.0	7.5	8.0	6.0	5.5	6.0	4.0	3.0	3.5
30	7.0	5.5	6.0	7.5	7.0	7.5	6.0	5.5	6.0	3.5	2.5	3.0
31	6.5	5.0	5.5	--	--	--	6.0	5.5	5.5	4.0	2.5	3.0
MONTH	11.0	5.0	8.3	8.5	5.0	7.0	7.0	4.0	5.7	6.5	2.5	5.1



WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	4.0	3.0	3.5	6.0	4.0	5.0	6.0	5.0	5.5	7.0	6.0	6.5
2	4.0	3.0	3.5	6.0	4.5	5.0	6.0	4.5	5.0	7.0	5.5	6.0
3	4.5	2.5	3.5	5.5	5.0	5.0	7.0	4.0	5.5	8.0	5.5	6.5
4	4.5	4.0	4.5	6.5	4.5	5.5	8.0	5.5	6.5	8.0	5.5	6.5
5	4.5	2.5	4.0	5.5	5.0	5.5	8.0	6.0	7.0	8.5	5.5	7.0
6	4.0	2.5	3.5	6.0	5.5	5.5	7.5	6.5	7.0	8.0	6.0	7.0
7	4.5	3.5	4.5	6.0	5.5	5.5	9.5	6.5	7.5	7.0	6.0	6.5
8	4.5	4.0	4.5	7.0	5.5	6.0	10.0	7.0	8.0	7.5	5.5	6.5
9	5.0	4.5	4.5	6.5	5.5	6.0	8.0	7.5	8.0	8.5	5.5	6.5
10	5.5	4.0	4.5	6.0	5.5	6.0	7.5	7.0	7.5	8.0	6.0	7.0
11	6.0	5.0	5.5	6.5	5.5	6.0	7.5	6.5	7.0	7.5	6.5	7.0
12	6.5	5.0	5.5	6.5	5.5	6.0	6.5	6.0	6.5	8.5	7.0	7.5
13	6.5	5.0	5.5	7.0	5.0	6.0	8.0	6.0	6.5	8.0	7.0	7.5
14	6.5	5.0	5.5	7.5	5.0	6.0	8.5	6.0	7.0	8.0	7.0	7.5
15	6.5	5.0	6.0	6.5	5.5	6.0	8.5	6.5	7.5	8.5	7.0	7.5
16	6.5	5.5	6.0	6.5	5.0	5.5	8.0	6.5	7.5	8.5	7.0	7.5
17	6.5	6.0	6.5	7.0	6.0	6.0	7.5	6.0	7.0	8.5	7.5	8.0
18	6.0	6.0	6.0	8.0	5.0	6.5	7.0	6.0	6.5	8.0	7.0	7.5
19	6.0	5.5	5.5	7.0	6.0	6.5	7.5	5.5	6.5	8.5	7.0	7.5
20	6.5	5.0	5.5	7.0	6.0	6.5	8.5	5.5	7.0	9.0	7.0	7.5
21	6.0	5.0	5.5	7.5	5.5	6.5	8.5	5.5	7.0	8.0	6.5	7.0
22	5.5	4.5	5.0	6.5	5.5	6.0	7.5	6.0	7.0	7.5	6.5	7.0
23	5.0	4.5	4.5	6.5	5.5	6.0	7.0	6.5	6.5	8.5	6.5	7.0
24	5.5	4.5	5.0	7.0	5.0	5.5	6.5	6.0	6.0	11.0	7.0	8.5
25	5.5	4.0	4.5	7.0	4.5	5.5	6.5	6.0	6.5	11.0	7.5	9.0
26	5.0	4.0	4.5	7.0	4.5	5.5	7.0	5.5	6.0	11.0	8.0	9.0
27	5.0	3.5	4.0	7.0	5.5	6.0	7.5	5.0	6.0	9.0	8.0	8.0
28	5.0	3.0	4.0	7.5	4.5	6.0	7.0	5.0	6.0	9.0	7.5	8.0
29	5.5	4.0	4.5	6.0	5.5	5.5	9.0	6.5	7.0	8.0	7.5	7.5
30	---	---	---	7.0	5.0	6.0	8.5	6.5	7.0	8.0	7.0	7.5
31	---	---	---	6.5	5.0	6.0	---	---	---	10.5	7.0	8.5
MONTH	6.5	2.5	4.8	8.0	4.0	5.8	10.0	4.0	6.7	11.0	5.5	7.4

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	11.0	7.5	9.0	13.0	9.5	11.0	14.0	10.5	12.5	12.5	10.5	11.5
2	12.5	8.5	10.0	12.5	10.0	11.0	13.5	11.0	12.0	12.5	10.0	11.5
3	11.5	9.0	10.0	11.5	9.5	10.5	12.5	11.5	12.0	12.5	11.0	11.5
4	10.0	9.0	9.0	11.5	9.5	10.5	11.5	11.0	11.0	11.5	10.0	10.5
5	12.0	8.5	10.0	12.5	8.5	10.0	12.0	10.5	11.0	11.0	10.0	10.5
6	12.5	8.5	10.5	13.5	9.0	11.0	14.5	10.0	12.0	11.5	10.5	11.0
7	11.0	9.0	10.0	13.5	9.5	11.5	14.5	10.5	12.5	11.5	10.5	11.0
8	12.0	8.5	10.0	14.5	10.0	12.5	15.0	11.0	12.5	12.5	11.0	11.5
9	10.5	9.0	9.5	13.0	10.0	11.0	15.0	11.0	13.0	13.0	11.0	12.0
10	11.0	8.5	9.5	13.5	9.0	11.0	15.0	11.5	13.0	12.5	10.0	11.0
11	10.5	8.5	9.5	14.0	9.5	11.5	14.0	11.5	12.5	12.5	10.5	11.5
12	12.0	8.0	10.0	14.5	10.0	12.0	14.5	10.5	12.5	12.5	11.0	11.5
13	11.5	8.5	10.0	14.5	10.0	12.0	14.5	11.0	12.5	11.0	10.5	11.0
14	12.5	8.5	10.0	15.5	10.5	12.5	14.5	11.5	13.0	11.5	10.5	11.0
15	12.0	8.5	10.0	14.5	10.5	12.5	14.0	11.0	12.5	11.5	10.5	11.0
16	10.5	8.5	9.5	13.0	10.5	11.5	13.5	11.0	12.0	11.5	10.5	10.5
17	9.5	8.5	9.0	11.5	10.0	10.5	12.0	11.0	11.5	11.5	10.0	10.5
18	10.0	8.0	9.0	11.0	9.5	10.0	12.0	10.0	11.0	10.5	9.0	10.0
19	12.5	8.0	10.0	11.0	10.0	10.5	12.5	10.0	11.0	10.5	10.0	10.0
20	13.0	8.5	10.5	12.0	10.5	11.0	12.0	10.5	11.5	10.5	9.5	10.0
21	12.5	8.5	10.0	14.5	10.0	12.0	12.5	9.5	11.0	10.0	9.0	9.5
22	11.0	9.0	9.5	15.0	10.5	12.5	13.0	10.0	11.5	10.0	8.5	9.0
23	10.0	8.5	9.5	15.5	11.0	13.0	13.5	10.5	12.0	10.5	7.5	9.0
24	10.5	9.0	10.0	15.5	11.5	13.0	13.5	10.5	12.0	10.5	8.5	9.5
25	12.5	9.0	10.0	15.0	11.0	13.0	13.5	11.0	12.0	10.5	8.0	9.5
26	13.0	9.0	10.5	15.0	11.0	13.0	13.0	11.0	12.0	11.0	8.5	9.5
27	10.5	9.5	10.0	14.5	11.0	12.5	12.5	11.5	12.0	11.0	9.0	10.0
28	10.0	9.0	9.5	14.0	11.5	12.5	13.0	11.0	12.0	11.0	9.0	10.0
29	12.5	9.0	10.0	15.0	11.5	13.0	14.0	11.0	12.5	11.0	9.0	10.0
30	12.5	9.0	10.5	14.5	11.0	13.0	13.5	11.5	12.5	11.0	9.5	10.0
31	---	---	---	14.0	11.0	12.5	12.5	11.0	12.0	---	---	---
MONTH	13.0	7.5	9.8	15.5	8.5	11.7	15.0	9.5	12.0	13.0	7.5	10.5
YEAR	15.5	2.5	7.9									

12147600 SOUTH FORK TOLT RIVER NEAR INDEX. WA

LOCATION.--Lat 47°42'25", long 121°35'56", in NE 1/4 SW 1/4 sec.25, T.26 N., R.9 E., King County, Hydrologic Unit 17110010, on left bank 0.6 mi upstream from Phelps Creek, 8.1 mi south of Index, and at mile 12.9.

DRAINAGE AREA. - - 5.34 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD. - December 1959 to December 1963, November 1967 to current year.

GAGE...Water-stage recorder. Elevation of gage is 1,850 ft above sea level, from topographic map. Prior to Oct. 1, 1961, at datum 0.85 ft higher. Oct. 1, 1961 to Sept. 30, 1992, at datum 1.00 ft higher.

REMARKS.--Records fair except flows above 300 ft<sup>3</sup>/s and estimated daily discharges, which are poor. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--31 years (water years 1961-63, 1969-96), 54.4 ft<sup>3</sup>/s, 138.47 in/yr, 39,430 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,190 ft<sup>3</sup>/s Jan. 23, 1982; maximum gage height, 8.13 ft, present datum, Dec. 14, 1959; minimum discharge, 2.2 ft<sup>3</sup>/s Oct. 9, 10, 1989.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 550 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	0045	900	5.14	Nov. 28	2015	*1,060	*5.50
Nov. 11	0300	758	4.78				

Minimum discharge, 4.6 ft<sup>3</sup>/s July 16, 17.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71	20	164	112	e24	14	39	40	38	16	7.3	7.6
2	64	17	107	149	e23	14	62	39	46	16	21	5.9
3	230	16	80	226	e22	19	31	36	54	14	44	6.0
4	85	16	76	112	e40	25	26	32	48	18	27	6.0
5	42	23	59	73	e95	21	32	30	36	14	76	9.8
6	30	26	50	122	250	24	72	29	36	11	46	16
7	31	406	45	337	280	23	113	28	36	9.9	29	11
8	34	596	40	142	450	29	82	28	30	9.7	21	31
9	38	149	43	94	175	50	73	24	26	9.7	17	28
10	371	83	125	96	75	100	85	22	22	8.5	15	16
11	193	333	164	76	50	81	74	21	24	7.4	13	11
12	134	93	143	61	44	65	70	36	22	6.9	12	9.4
13	73	150	181	68	51	44	60	138	21	6.2	11	8.9
14	45	175	133	231	57	35	50	96	19	5.8	9.8	29
15	33	115	96	250	63	46	46	76	19	5.3	9.1	68
16	139	92	77	153	60	37	73	65	18	4.9	8.6	61
17	230	56	61	86	94	32	67	60	17	5.7	8.2	42
18	119	67	58	64	175	29	56	80	24	7.2	7.9	27
19	54	63	51	55	106	31	47	109	18	69	7.4	59
20	45	43	45	49	71	29	43	67	15	52	7.7	63
21	60	33	41	45	51	24	44	49	15	28	7.7	58
22	51	62	37	41	38	29	50	74	16	21	7.0	65
23	36	184	33	39	32	26	185	87	17	17	6.6	43
24	37	183	31	37	26	23	143	60	20	14	6.0	31
25	81	209	29	34	23	19	70	56	18	12	5.8	25
26	202	148	27	33	20	17	61	51	19	11	5.6	20
27	90	177	26	31	18	15	58	41	24	9.9	5.6	17
28	52	585	26	30	16	13	46	38	24	9.5	5.6	15
29	35	478	47	e28	16	14	39	87	19	8.8	5.2	14
30	28	206	128	e26	---	13	37	70	17	8.3	5.6	13
31	23	---	180	e25	---	13	---	45	---	7.8	8.7	---
TOTAL	2756	4804	2403	2925	2445	954	1934	1714	758	444.5	467.4	816.6
MEAN	88.9	160	77.5	94.4	84.3	30.8	64.5	55.3	25.3	14.3	15.1	27.2
MAX	371	596	181	337	450	100	185	138	54	69	76	68
MIN	23	16	26	25	16	13	26	21	15	4.9	5.2	5.9
AC-FT	5470	9530	4770	5800	4850	1890	3840	3400	1500	882	927	1620
CF5M	16.6	30.0	14.5	17.7	15.8	5.76	12.1	10.4	4.73	2.69	2.82	5.10
IN.	19.20	33.47	16.74	20.38	17.03	6.65	13.47	11.94	5.28	3.10	3.26	5.65

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1996, BY WATER YEAR (WY)

MEAN	40.5	79.0	74.3	73.3	65.9	46.3	63.9	79.0	65.5	31.1	14.4	25.8
MAX	107	181	165	154	150	93.4	116	140	160	81.3	37.4	56.9
(WY)	1986	1991	1976	1990	1982	1972	1988	1972	1974	1974	1975	1969
MIN	6.24	14.0	20.0	19.8	9.41	18.4	28.6	26.0	13.1	13.2	3.95	4.07
(WY)	1988	1980	1986	1981	1969	1962	1975	1992	1992	1961	1994	1993

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1960 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	22536.2			22421.5			
ANNUAL MEAN	61.7			61.3		54.4	
HIGHEST ANNUAL MEAN						77.8	1972
LOWEST ANNUAL MEAN						37.7	1979
HIGHEST DAILY MEAN	596	Nov 8		596	Nov 8	1160	Nov 23 1986
LOWEST DAILY MEAN	3.0	Sep 25		4.9	Jul 16	2.3	Aug 28 1961
ANNUAL SEVEN-DAY MINIMUM	3.5	Sep 20		5.6	Aug 24	2.4	Aug 24 1961
ANNUAL RUNOFF (AC-FT)	44700			44470		39430	
ANNUAL RUNOFF (CFSM)	11.6			11.5		10.2	
ANNUAL RUNOFF (INCHES)	156.99			156.19		138.47	
10 PERCENT EXCEEDS	131			143		116	
50 PERCENT EXCEEDS	41			37		33	
90 PERCENT EXCEEDS	8.5			9.5		8.1	

e Estimated

## SNOHOMISH RIVER BASIN

249

12147600 SOUTH FORK TOLT RIVER NEAR INDEX, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD---

WATER TEMPERATURE: October 1994 to current year.

INSTRUMENTATION---Temperature recorder since October 1994.

EXTREMES FOR PERIOD OF RECORD---

WATER TEMPERATURE: Maximum, 17.5°C July 14, 1996; minimum recorded, 0.0°C at times during most winter periods.

EXTREMES FOR CURRENT YEAR---

WATER TEMPERATURE: Maximum, 17.5°C July 14; minimum, 0.0°C several days during winter period.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	9.5	8.5	8.5	4.0	3.0	3.5	4.5	4.0	4.0	3.5	3.0	3.5
2	9.5	8.5	9.0	3.5	3.0	3.0	4.0	3.5	3.5	4.0	3.0	3.5
3	9.5	8.0	8.5	4.0	2.5	3.0	3.5	2.0	3.5	3.5	2.5	3.0
4	9.0	8.0	8.0	4.5	3.5	4.0	3.0	1.5	3.0	3.0	2.5	2.5
5	9.0	7.5	8.0	4.5	3.0	4.0	3.0	2.0	2.5	2.5	.5	2.0
6	8.5	7.5	8.0	4.0	2.5	3.5	2.5	2.0	2.0	2.5	.5	2.0
7	9.0	8.0	8.0	5.5	3.0	4.0	2.5	2.0	2.0	3.5	2.5	3.0
8	8.5	8.0	8.0	6.5	5.0	5.5	2.0	.0	1.0	3.5	3.0	3.5
9	8.0	8.0	8.0	5.0	4.5	5.0	.0	.0	.0	3.5	3.0	3.0
10	8.5	8.0	8.0	5.0	4.0	4.5	2.0	.0	1.0	3.0	3.0	3.0
11	8.0	7.0	7.5	5.5	4.5	5.0	2.5	1.5	2.5	3.5	2.5	3.0
12	7.5	6.5	7.0	5.5	5.0	5.0	3.0	2.5	2.5	3.0	2.5	3.0
13	7.5	6.5	7.0	6.5	5.0	5.5	2.5	2.5	2.5	3.0	2.5	3.0
14	8.0	7.0	7.5	6.5	6.0	6.5	2.5	2.5	2.5	3.5	3.0	3.0
15	8.5	7.0	8.0	6.5	6.0	6.0	3.0	2.5	3.0	3.5	3.0	3.0
16	8.0	8.0	8.0	6.0	5.5	5.5	3.0	2.5	2.5	3.0	2.0	2.5
17	8.0	7.0	7.5	6.0	5.5	6.0	2.5	2.0	2.5	2.5	2.0	2.0
18	7.5	6.5	7.0	6.0	5.5	5.5	2.5	2.0	2.5	2.0	1.0	1.5
19	7.0	6.0	6.5	5.5	4.5	5.0	3.0	2.5	3.0	2.0	1.0	1.5
20	7.5	6.5	7.0	4.5	4.0	4.5	3.0	2.5	3.0	2.0	1.0	1.5
21	7.0	6.0	6.5	5.5	4.5	5.0	2.5	2.0	2.5	2.0	1.0	1.5
22	6.5	5.5	6.0	6.0	5.5	5.5	2.0	1.5	2.0	2.0	1.0	1.5
23	7.0	6.0	6.5	6.5	6.0	6.0	1.5	1.0	1.5	1.5	.5	1.0
24	7.0	6.0	6.5	6.5	6.0	6.0	1.0	1.0	1.0	1.5	.0	1.0
25	7.0	6.0	6.5	6.0	5.0	5.5	1.5	1.0	1.0	1.5	.5	1.0
26	7.0	6.5	6.5	5.5	4.5	5.0	1.5	1.0	1.5	2.0	.5	1.5
27	6.5	5.5	6.0	5.0	4.5	4.5	2.0	1.5	2.0	1.5	1.0	1.5
28	6.0	5.0	5.5	5.5	4.0	5.0	2.5	.5	2.0	1.0	.0	.5
29	5.5	4.5	5.0	6.0	5.0	5.5	2.0	.0	1.0	.5	.0	.5
30	5.0	4.0	4.5	5.0	4.5	5.0	3.0	2.0	2.5	.0	.0	.0
31	4.5	3.5	4.0	---	---	---	3.0	2.5	3.0	.0	.0	.0
MONTH	9.5	3.5	7.0	6.5	2.5	4.9	4.5	.0	2.2	4.0	.0	2.0

## SNOHOMISH RIVER BASIN

12147600 SOUTH FORK TOLT RIVER NEAR INDEX, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	.5	.0	.0	2.5	1.0	1.5	3.5	3.0	3.0	5.0	3.5	4.5
2	.5	.0	.0	2.5	1.0	1.5	4.0	2.5	3.0	5.0	3.0	4.0
3	.0	.0	.0	2.5	1.5	2.0	4.0	2.5	3.0	5.0	3.5	4.0
4	.5	.0	.0	3.5	2.0	2.5	6.0	3.0	4.5	6.0	3.5	4.5
5	.5	.0	.0	3.0	2.0	2.5	5.5	4.0	4.5	7.0	3.5	5.0
6	2.0	.0	1.0	3.0	2.5	2.5	5.0	4.0	4.5	6.0	4.5	5.0
7	3.0	2.0	2.5	3.0	2.5	2.5	6.0	4.0	5.0	5.0	3.5	4.0
8	3.0	2.5	2.5	4.5	2.5	3.5	6.5	4.5	5.5	5.5	3.5	4.0
9	2.5	2.0	2.5	4.0	3.5	3.5	6.0	5.0	5.5	5.5	3.5	4.5
10	2.0	1.5	2.0	3.5	3.0	3.5	5.0	4.5	4.5	5.5	3.5	4.5
11	2.5	1.5	2.0	4.0	3.0	3.5	5.0	4.0	4.5	5.5	4.0	5.0
12	3.5	2.5	3.0	4.0	3.0	3.5	4.5	4.0	4.0	6.5	5.0	6.0
13	4.0	3.0	3.5	4.0	2.5	3.5	5.5	4.0	4.5	6.0	5.0	5.5
14	3.5	3.0	3.0	5.0	3.0	3.5	6.0	4.0	5.0	6.0	5.0	5.5
15	4.0	3.5	3.5	4.0	3.0	3.5	6.5	5.0	5.5	6.0	5.5	5.5
16	4.0	3.0	3.5	4.0	2.5	3.0	5.5	4.5	5.0	6.0	5.0	5.5
17	4.0	4.0	4.0	4.5	3.0	3.5	5.5	4.0	4.5	6.5	5.5	6.0
18	4.0	3.5	3.5	5.0	3.0	3.5	5.5	4.0	4.0	6.0	5.5	5.5
19	3.5	3.0	3.5	4.0	3.5	4.0	5.0	3.5	4.0	6.0	5.0	5.5
20	3.5	2.5	3.0	4.5	3.5	4.0	5.5	4.0	4.5	6.5	5.0	5.5
21	3.5	2.5	3.0	4.5	3.0	4.0	6.0	3.5	4.5	6.0	5.0	5.5
22	2.5	1.0	2.0	3.5	3.0	3.5	5.5	4.5	5.0	6.0	5.0	5.5
23	2.0	1.0	1.5	3.5	3.0	3.5	5.0	4.5	4.5	6.5	5.0	5.5
24	2.5	1.5	2.0	4.0	2.5	3.0	4.5	4.0	4.0	8.5	5.5	7.0
25	2.5	1.5	2.0	4.0	1.5	3.0	4.5	4.0	4.0	9.0	6.5	7.5
26	2.0	1.0	1.5	4.0	2.0	3.0	4.5	3.0	4.0	9.0	6.5	7.5
27	1.5	.5	1.0	4.0	2.5	3.0	5.0	3.5	4.0	7.0	6.5	6.5
28	1.0	.0	.5	4.5	2.0	3.0	5.0	3.5	4.0	7.0	6.0	6.5
29	1.5	.5	1.0	3.0	1.0	2.0	7.0	4.5	5.5	6.5	5.5	6.0
30	---	---	---	3.5	2.0	2.5	6.5	5.0	5.5	6.0	5.5	6.0
31	---	---	---	3.5	2.5	3.0	---	---	---	8.5	5.5	6.5
MONTH	4.0	.0	2.0	5.0	1.0	3.0	7.0	2.5	4.4	9.0	3.0	5.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	9.0	6.5	7.5	14.0	9.0	11.5	15.5	12.0	13.5	12.5	10.5	11.5
2	11.0	7.5	9.0	12.5	10.5	11.5	13.5	11.5	12.5	12.5	10.0	11.0
3	10.5	8.5	9.5	11.0	10.0	10.5	11.5	10.5	11.0	11.5	10.5	11.0
4	9.0	7.5	8.0	11.0	9.5	10.0	10.5	10.0	10.5	10.5	9.5	10.0
5	10.5	7.5	8.5	12.5	8.5	10.0	10.5	9.0	9.5	10.0	9.5	9.5
6	11.5	8.5	9.5	14.0	9.0	11.0	12.5	9.0	10.5	10.5	9.5	10.0
7	10.0	8.5	9.0	15.0	10.0	12.0	13.5	9.5	11.0	11.0	10.0	10.5
8	11.0	8.0	9.5	15.5	11.0	13.0	14.5	10.0	12.0	11.0	10.5	10.5
9	9.5	8.5	9.0	13.0	11.0	11.5	15.0	10.5	12.5	11.0	9.5	10.5
10	10.5	8.0	9.0	14.5	9.5	11.5	15.5	11.5	13.0	12.0	8.5	10.0
11	9.5	8.0	8.5	15.5	10.5	13.0	13.5	12.0	12.5	---	---	---
12	12.0	7.0	9.5	16.0	11.5	14.0	14.5	10.5	12.5	---	---	---
13	11.0	8.0	9.5	17.0	12.0	14.5	15.0	11.0	13.0	11.0	10.0	10.5
14	12.5	8.5	10.0	17.5	13.0	15.0	15.5	12.5	13.5	10.5	9.5	10.0
15	12.5	8.0	10.0	17.0	13.5	15.0	14.5	12.0	13.0	9.5	8.5	9.0
16	11.0	8.5	9.5	15.0	13.0	13.5	13.0	11.5	12.5	9.0	8.0	8.5
17	9.5	8.0	8.5	13.0	10.5	11.5	12.5	11.0	12.0	9.0	8.0	8.5
18	9.0	7.5	8.0	11.0	10.0	10.5	11.5	10.5	11.0	9.0	7.0	8.0
19	12.0	7.0	9.5	10.0	9.0	9.5	12.5	9.5	11.0	8.5	8.0	8.0
20	12.5	7.5	10.0	10.0	9.0	9.5	12.0	11.0	11.0	8.5	7.5	8.0
21	12.5	8.0	10.0	13.5	9.0	11.0	12.5	9.5	11.0	7.5	7.0	7.5
22	10.5	9.0	9.5	14.5	10.0	12.0	13.5	10.0	11.5	7.5	6.5	7.0
23	10.0	8.5	9.0	16.0	11.0	13.0	14.5	11.0	12.5	7.5	6.0	7.0
24	10.0	8.5	9.5	16.0	12.0	14.0	14.5	11.5	13.0	8.0	6.5	7.0
25	11.0	8.5	9.5	16.5	12.0	14.0	14.0	12.0	13.0	8.0	6.0	7.0
26	12.0	8.5	10.0	16.5	12.5	14.5	14.0	12.0	13.0	8.5	6.5	7.5
27	9.5	9.0	9.0	16.5	13.0	14.5	13.5	12.5	13.0	9.0	7.0	8.0
28	9.5	8.5	9.0	16.0	13.5	15.0	14.0	12.0	13.0	9.0	7.0	8.0
29	12.5	8.5	10.0	17.0	13.5	15.0	15.5	12.0	13.5	9.0	7.0	8.0
30	13.0	8.5	10.5	16.5	13.5	15.0	14.0	12.5	13.5	9.0	8.0	8.5
31	---	---	---	16.0	13.0	14.5	13.0	11.5	12.0	---	---	---
MONTH	13.0	6.5	9.2	17.5	8.5	12.6	15.5	9.0	12.2	---	---	---

## SNOHOMISH RIVER BASIN

251

## 12147900 SOUTH FORK TOLT RESERVOIR NEAR CARNATION, WA

LOCATION.--Lat 47°41'38", long 121°47'10", in NW 1/4 SW 1/4 sec.32, T.26 N., R.9 E., King County, Hydrologic Unit 17110010, on top and near the center of the dam, 11.4 mi northeast of Carnation, and at mile 8.4.

DRAINAGE AREA.--18.8 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1991 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level (Seattle Water Department bench mark).

REMARKS.--Reservoir is formed by earthfill dam, with a concrete glory hole spillway, completed in 1962. Water used for municipal water supply by Seattle Water Department. Usable capacity, 15,600 acre-ft between elevations 1,749 ft (minimum pool) and 1,765 ft (maximum normal pool). Top of dam is at 1,775 ft with top of spillway at 1,757 ft. Flood control between elevations 1,749 and 1,757 ft. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--Capacity table furnished by Seattle Water Department.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 59,220 acre-ft Apr. 30, 1993, elevation, 1,766.26 ft; minimum contents, 25,980 acre-ft Nov. 4, 1991, elevation, 1,728.72ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 58,880 acre-ft May 23, elevation, 1,765.94 ft; minimum contents, 35,980 acre-ft Sept. 30, elevation, 1,741.80.

Capacity table (elevation, in feet, and usable contents, in acre-ft)

1,690	8,100	1,730	26,800	1,760	52,900
1,700	11,300	1,740	34,400	1,765	57,900
1,710	15,400	1,750	43,200	1,780	73,600
1,720	20,400				

RESERVOIR ELEVATION SURFACE WATER (FEET), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1744.21	1753.80	1763.24	1755.35	1755.44	1758.32	1760.32	1765.38	1764.96	1760.73	1752.88	1745.26
2	1744.34	1753.70	1762.76	1755.92	1755.10	1758.28	1760.60	1765.40	1764.66	1760.48	1752.85	1744.94
3	1745.63	1753.62	1762.46	1757.03	1754.63	1758.27	1760.62	1765.37	1764.50	1760.26	1752.74	1744.66
4	1745.79	1753.55	1762.26	1757.11	1754.53	1758.24	1760.63	1765.32	1764.54	1760.10	1752.54	1744.39
5	1745.71	1753.53	1761.59	1757.09	1754.38	1758.23	1760.67	1765.30	1764.51	1759.90	1752.67	1744.17
6	1745.63	1753.54	1760.03	1757.30	1756.59	1758.20	1761.04	1765.20	1764.44	1759.64	1752.56	1743.94
7	1745.57	1756.90	1758.59	1759.63	1758.58	1758.19	1761.43	1765.25	1764.38	1759.38	1752.39	1743.75
8	1745.53	1761.38	1757.15	1759.51	1763.97	1758.28	1761.62	1765.22	1764.31	1759.13	1752.18	1743.67
9	1745.52	1761.48	1755.70	1758.55	1763.44	1758.44	1761.79	1765.12	1764.24	1758.85	1751.91	1743.56
10	1748.19	1760.85	1755.60	1757.91	1762.78	1758.90	1762.06	1765.09	1764.15	1758.58	1751.66	1743.30
11	1749.23	1761.65	1755.98	1757.76	1762.33	1759.24	1762.33	1765.07	1764.04	1758.29	1751.35	1743.09
12	1749.74	1760.85	1755.82	1757.75	1762.06	1759.41	1762.56	1765.10	1763.88	1758.00	1751.10	1742.90
13	1749.86	1760.44	1755.79	1758.02	1761.55	1759.47	1762.80	1765.72	1763.75	1757.70	1750.81	1742.68
14	1749.89	1759.96	1755.57	1759.47	1760.61	1759.51	1762.94	1765.75	1763.61	1757.42	1750.51	1742.59
15	1749.90	1759.18	1755.21	1760.91	1759.89	1759.59	1763.04	1765.70	1763.40	1757.12	1750.22	1742.77
16	1750.43	1758.57	1755.03	1760.55	1759.60	1759.63	1763.35	1765.60	1763.23	1756.84	1749.92	1742.75
17	1751.61	1757.25	1754.80	1759.50	1759.96	1759.61	1763.68	1765.57	1763.11	1756.59	1749.61	1742.67
18	1752.02	1756.25	1754.46	1758.77	1760.66	1759.54	1763.88	1765.61	1763.00	1756.42	1749.33	1742.65
19	1752.10	1755.75	1754.13	1758.55	1760.93	1759.58	1764.03	1765.70	1762.88	1756.49	1749.03	1742.71
20	1752.19	1755.50	1753.80	1758.32	1760.99	1759.66	1764.17	1765.54	1762.69	1756.37	1748.77	1742.80
21	1752.35	1755.33	1753.80	1758.09	1760.63	1759.77	1764.28	1765.52	1762.48	1756.16	1748.50	1742.96
22	1752.40	1755.33	1753.66	1757.90	1760.12	1759.89	1764.49	1765.82	1762.27	1755.90	1748.25	1742.99
23	1752.41	1756.16	1753.60	1757.95	1759.76	1759.96	1765.53	1765.87	1762.19	1755.62	1747.91	1742.90
24	1752.35	1756.65	1753.52	1757.95	1759.44	1760.04	1765.88	1765.69	1762.05	1755.34	1747.59	1742.74
25	1752.65	1756.89	1753.45	1757.94	1759.10	1760.08	1765.79	1765.54	1761.93	1755.05	1747.27	1742.72
26	1753.64	1756.86	1753.41	1757.70	1758.83	1760.13	1765.71	1765.46	1761.79	1754.77	1746.96	1742.52
27	1753.93	1757.11	1753.30	1757.34	1758.65	1760.13	1765.66	1765.39	1761.59	1754.45	1746.67	1742.34
28	1754.09	1761.49	1753.32	1757.02	1758.47	1760.13	1765.54	1765.31	1761.36	1754.14	1746.35	1742.19
29	1754.07	1764.52	1753.44	1756.66	1758.34	1760.18	1765.46	1765.69	1761.16	1753.88	1746.07	1742.03
30	1754.00	1763.70	1753.99	1756.25	---	1760.10	1765.39	1765.50	1760.98	1753.53	1745.82	1741.80
31	1753.93	---	1755.01	1755.84	---	1760.10	---	1765.27	---	1753.19	1745.52	---
MEAN	1749.96	1757.73	1756.14	1757.92	1759.36	1759.33	1763.24	1765.45	1763.20	1757.11	1749.74	1743.15
MAX	1754.09	1764.52	1763.24	1760.91	1763.97	1760.18	1765.88	1765.87	1764.96	1760.73	1752.88	1745.26
MIN	1744.21	1753.53	1753.30	1755.35	1754.38	1758.19	1760.32	1765.07	1760.98	1753.19	1745.52	1741.80
(†)	47010	56600	48060	48860	51290	53000	58310	58180	53880	46290	39260	35980
(‡)	+8920	+9590	-8540	+800	+2430	+1710	+5310	-130	-4300	-7590	-7030	-3280

CAL YR 1995 MEAN 1757.49 MAX 1765.39 MIN 1743.48 AC-FT# -690  
WTR YR 1996 MEAN 1756.85 MAX 1765.88 MIN 1741.80 AC-FT# -2110

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





## SNOHOMISH RIVER BASIN

253

12148000 SOUTH FORK TOLT RIVER NEAR CARNATION, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1994 to current year.

INSTRUMENTATION.--Temperature recorder since October 1984.

EXTREMES FOR PERIOD OF RECORD.--

WATER TEMPERATURE: Maximum, 14.5°C Oct. 8, 1994; minimum, 1.0°C Feb. 3, 1996.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 13.0°C Oct. 1; minimum, 1.0°C Feb. 3.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	13.0	11.5	12.0	8.5	7.5	8.0	7.5	7.5	7.5	5.5	5.0	5.0
2	12.5	12.0	12.0	8.5	7.5	8.0	7.5	7.0	7.5	5.5	5.0	5.5
3	12.5	11.0	11.5	8.5	7.5	7.5	7.0	6.5	7.0	5.5	5.0	5.0
4	12.5	11.0	11.5	8.5	7.5	8.0	7.0	5.5	6.5	5.0	4.0	4.5
5	12.5	11.0	12.0	8.0	7.0	8.0	7.0	6.0	6.5	4.5	4.0	4.5
6	12.5	11.5	12.0	8.0	6.5	7.5	7.0	6.5	6.5	5.5	4.0	5.0
7	12.5	11.5	12.0	8.5	7.0	7.5	6.5	6.0	6.5	6.0	5.5	5.5
8	12.0	11.5	12.0	8.5	7.0	8.0	6.5	6.0	6.0	5.5	4.0	4.5
9	12.0	11.5	12.0	8.5	7.0	8.0	6.0	5.5	5.5	4.0	4.0	4.0
10	11.5	10.5	11.0	8.5	8.0	8.0	6.0	5.5	5.5	5.0	4.0	4.5
11	11.0	10.0	10.5	8.5	8.0	8.5	6.0	5.5	6.0	5.0	4.5	5.0
12	10.5	10.0	10.0	8.5	8.0	8.0	5.5	5.5	5.5	5.0	4.5	5.0
13	10.5	9.5	10.0	8.5	8.0	8.0	5.5	5.5	5.5	5.5	4.5	5.0
14	11.5	10.0	10.5	8.0	8.0	8.0	5.5	5.5	5.5	6.0	5.5	5.5
15	11.5	10.5	11.0	8.5	8.0	8.0	6.0	5.5	5.5	6.0	4.0	5.0
16	11.0	10.5	10.5	8.5	8.0	8.0	6.0	5.5	5.5	4.0	3.5	4.0
17	10.5	10.0	10.0	8.5	8.0	8.5	5.5	5.5	5.5	4.0	4.0	4.0
18	10.5	9.5	10.0	8.5	8.0	8.0	5.5	5.5	5.5	4.0	3.5	4.0
19	10.5	9.0	10.0	8.0	7.5	8.0	6.0	5.5	5.5	4.5	3.5	4.0
20	10.5	10.0	10.0	7.5	7.0	7.5	6.0	5.5	5.5	4.5	3.5	4.0
21	10.0	9.5	9.5	8.0	7.0	7.5	5.5	5.0	5.0	4.5	4.0	4.0
22	10.0	9.0	9.5	8.0	7.5	8.0	5.0	4.5	5.0	4.5	4.0	4.0
23	10.0	9.5	9.5	8.0	8.0	8.0	5.0	4.5	4.5	4.5	3.5	4.0
24	10.0	9.5	9.5	8.0	7.5	8.0	4.5	4.5	4.5	4.5	3.0	4.0
25	10.0	9.5	9.5	8.0	7.5	8.0	4.5	4.0	4.5	4.5	3.5	4.0
26	9.5	9.0	9.5	8.0	7.5	7.5	4.5	4.0	4.5	4.5	3.0	4.0
27	9.5	8.5	9.0	8.0	7.5	7.5	5.0	4.5	4.5	4.0	3.5	3.5
28	9.5	8.0	8.5	8.0	7.5	8.0	5.0	4.5	4.5	3.5	3.0	3.0
29	9.0	8.0	8.0	8.0	7.5	8.0	5.0	4.0	5.0	3.5	2.0	3.0
30	9.0	8.0	8.5	8.0	7.5	7.5	5.5	5.0	5.0	2.5	2.0	2.0
31	8.5	8.0	8.0	---	---	---	5.5	5.0	5.0	2.5	2.0	2.0
MONTH	13.0	8.0	10.3	8.5	6.5	7.9	7.5	4.0	5.6	6.0	2.0	4.2

12148000 SOUTH FORK TOLT RIVER NEAR CARNATION, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	2.5	1.5	2.0	4.0	3.0	3.5	6.0	5.0	5.0	7.0	6.0	6.5
2	2.0	1.5	1.5	4.5	3.0	3.5	5.5	4.5	5.0	7.5	6.0	6.5
3	2.0	1.0	1.5	4.0	3.5	3.5	6.0	4.0	5.0	8.0	6.5	7.0
4	2.5	2.0	2.5	4.5	3.5	4.0	7.0	5.0	5.5	8.0	6.5	7.0
5	3.0	2.5	2.5	4.0	3.5	4.0	7.0	5.0	6.0	8.5	6.5	7.0
6	3.5	2.5	3.0	4.5	4.0	4.0	6.5	5.5	6.0	7.5	6.5	7.0
7	3.5	3.5	3.5	4.5	4.0	4.0	8.5	6.0	6.5	7.0	6.0	6.5
8	4.5	1.5	3.5	5.5	4.0	4.5	8.5	5.5	6.5	7.5	6.0	6.5
9	3.5	1.5	2.5	5.5	4.5	5.0	6.5	6.0	6.0	7.5	6.0	6.5
10	2.0	1.5	2.0	5.5	5.0	5.0	6.0	5.5	6.0	7.5	6.0	6.5
11	3.0	2.0	2.5	5.5	4.5	5.0	6.5	5.5	5.5	7.5	6.5	7.0
12	4.5	3.0	4.0	5.0	4.5	4.5	6.0	5.0	5.5	8.0	7.0	7.5
13	4.5	2.0	3.5	5.5	4.0	4.5	7.0	5.0	6.0	8.5	7.5	8.0
14	2.5	2.0	2.0	6.0	4.0	5.0	8.0	5.5	6.5	8.5	8.0	8.5
15	2.5	2.0	2.5	5.0	4.0	4.5	8.0	6.5	7.0	8.5	8.0	8.0
16	4.5	2.5	3.5	5.0	4.0	4.5	7.5	6.0	6.5	9.0	8.0	8.5
17	5.0	4.5	4.5	5.5	4.0	4.5	7.5	6.0	6.5	9.5	8.5	8.5
18	5.0	4.5	4.5	6.0	4.0	4.5	6.5	5.5	6.0	9.0	8.5	8.5
19	4.5	4.0	4.5	5.5	4.0	4.5	7.0	5.5	6.0	8.5	7.5	8.0
20	5.0	3.5	4.5	5.5	4.5	5.0	7.5	5.5	6.5	9.0	8.0	8.5
21	4.0	3.0	3.5	6.0	4.0	5.0	8.0	5.5	6.5	8.5	8.0	8.5
22	3.0	2.5	3.0	5.0	4.5	4.5	7.0	6.0	6.5	8.5	7.5	8.0
23	4.0	3.0	3.5	5.5	4.5	4.5	7.0	6.5	6.5	9.0	8.0	8.5
24	4.5	3.5	4.0	5.5	4.0	4.5	6.5	6.0	6.5	9.5	8.5	9.0
25	4.5	3.5	3.5	5.5	3.5	4.5	6.5	6.0	6.5	10.0	8.5	9.0
26	4.0	3.0	3.5	5.5	4.0	4.5	7.0	6.0	6.5	10.5	8.5	9.0
27	3.5	2.5	3.0	5.5	4.0	4.5	7.0	6.0	6.5	9.0	8.5	8.5
28	3.5	2.0	2.5	6.0	4.0	4.5	7.0	6.0	6.5	9.0	8.0	8.5
29	4.0	2.5	3.0	4.5	4.0	4.5	7.5	6.5	7.0	9.0	8.0	8.5
30	---	---	---	5.5	4.0	5.0	7.5	6.5	7.0	9.5	9.0	9.5
31	---	---	---	5.5	4.5	5.0	---	---	---	10.5	8.5	9.0
MONTH	5.0	1.0	3.1	6.0	3.0	4.5	8.5	4.0	6.2	10.5	6.0	7.9
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	9.5	8.0	8.5	11.0	7.5	9.0	11.0	8.0	9.5	11.0	9.0	9.5
2	10.5	7.5	8.5	10.0	8.0	8.5	9.5	8.5	9.0	11.0	9.0	10.0
3	9.5	8.0	8.5	9.0	8.0	8.5	9.5	8.5	9.0	10.5	9.5	9.5
4	8.0	7.5	8.0	9.0	7.5	8.5	9.0	8.5	8.5	10.5	9.0	9.5</

12148300 SOUTH FORK TOLT RIVER BELOW REGULATING BASIN, NEAR CARNATION, WA

LOCATION.--Lat 47°41'49", long 121°47'10", in SW 1/4 NE 1/4 sec.33, T.26 N., R.8 E., King County, Hydrologic Unit 17110010, on right bank 2.3 mi upstream from mouth and 6.5 mi northeast of Carnation.

DRAINAGE AREA.--29.6 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--March 1982 to current year. Published as "South Fork Tolt River below regulating pond, near Carnation" March 1982 through September 1983.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 670 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by South Fork Tolt Reservoir 6.1 mi upstream, capacity, 57,830 acre-ft. During the current water year the Seattle Water Department diverted an average daily discharge of about 76 ft<sup>3</sup>/s. U.S. Geological Survey satellite telemetry at station.

AVERAGE DISCHARGE.--14 years (water years 1983-96), 144 ft<sup>3</sup>/s, 104,300 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge not determined, Nov. 24, 1990; maximum daily discharge, 3,700 ft<sup>3</sup>/s Nov. 24, 1990; minimum discharge, 36 ft<sup>3</sup>/s on many days during July and August, 1982.

EXTREMES FOR CURRENT YEAR.--Maximum discharge 2,300 ft<sup>3</sup>/s Nov. 29, gage height, 7.46 ft; minimum discharge, 56 ft<sup>3</sup>/s on several days in July and August.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	68	88	987	97	221	99	95	174	347	64	57	58
2	73	86	729	95	216	97	105	167	327	63	70	58
3	112	84	533	145	268	98	96	173	195	63	73	58
4	86	84	476	273	133	96	92	156	88	65	64	58
5	77	87	513	248	279	94	88	145	87	63	78	59
6	74	90	872	280	259	92	94	126	82	62	68	58
7	74	224	844	368	427	91	101	118	80	62	64	58
8	74	399	844	471	862	90	93	120	78	61	62	59
9	73	575	765	763	1520	91	91	109	77	61	61	58
10	173	801	502	615	853	101	93	98	75	61	60	57
11	171	843	339	274	530	104	96	96	75	60	60	57
12	132	793	554	162	356	100	96	97	73	60	59	57
13	109	793	561	102	463	96	100	185	85	60	59	57
14	98	791	599	161	727	94	97	316	70	60	59	58
15	91	776	544	435	589	95	95	301	69	59	59	65
16	111	599	327	797	363	92	113	262	68	59	59	61
17	145	791	314	836	134	90	106	227	69	60	59	59
18	134	727	303	608	215	118	106	222	71	60	58	59
19	112	460	286	306	294	153	106	274	67	68	58	68
20	107	234	262	300	251	89	104	247	66	63	59	73
21	109	169	99	300	374	89	100	196	65	61	58	70
22	102	153	95	219	494	95	100	270	65	60	58	70
23	97	117	92	107	365	91	133	429	67	59	57	67
24	93	308	89	105	262	88	372	354	69	59	57	65
25	94	589	87	99	253	86	373	262	67	58	57	62
26	131	583	85	200	209	85	313	196	65	58	57	61
27	116	758	81	261	149	98	304	162	67	58	57	61
28	106	1180	79	258	105	91	265	136	66	58	56	60
29	100	e1610	86	209	103	93	207	224	65	57	57	59
30	95	e1560	90	218	---	85	172	333	64	57	58	59
31	91	---	110	250	---	85	---	328	---	57	61	---
TOTAL	3228	16352	12147	9562	11274	2966	4306	6503	2809	1876	1879	1829
MEAN	104	545	392	308	389	95.7	144	210	93.6	60.5	60.6	61.0
MAX	173	1610	987	836	1520	153	373	429	347	68	78	73
MIN	68	84	79	95	103	85	88	96	64	57	56	57
AC-FT	6400	32430	24090	18970	22360	5880	8540	12900	5570	3720	3730	3630

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 1996, BY WATER YEAR (WY)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	80.8	239	204	242	186	149	149	162	117	69.9	59.2	66.9			
MAX	147	597	425	579	389	263	380	307	241	118	77.6	112			
(WY)	1986	1991	1991	1984	1996	1982	1989	1984	1990	1983	1993	1983			
MIN	41.2	43.5	70.2	66.3	83.8	73.2	73.1	68.0	53.7	41.9	38.5	42.4			
(WY)	1988	1988		1988	1994	1992	1992	1992	1992	1982	1982	1987			

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1982 - 1996
ANNUAL TOTAL	64588	74731	
ANNUAL MEAN	177	204	144
HIGHEST ANNUAL MEAN			217
LOWEST ANNUAL MEAN			84.7
HIGHEST DAILY MEAN	1610	Nov 29	3700
LOWEST DAILY MEAN	61	Sep 23	36
ANNUAL SEVEN-DAY MINIMUM	61	Sep 20	36
ANNUAL RUNOFF (AC-FT)	128100	148200	104300
10 PERCENT EXCEEDS	503	536	295
50 PERCENT EXCEEDS	89	97	86
90 PERCENT EXCEEDS	66	59	58

e Estimated

12148300 SOUTH FORK TOLT RIVER BELOW REGULATING BASIN, NEAR CARNATION, WA--Continued

## WATER-QUALITY RECORDS

## PERIOD OF RECORD.--

WATER TEMPERATURE: October 1994 to current year.

## INSTRUMENTATION.--Temperature recorder.

## EXTREMES FOR PERIOD OF RECORD.--

WATER TEMPERATURE: Maximum recorded, 16.0°C Aug. 11, 1995; minimum, 0.5°C, Feb. 3, 1996.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 14.5°C July 14; minimum, 0.5°C Feb. 3.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	12.5	10.5	11.5	7.5	6.0	6.5	8.0	7.5	7.5	6.5	6.0	6.5
2	12.0	11.5	11.5	7.0	5.5	6.5	7.5	7.0	7.5	7.0	6.5	6.5
3	12.0	11.0	11.5	7.0	5.5	6.5	7.5	7.0	7.0	7.0	4.5	6.0
4	11.5	10.5	11.0	8.0	6.0	7.0	7.0	6.0	6.5	4.5	4.0	4.5
5	12.0	10.0	11.0	8.0	7.0	7.5	6.5	5.5	6.0	5.0	4.0	4.0
6	12.0	10.5	11.0	7.5	6.5	7.0	7.0	6.5	6.5	5.0	4.0	4.5
7	12.0	11.0	11.5	8.5	7.0	7.5	6.5	6.0	6.5	6.5	5.0	5.5
8	11.5	11.0	11.5	9.0	7.5	8.5	6.0	5.5	6.0	6.5	4.5	5.5
9	11.5	11.0	11.0	8.5	7.0	8.0	5.5	5.5	5.5	4.5	4.5	4.5
10	11.5	10.5	11.0	8.5	8.0	8.0	6.0	5.5	5.5	4.5	4.5	4.5
11	10.5	9.5	10.0	9.0	8.5	8.5	7.0	6.0	6.5	4.5	4.0	4.5
12	10.5	9.5	10.0	8.5	8.5	8.5	6.5	6.0	6.0	5.5	4.0	5.0
13	10.5	9.0	9.5	9.0	8.5	8.5	6.0	6.0	6.0	6.0	5.0	5.5
14	11.0	9.0	10.0	9.0	8.5	8.5	6.0	5.5	6.0	7.0	6.0	6.5
15	11.5	9.5	10.5	9.0	8.5	8.5	6.0	5.5	5.5	7.0	5.0	6.0
16	11.0	10.5	10.5	9.0	8.5	8.5	6.0	5.5	5.5	5.0	4.0	4.5
17	10.5	9.5	10.0	9.0	8.5	8.5	5.5	5.5	5.5	4.5	4.0	4.0
18	10.0	8.5	9.5	9.0	8.0	8.5	5.5	5.5	5.5	4.0	3.5	4.0
19	10.0	8.0	9.0	8.5	7.5	8.0	5.5	5.5	5.5	4.0	3.5	3.5
20	10.0	9.5	10.0	8.0	7.5	7.5	5.5	5.0	5.5	4.0	3.5	4.0
21	9.5	8.5	9.5	8.5	7.5	8.0	6.0	5.0	5.5	4.0	3.5	4.0
22	9.5	7.5	8.5	8.5	8.0	8.5	5.5	5.0	5.0	5.0	3.5	4.0
23	10.0	8.5	9.0	8.5	8.5	8.5	5.0	4.5	4.5	5.0	4.5	4.5
24	9.5	9.0	9.5	8.5	8.5	8.5	4.5	4.0	4.0	4.5	3.0	4.0
25	9.5	8.5	9.0	8.5	8.0	8.0	4.5	3.5	4.0	5.0	4.0	4.5
26	9.5	9.0	9.0	8.0	7.5	8.0	4.5	3.5	4.0	4.0	3.5	3.5
27	9.5	8.0	9.0	8.0	7.5	8.0	5.5	4.5	5.0	3.5	3.0	3.0
28	9.0	7.5	8.0	8.5	8.0	8.0	6.0	5.0	5.5	3.0	2.5	3.0
29	8.0	6.5	7.0	8.5	8.0	8.5	6.0	5.0	5.5	3.0	2.0	2.5
30	8.0	6.5	7.0	8.0	8.0	8.0	6.5	6.0	6.0	2.0	1.5	1.5
31	7.5	6.0	6.5	---	---	---	6.5	6.0	6.5	2.5	1.0	1.5
MONTH	12.5	6.0	9.8	9.0	5.5	7.9	8.0	3.5	5.7	7.0	1.0	4.4



WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	2.5	1.0	1.5	5.0	3.0	4.0	7.0	6.0	6.5	8.0	6.5	7.5
2	2.5	1.0	1.5	5.5	3.5	4.0	6.5	5.0	6.0	8.5	6.0	7.0
3	1.0	.5	1.0	5.5	4.0	5.0	7.5	4.5	6.0	8.5	6.5	7.5
4	4.0	1.0	3.0	6.0	4.5	5.5	9.0	5.5	7.0	9.0	7.0	7.5
5	4.0	1.5	2.0	5.5	4.5	5.0	9.0	6.5	7.5	10.0	6.5	8.0
6	4.5	2.0	3.5	6.0	5.0	5.5	8.0	7.0	7.5	8.5	7.0	8.0
7	5.0	2.5	3.5	6.0	5.0	5.5	10.5	7.5	9.0	7.5	6.5	7.0
8	5.5	3.5	4.5	7.5	5.5	6.5	10.5	7.5	9.0	8.5	6.5	7.5
9	3.5	2.5	3.0	7.5	6.5	7.0	9.0	8.0	8.5	8.5	6.0	7.5
10	3.0	2.5	3.0	7.5	6.5	7.0	8.0	7.0	7.5	8.5	6.0	7.5
11	4.0	3.0	3.5	7.5	6.5	7.0	8.0	6.5	7.5	8.5	7.0	7.5
12	5.0	3.0	3.5	7.0	6.0	6.5	7.0	6.5	7.0	9.5	8.0	8.5
13	5.0	3.0	3.5	7.0	5.0	6.0	8.5	6.5	7.0	9.5	8.5	9.0
14	3.5	2.5	3.0	7.5	5.0	6.0	9.5	6.5	8.0	9.5	9.0	9.0
15	4.0	3.0	3.5	6.5	5.5	6.5	9.5	7.5	8.5	9.5	8.5	9.0
16	6.0	3.0	4.5	6.5	4.5	5.5	9.5	7.5	8.0	9.5	8.5	9.0
17	6.5	6.0	6.5	7.0	5.5	6.0	8.5	7.0	7.5	10.0	9.0	9.5
18	6.5	4.5	5.5	7.5	4.5	6.0	7.5	6.5	7.0	10.0	8.5	9.0
19	5.0	4.0	4.5	6.5	5.0	5.5	8.0	6.0	7.0	9.5	8.5	9.0
20	5.0	4.5	4.5	7.5	5.5	6.0	9.0	6.5	7.5	10.0	8.5	9.0
21	4.5	3.5	4.0	7.5	5.0	6.0	9.5	6.0	7.5	9.0	8.0	8.5
22	4.0	3.5	3.5	6.5	5.5	6.0	8.0	7.0	7.5	8.5	8.5	8.5
23	5.0	3.5	4.0	6.5	5.5	6.0	8.5	7.5	8.0	9.5	8.5	9.0
24	4.0	3.0	3.5	6.5	4.5	5.5	8.0	7.0	7.0	11.5	8.5	9.5
25	4.0	3.0	3.5	6.5	3.5	5.0	7.5	7.0	7.0	11.5	9.0	10.0
26	4.0	3.0	3.5	7.0	4.0	5.5	8.0	6.5	7.0	11.5	9.0	10.0
27	4.0	2.5	3.5	6.5	5.0	5.5	8.0	6.5	7.0	9.5	8.5	9.0
28	4.0	2.5	3.0	7.0	4.0	5.5	8.0	6.0	7.0	9.5	8.5	9.0
29	5.0	3.0	3.5	5.5	5.0	5.0	9.0	7.5	8.0	9.5	8.5	9.0
30	---	---	---	7.0	4.5	5.5	9.0	7.0	8.0	10.0	8.5	9.0
31	---	---	---	7.0	5.0	6.0	---	---	---	9.5	8.0	9.0
MONTH	6.5	.5	3.5	7.5	3.0	5.7	10.5	4.5	7.4	11.5	6.0	8.5

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.5	8.0	8.0	13.5	9.0	11.0	13.0	9.0	11.0	12.0	9.5	10.5
2	9.0	8.0	8.5	12.0	9.5	10.5	11.5	10.0	10.5	12.0	9.0	10.5
3	12.0	8.0	10.0	11.0	9.0	10.0	11.0	10.0	10.5	11.0	10.0	10.5
4	10.5	9.0	9.5	11.0	9.0	10.0	10.5	9.5	10.0	11.0	9.0	10.0
5	12.0	8.5	10.0	12.0	8.0	10.0	11.5	9.5	10.5	10.5	9.5	10.0
6	12.5	9.0	10.5	13.0	8.0	10.5	12.5	9.0	11.0	11.0	9.5	10.5
7	10.5	9.0	10.0	13.5	9.0	11.0	13.0	9.5	11.0	11.0	10.0	10.5
8	12.0	8.5	10.0	13.5	9.5	11.5	13.5	10.0	11.5	11.5	10.5	11.0
9	10.5	9.0	9.5	11.5	9.5	10.0	13.5	10.0	12.0	12.0	10.5	11.0
10	11.0	8.5	9.5	13.0	8.5	10.5	14.0	10.5	12.0	12.0	9.5	10.5
11	10.5	8.5	9.5	13.5	9.0	11.0	12.5	10.5	11.0	12.5	10.0	11.0
12	12.0	7.5	9.5	14.0	9.5	11.5	13.0	9.5	11.0	11.5	10.5	11.0
13	11.5	8.0	9.5	14.0	9.5	12.0	13.5	9.5	11.5	11.5	10.5	11.0
14	12.5	8.0	10.0	14.5	10.0	12.0	13.5	10.0	11.5	11.0	10.5	11.0
15	12.0	8.0	10.0	14.0	10.0	12.0	13.0	9.5	11.0	11.0	10.5	10.5
16	10.5	8.0	9.0	12.0	9.5	10.5	11.5	9.5	10.5	11.0	10.0	10.5
17	9.5	8.5	9.0	10.5	9.5	9.5	11.5	10.0	10.5	11.5	10.0	10.5
18	10.0	8.0	9.0	10.0	9.0	9.5	11.0	9.5	10.0	11.0	9.0	10.0
19	12.0	7.5	9.5	10.0	9.0	9.5	11.5	9.0	10.5	10.5	10.5	10.5
20	12.5	8.0	10.0	11.0	9.0	10.0	11.0	10.0	10.5	10.5	10.0	10.5
21	11.5	8.5	9.5	13.0	9.0	11.0	12.0	9.0	10.5	10.5	9.5	10.0
22	10.0	9.0	9.5	13.5	9.0	11.0	12.5	9.0	10.5	10.5	9.0	10.0
23	10.0	8.5	9.0	14.0	10.0	12.0	13.0	9.5	11.0	11.0	8.0	9.5
24	10.0	9.0	9.5	14.0	10.0	12.0	13.0	10.0	11.5	11.5	9.0	10.0
25	12.0	9.0	10.0	14.0	10.0	12.0	12.5	10.5	11.5	11.5	9.0	10.0
26	12.5	8.5	10.5	14.0	10.0	12.0	12.5	10.5	11.5	11.5	9.0	10.5
27	10.0	9.0	9.5	13.5	10.0	12.0	11.5	10.5	11.0	12.0	10.0	11.0
28	9.5	9.0	9.0	13.0	10.5	12.0	12.5	10.0	11.0	12.5	10.0	11.0
29	12.0	8.5	10.0	14.0	10.5	12.0	13.5	10.5	11.5	12.0	10.0	11.0
30	12.5	8.5	10.5	13.5	10.0	11.5	12.0	10.5	11.5	12.0	10.5	11.5
31	---	---	---	13.0	9.5	11.0	11.5	10.5	11.0	---	---	---
MONTH	12.5	7.5	9.6	14.5	8.0	11.0	14.0	9.0	11.0	12.5	8.0	10.5
YEAR	14.5	.5	7.9									

## SNOHOMISH RIVER BASIN

12148500 TOLT RIVER NEAR CARNATION, WA

LOCATION.--Lat 47°41'45", long 121°49'22", in SE 1/4 NE 1/4 sec.31, T.26 N., R.8 E., King County, Hydrologic Unit 17110010, on right bank 500 ft downstream from the forks, 0.4 mi upstream from Stossel Creek, 5.5 mi northeast of Carnation, and at mile 8.7.

DRAINAGE AREA.--81.4 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1928 to January 1932, September 1937 to current year. Prior to October 1951, published as "near Tolt."

REVISED RECORDS.--WSP 1286: 1929(M), 1930, 1938(M), 1939, 1943(M), 1945(M), 1951(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 348 ft above sea level (river-profile survey). Prior to Oct. 31, 1928, nonrecording gage, and Oct. 31, 1928 to Jan. 3, 1932, water-stage recorder at site 350 ft upstream at datum 7.1 ft higher (river-profile survey). Sept. 1 to Oct. 6, 1937, nonrecording gage at present site at datum 1.64 ft higher.

REMARKS.--No estimated daily discharges. Records good. Some regulation by South Fork Reservoir, capacity, 57,830 acre-ft, and by Seattle City Light hydroelectric project, upstream from station. During the current water year city of Seattle Water Department diverted an average daily discharge of about 76 ft<sup>3</sup>/s upstream from station for municipal use. Chemical analyses July 1960 to September 1970. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--62 years (water years 1929-31, 1938-96), 577 ft<sup>3</sup>/s, 418,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 17,400 ft<sup>3</sup>/s Dec. 15, 1959, gage height, 13.04 ft; minimum discharge, 53 ft<sup>3</sup>/s Sept. 22, 23, 1951, gage height, 3.84 ft.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1300	3,450	8.24	Jan. 7	0830	4,180	8.64
Nov. 8	0130	7,710	10.11	Jan. 15	1830	3,940	8.51
Nov. 11	0415	6,080	9.51	Feb. 6	2115	4,550	8.82
Nov. 29	0315	*11,400	*11.19	Feb. 8	1700	10,300	10.89

Minimum discharge, 114 ft<sup>3</sup>/s Sept. 2, 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	370	390	2880	771	500	401	442	629	747	218	144	141
2	354	364	1990	756	531	393	637	604	713	214	342	125
3	1030	343	1470	1330	566	400	408	605	592	208	493	119
4	474	338	1460	1040	499	421	359	561	459	224	265	121
5	300	369	1320	806	940	402	357	526	412	206	553	141
6	246	426	1680	1240	2340	394	532	489	390	194	348	184
7	278	2730	1560	3110	2670	387	774	468	379	189	248	143
8	293	5040	1500	1570	7120	421	503	470	353	186	213	229
9	281	2060	1450	1630	3960	518	441	428	329	185	194	233
10	2200	1700	1820	1550	1850	789	498	388	308	180	182	158
11	1400	3380	1620	934	1260	667	530	373	309	176	174	136
12	937	1820	1560	716	984	544	528	424	295	174	168	127
13	616	1880	1800	639	1020	441	571	1090	301	170	164	123
14	479	2150	1650	1810	1240	391	489	947	274	168	157	152
15	409	1760	1440	2480	1070	406	436	836	269	166	154	378
16	946	1440	1030	2270	866	378	637	737	259	163	151	398
17	1510	1490	917	1760	733	357	570	689	250	166	149	276
18	1010	1410	883	1330	1250	364	542	758	311	172	147	196
19	636	1050	829	883	1160	430	512	980	268	504	144	358
20	562	724	751	851	899	349	478	767	249	380	144	360
21	616	609	540	855	891	319	452	620	240	232	143	371
22	570	696	502	730	937	356	429	908	234	198	139	491
23	484	1300	471	591	800	339	1190	1340	243	184	137	321
24	459	1450	445	588	671	326	1340	982	276	176	135	243
25	509	1990	422	573	635	302	952	787	266	168	132	209
26	1610	1630	403	616	570	290	880	657	237	165	131	189
27	896	2320	382	633	501	294	961	565	260	159	130	176
28	630	6550	377	612	436	277	810	522	242	154	129	167
29	525	7840	534	550	416	285	666	1020	232	152	128	158
30	465	3700	746	570	---	269	591	996	223	149	131	151
31	423	---	1190	550	---	269	---	794	---	147	153	---
TOTAL	21518	58949	35622	34344	37315	12179	18515	21960	9920	6127	6022	6574
MEAN	694	1965	1149	1108	1287	393	617	708	331	198	194	219
MAX	2200	7840	2880	3110	7120	789	1340	1340	747	504	553	491
MIN	246	338	377	550	416	269	357	373	223	147	128	119
AC-FT	42680	116900	70660	68120	74010	24160	36720	43560	19680	12150	11940	13040

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1996, BY WATER YEAR (WY)

	440	792	884	843	747	598	671	680	549	293	181	249
MEAN	440	792	884	843	747	598	671	680	549	293	181	249
MAX	933	1965	1897	2058	1634	1472	1275	1208	1204	802	485	954
(WY)	1960	1996	1976	1953	1982	1972	1959	1948	1964	1955	1964	1959
MIN	79.5	123	305	246	163	267	289	310	205	120	74.9	72.9
(WY)	1988	1953	1986	1929	1929	1992	1941	1992	1992	1958	1958	1940

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1928 - 1996

ANNUAL TOTAL	240213	269045	
ANNUAL MEAN	658	735	
HIGHEST ANNUAL MEAN			577
LOWEST ANNUAL MEAN			922
HIGHEST DAILY MEAN	7840	7840	11400
LOWEST DAILY MEAN	120	119	53
ANNUAL SEVEN-DAY MINIMUM	123	131	56
ANNUAL RUNOFF (AC-FT)	476500	533700	418000
10 PERCENT EXCEEDS	1460	1560	1120
50 PERCENT EXCEEDS	445	478	443
90 PERCENT EXCEEDS	167	159	139

## 12149000 SNOQUALMIE RIVER NEAR CARNATION, WA

LOCATION.--Lat 47°39'58", long 121°55'27", in NW 1/4 SW 1/4 sec.9, T.25 N., R.7 E., King County, Hydrologic Unit 17110010, on left bank 40 ft downstream from highway bridge, 1.3 mi northwest of Carnation, 1.9 mi downstream from Tolt River, and at mile 23.0.

DRAINAGE AREA.--603 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1928 to current year. Monthly discharge only for October 1928 to February 1929, published in WSP 870. Prior to October 1951, published as "near Tolt."

REVISED RECORDS.--WSP 1316: 1932-33(M). WSP 1446: 1934(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to Dec. 20, 1933, nonrecording gage on old bridge, 100 ft upstream and Dec. 20, 1933, to Sept. 30, 1939, water-stage recorder at present site, at datum 42.96 ft higher.

REMARKS.--No estimated daily discharges. Records good. During the current water year, Seattle Water Department diverted an average daily discharge of 76 ft<sup>3</sup>/s upstream from station for municipal use. Several small diversions for irrigation and domestic use upstream from station. Low flow diverted for operation of powerplant at Snoqualmie Falls but returned to river upstream from station. Some pondage at Snoqualmie Falls and some diurnal fluctuation caused by powerplant. Chemical analyses October 1966 to June 1969. Water temperatures October 1966 to June 1969. U.S. Geological Survey telemeter at station.

AVERAGE DISCHARGE.--67 years (water years 1930-96), 3,730 ft<sup>3</sup>/s, 84.04 in/yr, 2,702,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 65,200 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 60.70 ft, from inside high-water mark; minimum discharge, 239 ft<sup>3</sup>/s Aug. 21, 1945, but may have been less sometime during period of faulty intake action Sept. 13 or 14, 1949; minimum daily discharge, 341 ft<sup>3</sup>/s Sept. 15, 1973.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 9	0430	40,000	57.96	Jan. 8	0030	20,000	54.27
Nov. 11	2300	24,600	55.75	Jan. 16	0730	16,900	53.02
Nov. 29	1700	61,200	60.30	Feb. 9	0630	*61,600	*60.34

Minimum discharge, 749 ft<sup>3</sup>/s Aug. 27, 28.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3710	2050	27100	8130	3030	2560	2190	4160	3760	1780	912	869
2	2380	1840	17200	6630	2920	2450	3970	3950	3770	1790	976	824
3	7640	1680	11100	11400	2900	2450	3200	3910	4460	1740	2400	822
4	6210	1570	10600	9670	2950	2910	2650	3660	4470	1840	1950	858
5	3390	1660	8750	6920	3430	2730	2540	3340	3650	1710	2590	883
6	2440	2060	7920	6410	9660	2650	2850	3130	3350	1490	2790	1040
7	2230	6120	7020	15500	23800	2680	5120	2960	3530	1410	1860	1020
8	2110	23600	6380	16500	37100	2670	5180	2960	3450	1400	1510	972
9	2060	30700	5980	9680	53000	3170	4990	2720	3020	1460	1330	1180
10	7250	11200	7720	8050	22800	4440	4880	2490	2640	1400	1220	1110
11	12800	17800	10100	6340	10900	4770	4810	2370	2490	1300	1150	997
12	7900	17100	9450	5420	7590	4390	4650	2580	2490	1300	1100	951
13	5110	9420	11400	4880	6660	3680	4420	5190	2370	1300	1050	917
14	3620	13800	10400	9710	6580	3150	4030	7080	2310	1270	1010	937
15	2940	9330	9530	12900	6160	3180	3510	5590	2270	1270	972	1590
16	3670	8100	7600	15500	5900	3280	4330	5140	2200	1230	951	2240
17	5380	6120	6530	9950	5670	2880	4540	4510	2080	1170	917	1930
18	6590	6210	5860	7380	10300	2670	4140	4990	2040	1170	899	1470
19	4050	5600	5400	5870	10000	2660	3830	6090	1940	1490	872	1460
20	3230	4270	4960	5480	7820	2630	3550	5480	1760	2190	857	2430
21	3390	3490	4490	5860	6470	2400	3250	4530	1750	1570	856	2130
22	3580	3270	4190	5290	5580	2520	2990	5200	1790	1320	836	2810
23	2930	4970	3960	4790	5080	2550	6380	8070	1830	1250	813	2580
24	2650	8150	3770	4640	4430	2390	12400	6340	2080	1200	800	1940
25	2470	11900	3600	4300	3940	2190	7900	5360	2110	1150	796	1600
26	6650	10000	3470	4040	3560	2070	6870	5150	1930	1080	792	1400
27	5420	9230	3350	3870	3210	1990	6310	4630	2120	1020	773	1260
28	3760	23600	3310	3700	2890	1890	5280	4010	2020	1000	773	1170
29	2980	54500	3570	3470	2700	1870	4430	4670	1950	991	788	1130
30	2550	49600	5170	3240	---	1930	4020	5610	1790	968	810	1100
31	2270	---	9590	3120	---	1840	---	4250	---	946	836	---
TOTAL	133360	358940	239470	228640	277030	85640	139210	140120	77420	42205	36189	41620
MEAN	4302	11960	7725	7375	9553	2763	4640	4520	2581	1361	1167	1387
MAX	12800	54500	27100	16500	53000	4770	12400	8070	4470	2190	2790	2810
MIN	2060	1570	3310	3120	2700	1840	2190	2370	1750	946	773	822
AC-FT	264500	712000	475000	453500	549500	169900	276100	277900	153600	83710	71780	82550
CFSM	7.13	19.8	12.8	12.2	15.8	4.58	7.70	7.50	4.28	2.26	1.94	2.30
IN.	8.23	22.14	14.77	14.11	17.09	5.28	8.59	8.64	4.78	2.60	2.23	2.57

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

MEAN	2525	4877	5535	5084	4470	3784	4339	4986	4453	2294	1103	1384
MAX	5811	12850	14530	11140	9743	9979	6797	7847	8983	5629	2992	5128
(WY)	1948	1991	1934	1953	1982	1932	1932	1936	1974	1955	1964	1959
MIN	407	619	1694	1291	1860	1933	2230	2434	1362	840	492	493
(WY)	1988	1953	1986	1937	1973	1941	1941	1992	1992	1940	1930	1938

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1929 - 1996

ANNUAL TOTAL	1577428	1799844	
ANNUAL MEAN	4322	4918	
HIGHEST ANNUAL MEAN		5439	
LOWEST ANNUAL MEAN		2314	1972
HIGHEST DAILY MEAN	54500	54500	Nov 29 1995
LOWEST DAILY MEAN	521	773	Aug 27 1973
ANNUAL SEVEN-DAY MINIMUM	533	790	Sep 15 1973
ANNUAL RUNOFF (AC-FT)	3129000	3570000	Sep 11 1973
ANNUAL RUNOFF (CFSM)	7.17	8.16	
ANNUAL RUNOFF (INCHES)	97.31	111.04	
10 PERCENT EXCEEDS	7930	9660	7000
50 PERCENT EXCEEDS	3000	3270	2960
90 PERCENT EXCEEDS	902	1030	825

## 12150800 SNOHOMISH RIVER NEAR MONROE, WA

LOCATION.--Lat 47°49'52", long 122°02'50", in NE 1/4 NW 1/4 sec.16, T.27 N., R.6 E., Snohomish County, Hydrologic Unit 17110011, on left bank 150 ft upstream from State Highway 522 bridge, 0.1 mi downstream from confluence of Snoqualmie and Skykomish Rivers, 3.6 mi southwest of Monroe, and 6.0 mi south of Snohomish.

DRAINAGE AREA.--1,537 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1963 to current year. Water years 1932, 1934, 1951, 1960, 1962-63 (annual maximum stage only) published in WSP 1932. Approximate annual maximum stages for water years 1921, 1949-50, 1952-59, and 1961 are on file in Washington office.

GAGE.--Water-stage recorder. Datum of gage is 13.25 ft above sea level. Prior to February 1963, crest-stage gage only at site about 800 ft downstream and Feb. 8, 1963, to May 27, 1964, water-stage recorder at site 100 ft upstream, both at sea level datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Some regulation by powerplant at Snoqualmie Falls, 40 mi upstream, and by Spada Lake, 30 mi upstream. Minor diversions for irrigation returned to river upstream from gage. During the current water year, City of Seattle Water Department diverted an average daily discharge of about 76 ft<sup>3</sup>/s upstream from station from South Fork Tolt River for municipal use and the City of Everett diverted an undetermined amount of discharge upstream from the station from Sultan River for municipal use. Chemical analyses December 1974 to January 1976, July 1979 to September 1986. Unpublished records of water temperature and suspended-sediment concentration are available in the Tacoma office of the U.S. Geological Survey.

AVERAGE DISCHARGE.--33 years (water years 1964-96), 9,515 ft<sup>3</sup>/s, 84.11 in/yr, 6,893,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 35.8 ft Feb. 10, 1951, datum then in use (discharge not determined); maximum discharge since February 1963, 150,000 ft<sup>3</sup>/s Nov. 25, 1990, gage height, 25.30 ft, from rating curve extended above 80,000 ft<sup>3</sup>/s; minimum discharge, 763 ft<sup>3</sup>/s Oct., 30, 31, 1987, gage height, 0.51 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of December 1921 reached a discharge of approximately 180,000 ft<sup>3</sup>/s. Floods in November or December 1897 and November 1906 are believed to be higher.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 33,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 11	unknown	34,800	10.45	Nov. 30	0415	*132,000	*24.10
Nov. 9	0115	76,300	18.72	Jan. 7	1845	48,500	13.41
Nov. 11	1500	61,500	16.02	Jan. 16	0530	40,400	11.68
Nov. 14	1030	38,400	11.23	Feb. 9	0930	98,800	21.53
Nov. 25	1015	39,100	11.39				

Minimum discharge, 1,780 ft<sup>3</sup>/s Sept. 3, 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e8600	e7400	73500	17400	6490	7640	5520	11200	10000	5540	2660	2040
2	e6200	6390	52200	14000	6250	7360	8050	10700	10000	5680	2650	1890
3	e19000	5800	33300	25600	5630	7190	7610	10100	12400	5600	4520	1810
4	e13800	5450	25400	26300	5490	7620	6450	9470	13400	5730	4700	1810
5	e8000	5490	20800	18100	6290	7380	6100	8740	11400	5510	5880	1830
6	e5900	6360	17500	15100	15600	6660	6700	8140	10400	4870	7030	2740
7	e5700	12000	15000	36800	46600	6680	11600	7750	10900	4590	4910	2620
8	e5400	61100	12800	38500	57800	6560	13400	7720	11000	4600	4010	2490
9	e5400	66300	11500	26000	91500	6960	13500	7270	9760	4830	3520	3180
10	e27400	42600	14600	21100	67100	9990	13000	6650	8620	4600	3230	2770
11	e31500	49700	23300	16800	39600	12100	12100	6260	8220	4310	3020	2460
12	e21200	45100	22900	13700	23100	11300	11300	6430	8040	4270	2870	2670
13	e14500	31900	27500	11900	18400	9770	10400	10800	7590	4340	2740	2570
14	e10600	37500	26500	20100	16900	8480	9510	17000	7440	4300	2610	2520
15	e8800	30800	23700	32700	16000	8240	8540	14200	7300	4230	e2500	3360
16	e16300	26900	18600	37600	15300	8610	9840	13200	7090	4070	e2380	5380
17	e22200	20200	15100	26800	14700	7840	11200	11800	6680	3850	e2280	4840
18	e23000	20200	13200	19400	24800	7270	10300	12800	6480	3760	e2200	3940
19	e14400	18000	11800	15200	26400	7040	9450	15000	6100	4490	e2120	3630
20	e11000	14300	10700	13300	21200	7010	8790	14400	5570	6240	e2050	4670
21	e11800	11700	9680	13300	17700	6450	8060	12200	5560	4760	e2010	4880
22	e12000	10900	8860	12300	15300	6470	7510	12100	5730	3990	e1980	5600
23	e9600	16600	8250	11200	14200	6590	13000	17200	5700	3730	e1940	5870
24	e9000	26500	7740	10700	12700	6270	29600	15300	5910	3610	e1890	4740
25	e8800	36200	7290	9960	11300	5830	23500	13500	6150	3490	e1870	4030
26	e24300	30400	6950	9160	10200	5510	19300	13600	5960	3320	e1850	3570
27	e18300	25900	6660	8600	9360	5300	18400	12800	6240	3140	e1840	3260
28	e13000	47300	6500	8140	8570	5080	15700	11500	6010	3030	e1830	3040
29	e10600	93300	6900	7710	8050	4920	13200	12200	5760	2980	e1820	2860
30	e9100	113000	9050	7170	---	5000	11700	14400	5490	2890	e1820	2730
31	e8100	---	17600	6740	---	4860	---	11500	---	2790	1940	---
TOTAL	413500	925290	565380	551380	632530	223980	353330	355930	236900	133140	88670	99800
MEAN	13340	30840	18240	17790	21810	7225	11780	11480	7897	4295	2860	3327
MAX	31500	113000	73500	38500	91500	12100	29600	17200	13400	6240	7030	5870
MIN	5400	5450	6500	6740	5490	4860	5520	6260	5490	2790	1820	1810
AC-FT	820200	1835000	1121000	1094000	1255000	444300	700800	706000	469900	264100	175900	198000
CFSM	8.68	20.1	11.9	11.6	14.2	4.70	7.66	7.47	5.14	2.79	1.86	2.16
IN.	10.01	22.39	13.68	13.35	15.31	5.42	8.55	8.61	5.73	3.22	2.15	2.42

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1996, BY WATER YEAR (WY)

	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	
MEAN	5738	12340	13510	12880	11420	9182	10300	12930	12350	6774	3053	3494																							
MAX	13340	34800	29580	22000	24300	25700	16050	20450	24730	15290	7885	7646																							
(WY)	1996	1991	1976	1984	1982	1972	1989	1972	1974	1964	1964	1978																							
MIN	894	2624	3966	4401	4606	4859	5340	7743	4070	2683	1413	1133																							
(WY)	1988	1988	1986	1979	1973	1985	1975	1992	1992	1987	1987	1987																							

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1963 - 1996
ANNUAL TOTAL	4084600	4579830	
ANNUAL MEAN	11190	12510	9515
HIGHEST ANNUAL MEAN			13670
LOWEST ANNUAL MEAN			6577
HIGHEST DAILY MEAN	113000	Nov 30	113000
LOWEST DAILY MEAN	1500	Sep 24	1810
ANNUAL SEVEN-DAY MINIMUM	1530	Sep 21	1850
ANNUAL RUNOFF (AC-FT)	8102000	9084000	6893000
ANNUAL RUNOFF (CFSM)	7.28	8.14	6.19
ANNUAL RUNOFF (INCHES)	98.86	110.85	84.11
10 PERCENT EXCEEDS	23100	25900	18000
50 PERCENT EXCEEDS	7740	8510	7490
90 PERCENT EXCEEDS	2380	2840	2270

e Estimated



## SNOHOMISH RIVER BASIN

261

12155300 PILCHUCK RIVER NEAR SNOHOMISH, WA

LOCATION.--Lat 47°56'06", long 122°04'19", in NW 1/4 NW 1/4 sec.8, T.28 N., R.6 E., Snohomish County, Hydrologic Unit 17110011, on right bank, 1.8 mi northeast of Snohomish, and at mile 3.6.

DRAINAGE AREA.--127 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1992 to current year.

GAGE.--Water-stage recorder. Datum of gage is 30.00 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are poor.

AVERAGE DISCHARGE.--4 years (water years 1993-96), 421 ft<sup>3</sup>/s, 45.09 in/yr, 305,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,580 Feb. 8, 1996, gage height, 18.18 ft; minimum discharge, 45 ft<sup>3</sup>/s Aug. 31, Sept. 1-3, 1994.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Nov. 24, 1990, reached a stage of 18.75 ft, from high-water mark at former bridge, discharge, 7,100 ft<sup>3</sup>/s (from slope area measurement of peak flow).

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 6,580 ft<sup>3</sup>/s Feb. 8, gage height, 18.18 ft; minimum daily discharge, 54 ft<sup>3</sup>/s Aug. 24-26, 28, 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	413	290	1670	673	216	434	514	e410	e320	e125	e74	e70
2	287	262	1420	513	197	409	692	e430	e300	e130	e80	e61
3	684	237	1010	842	181	406	527	e410	e310	e140	e100	e70
4	484	222	1040	1080	203	438	427	e360	e315	e150	e82	69
5	289	225	723	866	510	444	388	e330	e295	e140	e190	68
6	218	252	558	858	1890	417	436	e320	e265	e120	e150	240
7	290	734	472	2410	2810	415	876	e310	e260	e110	e105	133
8	508	2700	409	1700	4370	445	605	e340	e255	e105	e90	154
9	505	1560	392	896	4290	558	494	e330	e235	e110	e80	221
10	1850	889	1210	677	2220	1150	433	e310	e220	e105	e74	124
11	1630	2320	2410	544	1420	1170	426	e280	e210	e98	e70	98
12	1780	2080	1890	439	1020	846	503	e280	e200	e96	e68	88
13	927	1270	1990	394	828	593	535	e600	e190	e96	e66	82
14	592	1160	1810	988	695	492	498	e1000	e180	e96	e64	95
15	447	873	1600	1290	608	460	427	e800	e175	e95	e64	603
16	641	766	966	1790	554	422	568	e570	e170	e94	e64	654
17	1330	604	689	906	561	380	602	e470	e170	e96	e63	291
18	1280	836	595	587	971	355	593	e560	e180	e110	e62	185
19	744	885	536	493	1110	352	545	e740	e165	e200	e60	176
20	559	640	434	483	834	353	501	e570	e150	e310	e60	185
21	680	521	367	627	764	322	471	e420	e145	e220	e58	401
22	720	518	318	601	926	331	428	e600	e140	e140	e56	555
23	519	861	281	561	1080	331	1020	e970	e140	e110	e55	340
24	430	1080	252	596	965	320	1810	e670	e145	e100	e54	226
25	387	911	226	539	778	294	1130	e485	e150	e94	e54	174
26	1030	719	205	456	652	278	e1000	e430	e135	e90	e54	146
27	759	815	190	396	572	268	e750	e380	e135	e84	e55	128
28	521	3620	186	350	511	257	e560	e340	e160	e81	e54	115
29	416	4000	291	306	466	269	e470	e410	e140	e78	e54	105
30	365	2350	610	263	---	296	e425	e420	e130	e75	e60	99
31	323	---	1030	234	---	292	---	e350	---	e72	e77	---
TOTAL	21608	34200	25780	23358	32202	13797	18654	14895	5985	3670	2297	5956
MEAN	697	1140	832	753	1110	445	622	480	199	118	74.1	199
MAX	1850	4000	2410	2410	4370	1170	1810	1000	320	310	190	654
MIN	218	222	186	234	181	257	388	280	130	72	54	61
AC-FT	42860	67840	51130	46330	63870	27370	37000	29540	11870	7280	4560	11810
CFSM	5.49	8.98	6.55	5.93	8.74	3.50	4.90	3.78	1.57	.93	.58	1.56
IN.	6.33	10.02	7.55	6.84	9.43	4.04	5.46	4.36	1.75	1.07	.67	1.74

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

MEAN	277	596	823	658	660	554	526	343	199	167	111	123
MAX	697	1140	1097	753	1110	683	622	480	345	349	209	199
(WY)	1996	1996	1995	1996	1996	1994	1996	1996	1993	1993	1995	1996
MIN	116	179	617	572	263	418	375	208	118	105	57.8	90.9
(WY)	1993	1994	1993	1995	1993	1993	1995	1994	1992	1995	1994	1993

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1992 - 1996

ANNUAL TOTAL	173481	202402	
ANNUAL MEAN	475	553	421
HIGHEST ANNUAL MEAN			553
LOWEST ANNUAL MEAN			354
HIGHEST DAILY MEAN	4000	Nov 29	5000
LOWEST DAILY MEAN	61	Sep 26	45
ANNUAL SEVEN-DAY MINIMUM	63	Sep 20	54
ANNUAL RUNOFF (AC-FT)	344100	401500	305400
ANNUAL RUNOFF (CFSM)	3.74	4.35	3.32
ANNUAL RUNOFF (INCHES)	50.81	59.29	45.09
10 PERCENT EXCEEDS	1030	1120	871
50 PERCENT EXCEEDS	315	409	254
90 PERCENT EXCEEDS	81	83	72

e Estimated



## STILLAGUAMISH RIVER BASIN

12167000 NORTH FORK STILLAGUAMISH RIVER NEAR ARLINGTON, WA

LOCATION.--Lat 48°15'42", long 122°02'47", in SW 1/4 NW 1/4 sec.16, T.32 N., R.6 E., Snohomish County, Hydrologic Unit 17110008, on right bank 5.7 mi southeast of Arlington, 7.8 mi downstream from Deer Creek, and at mile 6.5.

DRAINAGE AREA.--262 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1928 to current year.

REVISED RECORDS.--WSP 1286: 1938-39. WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 89.34 ft above sea level.

REMARKS.--Records fair except for discharges above 15,000 ft<sup>3</sup>/s and estimated daily discharges, which are poor. No regulation. Small diversions for domestic use. National Weather Service radio telemeter and U.S. Geological Survey satellite telemeter at station. Chemical analyses November 1961 to September 1971, October 1973 to September 1974.

AVERAGE DISCHARGE.--68 years (water years 1929-96), 1,888 ft<sup>3</sup>/s, 97.92 in/yr, 1,368,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,700 ft<sup>3</sup>/s Nov. 24, 1990, gage height, 15.20 ft; minimum discharge, 117 ft<sup>3</sup>/s Sept. 23, 1938.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 13,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	0945	16,300	10.51	Dec. 11	0900	14,800	10.06
Nov. 8	0545	28,700	13.60	Jan. 7	1345	17,600	10.86
Nov. 11	0715	22,500	12.16	Feb. 7	0515	13,300	9.61
Nov. 23	1945	15,400	10.24	Feb. 8	unknown	*34,600	*14.84
Nov. 29	unknown	33,700	14.66				

Minimum discharge, 160 ft<sup>3</sup>/s Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1300	931	6320	2480	579	1140	2040	1580	1230	488	267	299
2	1170	851	4770	2660	537	1090	2700	1690	1200	493	301	213
3	2610	796	3740	7720	504	1080	1630	1570	1280	514	405	212
4	1590	764	3760	4020	500	1230	1360	1420	1250	578	331	321
5	1070	860	2970	2640	2610	1200	1310	1290	1120	514	756	415
6	880	1160	2540	3510	6490	1080	1860	1220	1040	442	613	809
7	896	8000	2280	12600	8940	1050	2530	1220	1040	413	418	501
8	1060	26100	2060	6080	e27500	1150	1970	1320	989	404	343	826
9	1090	7770	2040	3470	13200	1670	1800	1270	905	423	303	911
10	11800	4260	8280	3130	4750	5020	1700	1170	847	394	281	531
11	7030	14200	11500	2480	3240	4280	1630	1090	807	366	273	406
12	4570	6870	6660	2070	2660	2800	1810	1080	768	366	261	347
13	2640	5050	9310	2150	2480	2010	1610	2090	737	367	241	316
14	1860	5700	6600	4250	2350	1670	1380	3950	713	367	230	524
15	1470	4670	5130	5510	2190	1720	1250	2560	691	361	222	2160
16	2400	3980	3700	4380	2070	1540	1560	1990	665	351	218	2090
17	5510	3300	2790	2680	2280	1340	1710	1800	645	361	217	1170
18	3860	5400	2960	2090	4270	1270	1710	2140	705	414	212	797
19	2170	3570	2720	1820	3510	1310	1540	3000	614	919	206	773
20	1800	2640	2170	1630	2990	1240	1400	2060	561	1220	198	685
21	3000	2180	1840	1760	2660	1120	1250	1700	548	657	193	872
22	2370	2310	1630	1480	2300	1090	1130	2290	552	495	181	1110
23	1730	7910	1480	1440	2080	1050	5150	3770	548	433	172	961
24	1520	7050	1360	1310	1850	973	6190	2330	553	396	169	711
25	1830	7880	1250	1140	1650	877	3760	1850	589	368	167	580
26	3500	4900	1160	1010	1510	829	3640	1650	526	341	167	503
27	2080	4670	1090	911	1390	779	2750	1470	522	324	169	443
28	1600	16000	1070	830	1270	734	2130	1380	610	314	169	405
29	1340	26900	2030	729	1200	781	1810	1700	569	307	166	369
30	1160	11000	3460	633	---	777	1590	1650	510	296	169	338
31	1030	---	4370	595	---	772	---	1350	---	282	334	---
TOTAL	77936	197672	113040	89208	109960	44672	63900	56650	23334	13968	8352	20598
MEAN	2514	6589	3646	2878	3792	1441	2130	1827	778	451	269	687
MAX	11800	26900	11500	12600	27500	5020	6190	3950	1280	1220	756	2160
MIN	880	764	1070	595	504	734	1130	1080	510	282	166	212
AC-FT	154600	392100	224200	176900	218100	88610	126700	112400	46280	27710	16570	40860
CFSM	9.60	25.1	13.9	11.0	14.5	5.50	8.13	6.97	2.97	1.72	1.03	2.62
IN.	11.07	28.07	16.05	12.67	15.61	6.34	9.07	8.04	3.31	1.98	1.19	2.92

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1996, BY WATER YEAR (WY)

MEAN	1497	2760	3046	2767	2482	2103	2222	2151	1647	873	463	684
MAX	3832	8008	6177	5852	5632	5814	4040	3638	3348	2165	1049	2418
(WY)	1968	1991	1980	1953	1982	1972	1959	1949	1974	1972	1964	1959
MIN	171	223	871	484	467	898	812	1091	510	290	166	140
(WY)	1988	1937	1986	1937	1929	1992	1941	1992	1992	1940	1938	1938

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1928 - 1996

ANNUAL TOTAL	787859		819290									
ANNUAL MEAN	2159		2238									
HIGHEST ANNUAL MEAN										1888		
LOWEST ANNUAL MEAN										2808		1974
HIGHEST DAILY MEAN	26900	Nov 29	27500	Feb 8	34200	Nov 24	1990					
LOWEST DAILY MEAN	196	Sep 25	166	Aug 29	123	Sep 23	1938					
ANNUAL SEVEN-DAY MINIMUM	208	Sep 20	168	Aug 24	128	Sep 17	1938					
ANNUAL RUNOFF (AC-FT)	1563000		1625000		1368000							
ANNUAL RUNOFF (CFSM)	8.24		8.54		7.21							
ANNUAL RUNOFF (INCHES)	111.86		116.33		97.92							
10 PERCENT EXCEEDS	4670		4810		3700							
50 PERCENT EXCEEDS	1240		1300		1350							
90 PERCENT EXCEEDS	346		337		342							

e Estimated

## 12168500 PILCHUCK CREEK NEAR BRYANT, WA

LOCATION.--Lat 48°15'58", long 122°09'46", in NE 1/4 NE 1/4 sec.16, T.32 N., R.5 E., Snohomish County, Hydrologic Unit 17110008, on right bank 500 ft upstream from bridge on State Highway 9, 1.8 mi north of Bryant, and at mile 6.4.

DRAINAGE AREA.--52.0 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1929 to September 1931, June 1950 to September 1951, September 1952 to September 1975, June 1980 to current year (seasonal records).

REVISED RECORDS.--WSP 1316: 1930-31(M). WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 119.8 ft above sea level (stadia traverse). Prior to Oct. 1, 1931, nonrecording gage at site 100 ft downstream at different datum.

REMARKS.--No estimated daily discharges. Records good except for discharges above 1,000 ft<sup>3</sup>/s, which are fair. No regulation or diversion upstream from station. Water temperatures March 1952 to August 1968, March 1969 to September 1972.

AVERAGE DISCHARGE.--26 years (water years 1930, 1931, 1951, 1953-75), 281 ft<sup>3</sup>/s, 73.38 in/yr, 203,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,900 ft<sup>3</sup>/s Jan. 30, 1971, gage height, 8.20 ft, from high-water mark in well, from rating curve extended above 3,900 ft<sup>3</sup>/s; minimum discharge observed, 0.5 ft<sup>3</sup>/s Aug. 29 to Sept. 1, 1931, gage height, 0.90 ft, site and datum then in use.

EXTREMES FOR JUNE TO OCTOBER 1996.--Maximum discharge, 2,330 ft<sup>3</sup>/s Sept. 15, gage height, 5.30 ft; minimum discharge, 2.2 ft<sup>3</sup>/s Aug. 28.

DISCHARGE, CUBIC FEET PER SECOND, JUNE TO OCTOBER 1996  
DAILY MEAN VALUES

DAY	JUN	JUL	AUG	SEP	OCT
1	160	34	4.2	18	34
2	137	30	7.0	9.2	32
3	119	27	53	8.7	29
4	109	30	26	48	148
5	105	33	107	63	358
6	92	27	78	104	130
7	88	25	42	53	85
8	81	22	27	82	68
9	76	20	29	121	58
10	71	18	26	58	50
11	68	16	20	38	235
12	64	13	14	37	187
13	60	8.4	20	36	416
14	57	5.5	21	74	1010
15	51	4.5	19	980	743
16	48	3.8	18	424	472
17	45	4.5	18	183	273
18	47	14	17	112	419
19	49	215	15	128	375
20	44	202	14	112	271
21	38	72	12	112	229
22	34	44	9.3	118	846
23	35	30	5.2	111	572
24	42	22	3.5	80	1180
25	56	16	3.1	65	1080
26	45	12	2.7	55	580
27	37	11	2.6	48	360
28	41	8.0	2.9	43	988
29	47	7.0	7.7	39	693
30	39	6.2	4.9	36	378
31	---	---	---	---	4.9
TOTAL	1985	985.8	637.2	3395.9	12578
MEAN	66.2	31.8	20.6	113	406
MAX	160	215	107	980	1180
MIN	34	3.8	2.6	8.7	29
AC-FT	3940	1960	1260	6740	24950
CFSM	1.27	.61	.40	2.18	7.80
IN.	1.42	.71	.46	2.43	9.00

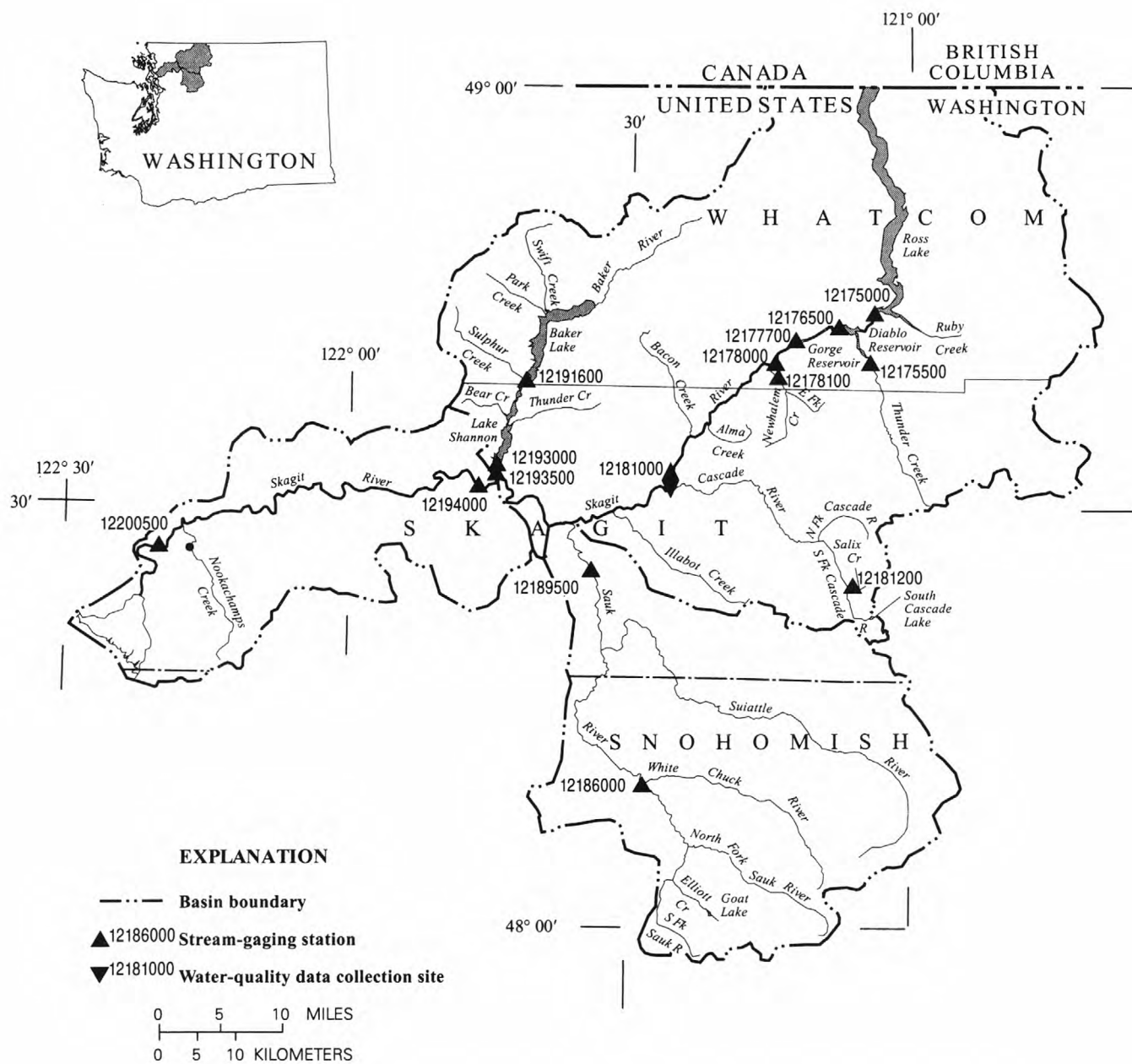
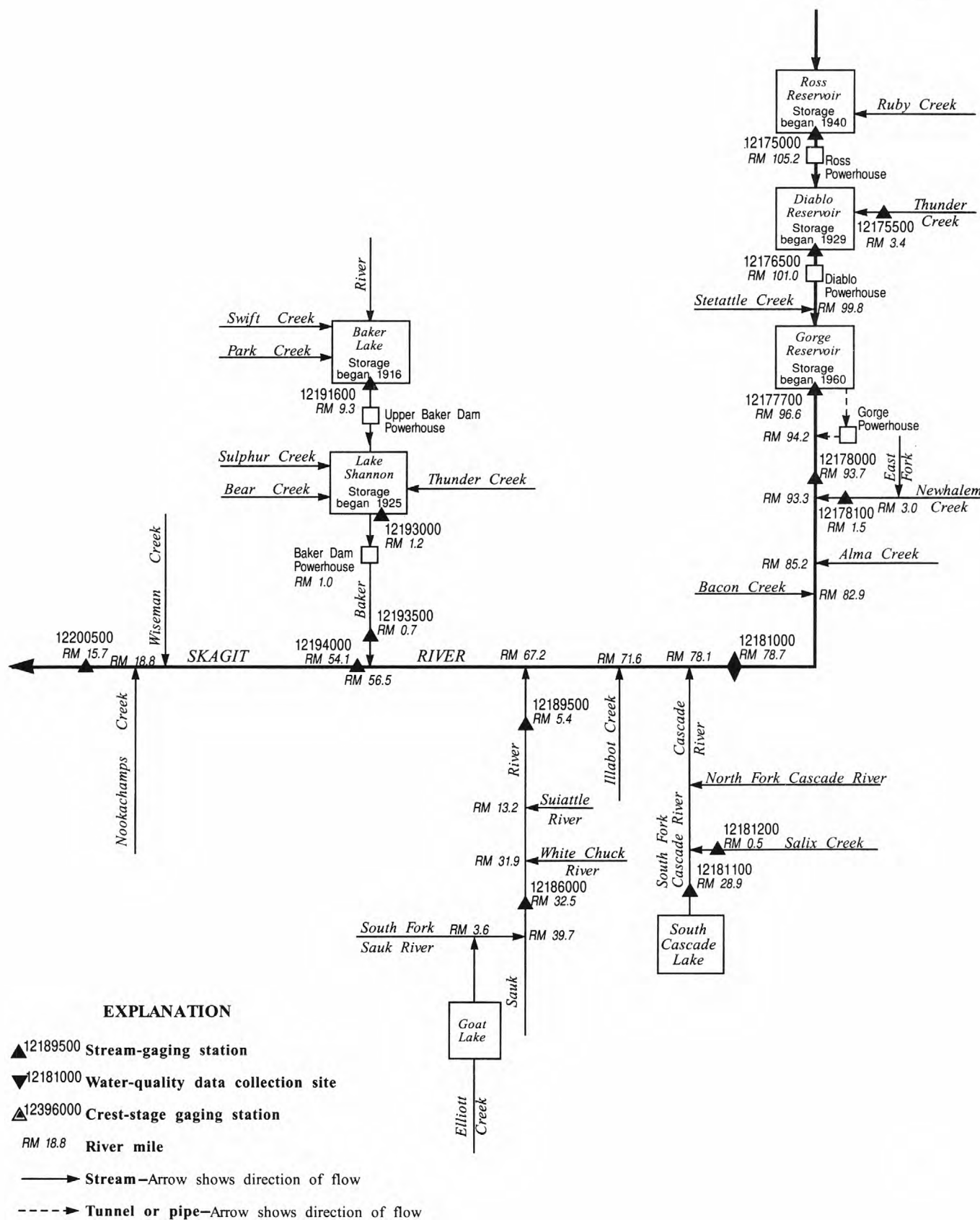


Figure 45. Location of surface-water and water-quality stations in the Skagit River Basin.



**Figure 46.** Schematic diagram showing surface-water and water-quality stations in the Skagit River Basin.

## SKAGIT RIVER BASIN

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

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

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

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

REVISED RECORDS.--WSP 1932: Drainage area.

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

REMARKS.--Reservoir is formed by concrete-arch dam completed to elevation 1,615 ft in 1949, storage began Mar. 11, 1940. Starting about July 1, 1967, taintor gates were extended to elevation 1,602.50 ft. Usable storage, 1,052,300 acre-ft between elevations 1,475 ft, lower limit of operation, and 1,602.5 ft, top of taintor gates. Dead storage below elevation 1,250 ft, 1,175 acre-ft. Water used by city of Seattle for power development. Figures given herein represent total contents. U.S. Geological Survey satellite telemeter at station.

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

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

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,433,322 acre-ft Dec. 1, elevation, 1,602.38 ft; minimum contents, 937,606 acre-ft Apr. 6, elevation, 1,555.42 ft.

Capacity table (elevation, in feet, and total contents, in acre-feet)  
(Based on 25-foot contour intervals furnished by city of Seattle in 1943)

1,490	454,480	1,550	888,320
1,500	509,240	1,575	1,130,200
1,525	678,950	1,603	1,440,700

ELEVATION, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1594.89	1594.01	1601.59	1587.23	1579.71	1575.12	1558.96	1561.15	1565.42	1591.52	1601.72	1601.23
2	1594.71	1593.63	1599.83	1587.05	1578.58	1574.74	1558.25	1560.89	1566.07	1592.40	1601.69	1601.08
3	1594.79	1593.13	1597.63	1587.52	1577.55	1574.20	1557.60	1560.67	1567.96	1593.56	1601.77	1600.93
4	1594.58	1592.73	1595.53	1587.62	1576.71	1573.57	1557.05	1560.29	1570.05	1594.91	1601.81	1600.88
5	1594.34	1592.45	1593.99	1587.53	1576.10	1573.04	1556.27	1560.01	1571.63	1595.52	1601.68	1600.77
6	1594.09	1592.05	1593.32	1587.64	1575.72	1572.46	1555.52	1559.70	1572.92	1596.02	1601.59	1600.64
7	1593.89	1592.03	1592.77	1588.47	1575.53	1571.92	1555.67	1559.32	1574.79	1596.48	1601.48	1600.49
8	1593.82	1595.04	1592.03	1589.03	1576.04	1571.28	1556.09	1558.85	1576.76	1597.10	1601.47	1600.39
9	1593.70	1596.53	1591.72	1589.45	1576.27	1570.92	1556.90	1558.53	1578.04	1597.96	1601.55	1600.26
10	1594.10	1596.64	1591.85	1589.55	1576.06	1570.59	1557.95	1558.05	1579.15	1598.68	1601.67	1600.17
11	1594.22	1596.75	1592.13	1589.44	1576.08	1570.40	1558.53	1557.42	1579.98	1599.10	1601.88	1599.92
12	1594.31	1596.82	1592.24	1589.22	1576.16	1570.02	1558.81	1556.91	1580.46	1599.42	1601.90	1599.84
13	1594.22	1596.73	1592.11	1589.05	1576.30	1569.71	1559.10	1556.66	1581.05	1599.90	1601.63	1599.80
14	1594.25	1597.83	1592.12	1589.07	1576.48	1569.55	1559.23	1556.86	1581.91	1600.43	1601.69	1599.83
15	1594.31	1598.85	1592.02	1589.57	1576.71	1569.18	1559.09	1557.28	1582.75	1600.94	1601.79	1599.74
16	1594.85	1598.94	1591.99	1589.77	1576.76	1568.84	1559.23	1557.77	1583.40	1601.27	1601.76	1599.48
17	1595.29	1598.97	1591.85	1589.54	1576.91	1568.34	1559.40	1558.11	1583.93	1601.28	1601.75	1599.30
18	1595.55	1599.26	1591.57	1589.28	1577.73	1567.82	1559.38	1558.65	1584.27	1601.23	1601.70	1599.02
19	1595.72	1598.45	1591.26	1588.68	1578.28	1567.52	1559.40	1559.10	1584.44	1601.06	1601.58	1598.71
20	1595.74	1597.35	1590.84	1588.57	1578.67	1567.05	1559.66	1559.56	1584.56	1601.25	1601.50	1598.43
21	1595.74	1596.34	1590.35	1588.22	1578.41	1566.40	1559.46	1559.63	1585.02	1601.52	1601.43	1598.24
22	1595.62	1595.38	1589.77	1587.48	1578.30	1565.72	1559.09	1559.89	1585.55	1601.55	1601.28	1597.98
23	1595.59	1595.49	1589.09	1586.90	1578.03	1565.25	1559.95	1560.18	1586.08	1601.71	1600.94	1597.43
24	1595.56	1596.15	1588.84	1586.24	1577.88	1564.58	1560.98	1560.43	1586.76	1601.87	1601.01	1597.06
25	1595.48	1596.34	1588.59	1585.45	1577.97	1563.94	1561.35	1560.89	1587.51	1601.94	1601.02	1596.72
26	1595.41	1595.68	1588.13	1584.80	1577.46	1563.15	1561.48	1561.77	1588.22	1601.88	1600.93	1596.39
27	1595.36	1594.06	1587.82	1584.05	1577.00	1562.52	1561.51	1562.59	1588.94	1601.85	1600.89	1596.08
28	1595.13	1594.47	1587.57	1583.28	1576.38	1561.76	1561.42	1563.55	1589.67	1601.92	1600.99	1595.84
29	1595.01	1599.74	1587.47	1582.21	1575.78	1561.11	1561.34	1564.27	1590.29	1601.78	1600.97	1595.65
30	1594.70	1602.34	1587.32	1581.17	---	1560.35	1561.27	1564.62	1590.85	1601.65	1601.13	1595.46
31	1594.37	---	1587.41	1580.32	---	1559.71	---	1565.16	---	1601.67	1601.21	---
MAX	1595.74	1602.34	1601.59	1589.77	1579.71	1575.12	1561.51	1565.16	1590.85	1601.94	1601.90	1601.23
MIN	1593.70	1592.03	1587.32	1580.32	1575.53	1559.71	1555.52	1556.66	1565.42	1591.52	1600.89	1595.46
(†)	1340681	1432846	1263010	1186192	1138312	977845	992792	1030568	1301135	1424906	1419478	1353044
(‡)	-7575	+92165	-169836	-76818	-47880	-160467	+14947	+37776	+270567	+123771	-5428	-66434

CAL YR 1995 MAX 1602.44 MIN 1507.76 AC-FT† +217478  
WTR YR 1996 MAX 1602.34 MIN 1555.52 AC-FT† +4788

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



12175500 THUNDER CREEK NEAR NEWHALEM, WA

LOCATION.--Lat 48°40'22", long 121°04'18", in SE 1/4 sec.23, T.37 N., R.13 E., (unsurveyed), Whatcom County, Hydrologic Unit 17110005, Ross Lake National Recreation Area, on right bank 0.4 mi upstream from high-water line of Diablo Reservoir, 9.0 mi east of Newhalem, and at mile 3.4.

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

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

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

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

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station. Large diurnal fluctuations caused by snowmelt during summer months.

AVERAGE DISCHARGE.--66 years (water years 1931-96), 614 ft<sup>3</sup>/s, 79.41 in/yr, 444,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 14,500 ft<sup>3</sup>/s Dec. 26, 1980, gage height, 14.5 ft, from rating curve extended above 3,500 ft<sup>3</sup>/s; minimum discharge not determined, probably less than 50 ft<sup>3</sup>/s during period of ice effect or no gage-height record in February 1936.

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

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1545	9,340	11.95	Nov. 23	2000	2,920	7.55
Nov. 14	0415	2,550	7.17	Nov. 29	1445	*10,900	*12.76
Nov. 18	0530	2,550	7.17				

Minimum discharge, 181 ft<sup>3</sup>/s Feb. 4, 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	425	306	1720	251	e195	263	215	384	534	1080	1020	929
2	410	295	1150	293	e189	246	218	363	817	1310	977	754
3	803	292	880	570	e184	237	207	341	1590	1560	930	723
4	436	284	734	440	e181	229	203	324	1650	1620	818	617
5	336	285	613	373	197	220	207	309	1240	1190	1010	553
6	306	280	535	387	267	213	296	304	1250	998	787	529
7	290	351	483	826	521	207	684	299	1610	1020	764	573
8	294	5910	443	749	1070	205	920	287	1570	1320	828	875
9	281	2470	432	585	1240	281	1020	275	1240	1510	942	792
10	973	1220	674	511	737	498	926	267	1010	1270	1050	656
11	687	1550	985	452	556	485	740	260	974	1230	1110	705
12	541	1190	776	410	e471	445	612	273	966	1440	961	847
13	455	1160	845	386	450	392	519	550	981	1610	899	852
14	785	2370	722	427	457	364	467	786	1000	1730	1020	811
15	821	1820	625	661	471	446	443	742	1040	1740	994	754
16	1320	1530	546	604	484	412	490	691	1010	1580	889	596
17	1070	1370	490	499	523	378	488	684	895	1310	765	497
18	e820	1900	450	429	791	355	453	775	777	1080	666	441
19	e720	1200	414	394	702	340	411	667	697	950	603	458
20	e620	933	383	360	595	322	388	584	731	862	645	417
21	e580	781	356	333	519	304	368	528	819	822	607	411
22	e510	871	332	308	459	296	364	493	825	992	588	399
23	e420	1730	312	294	419	282	597	468	884	1230	729	368
24	395	1890	295	277	378	266	853	479	908	1400	798	343
25	402	1700	287	259	344	252	645	664	963	1380	867	326
26	540	1240	278	247	318	244	571	867	1020	1310	1010	346
27	446	1020	267	e230	297	237	510	862	1030	1390	1070	432
28	399	2040	254	e224	285	228	460	746	992	1570	1060	443
29	369	7780	251	e216	278	225	424	683	936	1630	1120	464
30	347	3790	257	e208	--	218	401	589	933	1540	1200	477
31	328	--	266	e202	--	212	--	533	--	1260	1390	--
TOTAL	17129	49558	17055	12405	13578	9302	15100	16077	30892	40934	28117	17388
MEAN	553	1652	550	400	468	300	503	519	1030	1320	907	580
MAX	1320	7780	1720	826	1240	498	1020	867	1650	1740	1390	929
MIN	281	280	251	202	181	205	203	260	534	822	588	326
AC-FT	33980	98300	33830	24610	26930	18450	29950	31890	61270	81190	55770	34490
CFSM	5.26	15.7	5.24	3.81	4.46	2.86	4.79	4.94	9.81	12.6	8.64	5.52
IN.	6.07	17.56	6.04	4.39	4.81	3.30	5.35	5.70	10.94	14.50	9.96	6.16

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1931 - 1996, BY WATER YEAR (WY)

	442	397	319	253	236	215	382	882	1307	1312	978	618
MEAN	442	397	319	253	236	215	382	882	1307	1312	978	618
MAX	917	1652	1023	842	683	663	1057	1601	2072	1935	1334	894
(WY)	1934	1996	1981	1984	1991	1972	1934	1993	1948	1975	1972	1967
MIN	200	110	95.2	78.4	57.3	91.1	172	432	837	784	704	367
(WY)	1978	1936	1931	1979	1936	1956	1975	1977	1981	1993	1993	1985

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1931 - 1996
ANNUAL TOTAL	277312	267535	
ANNUAL MEAN	760	731	614
HIGHEST ANNUAL MEAN			863
LOWEST ANNUAL MEAN			452
HIGHEST DAILY MEAN	7780	Nov 29	8950
LOWEST DAILY MEAN	116	Jan 28	50
ANNUAL SEVEN-DAY MINIMUM	126	Jan 23	52
ANNUAL RUNOFF (AC-FT)	550000	530700	444600
ANNUAL RUNOFF (CFSM)	7.24	6.96	5.84
ANNUAL RUNOFF (INCHES)	98.25	94.78	79.41
10 PERCENT EXCEEDS	1560	1310	1350
50 PERCENT EXCEEDS	577	572	420
90 PERCENT EXCEEDS	202	262	133

e Estimated

## SKAGIT RIVER BASIN

12178000 SKAGIT RIVER AT NEWHALEM, WA

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

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

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

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

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

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

AVERAGE DISCHARGE.--88 years (water years 1909-96), 4,398 ft<sup>3</sup>/s, 3,186,000 acre-ft/yr, adjusted for storage in Diablo Reservoir since October 1929, Ross Reservoir since March 1940, and Gorge Reservoir since June 1960. 36 years (water years 1961-96), 4,447 ft<sup>3</sup>/s, 3,221,000 acre-ft/yr, regulated.

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

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 32,300 ft<sup>3</sup>/s Dec. 2, gage height, 91.14 ft; minimum discharge, 1,580 ft<sup>3</sup>/s Nov. 18, gage height, 81.44 ft; minimum daily discharge, 1,790 ft<sup>3</sup>/s Oct. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2980	4120	25600	3300	6910	6290	5850	4420	5010	4340	3790	2840
2	2770	3600	28200	4380	6720	4500	5560	5120	5090	3890	3880	3480
3	3090	4290	24700	4170	6870	4080	5520	5050	5470	4330	3090	2840
4	3090	3890	23000	3940	6550	5990	5350	4850	5660	3570	3130	2130
5	3150	3820	16500	3860	6460	5720	5170	4900	5370	3860	4530	2230
6	3110	3980	10900	4080	5950	4780	5480	4910	5220	3770	4260	2470
7	2760	4280	8360	4390	6540	4780	4740	4820	5160	3780	3270	2060
8	1790	12800	10000	4390	7470	4750	5970	4870	4910	3770	2860	3010
9	2090	7920	6300	4240	7430	4340	5780	4880	4910	3880	2770	3380
10	3350	7510	5990	4720	6790	5350	5150	4930	5110	4080	2740	2780
11	3210	7850	6910	6640	4900	5300	4880	5110	5100	4850	2280	3110
12	3110	7300	8830	5760	3770	5550	5900	5420	5120	5260	3160	3040
13	2590	8330	11700	4920	2670	5580	5330	5440	5230	5540	2980	2630
14	3510	12500	9740	5140	2600	4970	4750	5190	5070	5890	3150	2390
15	3360	9530	7770	5320	3210	5810	4850	5240	4970	6610	3080	3070
16	3830	13200	7790	6500	4150	5940	4820	4950	5110	5900	3010	3290
17	3430	13800	6670	7160	3830	6080	5160	4980	5130	6900	2920	2700
18	3030	13900	6660	6920	4060	5890	5260	4960	5100	6580	2320	2630
19	2680	17000	6940	6880	4170	6290	4790	4900	5050	5710	2620	3030
20	2690	14700	7230	6270	5040	5620	4720	4930	5080	4190	2570	3090
21	1910	14000	6830	5070	6030	6060	4490	4950	4140	2800	2180	3280
22	2500	12200	6790	6930	5970	6040	4770	4930	3690	4130	2420	3360
23	2670	14100	7010	6710	6100	5830	5290	4850	3970	4090	3390	2630
24	2800	11700	4800	6230	3920	5720	4940	4790	4050	5310	2860	3340
25	3060	16500	4220	7140	4060	6090	5770	4870	3640	5850	1950	2920
26	2960	17100	6080	6940	5290	6180	5680	4860	3730	6110	2960	3280
27	3300	19500	4210	6550	5580	4550	5720	4970	3790	6020	2960	3290
28	3380	15000	3990	6890	5990	6170	5630	4940	3720	6580	2350	2180
29	3400	23300	3980	7270	5940	5610	5530	5000	3540	6520	2610	2920
30	3180	21500	2910	7080	---	6090	5570	5080	3920	5750	2870	2180
31	3120	---	2500	7070	---	5860	---	4850	---	5590	3490	---
TOTAL	91900	339220	293110	176860	154970	171810	158420	153960	141060	155450	92450	86400
MEAN	2965	11310	9455	5705	5344	5542	5281	4966	4702	5015	2982	2880
MAX	3830	23300	28200	7270	7470	6290	5970	5440	5660	6900	4530	3480
MIN	1790	3600	2500	3300	2600	4080	4490	4420	3540	2800	1950	2060
AC-FT	182300	672800	581400	350800	307400	340800	314200	305400	279800	308300	183400	171400

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1996, BY WATER YEAR (WY)

	MEAN	2899	4630	4891	5248	5223	4625	3881	3689	5647	5999	3778	2893
MAX	4638	14530	9455	7599	10190	6783	5888	6767	17110	12490	6770	3786	
(WY)	1968	1991	1996	1980	1991	1974	1991	1976	1972	1972	1976	1983	
MIN	1419	2341	2909	3335	3401	2482	2273	1513	1979	1729	1750	1427	
(WY)	1978	1978	1986	1988	1973	1993	1979	1970	1993	1977	1977	1977	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1961 - 1996

ANNUAL TOTAL	1927630	2015610		
ANNUAL MEAN	5281	5507		
HIGHEST ANNUAL MEAN			4447	
LOWEST ANNUAL MEAN			6858	1991
HIGHEST DAILY MEAN	28200	Dec 2	31600	Jun 21 1967
LOWEST DAILY MEAN	1780	Sep 23	963	Sep 1 1969
ANNUAL SEVEN-DAY MINIMUM	2300	Sep 23	1110	Apr 28 1970
ANNUAL RUNOFF (AC-FT)	3823000	3998000	3221000	
10 PERCENT EXCEEDS	7260	7440	6770	
50 PERCENT EXCEEDS	4210	4910	3990	
90 PERCENT EXCEEDS	2740	2800	2190	

## 12178100 NEWHALEM CREEK NEAR NEWHALEM, WA

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

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

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

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

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

REMARKS.--Records fair except for estimated daily discharges, which are poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--35 years (water years 1962-96), 174 ft<sup>3</sup>/s, 84.74 in/yr, 126,100 acre-ft/yr.

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

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1445	982	4.40	Jan. 7	1015	807	4.09
Nov. 8	unknown	unknown	unknown	Feb. 8	unknown	1,670	5.35
Nov. 29	unknown	*4,500	*7.64	Apr. 23	1815	781	4.04
Dec. 11	0630	900	4.26				

Minimum discharge, 58 ft<sup>3</sup>/s Aug. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	86	e108	e620	131	e68	87	e67	139	168	283	119	83
2	92	e104	e340	218	e66	83	e68	129	294	328	128	68
3	301	e100	e290	457	e64	80	e65	119	523	348	135	65
4	141	e98	e240	252	e63	78	e64	113	431	357	122	64
5	101	e97	e210	189	e70	74	e90	106	318	221	160	79
6	93	e96	e170	270	e80	71	e180	100	346	195	111	104
7	96	e860	e153	635	e300	70	e300	97	439	218	103	94
8	116	e2000	138	393	e800	71	e330	94	379	290	101	154
9	129	e840	139	273	e960	130	e340	90	293	281	104	113
10	722	e380	462	232	e350	252	e310	86	237	221	106	84
11	392	e460	700	198	e240	231	e250	82	249	243	108	74
12	261	e400	449	171	e215	204	e215	86	235	279	96	72
13	189	e600	537	161	e205	166	e185	250	246	307	87	73
14	254	e640	358	227	e215	146	e160	315	261	306	88	80
15	224	e490	288	384	221	188	e150	290	267	286	87	131
16	468	e420	239	299	219	156	e170	256	251	243	80	107
17	449	e480	202	214	251	138	e165	259	213	219	75	85
18	e280	e600	187	176	434	125	156	305	176	190	69	73
19	e245	e450	175	153	296	119	140	260	154	217	63	75
20	e220	e320	158	138	239	111	131	219	178	192	68	72
21	e190	e260	143	124	203	102	122	190	210	156	65	97
22	e188	e500	131	115	174	98	122	185	217	178	60	107
23	e147	e510	125	110	153	94	418	188	211	201	59	90
24	e128	e530	117	101	137	e88	426	191	233	207	62	79
25	e130	e500	109	93	125	e84	270	258	244	194	63	74
26	e180	e370	102	89	114	e80	238	292	276	184	66	76
27	e155	e300	96	e84	105	e76	206	268	259	183	69	79
28	e140	e1350	92	e78	97	e73	179	219	241	188	68	69
29	e128	e2500	95	e75	91	e70	160	222	222	184	67	63
30	e120	e1300	126	e72	--	e68	146	194	232	171	79	60
31	e112	--	155	e69	--	e66	--	169	--	143	147	--
TOTAL	6477	17663	7346	6181	6555	3479	5823	5771	8003	7213	2815	2544
MEAN	209	589	237	199	226	112	194	186	267	233	90.8	84.8
MAX	722	2500	700	635	960	252	426	315	523	357	160	154
MIN	86	96	92	69	63	66	64	82	154	143	59	60
AC-FT	12850	35030	14570	12260	13000	6900	11550	11450	15870	14310	5580	5050
CFSM	7.49	21.1	8.49	7.15	8.10	4.02	6.96	6.67	9.56	8.34	3.25	3.04
IN.	8.64	23.55	9.79	8.24	8.74	4.64	7.76	7.69	10.67	9.62	3.75	3.39

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 - 1996, BY WATER YEAR (WY)

MEAN	122	183	169	132	128	108	147	277	359	261	120	88.8
MAX	351	589	552	340	313	290	267	448	594	476	254	192
(WY)	1968	1996	1981	1984	1991	1972	1989	1972	1974	1972	1976	1978
MIN	28.2	43.4	44.7	29.2	39.9	48.7	68.7	145	211	110	56.8	41.6
(WY)	1988	1980	1979	1979	1969	1962	1975	1977	1992	1977	1994	1990

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1961 - 1996

ANNUAL TOTAL	82295	79870	
ANNUAL MEAN	225	218	174
HIGHEST ANNUAL MEAN			244
LOWEST ANNUAL MEAN			114
HIGHEST DAILY MEAN	2500	Nov 29	5300
LOWEST DAILY MEAN	35	Sep 24	20
ANNUAL SEVEN-DAY MINIMUM	37	Sep 20	63
ANNUAL RUNOFF (AC-FT)	163200	158400	126100
ANNUAL RUNOFF (CFSM)	8.08	7.82	6.24
ANNUAL RUNOFF (INCHES)	109.73	106.49	84.74
10 PERCENT EXCEEDS	473	405	369
50 PERCENT EXCEEDS	149	167	118
90 PERCENT EXCEEDS	70	72	50

e Estimated

## SKAGIT RIVER BASIN

12181000 SKAGIT RIVER AT MARBLEMOUNT, WA

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

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

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--September 1943 to July 1944, October 1946 to September 1951, May 1976 to current year.

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

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

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

AVERAGE DISCHARGE.--25 years (water years 1947-51, 1977-96), 6,038 ft<sup>3</sup>/s, 4,374,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 62,300 ft<sup>3</sup>/s Nov. 29, 1995, gage height, 13.73 ft, from rating curve extended above 30,000 ft<sup>3</sup>/s; minimum discharge, 620 ft<sup>3</sup>/s Mar. 6, 1944, gage height, 0.55 ft; minimum daily discharge, 1,190 ft<sup>3</sup>/s Feb. 25, 1944.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 62,300 ft<sup>3</sup>/s Nov. 29, gage height, 13.73 ft; minimum discharge, 2,360 ft<sup>3</sup>/s Oct. 9; minimum daily discharge, 2,410 ft<sup>3</sup>/s Aug. 25.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3760	4690	30400	4620	7720	7450	6980	6160	6570	6330	5120	3570
2	3570	4380	31900	6590	7480	5640	6750	6440	7440	6340	5030	4150
3	5270	4730	27000	8600	7450	4850	6350	6560	9320	7090	4490	3500
4	4420	4570	25800	6590	7550	6810	6170	6220	9150	6240	4230	2730
5	4030	4470	19600	5920	7700	6480	6360	6130	8150	5880	5780	2700
6	3900	4570	13200	7300	8550	5790	7130	6150	8050	5350	5260	3190
7	3620	6480	10800	10900	10700	5480	7850	6050	8470	5530	4480	2720
8	2820	36700	11900	8950	15300	5660	9120	6010	8040	6020	3790	4360
9	2990	15200	8420	7300	13500	5780	9050	6030	7420	5920	3620	4550
10	9690	11500	10800	7030	10400	8470	8250	5990	7030	5970	3770	3670
11	7320	14600	13500	8570	7890	8170	7270	5990	7220	6600	3280	3710
12	5920	11600	13700	7930	6270	7870	7660	6550	7040	7320	3880	3750
13	4540	12600	17500	7040	5180	7360	6870	7920	7130	7800	3910	3400
14	5410	21200	14500	7860	4910	6600	6320	8170	7080	8180	3950	3390
15	5180	15700	11300	9840	5570	7440	6520	7900	6940	8860	3950	4410
16	7350	17300	10800	9770	6370	7320	6650	7430	7150	7950	3840	4590
17	7250	19100	9300	9410	6400	7360	7000	7370	6910	8630	3600	3680
18	5950	19600	8780	9030	8730	7230	6720	7800	6570	8230	2960	3320
19	4670	20300	8920	8650	7400	7250	6170	7890	6340	8280	3170	3700
20	4120	17700	9000	8160	7390	6970	5950	7380	6480	6480	3120	3750
21	3290	16800	8440	6630	7850	7070	5740	6970	5980	4470	2670	4160
22	3580	14900	8160	7920	7750	7220	6170	6890	5740	5490	2820	4500
23	3660	22800	8260	7980	7530	6760	9240	6960	5620	5740	3840	4400
24	3670	19100	6490	7430	5590	6590	9290	6690	5800	6970	3620	4140
25	4150	23800	5550	7970	5450	6830	8530	7350	5650	7400	2410	3570
26	5290	22000	6940	7690	6420	7040	8400	7500	5630	7530	3350	3910
27	5000	22300	5640	7550	6540	5620	7890	7420	5750	7620	3740	3950
28	4690	26400	5070	7610	6950	7000	7560	6940	5700	8060	2920	2770
29	4470	49000	5120	7920	6590	6360	7420	7100	5340	8080	3140	3340
30	4230	32800	4620	7690	---	6790	7250	7090	5670	7300	3630	2670
31	3910	---	4280	7780	---	6780	---	6580	---	7020	4460	---
TOTAL	147720	516890	375690	244230	223130	210040	218630	213630	205380	214680	117830	110250
MEAN	4765	17230	12120	7878	7694	6775	7288	6891	6846	6925	3801	3675
MAX	9690	49000	31900	10900	15300	8470	9290	8170	9320	8860	5780	4590
MIN	2820	4380	4280	4620	4910	4850	5740	5990	5340	4470	2410	2670
AC-FT	293000	1025000	745200	484400	442600	416600	433700	423700	407400	425800	233700	218700

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1996, BY WATER YEAR (WY)

	4087	6632	6466	6535	6892	5790	5556	6447	7411	7595	4848	3910
MEAN	4087	6632	6466	6535	6892	5790	5556	6447	7411	7595	4848	3910
MAX	7258	22270	12120	8719	13830	8438	9534	10630	13140	14730	9047	5240
(WY)	1948	1991	1996	1980	1991	1950	1951	1951	1982	1950	1976	1978
MIN	2071	1864	2609	2450	2115	2222	3394	3680	4153	2891	2884	2144
(WY)	1978	1944	1944	1944	1944	1948	1979	1977	1993	1977	1977	1977

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1943 - 1996
ANNUAL TOTAL	2667720	2798100	
ANNUAL MEAN	7309	7645	6038
HIGHEST ANNUAL MEAN			9617
LOWEST ANNUAL MEAN			4340
HIGHEST DAILY MEAN	49000	Nov 29	50000
LOWEST DAILY MEAN	1810	Sep 23	1190
ANNUAL SEVEN-DAY MINIMUM	2470	Sep 20	1520
ANNUAL RUNOFF (AC-FT)	5291000	5550000	4374000
10 PERCENT EXCEEDS	12100	11400	9200
50 PERCENT EXCEEDS	6200	6750	5390
90 PERCENT EXCEEDS	3340	3680	3090

## SKAGIT RIVER BASIN

271

12181000 SKAGIT RIVER AT MARBLEMOUNT, WA--Continued

## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: March 1986 to current year.

INSTRUMENTATION.--Water-temperature sensor interfaced directly with a data collection platform for satellite telemetry since March 1986.

REMARKS.--Temperature probe originally located in an open-bottom corrugated metal pipe well. Temperature probe relocated 30 ft upstream in a 1 1/2 inch diameter pipe attached to a cedar tree Sept. 28, 1995

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 14.5°C Aug. 12, 1990; minimum, 1.5°C Feb. 24-26, 1993.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 13.0°C several days in August; minimum, 2.5°C Jan. 29-31, Feb. 1-4.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	11.0	10.0	10.5	8.0	6.5	7.0	7.0	6.5	7.0	5.5	5.5	5.5
2	10.5	10.0	10.0	8.0	6.5	7.0	7.0	6.5	6.5	5.5	5.0	5.5
3	10.0	9.5	10.0	8.0	6.5	7.5	7.0	6.5	6.5	5.5	5.0	5.0
4	10.5	9.0	9.5	8.0	7.0	7.5	6.5	6.5	6.5	5.0	4.5	4.5
5	10.5	9.0	9.5	8.0	7.5	8.0	6.5	6.0	6.5	4.5	4.0	4.5
6	10.0	9.5	10.0	8.0	7.0	7.5	6.0	5.5	6.0	4.5	4.0	4.5
7	10.5	9.5	10.0	8.0	4.5	6.5	6.0	5.0	6.0	5.0	4.0	4.5
8	10.0	9.5	10.0	6.5	4.5	5.5	5.5	5.0	5.0	5.0	4.5	5.0
9	9.5	9.0	9.5	6.5	6.0	6.5	5.0	5.0	5.0	5.0	5.0	5.0
10	9.0	8.5	8.5	6.5	6.0	6.5	5.0	4.0	4.5	5.5	5.0	5.0
11	9.0	8.0	8.5	6.5	5.0	6.0	5.0	4.5	5.0	5.0	5.0	5.0
12	9.0	8.0	8.5	7.0	6.5	7.0	5.5	5.0	5.5	5.0	4.5	5.0
13	9.0	8.0	8.5	7.0	6.5	7.0	5.5	5.5	5.5	5.0	4.5	5.0
14	9.5	8.5	9.0	7.5	6.5	7.0	5.5	5.5	5.5	5.0	5.0	5.0
15	9.5	8.5	9.5	7.5	7.0	7.0	6.0	5.5	5.5	5.0	5.0	5.0
16	9.5	9.0	9.0	8.0	7.0	7.5	6.0	5.5	6.0	5.0	4.5	5.0
17	9.0	8.0	8.5	7.5	7.5	7.5	6.0	5.5	5.5	4.5	4.5	4.5
18	9.0	8.0	8.5	7.5	6.5	7.0	6.0	5.5	6.0	4.5	4.0	4.5
19	9.0	7.5	8.0	7.5	7.5	7.5	6.0	5.5	6.0	4.5	4.5	4.5
20	9.0	8.5	8.5	7.5	7.0	7.0	6.0	5.5	6.0	4.5	4.0	4.5
21	8.5	8.0	8.5	7.5	7.5	7.5	6.0	5.5	5.5	4.5	4.0	4.5
22	8.5	7.5	8.0	7.5	7.5	7.5	5.5	5.0	5.5	4.5	4.0	4.0
23	8.5	7.5	8.0	8.0	7.0	7.5	5.5	5.0	5.0	4.5	4.0	4.0
24	9.0	8.0	8.5	7.5	7.0	7.5	5.0	5.0	5.0	4.5	4.0	4.0
25	8.5	7.5	8.5	7.5	7.0	7.0	5.0	4.5	5.0	4.5	4.0	4.0
26	8.0	7.5	7.5	7.0	7.0	7.0	5.0	4.5	5.0	4.5	4.0	4.0
27	8.5	7.5	8.0	7.5	7.0	7.0	5.5	5.0	5.0	4.5	4.0	4.0
28	8.5	7.5	8.0	7.0	6.0	6.5	5.5	5.0	5.5	4.0	3.0	3.5
29	8.0	7.0	7.5	7.0	6.0	6.5	5.5	5.0	5.0	3.0	2.5	3.0
30	8.0	6.5	7.5	7.0	6.5	6.5	5.0	5.0	5.0	3.0	2.5	2.5
31	7.5	6.5	7.0	---	---	---	5.5	5.0	5.0	3.0	2.5	3.0
MONTH	11.0	6.5	8.7	8.0	4.5	7.0	7.0	4.0	5.6	5.5	2.5	4.4





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

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

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

PERIOD OF RECORD.--August to November 1910 (fragmentary gage heights only), October 1917 to September 1922, August 1928 to current year.

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

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

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

AVERAGE DISCHARGE.--73 years (water years 1918-22, 1929-96), 1,126 ft<sup>3</sup>/s, 100.69 in/yr, 816,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,100 ft<sup>3</sup>/s Dec. 26, 1980, gage height, 16.03 ft, from rating curve extended above 15,000 ft<sup>3</sup>/s; minimum discharge, 94 ft<sup>3</sup>/s Oct. 27-31, 1987.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1415	5,830	6.72	Nov. 29	1445	23,800	12.36
Oct. 17	1845	4,670	6.18	Dec. 11	0530	5,090	6.38
Nov. 8	1315	*124,100	*12.43	Dec. 13	0215	4,790	6.24
Nov. 11	0645	9,440	*8.15	Jan. 7	1115	5,690	6.66
Nov. 14	0130	4,730	6.21	Feb. 7	0645	6,020	6.80
Nov. 18	0600	4,860	6.27	Feb. 8	1800	16,000	10.24
Nov. 23	1900	6,000	6.79	Apr. 23	2230	4,900	6.34
Nov. 25	0100	6,540	7.03				

Minimum discharge, 235 ft<sup>3</sup>/s Sept. 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	863	653	4640	1140	548	666	486	1000	1150	1230	632	345
2	673	585	3300	1220	533	633	649	927	1530	1390	567	275
3	1600	532	2470	2580	509	612	599	834	2460	1420	593	250
4	1150	508	2090	1850	483	621	556	753	2480	1500	552	242
5	746	575	1680	1390	754	608	534	692	1870	1190	1090	292
6	575	590	1420	1680	2270	593	595	655	1900	997	801	630
7	530	2470	1250	4750	5080	582	1500	656	2250	1010	656	413
8	607	17400	1120	3190	10600	576	1830	635	2160	1290	564	590
9	623	5540	1080	2190	7220	729	2030	582	1760	1440	524	573
10	4100	3040	3030	1860	3280	1760	1860	542	1480	1150	497	411
11	3120	6490	4680	1540	2170	1720	1550	513	1480	1140	479	349
12	2360	3790	3590	1320	1740	1530	1350	548	1400	1340	445	336
13	1640	3160	4330	1210	1600	1240	1110	1260	1380	1410	404	317
14	1370	4190	3300	2000	1560	1070	971	1820	1410	1430	412	363
15	1290	3330	2580	3790	1570	1200	924	1640	1450	1350	408	694
16	3110	2920	2010	3200	1580	1080	1170	1550	1400	1240	368	805
17	3500	2330	1650	2050	1710	964	1250	1520	1250	1060	534	595
18	2950	3920	1430	1600	3240	907	1080	1770	1110	944	303	456
19	1890	2660	1260	1340	2590	864	956	1800	939	1080	278	478
20	1470	1980	1130	1180	2020	839	892	1540	902	1040	270	438
21	1390	1630	1020	1070	1660	803	827	1320	1010	852	267	448
22	1170	1780	921	945	1400	770	813	1270	1150	816	247	552
23	984	3720	843	875	1400	739	2580	1250	1120	952	245	484
24	894	4100	783	820	1190	707	3660	1190	1100	992	256	417
25	943	4910	734	750	1040	664	2410	1440	1120	962	273	364
26	2010	3290	685	696	935	622	2170	1720	1150	868	291	334
27	1480	2590	649	652	843	587	1710	1700	1240	829	302	323
28	1160	6410	618	618	765	553	1380	1450	1170	829	289	300
29	966	18900	657	606	710	527	1190	1580	1050	835	292	275
30	835	8300	992	556	---	508	1070	1410	1080	783	315	261
31	740	---	1530	548	---	487	---	1210	---	718	454	---
TOTAL	46739	122293	57472	49216	61000	25761	39702	36777	42951	34087	13408	12610
MEAN	1508	4076	1854	1588	2103	831	1323	1186	1432	1100	433	420
MAX	4100	18900	4680	4750	10600	1760	3660	1820	2480	1500	1090	805
MIN	530	508	618	548	483	487	486	513	902	718	245	242
AC-FT	92710	242600	114000	97620	121000	51100	78750	72950	85190	67610	26590	25010
CFSM	9.92	26.8	12.2	10.4	13.8	5.47	8.71	7.80	9.42	7.23	2.85	2.77
IN.	11.44	29.93	14.07	12.04	14.93	6.30	9.72	9.00	10.51	8.34	3.28	3.09

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1918 - 1996, BY WATER YEAR (WY)

MEAN	800	1194	1253	1004	916	771	1081	1880	2174	1401	595	488
MAX	2174	4117	3512	2584	2369	2442	1991	2965	3648	2875	1393	1504
(WY)	1968	1991	1918	1953	1951	1972	1934	1949	1974	1954	1954	1920
MIN	119	137	347	224	167	293	458	1119	895	396	215	177
(WY)	1988	1937	1986	1979	1929	1955	1975	1977	1941	1941	1941	1942

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1918 - 1996
ANNUAL TOTAL	524183	542016	
ANNUAL MEAN	1436	1481	1126
HIGHEST ANNUAL MEAN			1557
LOWEST ANNUAL MEAN			733
HIGHEST DAILY MEAN	18900	Nov 29	27000
LOWEST DAILY MEAN	126	Sep 25	94
ANNUAL SEVEN-DAY MINIMUM	143	Sep 20	96
ANNUAL RUNOFF (AC-FT)	1040000	1075000	816000
ANNUAL RUNOFF (CFSM)	9.45	9.74	7.41
ANNUAL RUNOFF (INCHES)	128.29	132.65	100.69
10 PERCENT EXCEEDS	2830	3030	2340
50 PERCENT EXCEEDS	1010	1080	814
90 PERCENT EXCEEDS	427	432	295

## 12189500 SAUK RIVER NEAR SAUK, WA

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

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

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

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

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

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation. Small diversion for millpond at Darrington and for domestic use. Summer flows augmented by glacier melt at source.

AVERAGE DISCHARGE.--68 years (water years 1929-96), 4,340 ft<sup>3</sup>/s, 82.58 in/yr, 3,144,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 98,600 ft<sup>3</sup>/s Dec. 26, 1980, gage height, 18.24 ft, from rating extended above 50,000 ft<sup>3</sup>/s; minimum discharge, 572 ft<sup>3</sup>/s Dec. 5, 1929, but may have been less during period of ice effect Jan. 10-27, 1930.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1700	17,800	8.62	Nov. 29	1800	73,600	16.03
Nov. 8	1700	*79,000	*16.57	Dec. 11	1000	19,100	8.83
Nov. 11	1100	32,400	11.08	Dec. 13	0700	17,500	8.48
Nov. 14	0500	17,500	8.48	Jan. 7	1500	21,800	9.36
Nov. 18	1000	17,300	8.48	Feb. 7	0900	21,000	9.22
Nov. 23	2400	20,000	9.03	Feb. 8	2200	58,000	14.37
Nov. 25	0500	20,400	9.11				

Minimum discharge, 1,300 ft<sup>3</sup>/s Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3060	2560	17100	5010	2470	3090	2440	3790	4320	e5000	2970	1940
2	2260	2380	12600	4800	2380	2980	3250	3570	4940	e5240	2780	1590
3	4640	2250	10400	9190	2310	2930	2540	3290	7910	e5900	2950	1470
4	4240	2150	9260	7600	2480	3050	2280	3050	8780	6300	2530	1430
5	2770	2240	7600	5800	3560	2920	2270	2830	6820	5320	4080	1420
6	2200	2510	6510	5990	9190	2800	2710	2720	6750	4480	3110	1970
7	2020	6580	5840	16800	17500	2750	4700	2700	7850	4410	2580	1690
8	2140	57000	5100	12800	35100	2770	5540	2670	8130	e5100	2390	e2100
9	2360	22700	4740	9210	31000	3540	6110	2510	6820	e6000	2510	e2400
10	11300	11500	10800	8000	13300	5930	5750	2390	5790	e5050	2540	1790
11	9720	23400	16900	6750	9090	5620	5060	2280	5530	e4900	2720	1610
12	7410	15600	13300	5740	7670	5050	4570	2310	5350	e5200	2530	1610
13	5510	12100	15900	5200	6720	4330	3910	4130	5340	e5800	2250	1710
14	4710	16000	12700	7150	6330	3820	3440	6770	5520	e6000	2260	1660
15	4540	12700	10900	11800	6200	4140	3240	5960	5680	e5800	2340	e2200
16	8060	11900	8790	11500	6170	3850	3860	5550	5620	e5200	2130	e2650
17	9860	9500	7320	8170	6300	3490	4250	5300	5100	e5050	1960	2170
18	9730	13500	6600	6510	10800	3230	e3850	6140	4630	4440	1770	1730
19	6330	10300	6000	5560	9680	3110	e3460	6200	3980	4240	1630	1750
20	5140	8280	5380	5000	7820	3020	3250	5400	3780	4230	1570	1840
21	5260	7070	4840	4680	6800	2810	3010	4770	4130	3400	1630	1810
22	4680	7000	4420	4240	6000	2740	2910	4640	4530	3500	1530	2110
23	3970	11600	4090	4030	5480	2650	4950	4390	4180	1500	1930	1930
24	3590	14400	3820	3790	4930	2520	11400	4520	4550	4530	1620	1680
25	3490	16800	3590	3530	4400	2360	7760	4940	4690	4510	1690	1540
26	6240	11900	3400	3320	4020	2280	7230	5820	4740	3970	1770	1440
27	5000	10300	3250	3130	3700	2200	5910	5900	e4900	4020	1890	1410
28	4090	21600	3130	3030	3400	2100	4920	5280	e4850	4200	1890	1370
29	3490	60400	3580	2820	3230	2090	4350	5690	4550	4290	1900	1320
30	3090	34600	4810	2590	--	2060	3980	5380	4580	4050	2030	1310
31	2800	--	6380	2530	--	2010	--	4690	--	3570	2290	--
TOTAL	153700	440820	239050	196270	238030	98240	135240	136140	164550	147880	69340	52650
MEAN	4958	14690	7711	6331	8208	3169	4508	4392	5485	4770	2237	1755
MAX	11300	60400	17100	16800	35100	5930	11400	6770	8780	6300	4080	2650
MIN	2020	2150	3130	2530	2310	2010	2270	2280	3780	3400	1500	1310
AC-FT	304900	874400	474200	389300	472100	194900	268200	270000	326400	293300	137500	104400
CFSM	6.94	20.6	10.8	8.87	11.5	4.44	6.31	6.15	7.68	6.68	3.13	2.46
IN.	8.01	22.97	12.45	10.23	12.40	5.12	7.05	7.09	8.57	7.70	3.61	2.74

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

MEAN	2826	4416	4693	4097	3846	3246	4008	6491	7869	5649	2816	2109
MAX	6770	14690	11580	8615	9062	9443	7375	10570	13520	10610	5529	4941
(WY)	1968	1996	1934	1974	1951	1972	1934	1949	1974	1972	1974	1959
MIN	751	724	1457	1199	793	1523	2039	4061	3715	2515	1625	1089
(WY)	1988	1930	1953	1979	1929	1955	1975	1977	1941	1941	1994	1942

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1929 - 1996
ANNUAL TOTAL	2036980	2071910	
ANNUAL MEAN	5581	5661	4340
HIGHEST ANNUAL MEAN			6048
LOWEST ANNUAL MEAN			2887
HIGHEST DAILY MEAN	60400	Nov 29	69900
LOWEST DAILY MEAN	1060	Sep 26	578
ANNUAL SEVEN-DAY MINIMUM	1120	Sep 21	604
ANNUAL RUNOFF (AC-FT)	4040000	4110000	3144000
ANNUAL RUNOFF (CFSM)	7.82	7.93	6.08
ANNUAL RUNOFF (INCHES)	106.13	107.95	82.58
10 PERCENT EXCEEDS	10100	10500	8300
50 PERCENT EXCEEDS	4180	4390	3340
90 PERCENT EXCEEDS	2060	1970	1540

e Estimated

## RESERVOIRS IN SKAGIT RIVER BASIN, WA

12175000 ROSS RESERVOIR.--(Station 12175000).

## 12176500 DIABLO RESERVOIR

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

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

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

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

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

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

EXTREMES FOR CURRENT YEAR.--Maximum contents, 88,974 acre-ft Aug. 14, elevation, 1,205.01 ft; minimum contents, 79,940 acre-ft Feb. 2, elevation, 1,194.63 ft.

## 12177700 GORGE RESERVOIR

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

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

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

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

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

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 9,761 acre-ft June 1, 1982, elevation, 880.01 ft; minimum observed contents since normal low operating level was reached in December 1960, 884 acre-ft Aug. 19, 1993, elevation, 806.25 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 9,557 acre-ft Nov. 30, elevation, 879.24 ft; minimum recorded contents, 6,240 acre-ft Nov. 23, elevation, 864.25 ft.

## 12191600 BAKER LAKE

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

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

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

GAGE.--Water-stage recorder. Datum of gage is sea level.

REMARKS.--Reservoir is formed by concrete gravity dam, completed in June 1959; storage began July 9, 1959. Usable storage, 220,630 acre-ft between elevations 655 ft, minimum operating pool, and 724 ft, normal full pool. Dead storage below elevation 655 ft, 64,840 acre-ft. Crest of spillway is at elevation 694 ft. Water used by Puget Sound Power and Light Co. for power development. Capacity table furnished by Puget Sound Power and Light Co. Figures given herein represent total contents. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 287,930 acre-ft July 12, 1972, elevation, 724.49 ft; minimum contents since normal operating level was reached in August 1960, 102,621 acre-ft May 8, 1977, elevation, 674.81 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 283,835 acre-ft July 20, elevation, 723.67 ft; minimum contents, 169,896 acre-ft Mar. 8, elevation, 697.24 ft.

## 12193000 LAKE SHANNON

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

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

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

GAGE.--Water-stage recorder; prior to Nov. 11, 1959, water-stage indicator in powerplant. Datum of gage is sea level. Prior to March 1959, at datum 1.72 ft lower. Period August 31, 1961 to September 30, 1991, at datum 0.15 ft higher.

REMARKS.--Reservoir is formed by concrete arch and gravity dam, completed in June 1927; storage began in November 1925. Usable storage, 142,400 acre-ft between elevations 355 ft, minimum operating pool, and 438.6 ft, normal full pool. Dead storage unknown. Spillway crest is at elevation 424.9 ft. Water used by Puget Sound Power and Light Co. for power development. Capacity table furnished by Puget Sound Power and Light Co. Prior to Nov. 11, 1959, gage-height record furnished by Puget Sound Power and Light Co. from powerplant log. Figures given herein represent contents above elevation 341.7 ft, center line of outlet tunnel. U.S. Geological Survey satellite telemeter at station. Midnight elevations for Apr. 9 to Apr. 14, furnished by Puget Sound Power & Light.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 161,470 acre-ft Sept. 17, 1968, elevation, 439.50 ft; minimum contents since October 1953, 28,260 acre-ft Mar. 6, 1969, elevation, 363.7 ft, not determined prior to October 1953 because of incomplete records.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 159,401 acre-ft Nov. 11, elevation, 438.57 ft; minimum contents, 66,345 acre-ft Mar. 25, elevation, 389.37 ft.

## SKAGIT RIVER BASIN

## Reservoirs in Skagit River basin--Continued

MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date		Elevation (feet)	Contents (acre- feet)	Change in contents (acre-feet)	Elevation (feet)	Contents (acre- feet)	Change in contents (acre-ft)
		12176500	Diablo Reservoir		12177700	Gorge Reservoir	
Sept.	30.....	1,202.83	87,010	--	872.35	7,866	--
Oct.	31.....	1,201.08	85,464	-1,546	874.59	8,387	+521
Nov.	30.....	1,201.87	86,159	+695	876.64	8,888	+501
Dec.	31.....	1,202.09	86,353	+194	872.17	7,825	-1,063
CAL YR 1995.....		--	--	-1,705	--	--	-77
Jan.	31.....	1,202.08	86,344	-9	871.24	7,618	-207
Feb.	29.....	1,201.50	85,834	-510	870.30	7,413	-205
Mar.	31.....	1,200.65	85,086	-748	872.55	7,911	+498
Apr.	30.....	1,201.13	85,508	+422	873.01	8,016	+105
May	31.....	1,202.68	86,876	+1,368	874.21	8,297	+281
June	30.....	1,203.40	87,518	+642	874.25	8,306	+9
July	31.....	1,202.34	86,573	-945	873.08	8,033	-273
Aug.	31.....	1,203.48	87,590	+1,017	871.33	7,638	-395
Sept.	30.....	1,201.67	85,983	-1,607	873.85	8,212	+574
WTR YR 1996.....		--	--	-1,027	--	--	+346
		12191600	Baker Lake		12193000	Lake Shannon	
Sept.	30.....	714.38	239,708	--	430.76	142,613	--
Oct.	31.....	712.37	230,712	-8,996	428.53	138,014	-4,599
Nov.	30.....	718.57	259,096	+28,384	437.64	157,347	+19,333
Dec.	31.....	705.95	203,341	-55,755	430.49	142,052	-15,295
CAL YR 1995.....		--	--	-2,098	--	--	-11,102
Jan.	31.....	698.77	175,467	-2,874	424.92	130,758	-11,294
Feb.	29.....	702.42	189,280	+13,813	404.17	91,729	-39,029
Mar.	31.....	699.88	179,587	-9,693	392.86	72,076	-19,653
Apr.	30.....	710.65	223,171	+43,584	421.90	124,833	+52,757
May	31.....	716.58	249,780	+26,609	422.74	126,471	+1,638
June	30.....	718.78	260,088	+10,308	425.09	131,095	+4,624
July	31.....	722.24	276,773	+16,685	436.05	153,869	+22,774
Aug.	31.....	721.75	274,438	-2,335	415.63	112,987	-40,882
Sept.	30.....	719.91	265,472	-8,966	426.06	133,024	+20,037
WTR YR 1996.....		--	--	+25,764	--	--	-9,589



## SKAGIT RIVER BASIN

277

12193500 BAKER RIVER AT CONCRETE, WA

LOCATION.--Lat 48°32'24", long 121°44'31", in NW 1/4 NW 1/4 sec.11, T.35 N., R.8 E., Skagit County, Hydrologic Unit 17110005, on left bank at upstream side of fish barrier, 0.2 mi northeast of Concrete, 0.3 mi downstream from Baker River powerplant, and at mile 0.7.

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

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

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

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

REMARKS.--Records good except those below 100 ft<sup>3</sup>/s, which are poor. Flows on occasion may be affected by backwater from Skagit River during high flows. All diversions returned to river upstream from gage; at times, power generation is shut down for maintenance at Baker River or the fish-barrier dam causing the stage to drop below the control. Water is released through a valve-controlled pipe to the fish ladder located on the left bank just downstream from the gage and control. Flow regulated by Baker and Shannon Lakes (stations 12191600 and 12191300). U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--57 years (water years 1911-14, 1944-96), 3,110 ft<sup>3</sup>/s, 121.12 in/yr, 1,919,000 acre-ft/yr, adjusted for storage in Lake Shannon since November 1925, and Baker Lake since July 1959.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 29,400 ft<sup>3</sup>/s Nov. 28, elevation, 184.58 ft; minimum daily discharge, 45 ft<sup>3</sup>/s Apr. 11-15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3020	4000	19000	1950	3860	3680	688	3420	2760	1060	1650	1930
2	2640	3470	16100	2890	3840	3670	105	3440	2760	979	2680	1960
3	1150	3020	6210	3670	3820	3660	414	3470	2760	1560	2850	2000
4	2510	3020	4070	3960	3790	3650	362	3500	2810	95	1910	2020
5	2440	2990	4020	3960	3770	3640	170	3530	2840	95	2870	2820
6	1990	2320	3960	3960	3770	3630	92	3570	2850	1340	1980	2830
7	3020	2940	3910	3950	3790	3610	92	3580	2840	1970	1980	2840
8	921	6360	3920	3920	3820	3330	e63	3200	2850	2700	1920	2400
9	1910	4480	4200	3920	3850	1790	47	1110	2840	2360	1660	2870
10	3410	2740	4510	3920	3600	1560	46	2000	2850	1830	1720	2860
11	3930	6270	5420	3920	3810	1720	45	85	2850	2960	1800	71
12	3890	11700	9460	3910	3710	1660	45	82	2850	2780	1930	66
13	3890	11900	10000	3910	3840	1680	45	2340	2860	1870	1890	69
14	3860	9920	5010	3930	3840	1890	45	2820	2860	1870	1890	80
15	3800	7530	6320	3960	3820	2590	45	2010	2860	2200	1830	493
16	3920	9570	4870	3950	3810	2600	56	447	2880	1970	2780	81
17	3920	12000	3990	3950	3790	2600	74	1340	2780	2240	110	2190
18	3870	12000	3990	3960	3780	2600	74	1790	2780	2240	66	819
19	3880	5580	3980	3960	3780	2590	265	1820	2780	2330	1830	2080
20	3870	4030	3970	3950	3770	2580	3290	2840	2780	2910	1350	2410
21	3750	4020	3970	3950	3770	2580	3330	2720	2800	2850	1850	1730
22	3740	4010	3560	3950	3750	2570	3380	2160	1970	2080	2290	405
23	3480	5020	2910	3950	3740	2570	3440	1660	2720	2840	2930	1920
24	3800	8570	2960	3960	3730	2570	3430	1440	2260	2760	2950	276
25	3800	9630	2910	3950	3720	2530	3420	1960	1860	1910	2360	271
26	3830	10800	2960	3490	3710	1190	3460	1820	2170	1900	2970	88
27	3900	11600	2720	2930	3710	721	3470	1980	1280	2410	2990	88
28	3920	12600	1920	3910	3700	291	3490	2070	1070	2870	3020	88
29	3920	16900	1990	3890	3700	98	3480	2800	92	2870	3050	1400
30	3970	10600	1650	3890	---	100	3250	2760	92	1790	3080	1480
31	3990	---	1120	3890	---	446	---	2760	---	1500	2040	---
TOTAL	103941	219590	155580	117260	109390	70396	40213	70524	72754	63139	66226	40635
MEAN	3353	7320	5019	3783	3772	2271	1340	2275	2425	2037	2136	1354
MAX	3990	16900	19000	3960	3860	3680	3490	3580	2880	2960	3080	2870
MIN	921	2320	1120	1950	3600	98	45	82	92	95	66	66
AC-FT	206200	435600	308600	232600	217000	139600	79760	139900	144300	125200	131400	80600
MEAN†	3132	8124	3863	4419	3333	1793	2960	2733	2676	2678	1434	1541
CFSM†	10.54	27.35	13.01	14.88	11.22	6.04	9.97	9.20	9.01	9.02	4.83	5.19
IN.†	12.16	30.51	15.00	17.16	12.11	6.96	11.12	10.61	10.05	10.40	5.57	5.79
AC-FT†	192600	483300	237600	271800	191800	110300	176100	168100	159200	164700	88180	91670

CAL YR 1995 TOTAL 1175506 MEAN 3221 MAX 19000 MIN 111 AC-FT 2332000 MEAN† 3203 CFSM† 10.78 IN.† 146.40 AC-FT† 2319000  
WTR YR 1996 TOTAL 1129648 MEAN 3086 MAX 19000 MIN 45 AC-FT 2241000 MEAN† 3110 CFSM† 10.47 IN.† 142.49 AC-FT† 2257000

e Estimated

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

## SKAGIT RIVER BASIN

12194000 SKAGIT RIVER NEAR CONCRETE, WA

LOCATION.--Lat 48°31'28", long 121°46'11", in SE 1/4 NE 1/4 sec.16, T.35 N., R.8 E., Skagit County, Hydrologic Unit 17110007, on right bank at Dalles Bridge 1.3 mi southwest of Concrete, 2.4 mi downstream from Baker River, and at mile 54.1.

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

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

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

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

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

AVERAGE DISCHARGE.--72 years (water years 1925-96), 15,030 ft<sup>3</sup>/s, 10,890,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 160,000 ft<sup>3</sup>/s Nov. 29, 1995, gage height, 41.57 ft; minimum discharge, probably less than 2,160 ft<sup>3</sup>/s during period Oct. 1-24, 1925, when recorder was not operating and gates in Baker River Dam were first closed; minimum daily recorded, 2,360 ft<sup>3</sup>/s Dec. 12, 1929.

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

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 160,000 ft<sup>3</sup>/s Nov. 29, gage height, 41.57 ft; minimum discharge, 4,890 ft<sup>3</sup>/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11100	12100	78200	13800	15400	16100	10900	16100	16000	14200	11600	e8900
2	9440	11700	70200	16100	15200	14100	11700	15500	17000	15900	11800	e8750
3	12100	10800	49100	26500	14700	12600	10500	15800	23500	17500	12400	e8500
4	13200	10800	44800	22200	15200	14600	9980	14800	25400	16100	10100	8110
5	10500	10900	36300	18900	16200	14500	9870	14400	21400	14100	14200	7720
6	9220	10500	28100	19200	24800	13800	10800	14300	20800	13300	12200	9090
7	9810	14200	25500	36200	36400	12900	15100	14100	22600	13800	10700	8460
8	7130	93200	23700	31500	55600	13100	17500	13600	23200	16200	e9650	9230
9	8140	67500	21600	24200	62700	12000	18700	11100	20600	17500	e9250	11300
10	25200	34500	30000	22100	34200	17400	17500	11600	18500	15500	e9450	9670
11	25700	53200	43000	21700	25600	18100	15100	9510	18200	16400	e9400	6320
12	20400	47600	40800	20200	21000	17200	14400	9960	17700	18300	e9250	6370
13	16300	40100	49800	18600	19400	15700	13100	15500	17800	18500	e9400	6340
14	15500	53700	39000	21500	18400	14000	11600	21500	18000	19300	e9140	6160
15	15500	41000	34200	29600	18800	15900	11200	19300	18100	20200	e9500	7760
16	21500	43200	28900	29600	19200	16000	12000	16800	18200	19000	e9880	9260
17	23600	44700	24200	25000	19600	15300	13300	16500	17200	18100	e9250	9490
18	24000	48500	22400	22200	27600	14900	12300	18900	16200	17400	e6950	6910
19	17600	40100	22100	20900	25200	14500	11700	19500	15000	16600	e6700	8210
20	15300	32700	21300	19600	22600	14400	14400	18800	14800	16700	e7380	8980
21	14900	30200	19800	17400	21400	13700	13900	17200	15100	13200	e7050	8640
22	14200	27600	18600	18000	20400	14100	13700	16200	14300	12100	e7250	8090
23	12900	39900	17600	18000	19300	13400	20400	16600	14800	14900	e8200	9330
24	12800	47700	15800	17200	17100	13100	30700	15300	14800	16100	e9300	7000
25	12600	56000	14100	17000	15700	12900	24000	16700	14600	16100	e8000	6410
26	17500	49200	14800	16300	15900	11400	23000	18200	14900	15200	e8400	6150
27	16000	45600	13600	15100	15600	10100	20800	18400	14500	16100	e9520	6210
28	14400	65500	11800	16200	15700	9760	19000	17200	13800	17000	e9050	5530
29	13500	131000	12600	16300	15100	9440	17900	18400	12100	17400	e8900	6500
30	12900	106000	13200	15600	---	9740	17000	18300	12100	15600	e9550	6710
31	12200	---	14800	15500	---	9940	---	16600	---	14100	e9900	---
TOTAL	465140	1319700	899900	642200	664000	424680	462050	496670	521200	502400	292170	236100
MEAN	15000	43990	29030	20720	22900	13700	15400	16020	17370	16210	9425	7870
MAX	25700	131000	78200	36200	62700	18100	30700	21500	25400	20200	14200	11300
MIN	7130	10500	11800	13800	14700	9440	9870	9510	12100	12100	6700	5530
AC-FT	922600	2618000	1785000	1274000	1317000	842400	916500	985100	1034000	996500	579500	468300

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1925 - 1996, BY WATER YEAR (WY)

	11030	15350	16070	14600	13790	12030	13810	20540	24640	19180	10730	8488
MEAN	11030	15350	16070	14600	13790	12030	13810	20540	24640	19180	10730	8488
MAX	22550	49160	34660	25240	28840	23380	29270	36310	43320	37430	20930	16400
(WY)	1968	1991	1976	1935	1991	1972	1934	1925	1972	1972	1976	1959
MIN	3808	2876	5289	4485	3195	6224	7825	11440	12300	8856	6403	4852
(WY)	1926	1937	1930	1930	1929	1929	1973	1977	1926	1977	1941	1942

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1925 - 1996

ANNUAL TOTAL	6638020	6926210	
ANNUAL MEAN	18190	18920	15030
HIGHEST ANNUAL MEAN			21270
LOWEST ANNUAL MEAN			9629
HIGHEST DAILY MEAN	131000	Nov 29	131000
LOWEST DAILY MEAN	4630	Sep 23	5530
ANNUAL SEVEN-DAY MINIMUM	5760	Sep 21	6360
ANNUAL RUNOFF (AC-FT)	13170000		13740000
10 PERCENT EXCEEDS	33100		31900
50 PERCENT EXCEEDS	14700		15600
90 PERCENT EXCEEDS	8270		9080
			10890000
			26200
			12700
			6670

e Estimated

LOCATION.--Lat 48°26'42", long 122°20'03", in SE 1/4 SE 1/4 sec.7, T.34 N., R.4 E., Skagit County, Hydrologic Unit 17110007, on draw west of and 150 ft downstream from bridge on former U.S. Highway 99, 1.5 mi north of Skagit Valley Junior College in Mount Vernon, and at mile 15.7.

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

REVISÉD RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is sea level. Supplementary water-stage recorder in bridge pier 0.2 mi downstream from base gage from Dec. 3, 1957, to Oct. 15, 1964.

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

AVERAGE DISCHARGE, --56 years (water years 1941-96), 16,570 ft<sup>3</sup>/s, 12,000,000 acre-ft, unadjusted.

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

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

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 9	1415	92,000	31.64	Nov. 25	1830	62,800	27.06
Nov. 11	2315	60,800	26.65	Nov. 30	1315	*141,000	*37.34
Nov. 14	1630	58,600	26.20	Dec. 13	1915	56,000	25.83
Nov. 19	0145	55,000	25.40	Feb. 9	1415	78,300	29.20

Minimum discharge, 5,760 ft<sup>3</sup>/s Sept. 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	11800	13200	93600	16200	15700	16600	12200	17600	17000	13300	13100	10200
2	10600	13500	78700	16800	15500	15500	13900	16600	17000	15900	12200	88400
3	11600	11800	61000	26700	14900	14400	12300	16900	21200	16700	13000	88300
4	14600	12000	48300	26600	15600	14700	11600	15900	25000	17100	11000	82800
5	12000	11800	39700	21700	e16800	15600	11200	15400	22800	15300	12700	82400
6	11100	12200	31100	20200	26500	15000	11600	15100	21100	14100	13800	89400
7	9550	13200	27100	33600	35800	13900	15100	15200	21900	13300	11800	92300
8	9310	48400	23800	39600	46400	14200	17300	15000	23200	15600	10400	90800
9	7570	81300	23100	27900	73200	13500	18600	13400	21500	17000	9860	11100
10	19100	48800	27600	24400	49500	18500	18400	11700	19700	16600	9660	10600
11	34000	48500	42100	23100	32600	21000	16400	11700	18700	15500	9970	e8000
12	25900	57100	45300	22100	26100	19300	15500	10800	18400	17700	9650	70900
13	20800	45300	51000	20700	23700	17300	14700	13700	18100	18400	9820	70200
14	17400	52800	48400	22800	22200	15800	13600	21700	18500	19000	9520	69000
15	17700	48600	38900	30200	21800	16200	12000	21300	18500	19900	9740	85800
16	20600	47700	32800	33900	21900	17100	12600	19200	18500	19400	10200	106000
17	26300	47100	27100	28200	22400	16400	14000	16900	18000	18300	8630	97900
18	30200	50400	24700	24700	27300	15700	13800	19400	17000	18300	7190	90700
19	22400	50200	24400	22400	29000	15300	13100	22300	15900	17100	7020	76300
20	18400	38900	23200	21300	24700	15400	14000	21400	15300	18600	7970	97900
21	17800	34300	21600	19700	23300	14400	14500	19300	15500	15000	7440	88100
22	17000	30400	20600	18800	22000	14700	14000	18400	14700	12400	7700	92500
23	15400	36100	19000	19600	20900	14400	18400	21000	15100	14600	8590	95000
24	14500	55000	17800	18900	19600	13900	32000	18900	15000	15500	9530	86600
25	14300	57900	15800	17800	17300	13400	26700	18000	15100	16300	8500	76200
26	19200	57300	15300	17800	16500	12500	24700	19200	15100	15600	8620	68700
27	19200	51900	15500	16300	16900	12400	22800	19500	15000	16200	9630	69300
28	17100	59300	13500	16300	16600	10200	20600	18700	14700	16900	9740	67500
29	15600	91600	14200	16200	10900	10900	19200	18800	13200	17500	9350	59800
30	14700	132000	15600	15900	---	10800	18300	19700	12400	16400	9640	83100
31	13800	---	18000	15800	---	10700	---	18000	---	14800	10100	---
TOTAL	529530	1358600	998800	696700	730900	459700	493100	540700	533100	508300	306070	256490
MEAN	17080	45290	32220	22470	25200	14830	16440	17440	17770	16400	9873	8550
MAX	34000	132000	93600	39600	73200	21000	32000	22300	25000	19900	13800	11100
MIN	7570	11800	13500	15800	14900	10200	11200	10800	12400	12400	7020	5980
AC-FT	1050000	2695000	1981000	1382000	1450000	911800	978100	1072000	1057000	1008000	607100	508700

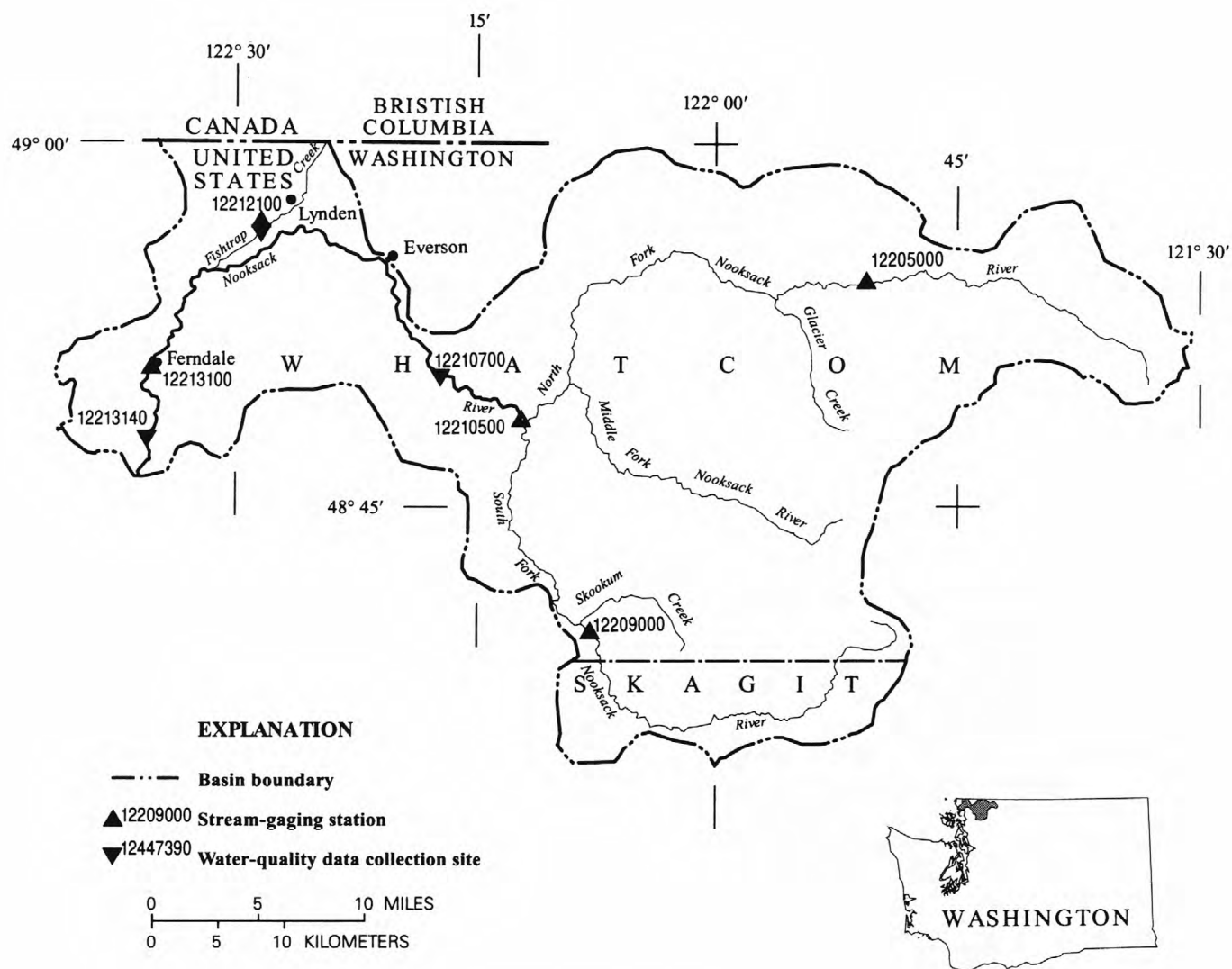
## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1941 - 1996, BY WATER YEAR (WY)

MEAN	12200	17960	18910	17350	16830	14150	14990	20550	24670	20240	11630	9395
MAX	23710	52550	37930	27220	31140	27010	23360	36530	43460	37650	20990	17540
(WY)	1968	1991	1976	1974	1951	1972	1943	1946	1972	1972	1976	1959
MIN	4323	6592	8417	7636	7626	6856	8857	12460	13430	9310	6441	5023
(WY)	1943	1944	1953	1942	1942	1942	1973	1970	1992	1977	1941	1942

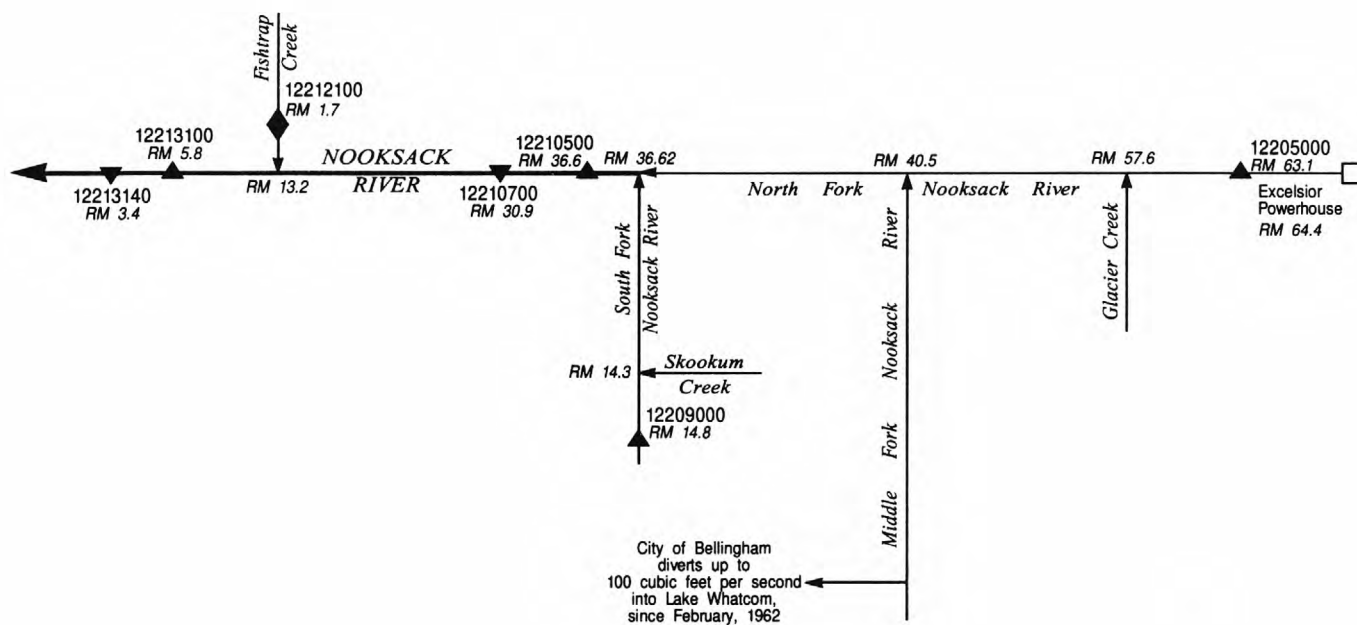
SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1941 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	7320630		7411990			
ANNUAL MEAN	20060		20250		16570	
HIGHEST ANNUAL MEAN					23140	1991
LOWEST ANNUAL MEAN					10510	1944
HIGHEST DAILY MEAN	132000	Nov 30	132000	Nov 30	142000	Nov 25 1990
LOWEST DAILY MEAN	4560	Sep 24	5980	Sep 29	3050	Oct 26 1942
ANNUAL SEVEN-DAY MINIMUM	6000	Sep 21	7300	Sep 24	3530	Oct 22 1942
ANNUAL RUNOFF (AC-FT)	14520000		14700000		12000000	
10 PERCENT EXCEEDS	37200		34700		27300	
50 PERCENT EXCEEDS	16600		16600		14500	
90 PERCENT EXCEEDS	8770		9510		7880	

e Estimated



**Figure 47.** Location of surface-water stations in the Nooksack River Basin.



### EXPLANATION

- ▲ 12205000 Stream-gaging station
- ▼ 14142500 Water-quality data collection site
- ▲ 12396000 Crest-stage gaging station
- RM 63.1 River mile
- Stream—Arrow shows direction of flow
- Tunnel or pipe—Arrow shows direction of flow

Figure 48. Schematic diagram showing surface-water stations in the Nooksack River Basin.



## NOOKSACK RIVER BASIN

12205000 NORTH FORK NOOKSACK RIVER BELOW CASCADE CREEK, NEAR GLACIER, WA

LOCATION.--Lat 48°54'22", long 121°50'35", in SE 1/4 SW 1/4 sec.36, T.40 N., R.7 E., Whatcom County, Hydrologic Unit 17110004, Mt. Baker National Forest, on right bank 0.2 mi downstream from Cascade Creek, 0.3 mi downstream from Deadhorse Creek, 4.8 mi east of Glacier, 5.5 mi upstream from Glacier Creek, and at mile 63.1.

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

PERIOD OF RECORD.--October 1937 to current year. Published as "Nooksack River above Cascade Creek, near Glacier" 1937-58 and as "Nooksack River below Cascade Creek, near Glacier" 1958-66.

REVISED RECORDS.--WSP 1092: 1946.

GAGE.--Water-stage recorder. Elevation of gage is 1,245 ft above sea level, from river-profile map. Supplementary gage on left bank, at datum 1.19 ft lower, used as principal gage prior to Oct. 1, 1953, and Oct. 8, 1958, to Sept. 30, 1959.

REMARKS.--Records fair except for estimated daily discharges, which are poor. No diversion upstream from station. Some regulation at low flow by powerplant at Excelsior. Summer flows augmented by glacier melt. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--59 years (water years 1938-96), 776 ft<sup>3</sup>/s, 100.46 in/yr, 562,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 11,200 ft<sup>3</sup>/s Nov. 10, 1989, gage height, 9.56 ft; minimum discharge, 60 ft<sup>3</sup>/s Mar. 12, 1969; minimum daily, 98 ft<sup>3</sup>/s Jan. 8, 1979, result of freezeup.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Oct. 10	1015	3,620	4.83	Nov. 29	1430	*8,800	*8.46
Nov. 8	1245	8,120	8.03	Dec. 11	0900	3,750	4.94
Nov. 18	0300	7,740	7.79	Dec. 13	0345	4,240	5.33
Nov. 23	1715	3,780	4.96				

Minimum daily discharge, 260 ft<sup>3</sup>/s Feb. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	487	431	2180	518	e265	402	440	543	758	1140	781	595
2	555	416	1560	893	e260	383	444	506	1230	1360	878	484
3	1070	394	1190	1560	e270	375	379	463	1980	1700	901	739
4	691	387	1040	1050	e285	389	359	433	1850	1840	713	538
5	496	397	787	757	611	369	380	410	1460	1240	786	454
6	466	381	673	1020	793	355	671	400	1530	1020	622	456
7	474	1040	e580	1990	1220	338	1130	404	1780	1060	618	439
8	578	5250	e480	1410	2280	360	1210	378	1610	1310	668	1100
9	565	1360	426	1080	1820	568	1360	360	1330	1400	752	695
10	2540	689	1960	897	1100	1490	1530	346	1140	1190	816	521
11	1660	1700	3020	724	812	1350	1030	334	1150	1210	836	519
12	1260	858	2550	633	680	992	786	387	1060	1380	672	559
13	967	749	3110	671	672	710	616	1040	1050	1510	628	560
14	1190	2100	1830	909	678	612	542	1170	1090	1610	693	1190
15	1050	1860	1460	1890	706	769	562	1100	1120	1580	656	1370
16	1780	1390	1170	1380	725	630	753	1110	1060	1330	591	757
17	1870	2420	947	977	987	568	744	1160	921	1140	515	526
18	1340	3230	1180	e800	2160	519	598	1530	767	997	464	436
19	940	991	984	e690	1480	518	539	1490	645	1150	440	442
20	870	577	788	e600	1110	494	495	1150	690	993	460	396
21	783	422	670	e540	908	456	466	936	858	827	437	416
22	685	488	603	e480	726	445	450	931	1020	970	424	418
23	619	2120	541	e440	644	423	1790	910	893	1120	493	376
24	575	1840	e480	e400	574	399	1930	886	970	1190	515	342
25	615	1770	e450	e360	533	385	1240	1100	1000	1190	563	317
26	755	1020	e420	e335	505	372	1040	1200	1010	1210	680	324
27	653	694	e390	e320	478	363	839	1120	1100	1180	722	363
28	579	2860	409	e305	471	351	690	917	1140	1230	701	357
29	531	6300	527	e295	428	351	609	1020	1030	1270	752	362
30	498	3360	520	e285	---	343	559	909	991	1200	1150	357
31	473	---	599	e275	---	341	---	761	---	950	1070	---
TOTAL	27615	47494	33524	24484	24181	16420	24181	25404	34233	38497	20997	16408
MEAN	891	1583	1081	790	834	530	806	819	1141	1242	677	547
MAX	2540	6300	3110	1990	2280	1490	1930	1530	1980	1840	1150	1370
MIN	466	381	390	275	260	338	359	334	645	827	424	317
AC-FT	54770	94200	66490	48560	47960	32570	47960	50390	67900	76360	41650	32550
CFSM	8.48	15.1	10.3	7.52	7.94	5.04	7.68	7.80	10.9	11.8	6.45	5.21
IN.	9.78	16.83	11.88	8.67	8.57	5.82	8.57	9.00	12.13	13.64	7.44	5.81

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1938 - 1996, BY WATER YEAR (WY)

MEAN	658	738	645	494	481	405	562	1119	1520	1302	794	581
MAX	1358	2143	1354	1126	1401	1061	929	1631	2459	2112	1386	1122
(WY)	1968	1991	1940	1968	1991	1972	1990	1993	1948	1974	1974	1978
MIN	210	216	232	147	165	191	253	686	893	725	473	353
(WY)	1988	1953	1979	1979	1956	1948	1975	1962	1941	1940	1941	1989

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1938 - 1996
ANNUAL TOTAL	339632	333438	
ANNUAL MEAN	930	911	776
HIGHEST ANNUAL MEAN			1042
LOWEST ANNUAL MEAN			540
HIGHEST DAILY MEAN	6300	Nov 29	8620
LOWEST DAILY MEAN	200	Jan 27	98
ANNUAL SEVEN-DAY MINIMUM	230	Jan 22	108
ANNUAL RUNOFF (AC-FT)	673700	661400	562400
ANNUAL RUNOFF (CFSM)	8.86	8.68	7.39
ANNUAL RUNOFF (INCHES)	120.33	118.13	100.46
10 PERCENT EXCEEDS	1830	1590	1540
50 PERCENT EXCEEDS	640	741	595
90 PERCENT EXCEEDS	343	380	258

e Estimated

## 12208000 MIDDLE FORK NOOKSACK RIVER NEAR DEMING, WA

LOCATION.--Lat 48°46'43", long 122°06'20", in lot 7 or 8, in SW 1/4 sec.13, T.38 N., R.5 E., Whatcom County, Hydrologic Unit 17110004, on left bank 0.5 mi upstream from Heislars Creek, 6.0 mi southeast of Deming, and at mile 5.6.

DRAINAGE AREA.--73.3 mi<sup>2</sup>. Area at site 1910-11, 1920-21, 1954, 75.4 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1910 to March 1911 (fragmentary gage heights and discharge measurements only), August 1920 to September 1921, February 1934 to September 1935, June to October 1954, October 1964 to November 1968, July 1969 to July 1970, October 1995 to September 1996.

REVISED RECORDS.--WSP 1932: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 580 ft above sea level, from river-profile map. Oct. 11, 1910 to Mar. 14, 1911, Aug. 28, 1920 to Sept. 30, 1921, June 3 to Oct. 31, 1954, nonrecording gages at site 0.8 mi downstream at different datums. Feb. 18 to Apr. 6, 1934, Nov. 16, 1934 to Sept. 30, 1935, nonrecording gage at present site and datum.

REMARKS.--Records good. At times, since February 1962, the city of Bellingham diverts up to about 100 ft<sup>3</sup>/s at dam, 1.8 mi upstream for municipal use. No regulation.

COOPERATION.--Records provided by city of Bellingham since October 1995.

AVERAGE DISCHARGE.--7 years (water years 1921, 1935, 1965-68, 1996), 518 ft<sup>3</sup>/s, 96.01 in/yr, 375,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined, probably occurred Nov. 5, 1934, gage height, 15.0 ft, from floodmarks, present site and datum; minimum discharge, 30 ft<sup>3</sup>/s Oct. 3, 1965, gage height, 4.04 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 5,700 ft<sup>3</sup>/s Nov. 28, gage height, 7.65 ft; minimum discharge, 94 ft<sup>3</sup>/s Aug. 22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	288	160	1240	563	e143	169	366	320	306	295	229	206
2	350	150	953	922	e140	154	337	289	452	349	289	157
3	1070	110	786	1520	218	152	206	262	622	443	241	428
4	476	112	718	752	526	173	185	241	516	535	198	235
5	232	123	593	554	864	156	240	226	401	324	295	276
6	251	123	530	899	1080	144	535	223	443	285	200	285
7	427	1440	485	1390	1220	138	648	232	521	299	190	351
8	427	3330	442	858	2170	182	526	217	443	365	235	1130
9	362	1190	508	670	1300	470	507	195	369	357	241	535
10	1910	730	1700	618	691	1060	598	179	335	299	256	327
11	1250	1970	1640	503	507	763	442	169	389	313	250	282
12	793	966	1530	398	430	481	378	253	313	389	211	272
13	552	1020	1760	578	426	334	286	1070	302	401	214	259
14	552	1350	1110	1140	418	280	240	910	299	426	229	422
15	409	1380	870	1500	413	390	246	638	295	409	206	960
16	764	1020	718	966	378	276	363	565	275	349	182	430
17	1280	1240	648	633	655	243	348	540	244	342	150	292
18	752	1490	1070	516	1030	222	283	800	238	309	126	229
19	443	798	781	455	670	248	248	964	200	525	118	244
20	388	605	603	409	540	225	237	694	206	385	122	220
21	427	502	516	374	442	195	208	502	238	262	108	320
22	338	520	455	341	345	190	222	898	272	275	114	365
23	270	1280	409	327	306	180	1560	1160	247	306	152	272
24	235	1160	378	306	267	160	1180	655	282	320	169	209
25	327	1230	352	286	231	148	746	560	275	306	182	214
26	480	953	330	237	211	142	617	493	259	338	223	232
27	317	870	293	190	195	132	470	426	279	316	247	241
28	244	3120	258	175	180	123	381	353	285	346	250	226
29	201	3920	699	e162	173	127	338	405	256	346	262	229
30	174	1770	729	e154	---	123	313	373	247	338	476	217
31	154	---	895	e147	---	136	---	313	---	272	412	---
TOTAL	16143	34632	23999	18543	16169	7916	13254	15125	9809	10824	6777	10065
MEAN	521	1154	774	598	558	255	442	488	327	349	219	335
MAX	1910	3920	1760	1520	2170	1060	1560	1160	622	535	476	1130
MIN	154	110	258	147	140	123	185	169	200	262	108	157
AC-FT	32020	68690	47600	36780	32070	15700	26290	30000	19460	21470	13440	19960
CFSM	7.10	15.7	10.6	8.16	7.61	3.48	6.03	6.66	4.46	4.76	2.98	4.58
IN.	8.19	17.58	12.18	9.41	8.21	4.02	6.73	7.68	4.98	5.49	3.44	5.11

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1920 - 1996, BY WATER YEAR (WY)

	MEAN	579	631	616	597	558	353	400	578	681	471	317	388
MAX	1272	1154	837	908	855	603	739	780	1202	839	573	796	
(WY)	1921	1996	1967	1968	1921	1934	1966	1921	1921	1954	1954	1920	
MIN	296	383	440	409	198	247	127	401	327	311	180	120	
(WY)	1970	1967	1970	1966	1966	1935	1967	1970	1996	1970	1969	1965	

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1920 - 1996

ANNUAL TOTAL	183256												
ANNUAL MEAN	501									518			
HIGHEST ANNUAL MEAN										665			
LOWEST ANNUAL MEAN										444			1921
HIGHEST DAILY MEAN	3920						Nov 29			7500		Oct 4	1920
LOWEST DAILY MEAN	108						Aug 21			32		Sep 29	1965
ANNUAL SEVEN-DAY MINIMUM	127						Aug 17			36		Sep 27	1965
ANNUAL RUNOFF (AC-FT)	363500									375200			
ANNUAL RUNOFF (CFSM)	6.83									7.07			
ANNUAL RUNOFF (INCHES)	93.00									96.01			
10 PERCENT EXCEEDS	1070									966			
50 PERCENT EXCEEDS	343									382			
90 PERCENT EXCEEDS	172									175			

e Estimated

## NOOKSACK RIVER BASIN

12209000 SOUTH FORK NOOKSACK RIVER NEAR WICKERSHAM, WA

LOCATION.--Lat 48°39'52", long 122°09'56", in lot 2, SW 1/4 SW 1/4 sec.26, T.37 N., R.5 E., Whatcom County, Hydrologic Unit 17110004, on left bank 0.5 mi upstream from Skookum Creek, 3.7 mi east of Wickersham, and at mile 14.8.

DRAINAGE AREA.--103 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1933 to October 1977, June to September 1978, October 1980 to September 1995 (seasonal records), October 1995 to September 1996.

REVISED RECORDS.--WSP 832: 1935-36.

GAGE.--Water-stage recorder. Elevation of gage is 385 ft above sea level, from river-profile map. Prior to July 9, 1934, nonrecording gage, at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--45 years (water years 1934-77, 1996), 741 ft<sup>3</sup>/s, 97.73 in/yr, 536,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 22,400 ft<sup>3</sup>/s Nov. 23, 1990, gage height, 13.20 ft, from rating curve extended above 11,000 ft<sup>3</sup>/s; minimum discharge, 59 ft<sup>3</sup>/s Oct. 20-25, 30, 31, 1987, gage height, 1.79 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 16,900 ft<sup>3</sup>/s Nov. 29, gage height, 11.38 ft; minimum discharge, 79 ft<sup>3</sup>/s Aug. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e415	281	2480	899	452	363	578	635	473	236	124	108
2	e370	256	e1860	1360	568	351	700	603	542	254	140	93
3	e1190	237	1390	3130	622	359	443	564	676	270	177	150
4	e638	231	1270	1360	e495	474	387	516	618	327	153	179
5	e330	302	999	918	e923	409	407	474	484	249	235	260
6	e280	337	e843	1140	2290	365	763	463	466	208	184	e265
7	e300	e3130	738	3000	2670	352	1040	513	492	202	147	258
8	e350	11800	670	1710	5430	411	952	506	469	214	131	708
9	e800	2550	686	e1150	2720	838	902	468	411	230	122	459
10	e3900	1470	e2480	1070	1390	2710	880	432	379	194	117	244
11	e2600	4780	3080	828	974	1830	739	405	391	188	112	e184
12	1660	2110	e2650	675	811	1100	693	458	352	203	108	e155
13	905	e1770	5080	864	781	756	506	1400	342	e209	104	146
14	714	e2010	e2100	2070	749	617	355	1440	333	211	103	444
15	521	2270	e1620	3600	725	703	321	1030	330	204	99	1630
16	960	1680	e1260	2110	e724	572	636	931	308	184	98	650
17	e2210	1610	1000	1140	e1140	510	796	807	283	197	98	387
18	1370	1950	e1590	866	2170	469	620	1250	278	280	96	289
19	738	e1180	1210	710	e1440	475	469	2120	252	617	94	284
20	e627	e600	898	631	e1100	494	442	1370	240	677	92	249
21	e678	e690	734	574	e923	450	346	942	261	290	90	383
22	569	e689	623	497	e770	443	364	1580	285	227	88	672
23	446	e3920	549	478	e668	433	3780	2450	257	208	87	449
24	391	e2720	488	432	590	391	2550	1250	273	190	85	316
25	718	e3210	447	387	521	357	1550	989	287	176	82	260
26	1460	e2160	409	363	470	340	1390	851	252	165	82	226
27	743	1890	381	340	433	317	1020	739	263	158	81	205
28	533	8000	381	322	408	294	815	606	257	151	82	189
29	423	13400	922	321	389	297	718	599	246	147	82	175
30	359	4170	1210	320	---	296	653	592	231	139	86	164
31	316	---	e1480	355	---	296	---	514	---	131	140	---
TOTAL	27514	81403	41528	33620	33346	18072	25815	27497	10731	7336	3519	10181
MEAN	888	2713	1340	1085	1150	583	860	887	358	237	114	339
MAX	3900	13400	5080	3600	5430	2710	3780	2450	676	677	235	1630
MIN	280	231	381	320	389	294	321	405	231	131	81	93
AC-FT	54570	161500	82370	66690	66140	35850	51200	54540	21280	14550	6980	20190
CFSM	8.62	26.3	13.0	10.5	11.2	5.66	8.35	8.61	3.47	2.30	1.10	3.29
IN.	9.94	29.40	15.00	12.14	12.04	6.53	9.32	9.93	3.88	2.65	1.27	3.68

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 1996, BY WATER YEAR (WY)

	MEAN	620	1005	1058	918	800	677	828	1060	861	441	205	274
MAX	1806	3418	2164	2092	1847	1745	1456	1666	1740	1055	501	791	
(WY)	1968	1991	1976	1953	1951	1972	1959	1936	1937	1974	1954	1959	
MIN	68.6	126	500	194	288	324	401	540	263	123	81.5	81.4	
(WY)	1988	1937	1953	1937	1956	1955	1975	1994	1992	1940	1958	1940	

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1934 - 1996

ANNUAL TOTAL	320562												
ANNUAL MEAN	876									741			
HIGHEST ANNUAL MEAN										989			
LOWEST ANNUAL MEAN										488			1974
HIGHEST DAILY MEAN										14000			Nov 9 1990
LOWEST DAILY MEAN										59			Oct 21 1987
ANNUAL SEVEN-DAY MINIMUM										60			Oct 19 1987
ANNUAL RUNOFF (AC-FT)	635800									536700			
ANNUAL RUNOFF (CFSM)	8.50									7.19			
ANNUAL RUNOFF (INCHES)	115.78									97.73			
10 PERCENT EXCEEDS	2080									1400			
50 PERCENT EXCEEDS	486									507			
90 PERCENT EXCEEDS	154									136			

e Estimated





## NOOKSACK RIVER BASIN

12210700 NOOKSACK RIVER AT NORTH CEDARVILLE, WA

## WATER-QUALITY RECORDS

LOCATION.--Lat 48°50'31", long 122°17'35", in SE 1/4 NE 1/4 sec.28, T.39 N., R.4 E., Whatcom County, Hydrologic Unit 17110004, on left bank underneath highway bridge, 0.15 mi east of Cedarville, and at mile 30.9.

DRAINAGE AREA.--589 mi<sup>2</sup>.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March to September 1996.

WATER TEMPERATURE: March to September 1996.

DISSOLVED OXYGEN: March to September 1996.

INSTRUMENTATION.--Water-quality monitor since March 1996. Electronic data logger with sixty-minute recording interval.

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 106 microsiemens Aug. 22, 23; minimum recorded, 45 microsiemens Apr. 24.

WATER TEMPERATURE: Maximum recorded, 19.0°C July 23, 24, 26, 27; minimum recorded, 3.0°C Mar. 25.

DISSOLVED OXYGEN: Maximum recorded, 11.6 mg/l Mar. 24, 25, but may have been higher during periods of missing record; minimum recorded, 8.5 mg/l Aug. 6, but may have been lower during periods of missing record.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	99	80	92	80	76	78
2	---	---	---	---	---	---	80	70	74	83	77	80
3	---	---	---	---	---	---	87	78	83	83	79	81
4	---	---	---	---	---	---	91	87	89	87	80	83
5	---	---	---	---	---	---	91	90	90	88	82	85
6	---	---	---	---	---	---	90	71	82	88	83	86
7	---	---	---	---	---	---	71	63	65	89	84	88
8	---	---	---	100	96	99	65	62	63	91	88	89
9	---	---	---	96	76	86	65	63	64	93	91	92
10	---	---	---	76	52	57	63	57	59	94	93	93
11	---	---	---	57	55	56	66	61	64	96	94	95
12	---	---	---	68	57	63	71	66	68	96	90	94
13	---	---	---	75	67	72	84	71	79	90	58	69
14	---	---	---	79	75	77	88	79	85	63	59	61
15	---	---	---	79	73	75	90	84	88	69	61	65
16	---	---	---	78	74	77	89	79	84	72	67	69
17	---	---	---	82	78	80	81	77	79	73	71	73
18	---	---	---	85	82	83	84	77	82	71	63	67
19	---	---	---	85	83	84	87	83	86	63	56	59
20	---	---	---	84	82	83	89	79	87	68	63	65
21	---	---	---	88	84	86	94	79	91	73	68	72
22	---	---	---	89	88	88	96	90	94	73	57	67
23	---	---	---	90	89	90	91	46	62	62	52	56
24	---	---	---	93	89	91	61	45	54	71	62	67
25	---	---	---	95	93	94	68	60	65	73	71	72
26	---	---	---	97	95	96	71	61	67	75	72	73
27	---	---	---	98	97	97	76	69	73	77	74	75
28	---	---	---	100	98	98	82	69	77	81	77	79
29	---	---	---	99	97	98	79	71	76	81	77	80
30	---	---	---	100	99	99	82	76	79	81	77	79
31	---	---	---	101	99	100	---	---	---	84	81	83
MONTH	---	---	---	---	---	---	99	45	77	96	52	77
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	86	84	85	80	76	78	82	76	78	89	79	85
2	86	75	82	76	69	72	81	78	80	96	89	92
3	75	66	68	71	63	66	82	79	80	96	78	90
4	69	62	65	63	55	57	87	82	85	92	77	84
5	75	69	72	69	58	64	87	80	83	95	92	94
6	75	72	74	76	69	72	90	84	87	92	86	88
7	72	69	70	76	74	74	92	89	90	93	90	92
8	72	67	69	74	67	69	92	88	89	90	65	69
9	76	72	74	67	61	63	89	84	86	77	67	71
10	79	76	77	71	65	67	87	83	84	88	77	84
11	79	76	77	73	70	71	84	79	81	88	86	87
12	81	78	79	72	66	68	89	81	85	87	84	85
13	82	80	81	68	63	65	91	87	89	87	84	85
14	82	80	81	65	60	62	91	85	87	87	67	78
15	82	78	80	63	59	61	90	84	86	67	53	60
16	81	79	80	67	59	62	92	88	90	77	59	69
17	84	81	83	70	67	69	97	91	93	86	77	82
18	86	84	85	74	70	72	101	97	99	92	86	89
19	92	86	89	75	65	72	104	101	102	92	92	92
20	92	91	91	74	63	67	103	101	102	95	92	94
21	92	87	89	81	74	78	104	100	101	95	88	91
22	88	80	83	81	79	81	106	103	104	88	81	84
23	84	83	84	80	74	76	106	99	101	90	81	86
24	84	82	83	77	72	73	100	93	96	96	90	93
25	82	80	81	73	68	70	97	91	93	100	96	98
26	81	80	81	72	68	70	92	84	86	103	100	101
27	81	78	79	73	69	71	84	80	81	102	101	101
28	79	76	77	72	68	70	84	80	82	103	101	102
29	79	75	76	69	66	67	81	77	79	103	103	103
30	80	78	79	70	65	67	77	67	72	105	102	103
31	---	---	---	77	69	72	79	68	72	---	---	---
MONTH	92	62	79	81	55	69	106	67	88	105	53	88



NOOKSACK RIVER BASIN

287

12210700 NOOKSACK RIVER AT NORTH CEDARVILLE, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	6.5	5.5	6.0	9.5	7.0	8.0
2	---	---	---	---	---	---	8.0	4.5	6.0	9.0	6.5	7.5
3	---	---	---	---	---	---	7.5	4.5	6.0	9.5	6.0	7.5
4	---	---	---	---	---	---	10.0	5.5	7.5	8.5	6.0	7.5
5	---	---	---	---	---	---	9.5	7.0	8.0	12.0	6.0	8.5
6	---	---	---	---	---	---	8.5	8.0	8.5	11.0	7.5	9.0
7	---	---	---	---	---	---	11.0	7.5	9.0	11.0	7.5	9.0
8	---	---	---	7.0	5.0	6.0	11.5	7.5	9.5	10.0	6.5	8.0
9	---	---	---	7.0	6.0	6.5	10.0	8.0	9.0	10.0	6.0	8.0
10	---	---	---	6.5	5.0	6.0	8.0	7.5	7.5	8.5	7.0	7.5
11	---	---	---	7.0	6.0	6.5	8.5	7.0	7.5	9.5	6.5	8.0
12	---	---	---	6.5	5.0	6.0	10.0	6.5	7.5	12.5	8.0	10.0
13	---	---	---	7.5	4.5	6.0	9.0	6.0	7.5	11.0	8.5	9.5
14	---	---	---	8.5	4.5	6.5	10.0	6.5	8.0	9.0	8.0	8.5
15	---	---	---	7.5	6.0	6.5	10.5	8.0	9.0	10.0	7.5	8.5
16	---	---	---	6.0	5.0	5.5	10.5	8.0	9.0	11.0	7.5	9.0
17	---	---	---	7.0	5.5	6.0	10.0	7.0	8.5	10.5	8.0	9.0
18	---	---	---	8.5	4.5	6.5	9.5	7.0	8.0	9.0	8.0	8.5
19	---	---	---	8.0	6.5	7.0	9.5	6.5	8.0	9.5	7.0	8.0
20	---	---	---	8.0	6.0	7.0	10.5	7.0	8.5	10.0	7.5	8.5
21	---	---	---	8.5	5.5	7.0	12.0	6.5	9.0	9.0	7.5	8.0
22	---	---	---	8.0	6.5	7.0	9.5	8.0	8.5	8.0	7.5	8.0
23	---	---	---	7.0	5.5	6.5	8.0	7.0	7.5	10.5	7.0	8.5
24	---	---	---	7.0	3.5	5.0	7.5	6.0	7.0	13.0	8.0	10.5
25	---	---	---	7.5	3.0	5.0	7.0	6.0	6.5	12.0	9.5	11.0
26	---	---	---	8.5	4.0	6.0	7.5	6.0	6.5	13.5	9.0	11.0
27	---	---	---	8.5	5.5	6.5	9.5	6.0	7.5	10.5	8.5	9.5
28	---	---	---	8.0	4.0	6.0	7.0	5.5	6.5	10.5	8.5	9.0
29	---	---	---	7.5	5.0	6.0	10.5	6.5	8.5	10.0	8.5	9.0
30	---	---	---	7.5	5.0	6.0	10.0	7.5	8.5	9.0	8.0	8.5
31	---	---	---	6.5	5.0	6.0	---	---	---	13.0	8.0	10.5
MONTH	---	---	---	---	---	---	12.0	4.5	7.8	13.5	6.0	8.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	13.5	9.0	11.0	17.5	11.5	14.0	17.5	12.0	14.5	15.0	11.0	12.5
2	16.0	10.5	13.0	16.0	12.0	14.0	15.5	12.5	13.5	16.0	10.5	13.0
3	14.0	11.0	12.5	14.0	11.0	12.0	13.0	11.0	12.0	14.0	11.5	12.5
4	12.0	10.0	11.0	13.5	10.0	11.5	12.5	11.0	11.5	13.0	10.0	11.5
5	14.5	9.0	11.5	14.0	9.5	11.5	14.5	10.5	12.0	12.0	10.5	11.5
6	12.0	10.0	11.0	16.0	10.0	12.5	17.0	11.0	14.0	12.0	10.5	11.0
7	13.0	10.0	11.5	17.5	11.0	14.0	18.0	12.0	15.0	13.0	11.0	12.0
8	13.5	9.5	11.5	18.0	12.0	15.0	18.5	12.5	15.5	12.5	11.5	12.0
9	12.0	10.0	11.0	15.5	12.0	13.0	18.5	13.0	15.5	14.5	11.0	12.5
10	11.5	9.5	10.5	16.5	10.5	13.5	18.5	13.0	15.5	15.5	10.5	12.5
11	12.0	9.5	10.5	17.5	11.5	14.5	16.5	13.0	14.5	15.0	11.0	13.0
12	14.5	8.5	11.5	18.0	12.0	15.0	17.5	11.5	14.5	14.5	11.5	13.0
13	15.0	10.0	12.0	18.5	12.0	15.0	18.5	12.0	15.0	13.0	11.5	12.5
14	15.5	10.0	12.5	18.5	12.5	15.5	18.0	12.5	15.5	12.0	11.0	11.5
15	15.0	10.0	12.5	17.5	12.5	15.0	16.5	12.0	14.5	12.0	10.5	11.0
16	13.5	9.5	11.5	15.5	12.0	14.0	15.0	13.0	13.5	12.0	9.5	10.5
17	12.5	9.5	11.0	14.0	10.5	11.5	14.5	11.5	13.0	13.5	9.5	11.5
18	12.0	9.0	10.5	12.5	10.0	11.0	13.5	11.5	12.5	11.5	9.5	10.5
19	15.5	9.0	12.0	11.5	10.0	10.5	14.5	11.5	13.0	12.5	10.5	11.0
20	16.5	10.5	13.5	13.0	10.0	11.5	15.5	12.0	13.5	11.0	9.5	10.5
21	17.0	11.0	14.0	17.0	10.5	13.5	15.0	11.0	13.0	11.0	9.5	10.0
22	14.5	10.5	11.5	18.5	12.0	15.0	17.5	11.5	14.0	11.0	9.0	9.5
23	12.5	10.0	11.0	19.0	13.0	15.5	18.0	12.0	15.0	11.0	7.5	9.0
24	14.5	10.0	11.5	19.0	13.0	15.5	18.0	12.5	15.0	12.0	8.5	10.0
25	14.5	10.5	12.0	18.5	13.0	15.5	17.5	12.5	15.0	12.5	8.5	10.5
26	16.5	10.5	13.0	19.0	13.0	16.0	16.5	12.5	14.5	13.0	9.0	11.0
27	14.0	11.0	12.5	19.0	13.0	16.0	15.0	12.0	13.0	13.5	9.5	11.5
28	12.5	10.5	11.5	18.0	13.5	15.5	15.0	11.5	13.0	13.5	10.0	11.5
29	15.0	10.0	12.0	18.5	13.5	15.5	17.0	11.5	14.0	13.5	10.0	12.0
30	15.0	11.0	12.5	17.5	12.5	15.0	15.0	12.0	13.0	13.0	10.5	11.5
31	---	---	---	17.5	11.5	14.5	14.0	11.0	12.5	---	---	---
MONTH	17.0	8.5	11.8	19.0	9.5	13.9	18.5	10.5	13.9	16.0	7.5	11.4

## NOOKSACK RIVER BASIN

12210700 NOOKSACK RIVER AT NORTH CEDARVILLE, WA--Continued

OXYGEN DISSOLVED (MG/L), MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	10.9	10.6	10.8	---	---	---
2	---	---	---	---	---	---	11.3	10.8	11.0	---	---	---
3	---	---	---	---	---	---	11.5	11.0	11.2	---	---	---
4	---	---	---	---	---	---	11.3	10.4	10.9	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	11.5	11.0	11.3	---	---	---	11.2	10.7	11.0
9	---	---	---	11.2	11.0	11.1	---	---	---	11.4	10.8	11.0
10	---	---	---	11.5	11.0	11.2	---	---	---	11.3	10.8	11.1
11	---	---	---	11.2	11.0	11.1	---	---	---	11.3	10.6	11.0
12	---	---	---	11.3	11.0	11.1	---	---	---	11.0	10.1	10.6
13	---	---	---	11.4	10.9	11.1	---	---	---	10.7	10.1	10.5
14	---	---	---	11.4	10.7	11.1	---	---	---	10.8	10.6	10.7
15	---	---	---	11.2	10.8	11.0	---	---	---	10.8	10.4	10.6
16	---	---	---	11.4	11.2	11.3	---	---	---	10.8	10.3	10.6
17	---	---	---	11.3	11.0	11.2	---	---	---	10.7	10.4	10.5
18	---	---	---	11.4	10.6	11.0	---	---	---	10.8	10.5	10.7
19	---	---	---	10.9	10.7	10.8	---	---	---	11.1	10.7	10.9
20	---	---	---	11.1	10.7	10.9	---	---	---	11.0	10.5	10.8
21	---	---	---	11.1	10.5	10.9	---	---	---	10.9	10.5	10.7
22	---	---	---	10.8	10.5	10.7	---	---	---	11.0	10.6	10.8
23	---	---	---	11.0	10.6	10.9	---	---	---	11.2	10.6	10.9
24	---	---	---	11.6	10.8	11.2	---	---	---	10.9	10.0	10.5
25	---	---	---	11.6	10.8	11.2	---	---	---	10.6	10.1	10.4
26	---	---	---	11.3	10.5	11.0	---	---	---	10.8	10.0	10.4
27	---	---	---	11.2	10.6	10.9	---	---	---	10.8	10.3	10.6
28	---	---	---	11.4	10.6	11.0	---	---	---	10.8	10.4	10.6
29	---	---	---	11.2	10.6	10.9	---	---	---	10.7	10.5	10.6
30	---	---	---	11.3	10.7	11.0	---	---	---	10.8	10.7	10.8
31	---	---	---	11.1	10.6	10.9	---	---	---	10.8	10.1	10.5
MONTH	---	---	---	---	---	---	---	---	---	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	10.7	10.0	10.4	10.5	9.0	9.8	10.5	9.2	9.9	---	---	---
2	10.5	9.7	10.1	10.3	9.1	9.7	10.3	9.4	10.0	---	---	---
3	10.4	9.9	10.1	10.4	9.4	10.1	10.8	10.0	10.4	---	---	---
4	10.7	10.1	10.5	10.8	10.0	10.4	10.4	9.6	10.0	---	---	---
5	10.9	10.0	10.5	11.1	9.7	10.5	10.7	9.4	10.0	---	---	---
6	10.7	10.1	10.5	10.9	9.2	10.1	10.2	8.5	9.4	---	---	---
7	10.7	10.2	10.4	10.5	8.8	9.7	---	---	---	---	---	---
8	10.8	10.1	10.4	10.1	8.6	9.4	---	---	---	---	---	---
9	10.8	10.2	10.5	10.4	8.9	9.9	---	---	---	---	---	---
10	10.8	10.3	10.6	10.7	9.5	10.1	---	---	---	---	---	---
11	10.9	10.4	10.6	10.5	9.3	9.9	---	---	---	---	---	---
12	11.0	9.9	10.5	10.3	9.2	9.7	---	---	---	---	---	---
13	10.8	10.0	10.4	10.2	9.1	9.7	---	---	---	---	---	---
14	11.3	9.9	10.6	10.1	9.0	9.6	---	---	---	---	---	---
15	11.1	9.9	10.5	10.1	9.1	9.6	---	---	---	---	---	---
16	11.2	10.1	10.7	10.3	9.3	9.9	---	---	---	---	---	---
17	11.2	10.5	10.8	10.5	9.7	10.3	---	---	---	---	---	---
18	11.4	10.6	11.0	10.7	10.3	10.5	---	---	---	---	---	---
19	11.4	9.6	10.6	10.8	10.4	10.6	---	---	---	---	---	---
20	10.9	9.4	10.1	10.7	10.1	10.5	---	---	---	---	---	---
21	10.8	9.3	10.0	10.7	9.4	10.1	---	---	---	---	---	---
22	10.8	9.4	10.4	10.4	9.2	9.8	---	---	---	---	---	---
23	10.9	10.1	10.6	10.4	9.2	9.7	---	---	---	---	---	---
24	10.8	9.9	10.4	10.4	9.2	9.8	---	---	---	---	---	---
25	10.8	9.8	10.3	10.4	9.2	9.8	---	---	---	---	---	---
26	10.7	9.3	10.0	10.4	9.1	9.7	---	---	---	---	---	---
27	10.5	9.4	10.1	10.4	9.1	9.8	---	---	---	---	---	---
28	10.9	10.0	10.5	10.3	9.4	9.8	---	---	---	---	---	---
29	11.1	9.7	10.4	10.3	9.3	9.8	---	---	---	---	---	---
30	10.8	9.6	10.2	10.4	9.4	9.9	---	---	---	---	---	---
31	---	---	---	10.6	9.4	10.0	---	---	---	---	---	---
MONTH	11.4	9.3	10.4	11.1	8.6	9.9	---	---	---	---	---	---

NOOKSACK RIVER BASIN

289

12212100 FISHTRAP CREEK AT FLYNN ROAD, AT LYNDEN, WA

LOCATION.--Lat 48°55'36", long 122°29'42", in NW 1/4 SE 1/4 sec.25, T.40 N., R.2 E., Whatcom County, Hydrologic Unit 17110004, on left bank, and at mile 1.7.

DRAINAGE AREA.--38.1 mi<sup>2</sup>.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May to September 1996.

GAGE.--Water-stage recorder. Elevation of gage is 40 ft above sea level, from topographic map.

REMARKS.--Records good. No regulation. Small diversions for irrigation upstream.

EXTREMES FOR PERIOD MAY TO SEPTEMBER.--Maximum discharge, 101 ft<sup>3</sup>/s Sept. 15, gage height, 33.23 ft; minimum discharge, 8.7 ft<sup>3</sup>/s July 31.

DISCHARGE, CUBIC FEET PER SECOND, MAY TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	MAY	JUN	JUL	AUG	SEP
1	---	52	27	11	13
2	---	50	26	12	13
3	---	48	25	14	16
4	---	47	30	15	17
5	---	47	29	18	16
6	---	46	26	19	16
7	---	45	23	16	17
8	---	43	22	15	21
9	---	44	21	14	21
10	---	44	21	13	17
11	---	43	20	13	15
12	---	42	20	14	14
13	---	40	19	13	16
14	---	39	18	13	20
15	---	38	18	13	53
16	---	36	19	13	51
17	---	34	24	14	32
18	---	33	26	14	25
19	---	32	25	15	22
20	---	30	25	14	22
21	---	30	22	14	20
22	---	30	19	13	21
23	---	32	17	13	22
24	---	35	15	12	20
25	---	32	11	12	19
26	---	30	11	12	18
27	---	31	11	12	17
28	---	35	11	12	18
29	---	31	11	11	18
30	e60	29	11	13	17
31	54	---	10	14	---
TOTAL	---	1148	613	421	627
MEAN	---	38.3	19.8	13.6	20.9
MAX	---	52	30	19	53
MIN	---	29	10	11	13
AC-FT	---	2280	1220	835	1240

e Estimated

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--March to September 1996.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March to September 1996.

WATER TEMPERATURE: March to September 1996.

DISSOLVED OXYGEN: March to September 1996.

INSTRUMENTATION.--Water-quality monitor since March 1996. Electronic data logger with fifteen-minute recording interval.

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 284 microsiemens July 9, but may have been higher during periods of missing record; minimum recorded, 118 microsiemens Sept. 15, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum recorded, 20.5°C July 14, 26, 27, 29; minimum recorded, 5.0°C Mar. 24.

DISSOLVED OXYGEN: Maximum recorded, 12.1 mg/l Mar. 24, but may have been higher during periods of missing record; minimum recorded, 7.1 mg/l July 27, Aug. 26, but may have been lower during periods of missing record.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	241	193	225	---	---	---
2	---	---	---	---	---	---	215	195	207	---	---	---
3	---	---	---	---	---	---	232	215	223	---	---	---
4	---	---	---	---	---	---	256	230	237	---	---	---
5	---	---	---	---	---	---	256	242	245	---	---	---
6	---	---	---	---	---	---	257	227	239	---	---	---
7	---	---	---	---	---	---	235	213	220	---	---	---
8	---	---	---	263	254	260	228	218	223	---	---	---
9	---	---	---	260	222	253	235	208	226	---	---	---
10	---	---	---	250	217	228	229	214	221	---	---	---
11	---	---	---	235	220	230	230	219	224	---	---	---
12	---	---	---	245	234	239	223	217	219	---	---	---
13	---	---	---	252	245	247	228	221	224	---	---	---
14	---	---	---	252	249	251	234	226	230	---	---	---
15	---	---	---	252	248	250	239	234	237	---	---	---
16	---	---	---	252	248	250	239	204	225	---	---	---
17	---	---	---	255	250	252	224	209	218	---	---	---
18	---	---	---	257	251	253	223	193	220	---	---	---
19	---	---	---	258	219	248	220	188	209	---	---	---
20	---	---	---	245	216	228	223	219	220	---	---	---
21	---	---	---	242	222	234	230	223	226	---	---	---
22	---	---	---	247	234	242	233	209	227	---	---	---
23	---	---	---	268	245	249	216	124	160	---	---	---
24	---	---	---	268	243	248	---	---	---	---	---	---
25	---	---	---	247	244	245	---	---	---	---	---	---
26	---	---	---	251	246	248	---	---	---	---	---	---
27	---	---	---	250	246	248	---	---	---	---	---	---
28	---	---	---	249	246	247	---	---	---	---	---	---
29	---	---	---	254	217	242	---	---	---	---	---	---
30	---	---	---	252	246	249	---	---	---	---	---	---
31	---	---	---	249	221	242	---	---	---	262	256	259
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	262	259	260	243	237	240	269	251	254	254	245	250
2	264	260	262	246	241	243	273	250	257	255	244	248
3	274	262	264	250	244	245	257	243	249	254	210	226
4	271	263	265	248	230	243	249	242	246	251	223	241
5	274	258	264	231	227	229	248	240	243	243	236	238
6	266	263	265	238	231	235	244	228	234	237	226	233
7	268	264	266	247	236	239	235	227	229	242	219	231
8	269	265	266	247	240	242	243	234	239	234	210	220
9	267	258	264	284	244	256	248	241	244	246	223	233
10	264	259	262	258	254	256	253	244	247	224	218	220
11	266	262	264	258	253	255	254	248	251	238	221	230
12	266	262	264	258	253	255	253	247	250	242	236	238
13	273	264	268	257	251	254	254	248	250	245	235	242
14	274	267	269	258	252	254	255	249	252	241	180	228
15	271	267	268	258	250	254	262	251	255	246	118	193
16	268	266	266	259	253	256	260	250	255	192	168	178
17	267	265	266	257	213	236	261	252	256	224	192	208
18	269	262	265	254	233	244	259	247	254	242	224	234
19	265	263	264	233	217	226	258	248	251	255	236	248
20	266	262	264	241	224	234	253	246	250	257	255	255
21	263	260	262	236	231	233	255	247	251	259	250	255
22	260	257	258	242	235	237	259	246	251	253	227	243
23	258	218	251	251	240	243	258	247	251	257	236	250
24	243	211	236	253	248	251	254	248	251	245	236	239
25	241	236	238	256	242	250	256	248	253	255	245	250
26	244	240	242	258	251	253	258	251	254	256	251	253
27	247	237	243	256	252	254	259	251	255	258	255	256
28	238	220	230	259	251	255	262	252	257	257	253	254
29	231	220	226	254	247	251	267	253	259	255	253	254
30	237	229	234	255	250	252	262	209	246	257	254	255
31	---	---	---	256	249	252	253	230	243	---	---	---
MONTH	274	211	257	284	213	246	273	209	250	259	118	237

NOOKSACK RIVER BASIN

291

12212100 FISHTRAP CREEK AT FLYNN ROAD, AT LYNDEN, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	---	---	---	8.0	7.5	8.0	---	---	---
2	---	---	---	---	---	---	10.0	7.0	8.5	---	---	---
3	---	---	---	---	---	---	9.5	7.5	8.5	---	---	---
4	---	---	---	---	---	---	11.0	8.5	9.5	---	---	---
5	---	---	---	---	---	---	12.0	10.0	11.0	---	---	---
6	---	---	---	---	---	---	11.5	11.0	11.5	---	---	---
7	---	---	---	---	---	---	13.5	11.0	12.0	---	---	---
8	---	---	---	9.0	7.5	8.0	13.5	11.0	12.5	---	---	---
9	---	---	---	9.5	8.5	9.0	13.5	12.0	12.5	---	---	---
10	---	---	---	10.5	9.0	9.5	12.0	11.0	11.5	---	---	---
11	---	---	---	11.5	9.5	10.5	11.0	10.0	10.5	---	---	---
12	---	---	---	10.5	9.0	9.5	11.5	9.0	10.0	---	---	---
13	---	---	---	10.0	7.5	9.0	12.0	9.5	10.5	---	---	---
14	---	---	---	11.0	7.5	9.5	12.0	10.0	11.0	---	---	---
15	---	---	---	10.5	8.5	9.5	12.0	11.0	11.5	---	---	---
16	---	---	---	9.0	8.0	8.5	12.5	10.5	11.5	---	---	---
17	---	---	---	9.0	8.0	8.5	12.5	10.0	11.5	---	---	---
18	---	---	---	10.5	7.0	8.5	11.5	10.0	11.0	---	---	---
19	---	---	---	10.5	9.5	10.0	11.5	9.5	10.5	---	---	---
20	---	---	---	10.0	8.5	9.5	13.0	10.0	11.5	---	---	---
21	---	---	---	10.5	8.0	9.5	13.5	10.0	11.5	---	---	---
22	---	---	---	11.5	9.5	10.0	13.0	10.5	11.5	---	---	---
23	---	---	---	10.0	8.0	9.0	11.5	9.5	10.5	---	---	---
24	---	---	---	8.0	5.0	6.5	---	---	---	---	---	---
25	---	---	---	8.5	5.5	7.0	---	---	---	---	---	---
26	---	---	---	10.0	7.0	8.5	---	---	---	---	---	---
27	---	---	---	9.5	7.5	8.5	---	---	---	---	---	---
28	---	---	---	9.5	6.5	8.0	---	---	---	---	---	---
29	---	---	---	9.5	7.0	8.5	---	---	---	---	---	---
30	---	---	---	9.5	8.0	9.0	---	---	---	---	---	---
31	---	---	---	9.0	8.0	8.5	---	---	---	14.5	11.0	12.5
MONTH	---	---	---	---	---	---	---	---	---	---	---	---
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	15.0	12.5	14.0	17.5	14.0	15.5	18.5	14.5	16.0	17.5	15.0	16.0
2	16.5	14.0	15.5	18.0	15.0	16.0	16.5	15.0	15.5	17.0	13.5	15.0
3	16.5	15.0	16.0	16.5	15.0	15.5	16.0	14.0	15.0	16.0	14.0	15.0
4	16.0	14.5	15.0	16.0	14.0	15.0	15.0	14.0	14.5	15.0	13.0	14.0
5	16.0	13.5	15.0	17.0	14.0	15.0	15.5	13.5	14.5	14.5	13.5	14.0
6	15.5	14.0	14.5	17.0	13.5	15.0	17.0	13.5	15.0	14.0	12.5	13.5
7	15.0	13.5	14.0	18.0	14.5	16.0	18.0	14.0	16.0	14.5	13.0	14.0
8	15.5	12.5	14.0	19.0	15.5	17.0	19.0	15.0	17.0	15.5	14.0	14.5
9	15.0	13.5	14.0	17.5	15.5	16.5	19.5	15.5	17.0	15.5	14.0	14.5
10	14.0	13.5	14.0	17.5	14.0	15.5	20.0	15.5	17.5	16.0	13.5	14.5
11	14.0	12.5	13.0	18.0	14.5	16.0	18.5	16.0	17.0	16.0	14.0	15.0
12	15.0	11.5	13.0	19.5	15.5	17.0	18.5	14.5	16.5	16.5	14.5	15.5
13	15.5	13.0	14.0	20.0	16.0	18.0	19.0	14.5	16.5	15.5	15.0	15.0
14	16.0	13.0	14.5	20.5	16.5	18.5	19.5	15.5	17.0	15.0	14.0	14.5
15	15.5	13.0	14.5	20.0	17.0	18.5	18.0	15.0	16.5	14.5	13.5	14.0
16	14.5	12.5	13.5	18.0	16.0	17.0	17.0	15.0	16.0	15.5	13.0	13.5
17	14.5	12.5	13.5	16.0	13.5	14.5	17.0	14.0	15.5	14.0	12.0	13.0
18	14.5	12.0	13.0	14.0	13.0	13.5	16.0	14.0	15.0	13.0	12.0	12.5
19	15.0	12.0	13.5	14.5	13.0	13.5	16.5	14.0	15.0	14.0	12.5	13.0
20	16.0	13.0	14.5	15.5	13.5	14.5	17.0	14.0	15.0	13.0	12.0	12.5
21	16.5	13.5	15.0	17.0	13.5	15.0	16.0	13.5	14.5	13.0	11.5	12.0
22	15.0	13.5	14.0	18.5	14.5	16.5	17.5	13.0	15.0	12.5	11.0	12.0
23	14.5	13.0	13.5	19.5	15.5	17.5	18.0	13.5	15.5	12.0	10.0	11.0
24	15.5	13.0	14.0	20.0	16.0	18.0	19.0	14.0	16.0	12.5	11.0	11.5
25	16.5	13.5	15.0	20.0	16.5	18.0	18.5	14.5	16.5	12.5	10.5	11.5
26	16.5	14.0	15.5	20.5	16.5	18.5	18.5	15.5	16.5	13.0	11.0	11.5
27	16.0	14.5	15.0	20.5	17.0	18.5	16.5	15.5	16.0	13.5	11.0	12.0
28	15.0	14.0	14.5	20.0	17.5	18.5	18.0	15.5	16.5	13.0	12.0	12.5
29	16.0	14.0	15.0	20.5	17.0	18.5	19.5	15.5	17.0	13.0	11.5	12.0
30	16.0	14.0	15.0	19.5	16.5	17.5	18.0	16.5	17.0	13.5	12.0	12.5
31	---	---	---	19.0	15.0	16.5	18.0	15.5	16.5	---	---	---
MONTH	16.5	11.5	14.3	20.5	13.0	16.5	20.0	13.0	16.0	17.5	10.0	13.4



OXYGEN DISSOLVED (MG/L), MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	---	---	---	---	---	---	10.8	8.8	10.2	---	---	---
2	---	---	---	---	---	---	11.2	8.8	10.5	---	---	---
3	---	---	---	---	---	---	11.4	10.4	10.8	---	---	---
4	---	---	---	---	---	---	11.3	9.7	10.7	---	---	---
5	---	---	---	---	---	---	10.8	9.7	10.2	---	---	---
6	---	---	---	---	---	---	10.2	9.5	9.9	---	---	---
7	---	---	---	---	---	---	10.0	9.3	9.7	---	---	---
8	---	---	---	10.5	9.9	10.2	10.2	9.2	9.7	---	---	---
9	---	---	---	10.1	9.7	9.9	10.0	9.2	9.4	---	---	---
10	---	---	---	9.8	9.5	9.6	10.0	9.1	9.6	---	---	---
11	---	---	---	9.9	9.5	9.7	10.1	9.5	9.8	---	---	---
12	---	---	---	10.3	9.6	9.9	10.5	9.7	10.1	---	---	---
13	---	---	---	10.6	9.9	10.2	10.6	9.6	10.1	---	---	---
14	---	---	---	10.7	9.7	10.2	10.6	9.5	10.0	---	---	---
15	---	---	---	10.6	9.7	10.3	10.1	9.5	9.8	---	---	---
16	---	---	---	11.3	10.3	10.8	10.0	9.4	9.6	---	---	---
17	---	---	---	11.1	10.8	11.0	10.4	9.5	9.9	---	---	---
18	---	---	---	11.5	10.3	11.0	10.6	9.7	10.2	---	---	---
19	---	---	---	10.9	10.3	10.6	10.3	9.5	9.9	---	---	---
20	---	---	---	11.1	10.4	10.7	10.3	9.4	9.8	---	---	---
21	---	---	---	11.1	10.1	10.7	10.4	9.1	9.8	---	---	---
22	---	---	---	10.8	10.0	10.4	10.1	9.2	9.6	---	---	---
23	---	---	---	11.1	10.0	10.6	9.6	8.1	8.6	---	---	---
24	---	---	---	12.1	10.0	11.4	---	---	---	---	---	---
25	---	---	---	11.9	10.2	11.2	---	---	---	---	---	---
26	---	---	---	11.3	9.8	10.6	---	---	---	---	---	---
27	---	---	---	10.9	9.7	10.3	---	---	---	---	---	---
28	---	---	---	11.0	9.6	10.4	---	---	---	---	---	---
29	---	---	---	11.2	9.8	10.5	---	---	---	---	---	---
30	---	---	---	11.4	10.3	10.8	---	---	---	---	---	---
31	---	---	---	11.5	9.9	10.7	---	---	---	10.1	9.2	9.8
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	10.1	9.1	9.6	10.1	8.5	9.3	---	---	---	---	---	---
2	9.8	8.7	9.3	10.0	8.0	9.0	---	---	---	---	---	---
3	9.7	8.7	9.2	9.8	8.0	8.9	---	---	---	---	---	---
4	9.9	8.8	9.3	10.2	8.7	9.4	---	---	---	---	---	---
5	10.0	8.9	9.4	10.1	8.7	9.4	---	---	---	---	---	---
6	10.0	9.0	9.5	10.3	8.5	9.3	---	---	---	10.2	8.1	9.1
7	10.2	9.2	9.6	10.2	8.1	9.1	10.5	8.3	9.1	10.4	8.2	9.3
8	10.4	9.1	9.7	10.0	7.9	8.8	10.5	8.3	9.1	9.9	8.7	9.2
9	10.3	9.1	9.6	10.6	8.0	9.1	10.5	8.3	9.2	10.5	9.0	9.6
10	10.6	9.3	9.8	10.4	8.4	9.3	10.4	8.1	9.0	10.6	8.8	9.5
11	10.9	9.4	10.1	10.4	8.2	9.2	10.5	8.1	9.1	10.6	8.6	9.4
12	11.0	9.2	10.1	10.3	8.0	8.9	10.7	8.2	9.2	10.8	8.6	9.4
13	11.1	8.6	9.8	10.1	7.6	8.7	10.6	7.8	9.0	9.8	8.5	9.0
14	11.4	8.6	10.0	10.0	7.6	8.6	10.3	7.7	8.8	10.2	8.4	9.1
15	11.4	9.3	10.2	10.0	7.6	8.5	10.4	8.0	9.1	9.5	8.5	9.1
16	11.7	9.5	10.5	10.5	7.7	8.9	10.2	8.2	9.0	9.8	9.2	9.5
17	11.7	9.6	10.5	8.5	7.8	8.2	10.6	8.4	9.3	10.2	9.4	9.7
18	11.8	9.6	10.5	10.1	8.5	9.3	10.8	8.4	9.4	10.5	9.4	9.9
19	11.7	9.5	10.6	9.7	8.6	9.0	11.0	8.5	9.5	10.6	9.4	9.8
20	11.5	9.1	10.3	10.3	8.5	9.3	10.8	8.5	9.4	11.0	9.6	10.1
21	11.5	9.0	10.1	10.4	8.2	9.2	11.1	8.5	9.6	11.3	9.7	10.2
22	10.9	9.0	9.8	10.4	7.8	8.9	11.0	7.8	9.5	11.5	9.7	10.3
23	11.2	8.8	10.0	10.3	7.6	8.7	10.9	8.3	9.4	11.9	10.0	10.7
24	10.8	8.8	9.8	10.2	7.5	8.6	11.0	8.3	9.3	12.2	10.0	10.7
25	10.7	8.9	9.7	10.2	7.4	8.5	10.9	8.0	9.2	12.3	9.9	10.8
26	10.6	8.7	9.6	10.1	7.3	8.4	10.8	7.1	8.7	12.4	9.8	10.7
27	10.5	8.7	9.4	9.9	7.1	8.2	10.2	7.5	8.7	12.0	9.3	10.2
28	10.3	8.9	9.5	10.1	7.3	8.4	10.8	8.1	9.3	11.5	8.7	9.9
29	10.4	8.8	9.6	---	---	---	10.4	7.7	9.0	---	---	---
30	10.2	8.8	9.4	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	11.8	8.6	9.8	---	---	---	---	---	---	---	---	---

## 12213100 NOOKSACK RIVER AT FERNDAL, WA

LOCATION.--Lat 48°50'42", long 122°35'17", in NE 1/4 NW 1/4 sec.29, T.39 N., R.2 E., Whatcom County, Hydrologic Unit 17110004, on right bank 300 ft downstream from highway bridge at Ferndale, and 5.8 mi upstream from mouth.

DRAINAGE AREA.--786 mi<sup>2</sup>, of which 48.9 mi<sup>2</sup> is in Canada.

PERIOD OF RECORD.--Annual maximum stage only, water years 1918, 1922, 1932, 1935. Annual maximum, water years 1946, 1950-66. October 1966 to current year.

REVISED RECORDS.--WDR WA-83-1: 1971(M), 1976(M), WDR WA-94-1: 1976(M), 1980(M), 1984(M), 1990(M), 1991, 1991(M).

GAGE.--Water-stage recorder. Datum of gage is 4.61 ft above sea level. Prior to July 18, 1968, at site 220 ft upstream at datum 4.21 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are fair. Slight regulation by powerplant at Excelsior. City of Bellingham diverts up to about 100 ft<sup>3</sup>/s at times from Middle Fork Nooksack River for municipal use. Cities of Ferndale and Lynden divert about 10 ft<sup>3</sup>/s for municipal use. Chemical analyses October 1961 to September 1970. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--30 years (water years 1967-96), 3,807 ft<sup>3</sup>/s, 65.80 in/yr, 2,758,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum recorded discharge, 57,000 ft<sup>3</sup>/s Nov. 10, 1990, gage height, 23.56 ft; minimum discharge, 463 ft<sup>3</sup>/s Oct. 26, Nov. 9, 10, 1987.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 9	0700	30,600	19.02	Nov. 30	0600	*47,200	*22.05
Nov. 11	1400	19,700	15.60	Dec. 13	1600	21,100	16.14
Nov. 18	1400	16,200	13.91	Feb. 9	0500	21,500	16.29

Minimum discharge, 1,110 ft<sup>3</sup>/s Aug. 23.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2520	1580	20000	5120	e2000	2520	2230	3620	3190	2300	1920	1910
2	1470	1500	12400	5150	e1900	2450	3440	3550	3210	2550	1810	1500
3	3030	1380	9340	10500	e2100	2370	2720	3390	4190	2860	2060	1460
4	3450	1320	7910	8210	e2500	2460	2360	3110	4670	3530	1850	2170
5	1940	1340	6430	5620	3500	2410	2260	2880	3960	3100	e1900	1580
6	1490	1450	5400	5030	7140	2290	2710	2740	3660	2520	e1500	1860
7	1710	1710	4770	9130	9970	2210	4190	2670	3920	2350	e1550	1650
8	1760	19600	4220	9040	14100	2200	4150	2670	3990	2460	e1610	3440
9	2030	23600	3920	6350	18400	2660	3920	2500	3520	2740	e1800	3690
10	7430	10000	7480	5710	10000	6130	4710	2350	3230	2550	e1950	2430
11	9710	14500	12600	4980	6810	5960	4320	2230	3130	2350	e1950	1980
12	7150	12100	11700	4280	5430	5030	3860	2200	3020	2480	e1700	1870
13	4620	8300	17600	4220	4790	3780	3390	4300	2850	2670	1570	1830
14	4130	11700	13400	7790	4450	3250	2980	6080	2780	2820	1580	1970
15	3550	10100	9740	12700	4200	3300	2760	5620	2790	2900	1600	4300
16	4510	11900	7700	12300	4040	3140	3050	4730	2720	2770	1510	4380
17	5960	9480	6280	7910	4130	2850	3400	4230	2560	2430	1430	2720
18	8000	12800	7390	5950	6930	2680	3200	4820	2430	2390	1310	2170
19	4440	8690	7460	5010	7160	2660	3060	7160	2260	2360	1240	1950
20	3520	6390	5800	4380	6050	2770	2900	6110	2120	3370	1210	1870
21	3360	5240	4910	4050	5090	2560	2680	4930	2170	2450	1200	1860
22	3240	4750	4310	3670	4380	2490	2510	5160	2360	2180	1150	2200
23	2670	6620	3910	3520	4120	2430	5960	9570	2320	2280	1180	2290
24	2340	11600	3620	3380	3720	2290	12500	6990	2390	2300	1270	1850
25	2170	12300	3390	3140	3370	2150	7960	5500	2430	2340	1310	1640
26	3790	9380	3200	2960	3100	2070	6820	5010	2370	2330	1410	1540
27	3140	8390	3060	2770	2910	2000	5750	4530	2400	2320	1570	1520
28	2510	14300	2940	2600	2730	1920	4710	4020	2460	2280	1620	1510
29	2130	31600	4050	e2300	2610	1910	4160	3750	2460	2380	1650	1450
30	1880	42100	5430	e2200	---	1920	3820	3840	2300	2380	1820	1450
31	1710	---	6510	e2100	---	1870	---	3430	---	2170	2660	---
TOTAL	111360	315720	226870	172070	157630	86730	122480	133690	87860	78910	49890	64040
MEAN	3592	10520	7318	5551	5436	2798	4083	4313	2929	2545	1609	2135
MAX	9710	42100	20000	12700	18400	6130	12500	9570	4670	3530	2660	4380
MIN	1470	1320	2940	2100	1900	1870	2230	2200	2120	2170	1150	1450
AC-FT	220900	626200	450000	341300	312700	172000	242900	265200	174300	156500	98960	127000
CFSM	4.57	13.4	9.31	7.06	6.92	3.56	5.19	5.49	3.73	3.24	2.05	2.72
IN.	5.27	14.94	10.74	8.14	7.46	4.10	5.80	6.33	4.16	3.73	2.36	3.03

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1996, BY WATER YEAR (WY)

MEAN	2555	4925	5169	4748	4423	3686	3664	4502	4733	3433	2049	1844
MAX	6815	13980	9992	8720	8197	9339	5723	6526	8285	6156	3511	4074
(WY)	1968	1991	1976	1984	1982	1972	1988	1969	1974	1972	1976	1978
MIN	629	1276	1539	1149	1920	1864	1746	2998	2411	1988	1338	917
(WY)	1988	1988	1986	1979	1985	1985	1975	1978	1992	1977	1987	1989

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1967 - 1996
ANNUAL TOTAL	1539354	1607250	
ANNUAL MEAN	4217	4391	3807
HIGHEST ANNUAL MEAN			5152
LOWEST ANNUAL MEAN			2695
HIGHEST DAILY MEAN	42100	Nov 30	48200
LOWEST DAILY MEAN	852	Sep 23	466
ANNUAL SEVEN-DAY MINIMUM	879	Sep 21	483
ANNUAL RUNOFF (AC-FT)	3053000	3188000	2758000
ANNUAL RUNOFF (CFSM)	5.37	5.59	4.84
ANNUAL RUNOFF (INCHES)	72.85	76.07	65.80
10 PERCENT EXCEEDS	8340	8790	6740
50 PERCENT EXCEEDS	2940	3050	3060
90 PERCENT EXCEEDS	1390	1650	1390

e Estimated

## NOOKSACK RIVER BASIN

12213140 NOOKSACK RIVER AT BRENNAN, WA

## WATER-QUALITY RECORDS

LOCATION.--Lat 48°49'10", long 122°34'43", in NW 1/4 NE 1/4 sec.5, T.38 N., R.2 E., Whatcom County, Hydrologic Unit 17110004, on left bank underneath Slater Road bridge, and 3.25 mi upstream from mouth.

DRAINAGE AREA.--790 mi<sup>2</sup>, of which 48.9 mi<sup>2</sup> is in Canada.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March to September 1996.

WATER TEMPERATURE: March to September 1996.

INSTRUMENTATION.--Water-quality monitor since March 1996. Electronic data logger with sixty-minute recording interval.

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--

SPECIFIC CONDUCTANCE: Maximum recorded, 141 microsiemens Aug. 23; minimum recorded, 58 microsiemens Apr. 24.

WATER TEMPERATURE: Maximum recorded, 19.0°C on several days during August; minimum recorded, 5.0°C Mar. 7, 24, 25.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, MARCH TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	125	117	123	113	111	112
2	---	---	---	---	---	---	117	93	102	116	111	114
3	---	---	---	---	---	---	106	94	100	116	110	112
4	---	---	---	---	---	---	112	106	109	116	113	115
5	---	---	---	---	---	---	114	112	114	119	116	118
6	---	---	---	---	---	---	114	104	111	120	118	118
7	---	---	---	130	128	129	104	87	92	120	119	120
8	---	---	---	128	126	127	88	86	87	120	116	117
9	---	---	---	126	106	118	89	87	88	118	116	117
10	---	---	---	106	69	87	89	81	85	119	118	118
11	---	---	---	77	71	75	88	80	84	122	119	120
12	---	---	---	84	74	78	91	88	89	124	122	123
13	---	---	---	92	84	88	95	91	93	123	76	105
14	---	---	---	98	92	95	100	95	97	81	76	78
15	---	---	---	99	92	97	103	100	102	85	77	80
16	---	---	---	96	92	93	103	99	102	86	84	85
17	---	---	---	100	96	98	99	94	96	89	85	87
18	---	---	---	103	100	101	96	94	94	89	82	86
19	---	---	---	106	103	105	101	96	99	82	67	73
20	---	---	---	106	105	105	103	101	102	82	74	78
21	---	---	---	108	106	107	107	103	104	89	82	86
22	---	---	---	111	108	110	109	107	108	90	80	88
23	---	---	---	112	110	111	110	63	95	80	66	71
24	---	---	---	112	111	111	80	58	67	92	75	84
25	---	---	---	114	112	113	94	80	87	95	92	94
26	---	---	---	116	114	115	94	87	90	96	93	95
27	---	---	---	119	116	118	101	93	96	97	94	96
28	---	---	---	120	119	119	106	101	103	101	97	99
29	---	---	---	121	119	120	111	106	108	101	99	101
30	---	---	---	120	119	119	112	110	111	103	95	99
31	---	---	---	125	120	123	---	---	---	105	100	103
MONTH	---	---	---	---	---	---	125	58	98	124	66	100

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	109	105	107	114	107	111	95	89	92	102	94	98
2	108	104	106	113	99	108	99	95	97	109	101	106
3	104	85	94	104	88	97	99	94	96	115	109	113
4	85	80	82	88	77	83	99	93	95	114	100	104
5	91	83	87	85	77	80	100	96	99	110	101	106
6	93	91	93	93	85	89	99	94	96	111	105	108
7	92	86	89	96	93	95	103	99	101	110	105	107
8	88	85	86	96	91	94	103	101	102	111	78	97
9	92	88	90	92	78	86	102	98	100	80	73	76
10	95	92	93	85	79	82	101	98	100	92	80	87
11	97	94	96	88	85	87	101	97	99	98	92	96
12	98	94	96	89	81	85	102	97	99	99	97	98
13	101	98	100	83	78	81	112	102	108	97	96	96
14	102	100	101	80	75	77	113	110	112	99	89	97
15	103	101	102	77	74	76	110	108	108	89	61	75
16	101	97	99	77	74	75	112	107	109	83	61	74
17	102	97	100	83	75	80	115	111	112	95	83	90
18	104	102	103	86	83	84	124	115	120	102	95	99
19	110	104	106	87	86	87	131	124	127	105	102	103
20	113	110	112	86	73	77	136	131	134	107	104	105
21	113	109	112	89	76	83	138	134	136	107	102	105
22	110	101	107	95	89	93	138	136	137	102	94	98
23	108	101	105	95	90	93	141	137	140	97	91	93
24	110	108	109	90	87	89	140	133	137	105	97	101
25	110	107	108	88	82	86	134	132	133	111	105	108
26	109	107	108	86	83	84	134	129	131	113	111	111
27	111	105	108	88	84	86	129	117	122	113	112	112
28	108	105	107	93	88	92	117	113	115	118	110	112
29	106	104	105	93	87	91	114	113	114	118	111	112
30	108	106	107	87	84	86	114	106	111	112	111	111
31	---	---	---	89	84	87	106	94	98	---	---	---
MONTH	113	80	101	114	73	87	141	89	112	118	61	100

NOOKSACK RIVER BASIN

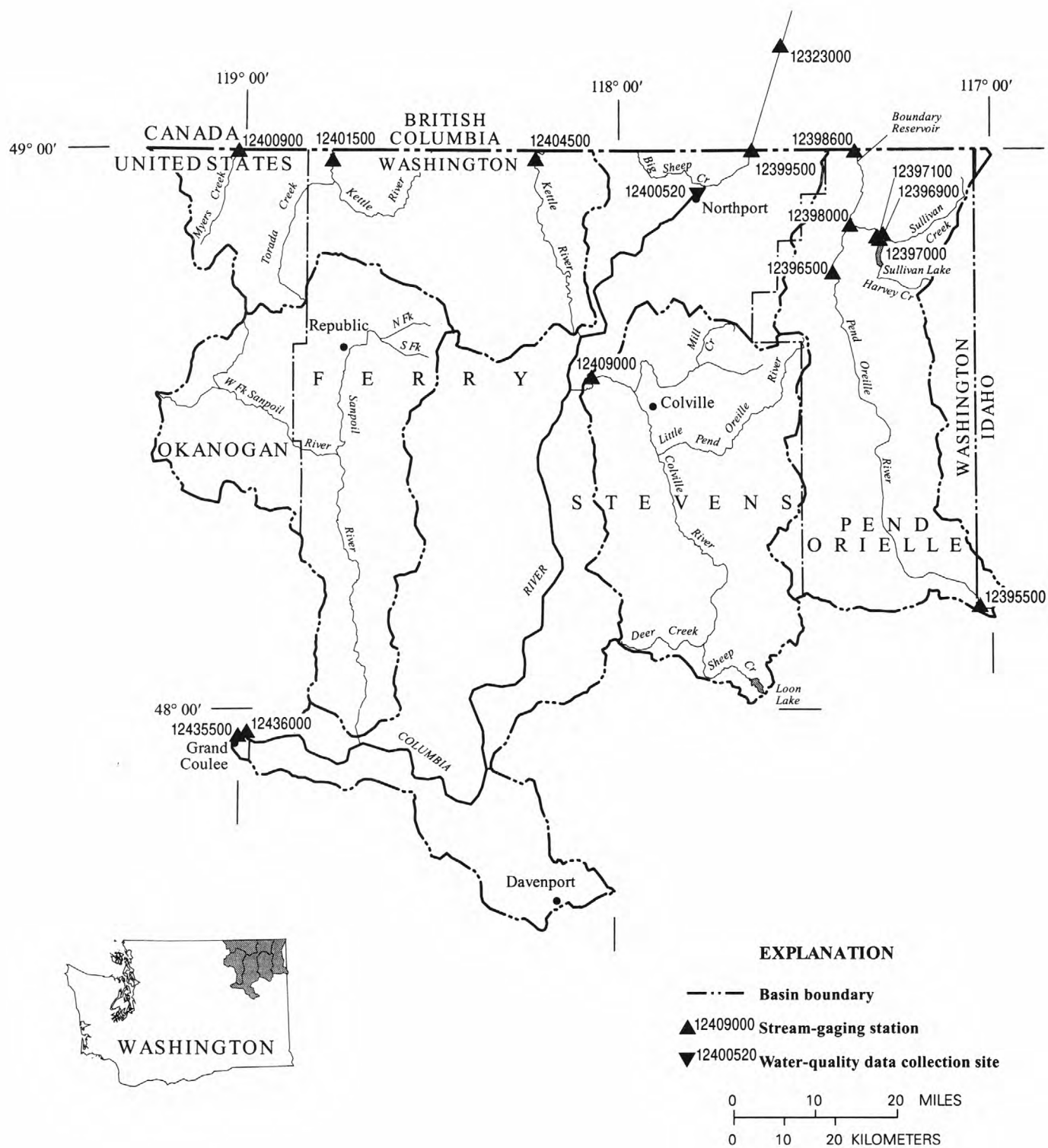
295

12213140 NOOKSACK RIVER AT BRENNAN, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, MARCH TO SEPTEMBER 1996

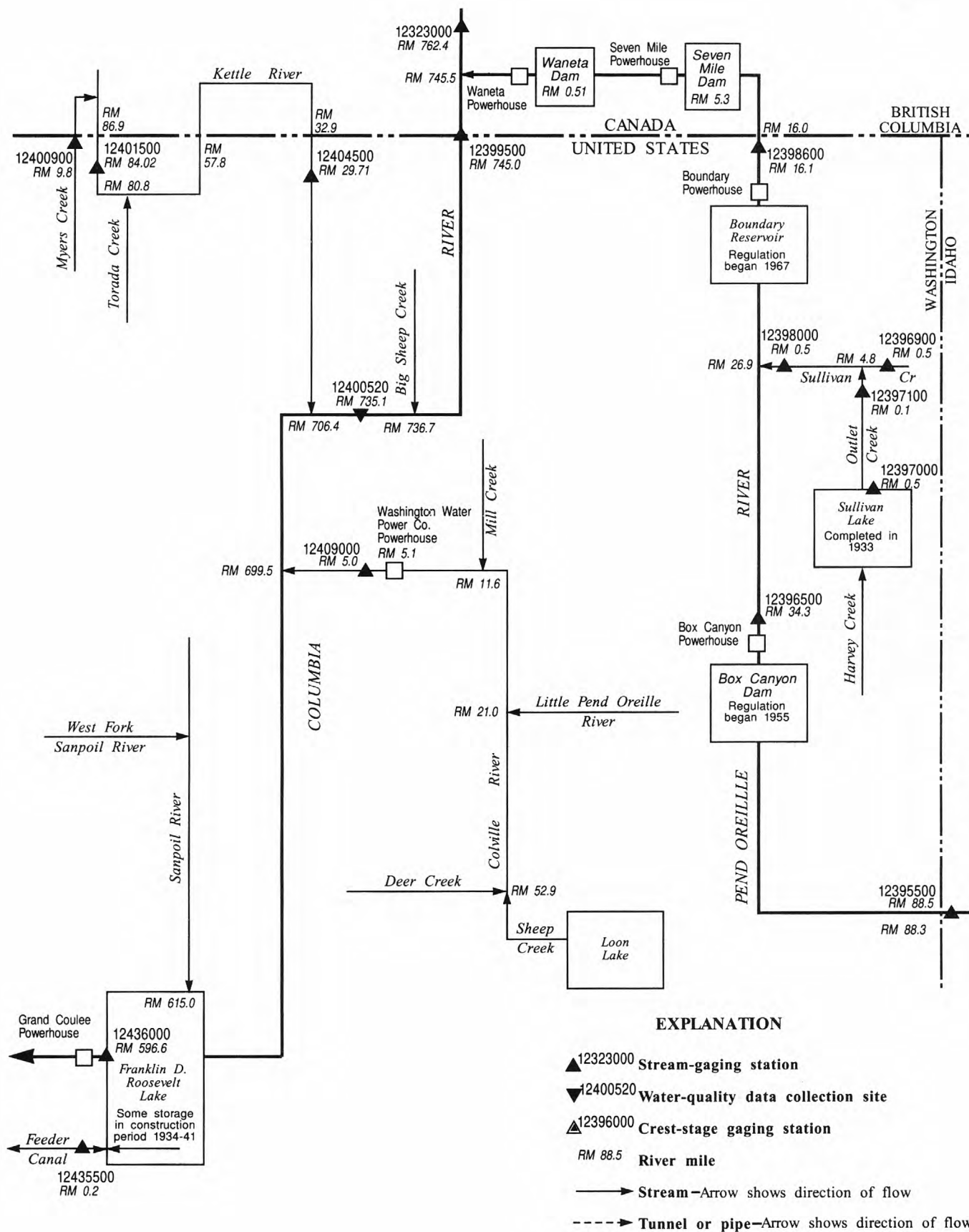
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	7.0	6.5	6.5	10.5	9.5	10.0
2	---	---	---	---	---	---	7.5	6.5	7.0	10.0	8.5	9.5
3	---	---	---	---	---	---	8.0	7.0	7.0	10.0	8.5	9.5
4	---	---	---	---	---	---	9.0	7.0	8.0	9.0	8.5	8.5
5	---	---	---	---	---	---	10.0	9.0	9.5	11.0	8.0	9.5
6	---	---	---	---	---	---	10.0	9.5	9.5	11.0	10.5	11.0
7	---	---	---	5.5	5.0	5.5	11.0	9.0	9.5	11.0	10.0	10.5
8	---	---	---	7.0	5.5	6.0	11.0	10.0	10.5	10.5	9.5	10.0
9	---	---	---	7.5	7.0	7.0	11.5	10.5	11.0	10.0	9.0	9.5
10	---	---	---	7.5	6.0	7.0	10.5	8.5	9.5	10.5	9.5	9.5
11	---	---	---	7.5	7.0	7.0	8.5	8.0	8.5	10.0	9.0	9.0
12	---	---	---	7.5	6.0	6.5	9.0	8.0	8.5	12.0	10.0	10.5
13	---	---	---	7.0	6.0	6.5	9.5	8.5	9.0	12.5	10.5	12.0
14	---	---	---	8.0	6.5	7.0	10.0	9.0	9.5	10.5	9.5	10.0
15	---	---	---	8.0	7.0	7.5	11.0	10.0	10.5	10.5	9.0	10.0
16	---	---	---	7.0	6.0	6.5	11.0	10.5	10.5	11.5	9.5	10.5
17	---	---	---	6.5	6.0	6.5	11.0	9.5	10.0	11.5	10.0	10.5
18	---	---	---	8.0	6.0	7.0	10.0	9.0	9.5	11.0	9.0	9.5
19	---	---	---	8.5	8.0	8.5	10.0	9.0	9.5	10.0	8.5	9.0
20	---	---	---	8.5	7.5	8.0	10.5	9.5	10.0	10.5	9.0	9.5
21	---	---	---	8.5	7.5	8.0	11.5	10.0	10.5	10.5	9.0	9.5
22	---	---	---	9.0	8.0	8.5	11.5	9.5	10.5	9.5	9.0	9.5
23	---	---	---	8.5	7.5	8.0	9.5	8.5	9.0	11.0	8.0	9.0
24	---	---	---	7.5	5.0	5.5	9.0	7.5	8.0	13.0	9.5	11.0
25	---	---	---	6.5	5.0	6.0	9.0	7.5	8.0	13.5	11.5	12.5
26	---	---	---	7.5	6.0	7.0	8.0	7.0	7.5	13.0	11.0	12.0
27	---	---	---	8.0	7.0	7.5	9.5	7.0	8.0	13.0	10.5	11.5
28	---	---	---	7.5	6.5	7.0	9.5	7.5	8.0	11.0	10.0	10.5
29	---	---	---	8.0	7.0	7.5	10.5	7.5	8.5	11.0	10.0	10.5
30	---	---	---	7.5	6.5	7.0	10.5	10.0	10.0	10.5	9.5	10.0
31	---	---	---	7.0	7.0	7.0	---	---	---	12.5	9.5	10.5
MONTH	---	---	---	---	---	---	11.5	6.5	9.0	13.5	8.0	10.1

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	13.5	12.0	12.5	16.5	14.5	15.5	17.0	16.0	16.5	15.0	13.5	14.0
2	15.5	13.0	14.0	16.5	16.0	16.5	16.5	15.0	16.0	15.5	13.5	14.5
3	15.5	14.0	15.0	16.0	13.0	14.5	15.0	14.0	14.5	15.0	13.5	14.5
4	14.5	12.5	13.5	14.0	12.0	13.0	14.0	13.0	13.5	13.5	12.0	12.5
5	14.0	11.0	12.5	14.0	12.0	13.0	14.5	13.0	13.5	13.5	12.5	13.0
6	14.0	12.0	13.0	15.0	13.0	14.0	16.0	13.5	14.5	12.5	12.0	12.0
7	13.0	12.0	12.5	16.5	15.0	15.5	18.0	15.5	16.5	13.0	12.0	12.5
8	14.0	12.0	13.0	17.0	16.5	16.5	19.0	16.5	17.5	13.0	12.5	13.0
9	14.0	12.5	13.0	17.0	15.0	16.0	19.0	17.0	18.0	13.5	12.0	12.5
10	13.0	12.0	12.0	15.5	13.5	14.5	19.0	17.0	18.0	14.0	13.0	13.5
11	13.0	11.5	12.0	16.5	15.5	16.0	18.0	16.5	17.5	14.5	14.0	14.5
12	13.5	11.5	12.5	17.0	16.5	17.0	17.0	15.0	16.0	15.5	14.0	14.5
13	14.0	13.5	14.0	17.5	17.0	17.0	18.5	16.0	17.0	15.0	13.0	14.0
14	15.0	13.5	14.0	18.0	17.0	17.5	19.0	17.0	17.5	13.5	13.0	13.5
15	15.0	14.0	14.5	18.0	17.0	17.5	17.5	16.0	17.0	13.0	12.0	12.0
16	14.0	13.0	13.5	17.0	15.0	16.0	16.5	15.0	16.0	12.5	11.0	11.5
17	13.5	12.0	13.0	15.0	12.5	14.0	16.0	14.0	15.0	12.5	11.0	11.5
18	13.0	12.0	12.5	12.5	11.5	12.0	16.0	14.0	15.0	12.5	11.5	12.0
19	14.0	11.5	13.0	12.5	12.0	12.5	15.5	13.5	14.5	12.5	11.5	12.0
20	16.0	14.0	15.0	13.0	11.5	12.0	17.0	14.5	15.5	12.0	11.5	12.0
21	16.5	15.0	15.5	16.0	13.0	14.0	16.0	14.5	15.5	11.5	11.0	11.5
22	15.5	12.5	14.5	17.5	16.0	17.0	17.5	14.0	15.5	11.0	10.5	11.0
23	12.5	11.5	12.0	18.5	17.5	18.0	19.0	15.5	17.0	10.5	10.0	10.0
24	14.0	12.5	13.0	18.5	18.0	18.0	19.0	16.0	17.5	11.5	10.5	10.5
25	15.5	13.5	14.5	18.0	18.0	18.0	18.5	16.5	17.5	12.0	11.0	11.5
26	15.5	14.0	14.5	18.5	18.0	18.0	18.0	16.0	17.0	13.0	11.0	12.0
27	16.0	14.0	15.0	18.5	18.0	18.0	16.0	14.5	15.5	13.5	11.5	12.5
28	14.5	13.0	13.5	18.5	18.0	18.0	15.0	13.5	14.5	13.0	11.5	12.5
29	14.0	12.5	13.0	18.0	17.5	18.0	16.5	14.5	15.5	13.5	11.5	12.5
30	14.5	14.0	14.5	17.5	17.0	17.5	16.5	14.5	16.0	14.0	12.5	13.0
31	---	---	---	17.0	16.0	16.5	14.5	13.0	14.0	---	---	---
MONTH	16.5	11.0	13.5	18.5	11.5	15.9	19.0	13.0	16.0	15.5	10.0	12.5



**Figure 49.** Location of surface-water and water-quality stations in the Columbia River Basin above Franklin D. Roosevelt Lake and including Colville River, Kettle River and Pend Oreille river Basins.





**Figure 50.** Schematic diagram of surface-water and water-quality stations in the Columbia River Basin above Franklin D. Roosevelt Lake and including Colville River, Kettle River and Pend Oreille River Basins.



## 12395500 PEND OREILLE RIVER AT NEWPORT, WA

LOCATION.--Lat 48°10'56", long 117°02'00", in SE 1/4 SE 1/4 SW 1/4 sec.24, T.56 N., R.6 W. (Boise Meridian), Bonner County, ID, Hydrologic Unit 17010216, on left bank at Newport, 0.2 mi upstream from bridge on U.S. Highway 2, 0.2 mi east of Idaho-Washington state line, 1.6 mi downstream from Albeni Falls Dam, and at mile 88.5.

DRAINAGE AREA.--24,200 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--June 1903 to September 1941, October 1952 to current year. Prior to October 1921, published as "Clark Fork at Newport, Wash.," October 1921 to September 1937, as "Clark Fork at Priest River, Idaho," and October 1937 to September 1941, as "Pend Oreille River at Priest River, Idaho."

REVISED RECORDS.--WSP 532: 1903-11.

GAGE.--Water-stage recorder. Datum of gage is 1,999.7 ft above sea level. Prior to Sept. 22, 1928, nonrecording gages at Priest River, Newport, or Metaline Falls at various datums (see description, WSP 532, p. 92). Sept. 22, 1928, to Sept. 30, 1935, at datum 40.44 ft higher, and Oct. 1, 1935, to Sept. 30, 1941, water-stage recorder at datum 0.30 ft higher. Since December 1952, auxiliary water-stage recorder 2.74 mi downstream from base gage.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow regulated at Albeni Falls Dam and affected by storage in Pend Oreille Lake, Flathead Lake, Hungry Horse Reservoir, and several smaller reservoirs. Diversions upstream from station for irrigation of about 354,000 acres. Stage-discharge relation affected by backwater from Box Canyon Dam 54 mi downstream. Discharge computed from slope and conveyance of reach between base and auxiliary gage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 136,000 ft<sup>3</sup>/s June 15, 1913, June 21, 1933, June 12, 1972; minimum discharge, 1,280 ft<sup>3</sup>/s Sept. 1, 1961.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1894 reached a stage of about 64.0 ft present site and datum, (from water surface profiles) discharge, about 200,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 96,200 ft<sup>3</sup>/s June 14, gage height, 47.21 ft; maximum gage height, 47.24 ft, June 15; minimum daily discharge, 12,000 ft<sup>3</sup>/s Sept. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17300	30700	21500	e24000	e17000	42600	31500	64300	e82000	48300	19800	12200
2	17200	30400	33200	e25000	e16500	41200	33500	63900	e82000	50600	22200	12000
3	17200	30300	42200	e26000	e18000	41700	37300	63200	e82500	50500	26600	14400
4	19900	26700	46700	e27500	e20500	41200	39600	62800	e81500	53400	22300	16600
5	22200	26200	48500	e28500	e21500	43800	42300	61800	e84000	51300	19400	16900
6	22400	23900	48900	e28000	e22500	45300	42600	59800	e85500	50600	19500	16100
7	22100	21900	47900	e26000	e22500	48300	39800	56000	e86500	50100	19500	15400
8	22000	22700	45600	e24000	22300	47700	35900	53400	87800	42700	19600	15600
9	21900	22600	43000	e25000	21500	47000	36400	52900	89200	39500	17400	15500
10	22000	24900	44800	e24000	29300	46800	41600	49500	90600	38500	16400	15300
11	16900	28400	45100	e23000	46900	44800	49800	45500	92100	36700	16500	15500
12	16200	28800	42300	e27500	52400	42800	52800	43900	94000	30200	16500	15800
13	16200	28900	40000	e28000	52800	42800	55200	e44000	94600	24600	16500	16000
14	16300	27800	37800	e27500	52600	43800	56500	e44500	94700	25200	17800	15500
15	16300	25600	e41500	e27500	52400	42200	60400	e49500	94600	27800	18600	15400
16	24700	25800	46800	e27500	52600	40800	63800	e62000	93800	28600	16600	15400
17	26000	29300	44700	e27500	53100	40800	63400	e68000	88500	27400	15500	15600
18	27500	29200	42000	e28000	53000	40600	63200	e70500	86000	24500	15400	15900
19	30100	29200	e38400	e27500	53200	41100	63000	e73000	83100	24900	15400	16000
20	30900	29400	e33500	e27500	53500	41900	62200	e76000	72400	26300	15600	15400
21	30300	28800	e31000	e27500	54000	42400	61800	e77500	59700	25900	15800	14700
22	30600	28500	e30000	e22500	54900	42800	61400	e78500	51200	26300	15700	14800
23	30500	28400	e29800	e21500	53700	42500	61000	e79500	49800	24200	15700	13400
24	30900	28000	e30200	e28000	54600	42500	60600	e80000	54500	18000	18100	13000
25	31600	27800	e29600	e28500	54200	42500	62500	e79500	57500	14800	20200	12700
26	31600	28100	e27500	e28500	50900	40000	63300	e79500	50700	12800	19500	12700
27	31600	29100	e24500	e28500	47400	36600	64800	e79000	46400	13500	18000	14400
28	30900	30100	e22000	e29000	47500	38400	65200	e78500	48400	16300	17500	18500
29	31200	29300	e27000	e28000	46100	38900	65000	e79500	50500	16400	17500	18500
30	30900	21400	e28500	e26500	---	38900	64400	e80000	47400	16900	14700	19000
31	31000	---	e26000	e22500	---	37400	---	e82500	---	17200	12800	---
TOTAL	766400	822200	1140500	820500	1197400	1310100	1600800	2038500	2261500	954000	552600	458200
MEAN	24720	27410	36790	26470	41290	42260	53360	65760	75380	30770	17830	15270
MAX	31600	30700	48900	29000	54900	48300	65200	82500	94700	53400	26600	19000
MIN	16200	21400	21500	21500	16500	36600	31500	43900	46400	12800	12800	12000
AC-FT	1520000	1631000	2262000	1627000	2375000	2599000	3175000	4043000	4486000	1892000	1096000	908800

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1903 - 1996, BY WATER YEAR (WY)

	MEAN	17490	18330	16220	15440	16550	19100	27270	49680	61960	32540	14230	13480
MAX	31330	32280	36790	40010	41290	42260	56940	87470	114900	73730	45210	21990	
(WY)	1960	1960	1996	1934	1996	1996	1956	1934	1933	1907	1907	1907	
MIN	6208	6049	5987	4271	4380	6622	5507	15320	15220	7295	5875	6353	
(WY)	1932	1937	1937	1937	1936	1937	1977	1977	1977	1977	1988	1931	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1903 - 1996
ANNUAL TOTAL	9006890	13922700	
ANNUAL MEAN	24680	38040	25130
HIGHEST ANNUAL MEAN			38040
LOWEST ANNUAL MEAN			12920
HIGHEST DAILY MEAN	64000	Jun 11	135000
LOWEST DAILY MEAN	5000	Jan 28	2420
ANNUAL SEVEN-DAY MINIMUM	7330	Jan 28	3280
ANNUAL RUNOFF (AC-FT)	17870000	27620000	18210000
10 PERCENT EXCEEDS	42100	65100	53000
50 PERCENT EXCEEDS	22000	30600	18900
90 PERCENT EXCEEDS	11100	16100	8530

e Estimated

## PEND OREILLE RIVER BASIN

12396500 PEND OREILLE RIVER BELOW BOX CANYON, NEAR IONE, WA

LOCATION.--Lat 48°46'52", long 117°24'55", in SE 1/4 NE 1/4 sec.19 T.38 N., R.43 E., Pend Oreille County, Hydrologic Unit 17010216, on left bank 1,000 ft downstream from Box Canyon Dam, 2.8 mi north of Ione, and at mile 34.3.

DRAINAGE AREA.--24,900 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1952 to current year.

REVISED RECORDS.--WSP 1933: Drainage area. WDR WA-81-2: 1976.

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to Mar. 29, 1954, nonrecording gage at site 300 ft upstream at same datum. Mar. 29 to Aug. 25, 1954, nonrecording gage at present site and datum. Since Aug. 20, 1967, auxiliary water-stage recorder 1.2 mi downstream at same datum.

REMARKS.--No estimated daily discharges. U.S. Geological Survey records good except those less than 10,000 ft<sup>3</sup>/s, which are poor. Daily discharges for Jan. 29 to Feb. 5, provided by Pend Oreille Co. PUD at Box Canyon Dam powerplant. Flow completely regulated by Box Canyon Reservoir, 1,000 ft upstream, since June 1955 and by Pend Oreille Lake, Flathead Lake, Hungry Horse Reservoir, and by several smaller reservoirs and powerplants. Numerous diversions upstream from station for irrigation.

AVERAGE DISCHARGE.--44 years (water years 1953-96), 26,730 ft<sup>3</sup>/s, 19,366,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 136,000 ft<sup>3</sup>/s June 13, 14, 1972; maximum elevation, 2,014.54 ft June 14, 1972; instantaneous no flow occurs most years (result of regulation).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 1948 reached an elevation of 2,018.00 ft, from floodmarks, discharge, 167,000 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 100,000 ft<sup>3</sup>/s June 15, elevation, 2,008.34 ft; maximum elevation, 2,008.76 ft June 14 (backwater from Boundary Dam); minimum discharge, 10,400 ft<sup>3</sup>/s Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	17300	29800	22700	26100	21200	44800	35700	66500	83300	47400	18800	12700
2	17300	26100	27800	25200	16900	42700	34100	65500	82700	48600	21500	12400
3	17500	26100	35800	27200	16400	42000	35800	65000	82700	50200	24200	12800
4	18000	25100	43300	28600	18000	42200	38000	64400	81800	50800	25900	16000
5	20600	23100	46100	29300	21000	42400	40800	63700	83100	52300	21900	16800
6	22200	22300	48200	29900	23400	43900	42500	62800	80700	50800	20400	16900
7	22200	20300	48000	28600	23400	46400	42600	60600	80600	50200	19800	15900
8	22200	20200	46200	26000	23900	47100	40000	57600	81900	46400	20000	15700
9	22100	21300	43300	25100	24200	48000	37200	55400	86500	42000	19500	15800
10	22300	22500	43800	26300	26400	47600	38700	53900	87100	39000	17400	15600
11	20500	23500	45100	23800	37900	46600	46300	50500	87900	37800	17100	15400
12	17000	25300	43400	26200	48800	44600	51900	47700	89100	35800	16700	15800
13	16100	26000	41600	27900	53000	44100	53600	45800	90400	30200	16800	16300
14	16100	25600	39100	28800	52400	43800	56700	45900	91200	26100	17000	16100
15	17500	23500	38500	29100	52300	43900	59100	48000	91900	26700	18800	15600
16	18600	23400	44600	28900	52500	43500	62400	57800	91700	28800	18300	15500
17	24200	24900	46000	28200	52700	42300	64600	66300	90600	29100	16500	15600
18	26100	27100	45100	28800	52900	41500	64200	73300	87800	27300	15900	15800
19	28300	26200	41400	28700	52900	41600	64100	75800	83600	25300	15800	15700
20	29100	26500	36500	28700	53500	41800	64000	76800	75900	25700	16000	16000
21	30100	26200	32900	28300	53900	42300	63200	84800	63400	26600	16000	15000
22	30200	25800	30700	26900	55100	42900	62600	83400	54100	26800	16200	14800
23	30100	26200	30500	23400	55300	43300	62200	78300	52000	26400	16100	14600
24	30100	27500	30800	22900	55200	43800	62600	79000	50800	23400	16600	13200
25	30500	26200	31000	27900	55000	43500	62700	80400	55700	18200	19200	13100
26	31100	26000	29400	29200	53300	43100	63700	80400	57100	16000	19900	12700
27	30700	26600	26000	30000	50200	39500	64500	80400	50700	14200	19300	12500
28	30900	27600	23700	30600	48100	38000	65400	79300	48600	15100	18300	16500
29	30900	28100	24500	31500	48400	39200	66900	79700	49900	17900	17900	18600
30	30500	21800	28400	29200	---	39300	67500	80000	49400	16900	17400	18700
31	30100	---	29200	24800	---	39800	---	83000	---	18200	14100	---
TOTAL	750400	750800	1143600	856100	1198200	1335500	1613600	2092000	2242200	990200	569300	458100
MEAN	24210	25030	36890	27620	41320	43080	53790	67480	74740	31940	18360	15270
MAX	31100	29800	48200	31500	55300	48000	67500	84800	91900	52300	25900	18700
MIN	16100	20200	22700	22900	16400	38000	34100	45800	48600	14200	14100	12400
AC-FT	1488000	1489000	2268000	1698000	2377000	2649000	3201000	4149000	4447000	1964000	1129000	908600
CAL YR 1995	TOTAL	9190710	MEAN	25180	MAX	64600	MIN	8160	AC-FT	18230000		
WTR YR 1996	TOTAL	14000000	MEAN	38250	MAX	91900	MIN	12400	AC-FT	27770000		

## 12396900 SULLIVAN CREEK ABOVE OUTLET CREEK, NEAR METALINE FALLS, WA

LOCATION.--Lat 48°50'44", long 117°17'08", in SW 1/4 SE 1/4 sec.30, T.39 N., R.44 E., Pend Oreille County, Hydrologic Unit 17010216, Colville National Forest, on left bank, at upstream side of road bridge, 0.1 mi upstream from Outlet Creek, 4 mi southeast of Metaline Falls, and at mile 5.0.

DRAINAGE AREA.--70.2 mi<sup>2</sup>.

PERIOD OF RECORD.--January 1959 to September 1972, April 1994 to current year.

REVISED RECORD.--WDR-95-1: 1994 (M).

GAGE.--Water-stage recorder. Datum of gage is 2,550.2 ft above sea level. Dec. 20, 1968 to September 1972 water-stage recorder 50 ft downstream at datum of 2,540.09 ft (revised to 2,556.75 ft Oct. 1, 1969) above sea level. Jan. 6, 1966 to Dec. 20, 1968 water-stage recorder 200 ft downstream at datum of 2,541.20 ft above sea level. Prior to Jan. 6, 1966 water-stage recorder 50 ft downstream at datum 2,540.09 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--15 years (water years 1960-72, 1995-96), 120 ft<sup>3</sup>/s, 23.29 in/yr, 87,180 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,480 ft<sup>3</sup>/s May 26, 1961, gage height, 13.61 ft, site and datum then in use; maximum gage height, 13.90 ft May 27, 1961, site and datum then in use; minimum discharge, 6.5 ft<sup>3</sup>/s Feb. 23, 24, 1962.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Apr. 24	0230	647	3.74	May 26	2015	*940	*4.04
May 15	2230	929	4.03	June 4	1715	*940	*4.04

Minimum discharge, 20 ft<sup>3</sup>/s Nov. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	46	28	208	e74	e43	e57	65	260	687	163	60	34
2	33	26	187	e74	e44	e57	66	244	697	154	62	34
3	42	30	168	e72	e44	e58	63	227	800	146	69	33
4	41	31	157	e66	e45	e58	62	216	913	148	65	34
5	33	31	135	e60	e46	e58	64	204	813	131	75	33
6	31	31	125	e62	46	e60	70	195	711	121	69	33
7	30	30	110	e64	49	e60	85	188	714	116	64	33
8	31	46	75	e66	e52	e61	120	176	770	110	60	33
9	33	59	e60	62	e100	60	195	168	691	104	58	32
10	37	45	e66	60	e90	67	270	159	585	99	56	31
11	56	47	e80	59	e80	71	305	153	511	95	54	30
12	58	45	e94	58	e77	65	295	152	461	93	52	29
13	49	45	e110	58	e74	63	271	188	432	89	50	31
14	45	49	e120	61	e71	63	247	377	410	86	49	31
15	42	51	e110	68	e71	68	235	680	389	83	48	34
16	41	59	e100	65	74	69	264	872	367	81	47	35
17	46	59	e110	55	77	70	284	854	345	78	46	32
18	54	74	e120	47	90	71	268	851	320	83	44	37
19	49	70	e110	61	92	72	248	800	285	80	44	34
20	45	68	e100	57	89	72	232	698	249	79	44	34
21	42	66	e90	58	92	72	222	616	234	75	44	38
22	40	64	e86	55	89	72	209	652	270	73	42	36
23	38	74	e70	55	87	72	283	646	246	72	41	34
24	37	87	e74	54	84	67	542	630	240	71	39	32
25	38	116	e70	52	e56	69	456	675	228	70	39	31
26	43	107	e68	e45	e57	69	404	811	208	68	38	30
27	39	104	e60	e40	e55	67	345	896	212	67	37	30
28	37	105	e52	e42	e56	66	309	820	205	65	37	30
29	35	161	e56	e43	e54	66	287	713	188	64	36	29
30	32	215	e70	e43	---	64	270	620	174	63	36	28
31	32	---	e74	e43	---	63	---	723	---	62	35	---
TOTAL	1255	2023	3115	1779	1984	2027	7036	15464	13355	2889	1540	975
MEAN	40.5	67.4	100	57.4	68.4	65.4	235	499	445	93.2	49.7	32.5
MAX	58	215	208	74	100	72	542	896	913	163	75	38
MIN	30	26	52	40	43	57	62	152	174	62	35	28
AC-FT	2490	4010	6180	3530	3940	4020	13960	30670	26490	5730	3050	1930
CFSM	.58	.96	1.43	.82	.97	.93	3.34	7.11	6.34	1.33	.71	.46
IN.	.67	1.07	1.65	.94	1.05	1.07	3.73	8.19	7.08	1.53	.82	.52

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

	MEAN	38.2	41.2	39.1	31.5	33.9	45.1	117	470	420	104	47.0	36.9
MAX	95.7	75.5	100	57.8	68.4	95.3	243	719	663	170	63.5	64.7	
(WY)	1960	1960	1996	1960	1996	1972	1969	1972	1967	1969	1972	1959	
MIN	23.4	21.7	20.3	17.4	16.0	16.5	47.3	327	191	67.6	34.2	27.0	
(WY)	1995	1995	1995	1962	1962	1962	1970	1962	1994	1994	1994	1994	

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1959 - 1996

	ANNUAL TOTAL	42804	53442	
ANNUAL MEAN	117	146		
HIGHEST ANNUAL MEAN			120	
LOWEST ANNUAL MEAN			154	1969
HIGHEST DAILY MEAN	896	May 18	913	Jun 4
LOWEST DAILY MEAN	17	Jan 7	26	Nov 2
ANNUAL SEVEN-DAY MINIMUM	18	Jan 2	30	Nov 1
ANNUAL RUNOFF (AC-FT)	84900		106000	
ANNUAL RUNOFF (CFSM)	1.67		2.08	
ANNUAL RUNOFF (INCHES)	22.68		28.32	
10 PERCENT EXCEEDS	290		370	
50 PERCENT EXCEEDS	56		68	
90 PERCENT EXCEEDS	25		34	

e Estimated



## POND OREILLE RIVER BASIN

12397000 SULLIVAN LAKE NEAR METALINE FALLS, WA

LOCATION.--Lat 48°50'21", long 117°17'15", in SW 1/4 NE 1/4 sec.31, T.39 N., R.44 E., Pend Oreille County, Hydrologic Unit 17010216, Colville National Forest, 200 ft south of dam at outlet, and 4.0 mi southeast of Metaline Falls.

DRAINAGE AREA. - - 51.2 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1912 to September 1923, January 1959 to current year (fragmentary).

REVISÉD RECORDS.--WSP 1933: Drainage area.

GAGE.--Nonrecording gage. Datum of gage is sea level (levels by Pend Oreille County Public Utility District). Prior to Sept. 30, 1923, nonrecording gage on dam at outlet of lake at different datum.

REMARKS:--Lake elevation is controlled by concrete dam. Top of gates is at 2,588.7 ft, bottom of gates is at 2,584.7 ft. Bottom of sluiceway is at 2,564 ft. Some small diversions for domestic use.

COOPERATION.--Elevation record furnished by Public Utility District No. 1 of Pend Oreille County.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation observed, 2,589.94 ft July 15, 1975; minimum observed, 2,564.00 ft on many days during period Jan. 6 to Mar. 25, 1970.

EXTREMES FOR CURRENT YEAR.--Maximum elevation observed, 2,587.65 ft June 24; minimum observed, 2,564.84 ft Feb. 6.

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY INSTANTANEOUS VALUES[illegible]

## PEND OREILLE RIVER BASIN

303

12397100 OUTLET CREEK NEAR METALINE FALLS, WA

LOCATION.--Lat 48°50'42", long 117°17'12", in SW 1/4 SE 1/4 sec.30, T.39 N., R.44 E., Pend Oreille County, Hydrologic Unit 17010216, Colville National Forest, on right bank 0.1 mi upstream from mouth, 0.4 mi downstream from Sullivan Lake Dam, and 4 mi east of Metaline Falls.

DRAINAGE AREA.--51.5 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,540.2 ft above sea level.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow completely regulated by Sullivan Lake 0.4 mi upstream (station 12397000). No diversions upstream from station.

AVERAGE DISCHARGE.--37 years (water years 1960-96), 72.8 ft<sup>3</sup>/s, 52,720 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 924 ft<sup>3</sup>/s May 31, 1969, gage height, 12.26 ft; minimum discharge, 1.5 ft<sup>3</sup>/s part or all of each day Mar. 4-10, 1990; minimum gage height, 8.76 ft part of each day Apr. 9-12, 1973, and Mar. 4-10, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 440 ft<sup>3</sup>/s May 28, gage height, 11.34 ft; minimum discharge, 3.0 ft<sup>3</sup>/s Mar. 21, 22, result of regulation.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	22	135	309	67	e35	58	16	16	360	116	23	23
2	22	192	301	66	e35	56	15	17	345	79	23	23
3	21	223	294	63	e34	55	16	17	343	59	23	22
4	21	215	325	60	e34	53	16	17	348	58	23	22
5	21	213	333	60	e34	53	16	17	335	55	23	22
6	21	211	323	60	e33	53	16	17	330	55	23	22
7	21	225	308	59	33	53	16	16	281	55	23	22
8	22	243	296	57	36	50	16	16	259	43	23	22
9	62	275	285	55	41	50	17	16	258	34	23	22
10	100	293	272	53	48	50	18	16	215	34	23	22
11	99	286	255	51	50	50	19	16	191	34	23	22
12	99	283	253	50	50	50	14	16	191	28	23	22
13	99	278	264	49	51	52	11	17	137	23	23	22
14	99	274	254	47	51	53	11	18	105	23	23	22
15	99	268	240	48	53	44	11	18	106	23	23	22
16	116	291	219	47	53	58	11	19	104	23	23	22
17	127	308	197	46	53	59	10	19	107	23	23	22
18	127	304	179	46	54	59	10	19	108	24	23	22
19	146	297	164	46	59	59	9.8	21	109	24	23	22
20	162	322	150	46	61	59	9.8	23	111	24	23	22
21	163	332	137	46	65	24	9.8	68	111	23	23	22
22	163	328	125	46	67	17	14	153	111	23	23	22
23	179	321	119	45	67	26	16	240	111	23	23	22
24	190	314	113	43	67	26	18	302	135	23	23	22
25	199	309	111	43	67	27	17	336	151	23	23	22
26	208	301	109	e37	65	21	16	375	149	23	23	22
27	206	320	109	e37	61	15	16	420	149	23	23	22
28	205	328	108	e36	60	15	16	437	144	23	23	22
29	203	322	95	e36	59	15	16	426	140	23	23	22
30	177	316	73	e35	---	15	16	400	137	23	23	22
31	147	---	70	e35	---	15	---	381	---	23	23	---
TOTAL	3546	8327	6390	1515	1476	1290	433.4	3889	5681	1090	713	662
MEAN	114	278	206	48.9	50.9	41.6	14.4	125	189	35.2	23.0	22.1
MAX	208	332	333	67	67	59	19	437	360	116	23	23
MIN	21	135	70	35	33	15	9.8	16	104	23	23	22
AC-FT	7030	16520	12670	3010	2930	2560	860	7710	11270	2160	1410	1310

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

	MEAN	211	201	81.7	44.7	31.6	31.7	23.8	32.1	134	43.4	23.1	26.6
MAX	395	343	382	201	130	323	132	239	437	129	40.0	157	
(WY)	1991	1985	1960	1984	1984	1959	1974	1961	1974	1974	1976	1965	
MIN	15.7	17.9	16.2	13.4	8.15	2.07	1.93	3.60	5.51	6.58	6.93	6.99	
(WY)	1974	1962	1976	1979	1981	1990	1973	1977	1977	1977	1977	1977	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1959 - 1996

ANNUAL TOTAL	29239.4	35012.4	72.8	
ANNUAL MEAN	80.1	95.7	132	1974
HIGHEST ANNUAL MEAN			42.7	1993
LOWEST ANNUAL MEAN			766	Nov 4 1976
HIGHEST DAILY MEAN	433	Jun 7	437	May 28
LOWEST DAILY MEAN	2.7	Mar 23	9.8	Apr 19
ANNUAL SEVEN-DAY MINIMUM	2.7	Mar 22	10	Apr 15
ANNUAL RUNOFF (AC-FT)	58000		69450	
10 PERCENT EXCEEDS	266		293	
50 PERCENT EXCEEDS	29		48	
90 PERCENT EXCEEDS	9.3		16	

e Estimated

## POND OREILLE RIVER BASIN

12398000 SULLIVAN CREEK AT METALINE FALLS, WA

LOCATION.--Lat 48°51'37", long 117°21'47", in SW 1/4 SW 1/4 sec.22, T.39 N., R.43 E., Pend Oreille County, Hydrologic Unit 17010216, on left pier of State highway bridge, 0.5 mi upstream from mouth, 0.5 mi east of Metaline Falls and at mile 0.5.

DRAINAGE AREA. - - 142 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1953 to November 1968, April 1994 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,050 ft above sea level, from topographic map. Aug. 24, 1956 to November 1968, water-stage recorder 100 ft downstream, at different datum. Prior to Aug. 24, 1956, staff gage at site 20 ft upstream at different datum.

REMARKS.--Records fair except for those above 1,000 ft<sup>3</sup>/s, which are poor. Some regulation by storage in Sullivan Lake. Small diversions upstream from station for municipal water supply.

AVERAGE DISCHARGE.--17 years (water years 1954-68, 1995-96), 228 ft<sup>3</sup>/s, 164,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD:--Maximum discharge observed, 3,550 ft<sup>3</sup>/s June 12, 1955, gage height, 3.90 ft, site and datum then in use; minimum discharge, 7.3 ft<sup>3</sup>/s Jan. 1, 1958, result of freezeup; minimum daily discharge, 27 ft<sup>3</sup>/s Jan. 1, 1958.

EXTREMES FOR CURRENT YEAR. -Maximum discharge, 1,460 ft<sup>3</sup>/s May 27, June 3; maximum gage height, 3.57 ft May 27, but may have been higher during period of missing record June 4; minimum discharge, 52 ft<sup>3</sup>/s Oct. 7, 8, gage height 0.93 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	73	204	645	166	e89	159	140	565	1230	484	e118	63
2	59	258	618	162	e90	157	140	558	1230	415	e119	63
3	62	338	590	160	e91	159	136	546	1330	343	e125	63
4	66	328	602	149	e92	157	134	534	e1400	345	e123	62
5	58	326	597	116	e94	150	135	521	e1310	307	e130	62
6	55	325	558	135	90	147	144	506	e1220	289	e120	63
7	53	339	536	153	90	144	163	495	e1160	272	101	63
8	53	405	471	147	102	144	204	480	e1200	244	92	62
9	77	460	464	136	161	142	311	472	e1120	216	88	61
10	151	458	488	130	154	153	443	464	e1040	205	86	60
11	183	454	497	125	139	161	487	456	e1000	196	84	59
12	196	449	503	122	139	166	477	454	e950	182	80	59
13	174	445	575	118	138	170	445	471	e880	160	79	60
14	166	447	516	123	136	173	428	588	e820	153	77	61
15	162	448	487	139	135	174	422	759	e760	146	77	65
16	172	474	454	136	140	193	443	921	e720	e140	76	71
17	198	499	428	118	149	196	476	925	e700	e138	74	64
18	216	513	395	95	166	197	454	932	e660	e140	72	69
19	225	506	356	117	181	201	435	916	e620	e139	72	66
20	257	520	322	113	183	201	415	862	587	e138	71	67
21	254	534	295	113	193	173	393	837	562	e135	72	72
22	249	526	270	109	192	148	372	935	606	e132	70	69
23	265	527	239	109	190	161	445	1020	593	e131	69	65
24	288	538	216	107	185	156	712	1090	604	e130	68	63
25	303	557	201	103	175	152	721	1150	618	e129	67	62
26	333	543	193	e90	154	158	687	1290	587	e127	66	61
27	320	552	183	e88	157	144	626	1350	584	e126	65	60
28	312	563	194	e86	149	140	583	1370	574	e125	64	60
29	306	599	192	e88	156	141	580	1280	540	e123	64	60
30	274	658	183	e88	--	139	571	1210	521	e121	64	59
31	228	--	175	e88	--	136	--	1280	--	e120	63	--
TOTAL	5788	13793	12443	3729	4110	4992	12122	25237	25726	6051	2596	1894
MEAN	187	460	401	120	142	161	404	814	858	195	83.7	63.1
MAX	333	658	645	166	193	201	721	1370	1400	484	130	72
MIN	53	204	175	86	89	136	134	454	521	120	63	59
AC-FT	11480	27360	24680	7400	8150	9900	24040	50060	51030	12000	5150	3760

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1954 - 1996, BY WATER YEAR (WY)

MEAN	219	185	148	99.5	83.0	113	204	628	668	177	81.5	88.0
MAX	370	460	465	230	147	360	463	1071	1404	394	115	262
(WY)	1967	1996	1960	1957	1959	1959	1956	1956	1955	1955	1955	1957
MIN	55.4	52.7	44.6	40.8	46.2	43.8	95.0	267	285	108	61.0	49.8
(WY)	1959	1957	1958	1958	1964	1964	1968	1955	1958	1994	1958	1995

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1954 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	94834		118481			
ANNUAL MEAN	260		324		228	
HIGHEST ANNUAL MEAN					324	1996
LOWEST ANNUAL MEAN					161	1966
HIGHEST DAILY MEAN	1030	May 18	1400	Jun 4	3350	Jun 12 1955
LOWEST DAILY MEAN	37	Jan 2	53	Oct 7	27	Jan 1 1958
ANNUAL SEVEN-DAY MINIMUM	38	Jan 1	58	Oct 2	30	Dec 31 1957
ANNUAL RUNOFF (AC-FT)	188100		235000		164900	
10 PERCENT EXCEEDS	618		691		538	
50 PERCENT EXCEEDS	169		181		110	
90 PERCENT EXCEEDS	48		66		55	

e Estimated

12399500 COLUMBIA RIVER AT INTERNATIONAL BOUNDARY  
(International gaging station)

LOCATION.--Lat 49°00'03", long 117°37'42", in NE 1/4 SE 1/4 sec.4, T.40 N., R.41 E., Stevens County, Hydrologic Unit 17020001, on left bank at international boundary, 0.5 mi downstream from Pend Oreille River, and at mile 745.0.

DRAINAGE AREA.--59,700 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1937 to current year. Prior to March 1938, monthly discharge only, published in WSP 1316.

REVISED RECORDS.--WSP 932; 1937 (m), 1938 (M), 1939 (m).

GAGE.--Water-stage recorder. Datum of gage is sea level (Bureau of Reclamation datum). Prior to Apr. 27, 1939, nonrecording gage at same site and datum. Since May 31, 1942, auxiliary water-stage recorder and Jan. 1 to May 30, 1942, auxiliary nonrecording gage 2.2 mi downstream from base gage at same datum.

REMARKS.--No estimated daily discharges. Records good. Flow regulated by eight major reservoirs and numerous smaller reservoirs and powerplants. It was estimated that 436,400 acres were under irrigation in the United States in 1980 with diversions for irrigation of an additional 35,000 acres in Canada.

COOPERATION.--This station is maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--59 years (water years 1938-96), 99,300 ft<sup>3</sup>/s, 71,943,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 550,100 ft<sup>3</sup>/s June 12, 1948, elevation, 1,338.13 ft; minimum discharge, 18,000 ft<sup>3</sup>/s Feb. 7, 1954, elevation, 1,289.38 ft.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1894 reached a stage of 1,346 ft, from information by Bureau of Reclamation, discharge, 680,000 ft<sup>3</sup>/s.

A discharge of about 12,900 ft<sup>3</sup>/s occurred Jan. 30 or 31, 1937, based on information from other gaging stations, elevation, 1,287.9 ft, from rating curve extended below 1,291.6 ft and may have been as low sometime in January 1930.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 267,000 ft<sup>3</sup>/s June 14, elevation, 1,318.72 ft; minimum discharge, 52,000 ft<sup>3</sup>/s Oct. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	71500	70500	96900	114000	154000	136000	86400	144000	205000	184000	147000	87900
2	71800	58200	95900	113000	150000	126000	83800	142000	207000	179000	158000	79500
3	70000	59700	99300	113000	146000	117000	84000	142000	212000	189000	167000	83600
4	71800	64800	97400	123000	140000	118000	78200	141000	222000	188000	166000	93700
5	75500	71800	100000	110000	144000	122000	85800	143000	223000	193000	156000	102000
6	79800	78000	119000	112000	148000	116000	88700	140000	226000	195000	151000	105000
7	73300	76700	129000	117000	125000	120000	89500	134000	227000	198000	147000	104000
8	72600	75700	122000	113000	107000	118000	90400	132000	241000	196000	132000	104000
9	77300	81200	121000	118000	89800	117000	90000	130000	254000	195000	133000	96800
10	74700	74900	121000	129000	77800	112000	91700	130000	253000	198000	128000	98700
11	76900	83200	123000	143000	93900	111000	103000	126000	253000	194000	125000	102000
12	70900	85400	120000	143000	118000	111000	113000	120000	254000	192000	124000	96700
13	73100	96400	125000	135000	140000	108000	114000	121000	254000	188000	131000	101000
14	69200	94800	119000	129000	158000	112000	120000	123000	255000	183000	135000	101000
15	67400	95300	120000	129000	174000	115000	126000	133000	254000	180000	137000	88300
16	72200	92400	117000	129000	180000	116000	130000	143000	253000	181000	137000	88800
17	72400	99300	129000	131000	166000	102000	135000	155000	252000	187000	132000	87000
18	70800	102000	126000	129000	150000	92500	136000	168000	250000	179000	118000	85100
19	71700	106000	123000	123000	141000	91100	136000	174000	242000	175000	126000	88100
20	75300	101000	115000	132000	138000	92200	137000	175000	234000	174000	125000	86800
21	83500	99200	112000	146000	142000	95600	137000	177000	219000	172000	126000	86600
22	83200	98900	113000	154000	147000	94800	137000	187000	202000	173000	123000	86200
23	80500	91800	104000	146000	149000	93800	140000	181000	202000	168000	120000	86800
24	75600	100000	111000	142000	148000	90500	150000	181000	199000	160000	110000	82900
25	80500	96700	108000	153000	145000	91800	148000	186000	204000	147000	104000	87600
26	75100	99600	112000	149000	146000	94700	146000	191000	207000	135000	107000	92600
27	76800	102000	103000	161000	152000	94600	146000	195000	192000	119000	105000	89000
28	87000	111000	101000	166000	147000	85600	147000	198000	183000	118000	98900	95400
29	92500	105000	108000	171000	138000	86800	146000	197000	186000	124000	98100	105000
30	84900	84200	115000	160000	--	87800	144000	198000	186000	131000	97000	106000
31	79300	--	110000	159000	--	85100	--	200000	--	133000	99000	--
TOTAL	2357100	2655700	3515500	4188000	4054500	3253900	3559500	4907000	6751000	5328000	3963000	2798100
MEAN	76044	88520	113400	135100	139800	105000	118600	158300	225000	171900	127800	93270
MAX	92500	111000	129000	171000	180000	136000	150000	200000	255000	198000	167000	106000
MIN	67400	58200	95900	109000	77800	85100	78200	120000	183000	118000	97000	79500
AC-FT	4675000	5268000	6973000	8307000	8042000	6454000	7060000	9733000	13390000	10570000	7861000	5550000
CAL YR 1995	TOTAL 31428100		MEAN 86100		MAX 156000		MIN 48300		AC-FT 62340000			
WTR YR 1996	TOTAL 47333100		MEAN 129300		MAX 255000		MIN 58200		AC-FT 93880000			

## COLUMBIA RIVER MAIN STEM

12400520 COLUMBIA RIVER AT NORTHPORT, WA  
(National stream quality accounting network station)

LOCATION.--Lat 48°55'08", long 117°47'11", in NW 1/4 SE 1/4 sec.36, T.40 N., R.39 E., Stevens County, Hydrologic Unit 17020001, 0.4 mi downstream from State Highway 25 bridge at Northport, 10.3 mi downstream from gaging station at boundary, and at mile 735.1.

DRAINAGE AREA.--60,200 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--Water years 1910-11, 1952 to current year. Prior to November 1951 published as "at Northport." November 1951 to September 1957 published as 12399500 "at international boundary," October 1957 to September 1963 as "at Northport," October 1963 to September 1973 as "at international boundary."

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: November 1951 to September 1975, April 1976 to September 1981.

pH: November 1951 to September 1969.

WATER TEMPERATURE: November 1951 to September 1981.

SUSPENDED-SEDIMENT DISCHARGE: February 1910 to January 1911.

REMARKS.--Discharge is routed from gaging station at international boundary (12399500).

## WATER-QUALITY DATA

		DIS- CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH, FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCARB (MG/L AS CACO3) (00904)	CALCIUM, DIS- SOLVED (MG/L AS CA) (00915)	
SEP 1995												
27...	1240	75800	136	8.3	16.5	0.3	9.5	102	62	20	18	
NOV												
27...	1330	95800	146	8.2	7.0	--	12.5	109	--	--	--	
JAN 1996												
16...	1000	122000	146	8.2	4.0	0.3	12.7	103	69	8	20	
FEB												
14...	1230	155000	145	8.1	2.0	0.8	14.8	110	69	8	20	
MAR												
06...	1100	107000	145	8.0	2.0	0.7	14.4	107	70	7	20	
19...	1030	88900	155	8.0	3.5	0.8	13.8	109	74	8	21	
APR												
03...	1000	83500	155	8.2	4.0	0.6	13.8	109	76	10	22	
17...	1130	137000	152	8.1	6.0	0.5	14.0	119	69	6	20	
MAY												
07...	1200	138000	149	8.0	7.0	1.1	13.5	116	72	8	21	
22...	1130	187000	143	8.1	8.0	1.5	13.3	119	69	8	20	
JUN												
03...	1200	215000	137	7.8	10.5	1.1	13.0	121	59	1	17	
19...	1130	249000	134	8.0	12.5	1.0	12.5	122	74	16	22	
JUL												
10...	1030	191000	126	8.2	14.5	0.5	11.3	116	54	4	16	
23...	1100	165000	128	8.1	15.5	0.9	11.0	115	55	0	16	
AUG												
14...	1030	122000	124	8.2	17.5	0.2	10.5	114	54	1	16	
SEP												
24...	1100	75300	129	8.2	14.0	0.5	9.9	100	62	9	18	
DATE		MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM AD- SORP- TION RATIO (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY, DIS IT, FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE, DIS IT, FIELD (MG/L AS HCO3) (00453)	CAR- BONATE, DIS IT, FIELD (MG/L AS CO3) (00452)	SULFATE, DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
SEP 1995												
27...	4.2	1.8	6	0.1	0.6	43	52	0	8.3	0.7	0.1	
NOV												
27...	--	--	--	--	--	58	71	0	--	--	--	
JAN 1996												
16...	4.7	1.8	5	0.1	0.6	62	75	0	8.3	0.8	0.2	
FEB												
14...	4.5	1.9	6	0.1	0.7	61	74	0	7.9	0.8	<0.1	
MAR												
06...	4.8	1.8	5	0.1	0.7	63	76	0	7.5	0.8	<0.1	
19...	5.1	2.2	6	0.1	0.7	66	80	0	8.6	0.8	<0.1	
APR												
03...	5.2	2.0	5	0.1	0.6	66	81	0	8.3	0.9	<0.1	
17...	4.7	2.1	6	0.1	0.7	63	77	0	8.1	0.9	<0.1	
MAY												
07...	4.6	2.0	6	0.1	0.7	63	77	0	8.2	0.8	<0.1	
22...	4.5	2.1	6	0.1	0.7	61	74	0	7.2	0.8	<0.1	
JUN												
03...	4.0	1.8	6	0.1	0.6	58	71	0	7.0	0.7	<0.1	
19...	4.5	1.2	3	0.1	0.6	58	70	0	7.4	0.6	0.1	
JUL												
10...	3.5	1.3	5	0.1	0.6	50	61	0	7.2	0.5	0.1	
23...	3.7	1.4	5	0.1	0.5	56	68	0	7.9	0.6	0.1	
AUG												
14...	3.5	1.2	5	0.1	0.5	54	65	0	8.0	0.5	<0.1	
SEP												
24...	4.0	1.5	5	0.1	0.6	52	64	0	7.7	0.6	<0.1	



## COLUMBIA RIVER MAIN STEM

307

12400520 COLUMBIA RIVER AT NORTHPORT, WA--Continued

## WATER-QUALITY DATA

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRITE, DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3, DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA, DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC, TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)
SEP 1995											
27...	3.7	74	63	0.10	15100	0.01	0.07	0.03	<0.2	0.02	<0.01
NOV											
27...	--	--	--	--	--	<0.01	0.08	<0.015	<0.2	0.01	<0.01
JAN 1996											
16...	4.9	86	79	0.12	28300	<0.01	0.12	<0.015	<0.2	<0.01	<0.01
FEB											
14...	5.5	83	78	0.11	34700	<0.01	0.12	<0.015	<0.2	<0.01	<0.01
MAR											
06...	5.5	86	79	0.12	24800	<0.01	0.11	0.06	<0.2	0.02	0.03
19...	6.2	88	85	0.12	21100	<0.01	0.10	<0.015	<0.2	0.02	0.01
APR											
03...	6.2	84	86	0.11	18900	<0.01	0.15	<0.015	<0.2	0.01	<0.01
17...	6.3	81	82	0.11	30000	<0.01	0.16	<0.015	<0.2	0.02	<0.01
MAY											
07...	6.8	89	82	0.12	33200	<0.01	<0.05	0.02	<0.2	0.01	<0.01
22...	6.7	91	79	0.12	45900	<0.01	0.08	0.04	<0.2	0.02	<0.01
JUN											
03...	6.1	84	73	0.11	48800	<0.01	0.08	0.04	<0.2	0.01	0.01
19...	6.0	86	77	0.12	57800	<0.01	0.08	0.03	<0.2	<0.01	<0.01
JUL											
10...	4.6	71	64	0.10	36600	<0.01	0.10	0.02	<0.2	<0.01	<0.01
23...	4.8	66	69	0.09	29400	0.01	0.12	0.05	<0.2	<0.01	<0.01
AUG											
14...	3.7	80	66	0.11	26400	0.01	0.11	0.03	<0.2	0.02	<0.01
SEP											
24...	4.1	77	69	0.10	15700	0.02	0.10	0.03	<0.2	<0.01	<0.01
DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)
SEP 1995											
27...	<0.010	<10	31	<3	<3	<4	<1	<10	<1	<1	<1
NOV											
27...	<0.001	7	33	<1	--	--	1	<1	<1	--	<1
JAN 1996											
16...	<0.001	4	32	<1	<3	<4	<1	<1	<1	<1	<1
FEB											
14...	0.002	7	33	<1	5	<4	1	<1	<1	<1	<1
MAR											
06...	0.002	4	33	<1	<3	<4	1	<1	<1	<1	<1
19...	0.001	3	40	<1	8	<4	2	<1	<1	<1	<1
APR											
03...	0.002	10	40	<1	11	<4	2	<1	<1	<1	<1
17...	<0.001	5	41	<1	6	<4	1	<1	<1	<1	1
MAY											
07...	0.002	15	38	<1	15	<4	1	<1	<1	<1	<1
22...	0.002	11	42	<1	16	<4	1	<1	<1	<1	<1
JUN											
03...	0.001	10	36	<1	8	<4	1	<1	<1	<1	<1
19...	<0.001	9	34	1	8	<4	<1	<1	<1	<1	<1
JUL											
10...	0.001	11	26	<1	7	<4	1	<1	<1	<1	<1
23...	<0.001	13	27	<1	9	<4	<1	<1	<1	<1	--
AUG											
14...	<0.001	10	22	<1	<3	<4	<1	<1	<1	<1	--
SEP											
24...	<0.001	6	27	<1	6	<4	<1	<1	<1	<1	<1

## WATER-QUALITY DATA

DATE	STRONTIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANADIUM, DIS- SOLVED (UG/L AS V) (01085)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	ACETO- CHLOR, DISS. (UG/L) (49260)	ALA- CHLOR, DISS. (UG/L) (46342)	DEETHYL ATRA- ZINE, DISS. (UG/L) (04040)	ATRA- ZINE, DISS. (UG/L) (39632)	METHYL AZIN- PHOS DISS. (UG/L) (82686)	BEN- FLUR- ALIN DISS. (UG/L) (82673)	BUTYL ATE, DISS. (UG/L) (04028)
SEP 1995 27...	93	<6	--	--	--	--	--	--	--	--	--
NOV 27...	--	--	<1	1.4	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
JAN 1996 16...	100	<6	<1	1.0	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
FEB 14...	96	<6	<1	1.1	<0.002	<0.002	<0.002	0.002	<0.001	<0.002	<0.002
MAR 06...	89	<6	<1	1.4	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
19...	87	<6	<1	1.2	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
APR 03...	82	<6	<1	1.4	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
17...	81	<6	<1	1.4	--	--	--	--	--	--	--
MAY 07...	78	<6	<1	1.6	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
22...	78	<6	<1	1.5	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
JUN 03...	78	<6	<1	1.6	<0.002	<0.002	<0.002	0.004	<0.001	<0.002	<0.002
19...	74	<6	<1	1.5	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
JUL 10...	86	<6	<1	1.3	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
23...	93	<6	<1	1.3	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
AUG 14...	95	<6	<1	1.2	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
SEP 24...	92	<6	<1	1.1	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002

DATE	CAR- BARYL, DISS. (UG/L) (82680)	CARBO- FURAN, DISS. (UG/L) (82674)	CHLOR- PYRIFOS, DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, DISS. (UG/L) (04041)	DCPA, DISS. (UG/L) (82682)	P,P' DDE, DISS. (UG/L) (34653)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE DISS. (UG/L) (82660)	DISUL- FOTON DISS. (UG/L) (82677)	EPTC DISS. (UG/L) (82668)
SEP 1995 27...	--	--	--	--	--	--	--	--	--	--	--
NOV 27...	<0.003	<0.003	<0.004	<0.004	<0.002	E0.002	<0.002	<0.001	<0.003	<0.017	<0.002
JAN 1996 16...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
FEB 14...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
MAR 06...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
19...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
APR 03...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
17...	--	--	--	--	--	--	--	--	--	--	--
MAY 07...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
22...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
JUN 03...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
19...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
JUL 10...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
23...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
AUG 14...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
SEP 24...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002

DATE	ETHAL- FLUR- ALIN, DIS- SOLVED (UG/L) (82663)	ETHO- PROP, DIS- SOLVED (UG/L) (82672)	FONOFOS, DIS- SOLVED (UG/L) (04095)	ALPHA BHC, DIS- SOLVED (UG/L) (34253)	LINDANE, DIS- SOLVED (UG/L) (39341)	LIN- URON, DIS- SOLVED (UG/L) (82666)	MALA- THION, DIS- SOLVED (UG/L) (39532)	METHYL PARA- THION, DIS- SOLVED (UG/L) (82667)	METO- LACHLOR, DIS- SOLVED (UG/L) (39415)	METRI- BUZIN SENCOR, DIS- SOLVED (UG/L) (82630)	MOL- INATE, DIS- SOLVED (UG/L) (82671)
SEP 1995 27...	--	--	--	--	--	--	--	--	--	--	--
NOV 27...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
JAN 1996 16...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
FEB 14...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
MAR 06...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
19...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
APR 03...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
17...	--	--	--	--	--	--	--	--	--	--	--
MAY 07...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
22...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
JUN 03...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	0.011
19...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
JUL 10...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
23...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
AUG 14...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
SEP 24...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004

12400520 COLUMBIA RIVER AT NORTHPORT, WA--Continued

## WATER-QUALITY DATA

DATE	NAPROP- AMIDE, DIS- SOLVED (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	PEB- ULATE, DIS- SOLVED (UG/L) (82669)	PENDI- METH- ALIN, DIS- SOLVED (UG/L) (82683)	PER- METHRIN CIS, DIS- SOLVED (UG/L) (82687)	PHORATE, DIS- SOLVED (UG/L) (82664)	PRON- AMIDE, DIS- SOLVED (UG/L) (82676)	PRO- METON, DIS- SOLVED (UG/L) (04037)	PROP- ACHLOR, DIS- SOLVED (UG/L) (04024)	PRO- PANIL, DIS- SOLVED (UG/L) (82679)
SEP 1995										
27...	--	--	--	--	--	--	--	--	--	--
NOV										
27...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
JAN 1996										
16...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
FEB										
14...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
MAR										
06...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
19...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
APR										
03...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
17...	--	--	--	--	--	--	--	--	--	--
MAY										
07...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
22...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
JUN										
03...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
19...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
JUL										
10...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
23...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
AUG										
14...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
SEP										
24...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004

DATE	PRO- PARGITE, DIS- SOLVED (UG/L) (82685)	SI- MAZINE, DIS- SOLVED (UG/L) (04035)	THIO- BENCARB, DIS- SOLVED (UG/L) (82681)	TEBU- THIURON, DIS- SOLVED (UG/L) (82670)	TER- BACIL, DIS- SOLVED (UG/L) (82665)	TER- BUFOS, DIS- SOLVED (UG/L) (82675)	TRIAL- LATE, DIS- SOLVED (UG/L) (82678)	TRI- FLUR- ALIN, DIS- SOLVED (UG/L) (82661)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)
SEP 1995										
27...	--	--	--	--	--	--	--	--	1	205
NOV										
27...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	1	259
JAN 1996										
16...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	14	4610
FEB										
14...	<0.013	<0.002	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	13	5440
MAR										
06...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	11	3180
19...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	7	1680
APR										
03...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	6	1350
17...	--	--	--	--	--	--	--	--	11	4070
MAY										
07...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	15	5590
22...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	26	13100
JUN										
03...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	15	8710
19...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	13	8740
JUL										
10...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	5	2580
23...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	5	2230
AUG										
14...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	2	659
SEP										
24...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	0	0.0

E Concentration is an estimated value because of problems with gas chromatography or extraction (Zaug and others, 1995), or the reported concentration is less than the method detection limit.

COLUMBIA RIVER MAIN STEM  
12400520 COLUMBIA RIVER AT NORTHPORT, WA--Continued

WATER-QUALITY DATA

DATE	TIME	SULFUR, SED. SUSP. (PERCENT) (30308)	PHOS- PHORUS, SED. SUSP. (PERCENT) (30292)	ALUM- INUM, SED. SUSP. (PERCENT) (30221)	AN- TIMONY, SED. SUSP. (UG/G) (29816)	ARSENIC, SED. SUSP. (UG/G) (29818)	BARIUM, SED. SUSP. (UG/G) (29820)	BERYL- LIUM, SED. SUSP. (UG/G) (29822)	CADMIUM, SED. SUSP. (UG/G) (29826)	CHRO- MIUM, SED. SUSP. (UG/G) (29829)
SEP 1995										
27...	1240	--	0.66	--	--	--	1000	1.6	5.6	--
NOV										
27...	1330	--	0.18	4.5	40	17.7	950	1.5	5.9	--
FEB 1996										
14...	1230	--	0.11	7.1	69	12.0	1900	2.3	2.0	170
MAR										
19...	1030	--	0.15	6.0	110	9.2	1800	1.8	2.6	140
APR										
17...	1130	<0.1	0.15	5.1	110	12.8	2000	1.7	3.3	180
MAY										
22...	1130	0.2	0.12	4.8	150	7.4	390	1.6	3.5	180
JUN										
19...	1130	0.6	0.11	4.2	18	9.5	1300	1.4	3.1	75

DATE	COBALT, SED. SUSP. (UG/G) (35031)	COPPER, SED. SUSP. (UG/G) (29832)	IRON, SED. SUSP. (PERCENT) (30269)	LEAD, SED. SUSP. (UG/G) (29836)	LITHIUM, SED. SUSP. (UG/G) (35050)	MAN- GANESE, SED. SUSP. (UG/G) (29839)	MERCURY, SED. SUSP. (UG/G) (29841)	MOLYB- DENUM, SED. SUSP. (UG/G) (29843)	NICKEL, SED. SUSP. (UG/G) (29845)
SEP 1995									
27...	95	580	5.0	500	15	2000	--	--	--
NOV									
27...	33	550	5.1	370	18	1900	--	--	--
FEB 1996									
14...	64	1300	10	170	43	2600	0.19	26	58
MAR									
19...	59	1500	10	200	38	2700	0.09	22	33
APR									
17...	72	1600	12	220	30	3200	--	33	50
MAY									
22...	72	1900	13	310	31	3100	0.21	32	44
JUN									
19...	14	260	3.7	190	22	930	0.06	11	36

DATE	SELE- NIUM, SED. SUSP. (UG/G) (29847)	SILVER, SED. SUSP. (UG/G) (29850)	STRON- TIUM, SED. SUSP. (UG/G) (35040)	THAL- LIUM, SED. SUSP. (UG/G) (49955)	TITA- NIUM, SED. SUSP. (PERCENT) (30317)	VANA- DIUM, SED. SUSP. (UG/G) (29853)	ZINC, SED. SUSP. (UG/G) (29855)	URANIUM, SED. SUSP. (UG/G) (35046)	CARBON, SED. SUSP. (PERCENT) (30244)
SEP 1995									
27...	--	11.1	310	<50	0.20	38	8600	<50	--
NOV									
27...	2.2	7.3	300	<50	0.19	55	3100	<50	--
FEB 1996									
14...	1.2	4.6	540	<50	0.30	85	7100	<50	--
MAR									
19...	1.1	4.4	440	<50	0.24	74	7200	<50	--
APR									
17...	1.3	5.0	470	<50	0.23	78	8900	<50	3.9
MAY									
22...	1.2	9.0	500	<50	0.22	77	9300	<50	2.2
JUN									
19...	0.6	1.3	280	<50	0.18	56	1900	<50	3.2

## KETTLE RIVER BASIN

311

12400900 MYERS CREEK NEAR CHESAW, WA

LOCATION.--Lat 48°59'55", long 119°01'08", in NW 1/4 NE 1/4 sec.3, T.40 N., R.30 E., Okanogan County, Hydrologic Unit 17020002, on left bank 150 yards upstream from the international boundary, 3.8 mi northeast of Chesaw, and at mile 9.8.

DRAINAGE AREA.--82 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--1923-24 (partial record), 1926-50 (partial record), October 1995 to September 1996. Prior to October 1995 published as near Myncaster, B.C. (station 12401000).

GAGE.--Water-stage recorder. Datum of gage is 2,630 ft above sea level. October 1929 to September 1950 water-stage recorder 500 ft downstream at datum 2,620 ft (from international boundary strip map, publication 1913). Prior to October 1929, staff gage only.

REMARKS.--Records good except for estimated daily discharges, which are fair. No known regulation. Small diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--1 year (water year 1996), 20.4 ft<sup>3</sup>/s, 3.39 in/yr, 14,820 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 171 ft<sup>3</sup>/s May 23, 1996, gage height, 6.27 ft; no flow July 16-18, 25, 1926, Aug. 13-25, 1939, and may have occurred during non-irrigation seasons.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 171 ft<sup>3</sup>/s May 23, gage height, 6.27 ft; minimum daily discharge, 4.0 ft<sup>3</sup>/s Feb. 3, 4.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e10	e9.0	11	e8.0	e4.5	e6.5	e13	44	79	28	14	9.6
2	e12	e8.5	10	e8.0	e4.5	e6.5	e13	40	75	27	15	9.6
3	e13	e8.5	e9.0	e8.0	e4.0	e6.5	e13	38	78	27	16	9.7
4	e13	e9.0	e8.0	e8.0	e4.0	e6.5	15	37	77	25	15	10
5	e13	e9.5	e7.5	e7.5	e4.5	e6.5	16	36	72	25	15	10
6	e13	e9.5	e7.0	e7.0	e4.5	e6.5	18	35	66	24	14	10
7	e12	e10	e6.0	e7.5	e5.0	e6.5	22	35	62	22	13	10
8	e12	e10	e5.5	e7.5	e6.0	e6.5	29	35	59	21	13	10
9	e12	e11	e5.0	e7.5	e6.0	e6.5	40	34	55	21	13	10
10	e12	e10	e5.5	e7.5	e6.0	e7.0	52	34	52	20	12	10
11	e13	e10	e6.5	e7.5	e6.0	e7.5	55	33	49	20	12	9.7
12	e12	e10	e8.0	e7.5	e6.0	e8.0	52	32	46	19	12	9.5
13	e12	e10	e9.0	e7.5	e6.0	e8.5	44	35	43	18	12	9.6
14	e12	e10	e8.5	e7.5	e6.0	e9.0	40	43	40	18	11	9.9
15	e11	e10	e8.5	e8.0	e6.0	e9.5	41	46	38	17	11	16
16	e11	e10	e8.5	e7.0	e6.0	e10	51	48	36	17	11	16
17	e11	e11	e8.0	e6.0	e6.0	e11	54	60	35	17	11	13
18	e11	e11	e8.0	e5.0	e6.5	e11	46	74	36	20	10	11
19	e11	e12	e7.5	e5.0	e7.0	e12	42	66	34	19	11	11
20	e10	e11	e7.5	e5.0	e7.0	e13	39	64	32	18	13	11
21	e9.5	e10	e7.5	e5.0	e6.5	e14	38	61	30	18	11	11
22	e9.5	e10	e7.5	e5.0	e6.5	e14	38	116	31	17	11	11
23	e9.5	e10	e7.0	e5.0	e6.5	e15	52	148	36	16	10	11
24	e9.5	e10	e7.0	e5.0	e6.5	e14	93	117	42	15	10	11
25	e9.5	e11	e7.0	e5.0	e6.5	e14	67	100	44	15	10	11
26	e10	e10	e6.0	e5.0	e6.5	e14	58	99	42	14	9.9	11
27	e10	e10	e7.0	e5.0	e6.5	e14	52	93	37	14	9.9	11
28	e9.5	e9.5	e7.5	e5.0	e6.5	e13	47	87	34	14	9.9	11
29	e9.5	e10	e7.5	e5.0	e6.5	e13	45	92	32	15	9.8	10
30	e9.5	12	e8.0	e4.5	---	e13	44	102	30	18	9.6	10
31	e9.5	---	e8.0	e4.5	---	e13	---	90	---	16	9.6	---
TOTAL	341.5	302.5	234.5	196.5	170.0	316.0	1229	1974	1422	595	364.7	323.6
MEAN	11.0	10.1	7.56	6.34	5.86	10.2	41.0	63.7	47.4	19.2	11.8	10.8
MAX	13	12	11	8.0	7.0	15	93	148	79	28	16	16
MIN	9.5	8.5	5.0	4.5	4.0	6.5	13	32	30	14	9.6	9.5
AC-FT	677	600	465	390	337	627	2440	3920	2820	1180	723	642
CFSM	.13	.12	.09	.08	.07	.12	.50	.78	.58	.23	.14	.13
IN.	.15	.14	.11	.09	.08	.14	.56	.90	.65	.27	.17	.15

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

	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996
MEAN	11.0	10.1	7.56	6.34	5.86	10.2	41.0	63.7	47.4	19.2	11.8	10.8
MAX	11.0	10.1	7.56	6.34	5.86	10.2	41.0	63.7	47.4	19.2	11.8	10.8
(WY)	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996
MIN	11.0	10.1	7.56	6.34	5.86	10.2	41.0	63.7	47.4	19.2	11.8	10.8
(WY)	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

ANNUAL TOTAL	7469.3
ANNUAL MEAN	20.4
HIGHEST DAILY MEAN	148 May 23
LOWEST DAILY MEAN	4.0 Feb 3
ANNUAL SEVEN-DAY MINIMUM	4.4 Jan 30
ANNUAL RUNOFF (AC-FT)	14820
ANNUAL RUNOFF (CFSM)	.25
ANNUAL RUNOFF (INCHES)	3.39
10 PERCENT EXCEEDS	48
50 PERCENT EXCEEDS	11
90 PERCENT EXCEEDS	6.0

e Estimated





## KETTLE RIVER BASIN

313

12404500 KETTLE RIVER NEAR LAURIER, WA  
(International gaging station)

LOCATION.--Lat 48°59'04", long 118°12'55", in SW 1/4 NW 1/4 sec.11, T.40 N., R.36 E., Ferry County, Hydrologic Unit 17020002, on right bank 1,000 ft downstream from Deep Creek, 1.1 mi south of international boundary, 1.1 mi southeast of Laurier, and at mile 29.71.

DRAINAGE AREA.--3,800 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--September 1929 to current year.

REVISED RECORDS.--WSP 737: 1930-31. WSP 862: 1937. WSP 882: 1938.

GAGE.--Water-stage recorder. Datum of gage is 1,425.5 ft above sea level. Prior to Jan. 3, 1930, nonrecording gage at same site and datum.

REMARKS.--Records excellent except for estimated daily discharges, which are fair. Diversions for irrigation of about 720 acres in the United States (for 1946 from United States reports), and 2,090 acres in Canada from the Canada Year Book for 1940. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--This station is maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--67 years (water years 1930-96), 2,895 ft<sup>3</sup>/s, 2,097,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 35,000 ft<sup>3</sup>/s May 29, 1948, gage height, 17.25 ft; minimum daily discharge, 70 ft<sup>3</sup>/s Jan. 11-31, 1930.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in May or June 1894 reached a stage of about 22 ft, from information by local residents.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 18,100 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 5	1130	*22,700	*13.54	No other peak greater than base discharge.			
Minimum discharge, 341 ft <sup>3</sup> /s Oct. 1, gage height, 2.96 ft.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	347	637	2810	1460	e600	1070	2640	8330	17500	7930	1620	452
2	370	564	2840	1450	e620	1110	2660	8240	17300	8070	1510	443
3	408	491	2620	1450	e640	1080	2630	7870	18400	8160	1480	435
4	428	503	2420	1380	e700	1110	2560	7410	20800	8350	1450	438
5	466	538	2160	1300	e850	1070	2570	7150	22300	8040	1460	465
6	475	583	1790	1200	e900	1070	2740	6950	19800	6970	1640	513
7	462	637	1430	1130	e940	1060	3240	6870	17600	6120	1760	560
8	438	641	e900	1180	e960	1060	4740	6890	19500	5740	1660	568
9	422	625	e600	1200	e1000	1090	8020	6660	20600	5580	1480	571
10	420	684	e500	1240	e1060	1180	12000	6380	17600	5320	1360	600
11	425	654	e600	1220	e1100	1340	13600	6180	14900	4830	1250	657
12	490	650	e800	1190	e1080	1570	14100	6020	13800	4380	1150	614
13	588	712	e1500	1170	e1040	1890	13200	6170	13100	4040	1080	570
14	667	767	2350	1160	e1010	2150	11700	8160	12900	3770	1010	538
15	679	757	2390	1160	e1000	2470	11000	10800	12600	3530	951	550
16	671	801	2350	1180	e1000	2930	11200	13300	12300	3280	898	765
17	747	929	2190	e1000	e1010	3130	13000	15500	11500	3020	849	1400
18	993	1120	2060	e800	e1050	3150	13100	17500	10800	2930	810	1410
19	1210	1440	2010	e560	e1110	3160	11800	17900	9630	3370	779	1190
20	1210	1620	1950	e520	1250	3240	10600	16900	8680	3670	748	1060
21	1120	1490	1900	e520	1300	3280	9710	15400	8020	3460	719	1010
22	1040	1410	1830	e540	1310	3330	9230	15100	7930	3070	698	1070
23	973	1450	1760	e580	1310	3370	9180	18000	8400	2750	676	1050
24	920	1510	1660	e620	1250	3290	12500	17500	9540	2510	648	1010
25	888	1710	1370	e600	1200	3130	13600	17500	10700	2320	619	962
26	866	2110	e900	e600	1210	3020	11700	18900	10200	2190	591	916
27	844	2180	e500	e600	1120	3020	10400	19900	9410	2090	564	875
28	822	2180	e600	e580	1110	2910	9330	19200	9080	1940	539	834
29	793	2100	e800	e580	1070	2800	8760	17800	8660	1800	515	811
30	758	2290	1240	e580	---	2740	8450	17000	8160	1760	492	788
31	698	---	1380	e580	---	2650	---	17000	---	1710	468	---
TOTAL	21638	33783	50210	29330	29800	69470	269960	384480	401710	132700	31474	23125
MEAN	698	1126	1620	946	1028	2241	8999	12400	13390	4281	1015	771
MAX	1210	2290	2840	1460	1310	3370	14100	19900	22300	8350	1760	1410
MIN	347	491	500	520	600	1060	2560	6020	7930	1710	468	435
AC-FT	42920	67010	99590	58180	59110	137800	535500	762600	796800	263200	62430	45870

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

	MEAN	673	739	598	507	552	1049	5097	12100	9144	2738	829	631
MAX	3815	2600	2652	1450	1407	4247	12170	18070	17650	6928	3140	3773	
(WY)	1942	1942	1942	1942	1935	1983	1934	1957	1974	1982	1976	1941	
MIN	176	202	154	76.5	97.9	212	1478	4246	2888	759	250	157	
(WY)	1988	1930	1930	1930	1930	1930	1930	1937	1930	1987	1934	1973	1967

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1929 - 1996

ANNUAL TOTAL	1116256	1477680	
ANNUAL MEAN	3058	4037	2895
HIGHEST ANNUAL MEAN			4469
LOWEST ANNUAL MEAN			1251
HIGHEST DAILY MEAN	17200	May 17	22300
LOWEST DAILY MEAN	150	Jan 1	347
ANNUAL SEVEN-DAY MINIMUM	244	Jan 1	422
ANNUAL RUNOFF (AC-FT)	2214000		2931000
10 PERCENT EXCEEDS	9640		12700
50 PERCENT EXCEEDS	989		1430
90 PERCENT EXCEEDS	363		567
			2097000
			9490
			782
			291

e Estimated

## COLVILLE RIVER BASIN

12409000 COLVILLE RIVER AT KETTLE FALLS, WA

LOCATION.--Lat 48°35'40", Long 118°03'41", in NE 1/4 NE 1/4 sec.30, T.36 N., R.38, E., Stevens County, Hydrologic Unit 17020003, on right bank 600 ft downstream from Washington Water Power Co.'s hydroelectric plant at foot of Meyers Falls, 1.0 mi south of town of Kettle Falls, and at mile 5.0.

DRAINAGE AREA.--1,007 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1922 to current year. Published as "at Meyer Falls" 1922-38.

REVISED RECORDS.--WSP 1316: 1938(M), 1941(M), 1948(M). WSP 1636: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 1,400 ft above sea level, from topographic map. Prior to Oct. 21, 1932, nonrecording gage at site 500 ft upstream at different datum. Oct. 21, 1932, to Sept. 19, 1938, nonrecording gages at site 200 ft upstream at different datum. Sept. 20, 1938, to Mar. 20, 1949, nonrecording gage at present site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Several diversions upstream from station for irrigation. Regulation at low flow by powerplant. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--74 years (water years 1923-96), 298 ft<sup>3</sup>/s, 215,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,440 ft<sup>3</sup>/s Jan. 21, 1974, gage height, 9.84 ft; maximum gage height, 10.17 ft Apr. 23, 1956; minimum discharge observed, 0.5 ft<sup>3</sup>/s Aug. 15, 1930.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,070 ft<sup>3</sup>/s Apr. 25, gage height, 8.58 ft; minimum discharge, 47 ft<sup>3</sup>/s Sept. 11.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

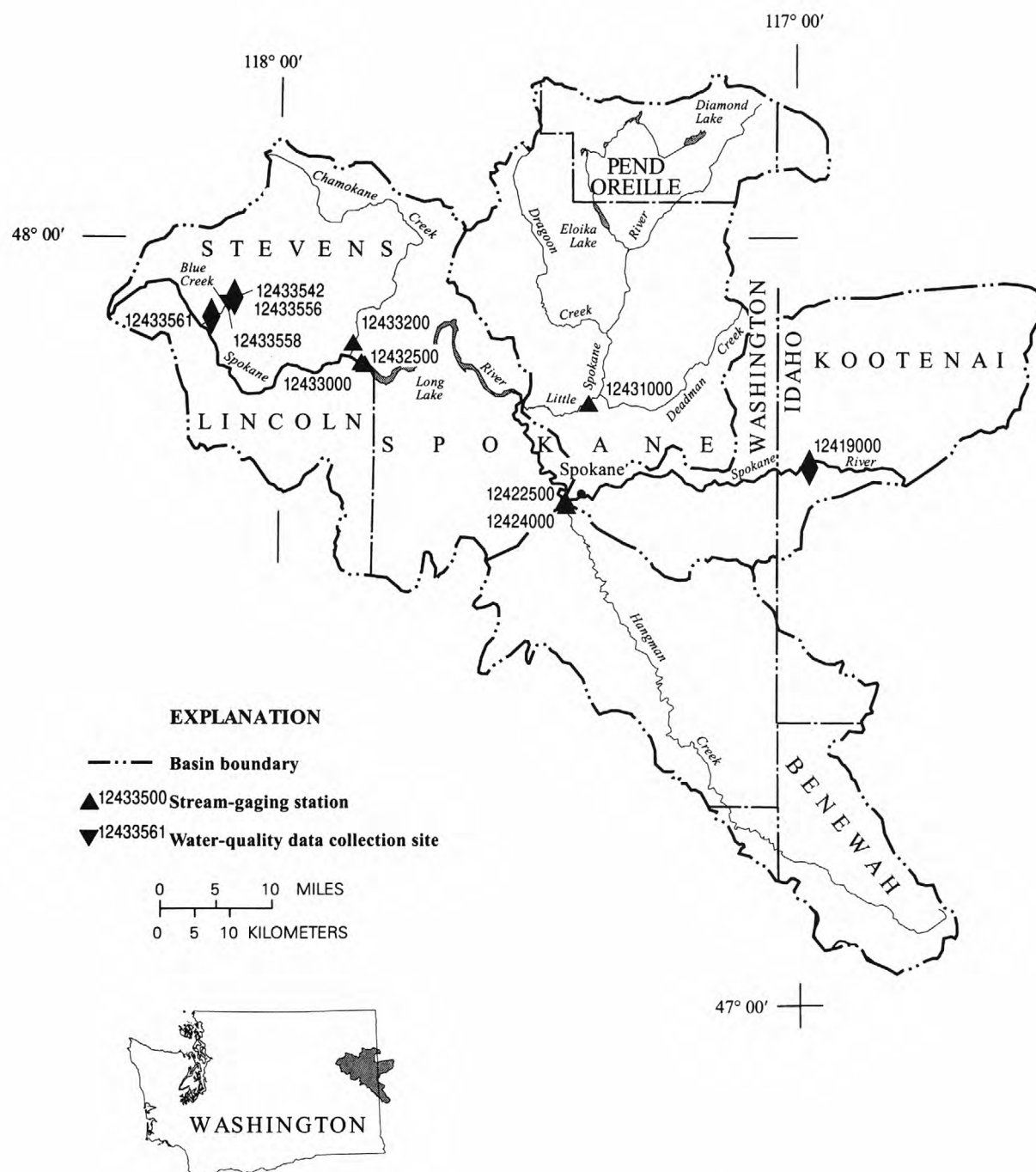
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	137	124	231	232	e160	513	618	1400	942	469	144	102
2	142	116	233	224	e160	511	656	1350	898	429	138	102
3	142	119	219	225	e170	518	657	1270	848	395	153	102
4	153	123	211	229	e180	515	639	1170	813	385	179	105
5	163	125	200	202	e190	503	622	1130	771	370	177	108
6	144	129	162	189	e220	488	627	1060	734	350	173	111
7	134	131	152	223	e380	475	656	1030	702	332	170	113
8	131	137	95	252	e520	467	706	967	668	314	158	116
9	128	154	e94	252	e750	478	770	924	628	301	145	118
10	126	176	e105	230	891	523	834	887	598	283	143	112
11	128	160	e150	222	867	572	877	863	570	269	136	104
12	140	152	258	220	830	621	913	831	548	255	129	108
13	149	155	444	214	728	666	938	814	525	246	124	109
14	139	170	577	215	662	676	921	844	502	234	121	115
15	132	179	581	242	546	687	890	951	481	223	118	125
16	129	174	519	383	495	707	877	1050	460	214	116	134
17	129	167	467	382	482	710	975	1040	441	190	116	138
18	138	165	411	273	529	713	1020	1040	428	203	115	132
19	149	163	352	257	683	713	1010	1020	416	220	115	133
20	145	158	323	e250	816	719	983	997	405	220	116	137
21	137	151	305	e240	839	719	940	960	392	219	120	145
22	134	146	292	e230	850	717	908	1010	428	209	125	148
23	132	147	279	e240	826	713	912	1230	535	194	118	148
24	129	150	261	e230	804	693	1360	1230	550	182	112	141
25	129	168	211	e220	773	651	1930	1170	599	172	108	144
26	135	188	182	e190	712	663	1840	1110	563	165	103	139
27	146	184	198	e180	660	644	1720	1050	536	159	103	137
28	141	185	263	e170	564	620	1580	990	622	156	101	134
29	134	196	277	e160	524	613	1530	955	583	151	102	133
30	132	232	245	e160	---	602	1460	942	522	153	105	129
31	127	---	234	e160	---	592	---	965	---	152	102	---
TOTAL	4254	4724	8531	7096	16811	19002	30369	32250	17708	7814	3985	3722
MEAN	137	157	275	229	580	613	1012	1040	590	252	129	124
MAX	163	232	581	383	891	719	1930	1400	942	469	179	148
MIN	126	116	94	160	160	467	618	814	392	151	101	102
AC-FT	8440	9370	16920	14070	33340	37690	60240	63970	35120	15500	7900	7380

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1923 - 1996, BY WATER YEAR (WY)

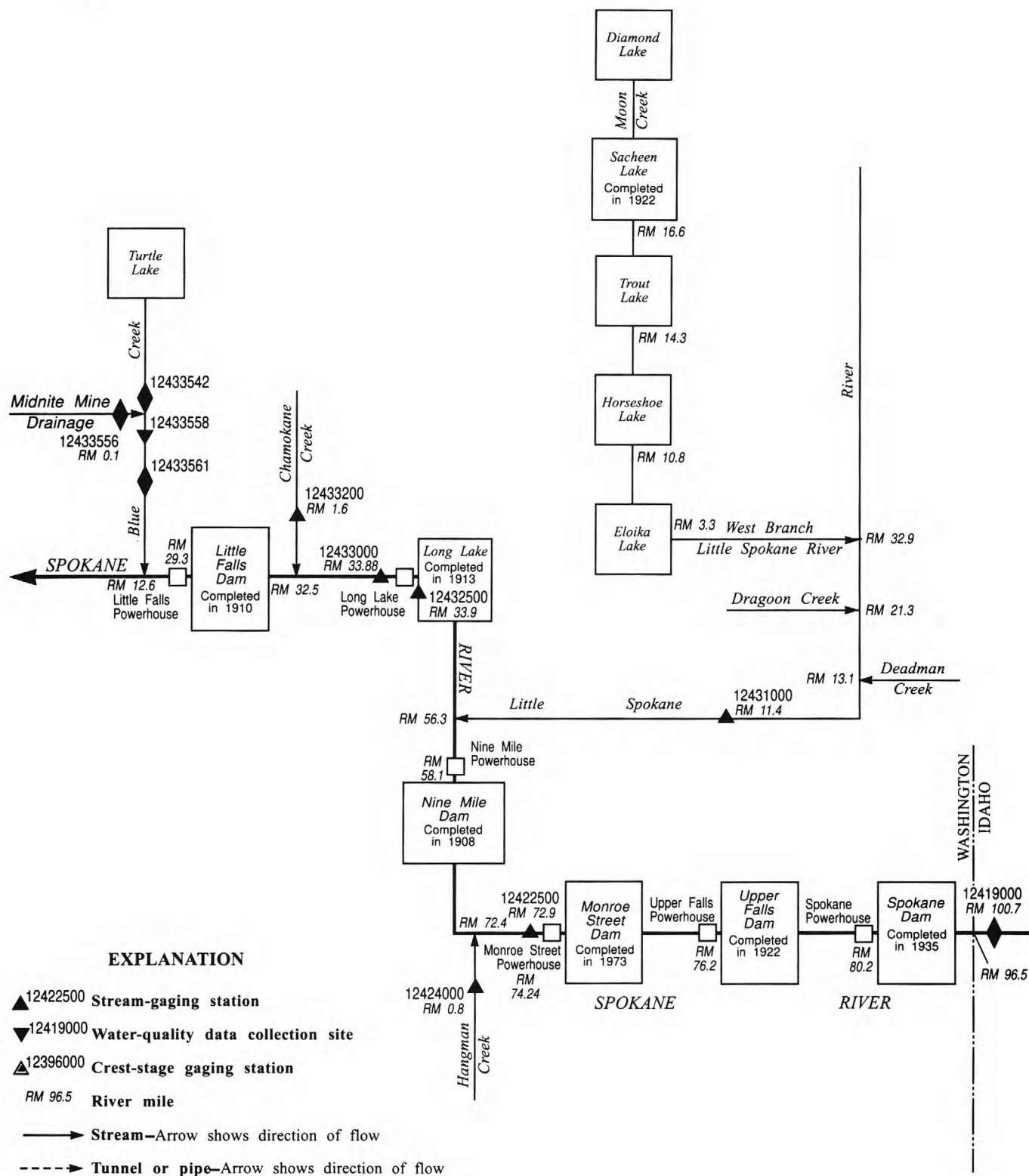
	115	151	179	204	280	479	818	676	341	150	85.3	93.7
MAX	301	401	783	1374	970	1410	2168	1744	1035	467	258	237
(WY)	1928	1928	1974	1974	1974	1983	1969	1948	1948	1948	1948	1927
MIN	35.8	49.5	56.3	32.9	65.7	127	128	93.8	48.4	20.6	12.0	22.7
(WY)	1932	1932	1932	1930	1937	1930	1930	1930	1926	1977	1931	1931

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR			FOR 1996 WATER YEAR			WATER YEARS 1923 - 1996		
ANNUAL TOTAL	140424			156266					
ANNUAL MEAN	385			427					
HIGHEST ANNUAL MEAN							298		
LOWEST ANNUAL MEAN							768		
HIGHEST DAILY MEAN	1750			Mar 22			70.5		
LOWEST DAILY MEAN	79			Aug 6			3360		
ANNUAL SEVEN-DAY MINIMUM	81			Aug 23			5.3		
ANNUAL RUNOFF (AC-FT)	278500			310000			215900		
10 PERCENT EXCEEDS	942						703		
50 PERCENT EXCEEDS	226						168		
90 PERCENT EXCEEDS	94						64		

e Estimated



**Figure 51.** Location of surface-water and water-quality stations in the Spokane River Basin.



**Figure 52.** Schematic diagram of surface-water and water-quality stations in the Spokane River Basin.



LOCATION.--Lat 47°42'11", long 116°58'37", in SW 1/4 SW 1/4 SW 1/4 sec.4, T.50 N., R.5 W., Kootenai County, Hydrologic Unit 17010305, on right bank 1.0 mi downstream from powerplant of Washington Water Power Co., 1.5 mi southwest of Post Falls, and at mile 100.7.

WATER-DISCHARGE RECORDS

GAGE.--Water-stage recorder. Datum of gage is 2,050.00 ft referred to originally accepted elevation of 2,157.40 ft for the U.S. Geological Survey bench mark in southeast corner of Idaho First National Bank Building (see WSP 882). Datum of gage is 2,047.00 ft above sea level. Jan. 1, 1913, to Nov. 21, 1920, nonrecording gage and Nov. 22, 1920, to Sept. 15, 1934, recording gage 0.6 mi upstream. From Sept. 16, 1934, to Nov. 15, 1949, recording gage 0.8 mi upstream. From Nov. 16, 1949, at present site. Datum of all gages prior to Sept. 30, 1964, 50.0 ft lower.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 50,100 ft<sup>3</sup>/s, when recorder was not operating, Dec. 25, 1933, (determined from unpublished records collected by Washington Water Power Co. for station at Liberty Bridge; minimum discharge, 65 ft<sup>3</sup>/s July 25, 30, 1973; minimum gage height, 4.68 ft, July 20, 21, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 38,000 ft<sup>3</sup>/s Feb. 12; minimum daily discharge, 370 ft<sup>3</sup>/s Sept. 4.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1480	3680	21900	e8800	e7200	19400	9240	25600	16800	3160	1270	e5500
2	1810	3680	26200	e8400	e6600	18200	9650	24300	16000	2820	1250	e5500
3	2200	3680	29000	e8000	e6400	17100	9940	23100	15400	2410	1200	e5500
4	2310	3670	29900	e7800	e6000	16000	10300	21900	14800	2450	1200	e3700
5	2300	3670	29500	e7600	e5900	15300	10400	20700	14600	2710	1190	e5400
6	2300	e4000	28400	e7400	6150	14500	10400	19600	13400	3120	e920	e5300
7	2300	e4200	26900	e7400	7730	13500	10400	18500	12600	3080	e600	e8500
8	2300	e4200	25100	e7800	12700	12700	10600	17500	11800	3040	e630	12900
9	2290	e4200	23200	e8400	20300	11900	11300	16500	10300	2640	e610	15000
10	2310	e4150	21600	e8600	29500	11600	12700	15300	9200	2460	e630	15400
11	2320	e4250	20800	e8800	e36000	11500	14100	14600	6840	2450	e960	19600
12	2320	e3600	20100	e9000	e38000	11400	15500	14000	6140	2480	1220	19300
13	2590	e3200	20300	e8800	e37500	12000	16300	13400	6760	2270	1220	18300
14	3000	e5800	20600	e8800	35800	12300	16600	13300	4830	1860	1220	18300
15	2990	e10000	21100	e9000	33700	12700	16700	13700	4420	1850	1220	18300
16	3000	e10500	21200	e10000	31600	12600	16600	14800	6120	1830	1050	18200
17	2990	e11100	20900	e10900	29700	12600	16600	16000	6750	1610	e710	18000
18	3000	e10900	20400	e11600	28500	12500	16800	17000	6770	1510	e470	18200
19	3260	e10800	19700	e12100	28900	12400	17000	18200	6140	1470	e390	18200
20	3700	e10700	18900	e12300	30000	12200	17000	19200	5130	1270	e480	18200
21	3710	10600	17900	e12200	30500	11900	16800	19700	4710	1130	e550	18200
22	3710	10300	17100	e11900	30400	11600	16600	19000	5270	e880	e550	18200
23	3710	10100	16000	e11500	29600	11400	16500	20100	5790	e700	e550	18200
24	3710	9920	15000	e11000	28200	11100	17800	19900	5790	e920	e550	18100
25	3700	9940	13900	e10500	26800	11000	21300	19600	5350	1240	e550	18100
26	3710	10600	12900	e9800	25300	10700	25500	19300	4980	1240	e550	18100
27	3710	11900	12100	e9200	23600	10200	27600	19000	5810	1230	e550	18100
28	3710	14300	11400	e8800	21900	9960	28000	18600	5540	1230	e550	18100
29	3700	15800	e10500	e8600	20600	9740	27600	18300	4040	1200	e550	18100
30	3680	17800	e9800	e8200	---	9520	26800	17900	3370	1200	e550	18100
31	3690	---	e9400	e7600	---	9140	---	17400	---	1270	e550	---
TOTAL	91510	241240	611700	290800	675080	388660	492630	567100	245450	58730	24540	448600
MEAN	2952	8041	19730	9381								

MEAN	1715	2892	4902	5162	6278	8134	14380	17440	9542	2070	946	1171
MAX	5460	13130	23660	24930	23280	25440	26050	31750	26710	10720	2133	1849
(WY)	1928	1928	1934	1934	1996	1972	1943	1917	1974	1916	1917	1985
MIN	782	627	784	996	1025	1751	3558	5141	1584	851	185	1888
(WY)	1964	1936	1936	1931	1929	1929	1977	1992	1926	1994	1958	1949

ANNUAL TOTAL	2975986			3732300			
ANNUAL MEAN	8153			10200		6188	
HIGHEST ANNUAL MEAN						11600	1974
LOWEST ANNUAL MEAN						2143	1977
HIGHEST DAILY MEAN	29900	Dec	4	38000	Feb	49800	Dec 25 1933
LOWEST DAILY MEAN	423	Sep	4	370	Sep	67	Jul 24 1973
ANNUAL SEVEN-DAY MINIMUM	442	Sep	1	506	Aug	108	Aug 10 1966
ANNUAL RUNOFF (AC-FT)	5903000			7403000		4483000	
10 PERCENT EXCEEDS	17900			21900		17300	
50 PERCENT EXCEEDS	6150			9070		2960	
90 PERCENT EXCEEDS	825			1200		902	

e Estimated

## SPOKANE RIVER BASIN

12419000 SPOKANE RIVER NEAR POST FALLS, ID--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1973-1981, July 1989 to current year.

## WATER-QUALITY DATA, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DATE	TIME	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE AIR (DEG C) (00020)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	COLI- FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML) (31625)	STREP- TOCOCCI FECAL, KF AGAR (COLS. PER 100 ML) (31673)
APR 23...	1200	16600	48	6.9	13.0	5.0	3.5	15.1	127	K8	K9
MAY 20...	1230	19900	48	7.1	15.0	9.5	2.7	11.6	108	K2	K6
JUN 11...	1500	8570	47	7.5	20.0	15.5	0.6	10.2	108	K12	K12
JUL 01...	0915	3160	48	7.5	26.0	18.0	0.3	9.1	102	K14	K13
JUL 31...	1000	1400	51	7.6	29.0	24.0	0.2	6.9	88	K16	--
SEP 12...	1345	1820	53	7.8	30.5	19.0	0.3	8.8	103	K5	130

DATE	HARD- NESS TOTAL (MG/L AS CACO3) (00900)	CALCIUM DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	BICAR- BONATE WATER WH FET FIELD MG/L AS HCO3 (00440)	CAR- BONATE WATER WH FET FIELD MG/L AS CO3 (00445)	ALKA- LINITY WAT WH TOT FET FIELD MG/L AS CACO3 (00410)
SEP 12...	21	5.5	1.7	1.7	14	0.9	25	0	20

DATE	SULFATE DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTI- TUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)
SEP 12...	4.5	0.6	<0.1	9.4	43	37	0.06	211

DATE	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC TOTAL (MG/L AS N) (00625)	PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	SEDI- MENT, DIS- SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)
APR 23...	<0.01	0.09	0.020	0.2	<0.01	<0.01	--	--
MAY 20...	<0.01	0.21	<0.015	<0.2	0.04	<0.01	3	161
JUN 11...	<0.01	<0.05	0.040	<0.2	<0.01	<0.01	2	46
JUL 01...	<0.01	0.08	0.020	<0.2	<0.01	<0.01	6	51
JUL 31...	<0.01	0.06	0.030	<0.2	<0.01	0.01	1	3.8
SEP 12...	<0.01	0.05	<0.015	<0.2	<0.01	<0.01	1	4.9

K Results based on counts outside ideal colony range.

## SPOKANE RIVER BASIN

319

## 12422500 SPOKANE RIVER AT SPOKANE, WA

LOCATION.--Lat 47°39'34", long 117°26'53", in SW 1/4 SW 1/4 sec.13, T.25 N., R.42 E., Spokane County, Hydrologic Unit 17010305, on right bank at Cochran Street in Spokane, 0.5 mi upstream from Hangman Creek, and at mile 72.9.

DRAINAGE AREA.--4,290 mi<sup>2</sup>, approximately, of which about 122 mi<sup>2</sup> in the vicinity of Hayden Lake is noncontributing to this station.

PERIOD OF RECORD.--April 1891 to current year.

REVISED RECORDS.--WSP 532: 1891-1904. WSP 1246: Drainage area. WSP 1286: 1907-09.

GAGE.--Water-stage recorder. Datum of gage is 1,696.6 ft above sea level (river-profile survey). Prior to July 1, 1921, water-stage recorders and nonrecording gages at several sites within 4 mi of present site at various datums.

REMARKS.--No estimated daily discharges. Records good. Discharge records for Feb. 1, 2 (frozen well), Aug. 10 to Sept. 11, (coffer dam construction), provided by Washington Water Power Co. Flow regulated by powerplants of Washington Water Power Co. at Post Falls, Idaho, 28.8 mi upstream and at Spokane, 1.3 mi upstream, and by Coeur d'Alene Lake, Idaho. Rathdrum Prairie Canal diverts water upstream from station for irrigation. In 1946, approximately 22,600 acres, of which about 15,000 acres utilized surface water, were under irrigation upstream from Spokane. Since 1966 irrigation has been from many wells in the valley near the river with only about 3,000 acres irrigated from the river. Chemical analyses October 1972 to September 1973.

AVERAGE DISCHARGE.--105 years (water years 1892-1996), 6,734 ft<sup>3</sup>/s, 4,878,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,000 ft<sup>3</sup>/s, estimated, May 31, 1894 (see WSP 532); minimum, 50 ft<sup>3</sup>/s Aug. 26, 1991, due to regulation for construction at Post Street Dam, but may have been lower during periods of missing record in 1991.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 36,500 ft<sup>3</sup>/s Feb. 12, gage height, 28.04 ft; minimum daily discharge, 990 ft<sup>3</sup>/s Aug. 20-22.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1730	3630	18200	9100	7930	18900	9140	24300	15900	3830	1680	1100
2	1820	3620	22300	8800	7350	17700	9440	23200	15200	3690	1760	1100
3	2200	3630	25300	8460	6580	16700	9650	22100	14600	3180	1770	1090
4	2320	3640	26800	8270	6430	15700	9910	21000	14100	3130	1790	1090
5	2340	3640	26700	8140	6280	15000	10000	19900	13800	3170	1730	1120
6	2340	3770	25900	8050	6240	14300	10000	18800	13000	3580	1740	1090
7	2350	4130	24700	7850	7070	13400	10100	17800	12200	3580	1490	1120
8	2380	4160	23300	7960	10400	12700	10200	16800	11400	3500	1350	1620
9	2380	4180	21800	8360	16600	12000	10600	15900	10400	3320	1340	1710
10	2390	4200	20300	8860	24900	11600	11600	14800	9440	3050	1290	1890
11	2470	4240	19400	9080	32300	11400	12700	14200	7810	3020	1430	2150
12	2420	4070	18700	9110	35500	11300	14100	13500	6290	3050	1620	2210
13	2560	3280	18700	9180	35400	11600	14900	13100	7200	2980	1650	2090
14	2880	3800	18900	9100	34100	11900	15300	12800	5960	2530	1650	2080
15	2940	8250	19400	9050	32300	12200	15400	13000	4940	2460	1660	2120
16	2900	8650	19500	9230	30300	12200	15400	13800	5900	2410	1610	2120
17	2950	9490	19400	10000	28600	12100	15400	14700	6710	2320	1470	2110
18	2950	9480	19000	11100	27200	12100	15500	15600	6740	2140	1130	2110
19	3100	9420	18300	11200	27300	12000	15700	16700	6490	2140	1040	2130
20	3440	9300	17600	12000	28400	11800	15800	17700	5710	2040	990	2150
21	3490	9220	16800	12000	29000	11600	15700	18300	5180	1850	990	2140
22	3520	9000	16000	11800	29100	11400	15500	18700	5350	1770	990	2160
23	3530	8880	15100	11500	28400	11200	15400	18800	5930	1530	1030	2150
24	3540	8720	14200	11000	27300	11000	16100	18700	5940	1490	1030	2180
25	3570	8670	13300	10600	25900	10800	18900	18500	5730	1790	1090	2170
26	3600	9020	12400	10100	24500	10500	22700	18200	5320	1810	1130	2180
27	3560	10100	11700	9600	23000	10200	25200	17800	5570	1770	1130	2170
28	3610	11700	11000	9230	21400	9920	26200	17500	6120	1770	1150	2180
29	3600	13300	10500	8690	20100	9650	26000	17200	4750	1740	1130	2180
30	3610	14800	10100	8280	--	9490	25300	16900	4210	1730	1100	2170
31	3610	--	9580	7780	--	9230	--	16400	--	1860	1100	--
TOTAL	90100	211990	564880	293480	639880	381590	457840	536700	247890	78200	42060	55880
MEAN	2906	7066	18220	9467	22060	12310	15260	17310	8263	2523	1357	1863
MAX	3610	14800	26800	12000	35500	18900	26200	24300	15900	3830	1790	2210
MIN	1730	3280	9580	7780	6240	9230	9140	12800	4210	1490	990	1090
AC-FT	178700	420500	1120000	582100	1269000	756900	908100	1065000	491700	155100	83430	110800

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1891 - 1996, BY WATER YEAR (WY)

	MEAN	2140	3307	5192	5496	6308	8295	14160	17850	10980	3432	1782	1750
MAX	5643	13050	22910	25430	22060	25380	25030	32920	29850	11910	4744	3302	
(WY)	1928	1928	1934	1934	1996	1972	1943	1917	1894	1899	1899	1912	
MIN	1300	1151	1233	1339	1489	2047	3865	5214	2141	1050	531	932	
(WY)	1893	1940	1932	1931	1929	1929	1977	1992	1926	1994	1994	1966	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1891 - 1996

ANNUAL TOTAL	2895719	3600490	6734
ANNUAL MEAN	7933	9837	12310
HIGHEST ANNUAL MEAN			1974
LOWEST ANNUAL MEAN			1977
HIGHEST DAILY MEAN	26800	Dec 4	49000
LOWEST DAILY MEAN	832	Sep 4	466
ANNUAL SEVEN-DAY MINIMUM	859	Sep 1	502
ANNUAL RUNOFF (AC-FT)	5744000	7142000	4878000
10 PERCENT EXCEEDS	17700	20500	17200
50 PERCENT EXCEEDS	6030	9030	3680
90 PERCENT EXCEEDS	1270	1700	1520

## SPOKANE RIVER BASIN

12424000 HANGMAN CREEK AT SPOKANE, WA

LOCATION.--Lat 47°39'10", long 117°26'55", in NW 1/4 sec.24, T.25 N., R.42 E., Spokane County, Hydrologic Unit 17010306, on left bank 0.3 mi downstream from bridge on Interstate 90 in Spokane, and at mile 0.8.

DRAINAGE AREA. - - 689 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1948 to September 1977; October 1977 to September 1978 (discharges above 20 ft<sup>3</sup>/s only),  
October 1978 to current year. Prior to October 1958, published as Latah Creek at Spokane.

REVISED RECORDS.--WSP 1933: Drainage area. WSP 2133: 1965(P).

GAGE.--Water-stage recorder. Datum of gage is 1,717.42 ft above sea level (levels by Corps of Engineers). Prior to Nov. 22, 1948, nonrecording gage at site 0.5 mi upstream at different datum.

REMARKS.--Records fair. No regulation. Some diversions for irrigation upstream from station. National Weather Service telemeter at station.

AVERAGE DISCHARGE.--47 years (water years 1949-77, 1979-96), 229 ft<sup>3</sup>/s, 4.52 in/yr, 166,100 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,600 ft<sup>3</sup>/s Feb. 3, 1963, gage height, 13.35 ft; minimum discharge, 0.74 ft<sup>3</sup>/s Sept. 5, 14, 1992.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 12	2400	2,540	6.78	Mar. 9	2230	3,680	8.45
Jan. 8	1600	3,710	7.78	Mar. 10	2300	3,660	8.44
Feb. 8	2145	*15,200	*13.26	Apr. 24	0915	5,100	8.62
Feb. 19	1545	3,240	8.15				

Minimum discharge, 19 ft<sup>3</sup>/s Aug. 20-27, Sept. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	23	23	282	357	e58	368	873	322	e148	54	25	20
2	20	23	258	216	e58	363	1180	287	e139	52	e26	20
3	25	23	310	348	e60	458		264	e130	49	e27	20
4	24	23	184	570	e64	967	472	247	e122	47	e26	20
5	27	24	140	298	e80	1290	376	236	e115	45	e25	21
6	25	24	220	226	e120	788	320	225	e107	43	e24	22
7	22	25	132	207	8420	672	290	217	e100	42	e23	22
8	21	26	87	3030	12900	869	262	208	e95	41	e23	22
9	20	28	76	1760	10300	2170	232	195	e89	39	e22	21
10	20	28	81	1420	3620	2370	207	186	e84	37	e22	21
11	30	34	75	892	1170	2530	190	176	e79	37	e22	21
12	29	35	1260	600	481	1860	185	177	e74	35	e21	21
13	33	39	1690	455	231	1280	195	235	e69	34	e21	21
14	34	50	763	381	183	969	191	253	67	34	e21	21
15	34	58	520	480	171	772	163	320	64	33	e22	23
16	30	63	526	840	258	613	151	567	63	31	e21	23
17	27	52	328	652	444	520	169	406	63	30	e20	23
18	25	46	239	331	1280	453	255	710	60	31	e20	23
19	24	42	183	243	1970	399	272	680	58	31	e20	25
20	24	40	151	219	1380	356	290	467	58	30	19	24
21	25	37	135	216	1520	312	383	372	57	30	19	25
22	24	36	122	194	1620	295	299	343	56	30	20	25
23	23	36	89	175	1240	324	375	410	58	28	20	25
24	23	36	88	167	1070	296	3920	326	66	27	19	25
25	23	38	72	150	906	237	2890	270	65	27	19	24
26	24	38	67	139	665	242	1570	233	61	26	19	24
27	25	37	59	e105	529	248	994	211	66	25	20	24
28	26	42	50	e90	354	216	639	193	61	25	20	24
29	25	68	49	e76	347	186	467	180	61	25	20	24
30	25	151	52	e66	--	184	380	173	58	24	21	24
31	25	--	110	e62	--	184	--	e160	--	24	20	--
TOTAL	785	1225	8398	14965	51499	22791	18852	9249	2393	1066	667	678
MEAN	25.3	40.8	271	483	1776	735	628	298	79.8	34.4	21.5	22.6
MAX	34	151	1690	3030	12900	2530	3920	710	148	54	27	25
MIN	20	23	49	62	58	184	151	160	56	24	19	20
AC-FT	1560	2430	16660	29680	102100	45210	37390	18350	4750	2110	1320	1340
CFSM	.04	.06	.39	.70	2.58	1.07	.91	.43	.12	.05	.03	.03
IN.	.04	.07	.45	.81	2.78	1.23	1.02	.50	.13	.06	.04	.03

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1996, BY WATER YEAR (WY)

MEAN	16.9	41.7	186	445	723	744	349	195	76.5	21.6	12.9	13.0
MAX	33.9	201	1251	2018	1776	1914	928	1925	434	77.7	38.1	29.9
(WY)	1976	1984	1956	1974	1996	1969	1969	1948	1990	1948	1948	1975
MIN	2.30	10.4	10.9	24.0	39.5	44.1	27.0	15.1	6.21	2.43	1.29	1.01
(WY)	1993	1988	1993	1979	1994	1977	1977	1992	1992	1973	1992	1992

SUMMARY STATISTICS                      FOR 1995 CALENDAR YEAR                      FOR 1996 WATER YEAR                      WATER YEARS 1948 - 1996

ANNUAL TOTAL	87336.9		132568			
ANNUAL MEAN	239		362		229	
HIGHEST ANNUAL MEAN					548	1974
LOWEST ANNUAL MEAN					27.3	1977
HIGHEST DAILY MEAN	4530	Feb 20	12900	Feb 8	13500	Jan 16 1974
LOWEST DAILY MEAN	9.9	Sep 3	19	Aug 20	.81	Sep 5 1992
ANNUAL SEVEN-DAY MINIMUM	10	Aug 30	19	Aug 20	.92	Sep 14 1992
ANNUAL RUNOFF (AC-FT)	173200		262900		166100	
ANNUAL RUNOFF (CFSM)	.35		.53		.33	
ANNUAL RUNOFF (INCHES)	4.72		7.16		4.52	
10 PERCENT EXCEEDS	737		777		574	
50 PERCENT EXCEEDS	50		74		41	
90 PERCENT EXCEEDS	13		22		8.7	

e Estimated

LOCATION.--Lat 47°47'05", long 117°24'12", in NE 1/4 NW 1/4 sec.5, T.26 N., R.43 E., Spokane County, Hydrologic Unit 17010308, on left bank 50 ft upstream from county bridge, 0.5 mi east of Dartford, 1.7 mi downstream from Deadman Creek, 7.5 mi north of Spokane, and at mile 11.4.

GAGE.--Water-stage recorder. Elevation of gage is 1,585.62 ft above sea level, from Washington State Department of Transportation levels. Prior to 1996 an arbitrary datum of 1,590 ft was used, from topographic map. Prior to Mar. 16, 1951, nonrecording gage and Mar. 16, 1951 to July 5, 1961 water-stage recorder, at site 0.5 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation. Small diversions for irrigation upstream from station. U.S. Geological Survey satellite telemeter at station. Chemical analyses, July 1960 to September 1970, water temperatures, July 1968 to September 1970.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,170 ft<sup>3</sup>/s Feb. 17, 1970, gage height, 7.29 ft; minimum discharge, 62 ft<sup>3</sup>/s Aug. 8, 1994.

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 9	1815	*2,460	*6.75	Apr. 24	2115	1,220	5.19
Feb. 20	0900	1,810	6.01				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

MEAN	154	187	231	274	403	557	612	409	254	162	132	137
MAX	234	357	824	1204	1108	1211	1301	1176	710	331	193	175
(WY)	1952	1984	1974	1974	1961	1950	1969	1948	1948	1948	1948	1952
MIN	87.9	113	114	99.6	143	167	168	132	98.2	80.3	67.8	80.3
(WY)	1932	1930	1993	1930	1993	1930	1977	1930	1931	1931	1931	1931

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR		FOR 1996 WATER YEAR		WATER YEARS 1929 - 1996	
ANNUAL TOTAL	124947		125942			
ANNUAL MEAN	342		344		294	
HIGHEST ANNUAL MEAN					554	1974
LOWEST ANNUAL MEAN					128	1931
HIGHEST DAILY MEAN	1690	Mar 16	2010	Feb 9	2800	Feb 17 1970
LOWEST DAILY MEAN	102	Aug 6	124	Aug 31	63	Jul 24 1930
ANNUAL SEVEN-DAY MINIMUM	106	Aug 1	125	Aug 30	65	Aug 13 1931
ANNUAL RUNOFF (AC-FT)	247800		249800		212900	
ANNUAL RUNOFF (CFSM)	.51		.52		.44	
ANNUAL RUNOFF (INCHES)	6.99		7.05		6.01	
10 PERCENT EXCEEDS	728		648		591	
50 PERCENT EXCEEDS	207		238		195	
90 PERCENT EXCEEDS	113		135		120	

e Estimated



## SPOKANE RIVER BASIN

12432500 LONG LAKE AT LONG LAKE, WA

LOCATION.--Lat 47°50'12", long 117°50'20", in NW 1/4 SW 1/4 sec.13, T.27 N., R.39 E., Lincoln County, Hydrologic Unit 17010307, at left end of spillway at Long Lake Dam on Spokane River, 12.0 mi north of Reardan, and at mile 33.9.

DRAINAGE AREA.--6,020 mi<sup>2</sup>, approximately, of which about 122 mi<sup>2</sup> in the vicinity of Hayden Lake is noncontributing to this station.

PERIOD OF RECORD.--October 1913 to current year. Prior to October 1950 monthend contents only, published in WSP 1316. October 1950 to September 1977 monthend stage and contents only.

REVISED RECORDS.--WSP 1736: Monthend contents for 1916-33 corrected. WSP 1933: Drainage area.

GAGE.--Water-stage recorder with remote indicator in powerhouse. Datum of gage is sea level (levels by Washington Water Power Co.).

REMARKS.--Reservoir is formed by concrete dam, completed in 1913 and raised in 1950. Capacity, 104,200 acre-ft between elevations 1,512 ft and 1,536 ft, normal limits of operation. Contents at elevation 1,512 ft by capacity table used prior to October 1915, 148,600 acre-ft. Records given herein represent usable contents. Water used for power. About 25,000 acres irrigated upstream from station, largely from wells in the Spokane Valley. Flow regulated by Coeur d'Alene Lake and powerplants along Spokane River.

COOPERATION.--Lake elevations and capacity table furnished by Washington Water Power Co. Records not reviewed.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 107,600 acre-ft Jan. 16, 1974, elevation, 1,536.67 ft; minimum contents, since filling reservoir in 1920, 214 acre-ft Feb. 16, 1985, elevation, 1,512.06 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 104,200 acre-ft Nov. 8, elevation, 1,535.99 ft; minimum contents, 91,210 acre-ft Feb. 16, elevation, 1,533.38 ft.

Capacity table (elevation, in feet and usable contents, in acre-feet)  
(Based on data furnished by Washington Water Power Company)

1,512	0	1,526	56,330	1,534	94,240
1,513	3,570	1,528	65,460	1,535	99,190
1,517	18,640	1,531	79,740	1,536	104,200
1,520	30,550	1,532	84,540	1,537	109,300
1,522	38,880	1,533	89,360		

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1535.47	1535.72	1534.16	1535.54	1535.34	1533.70	1535.60	1534.69	1535.34	1535.44	1535.66	1535.45
2	1535.37	1535.72	1535.31	1535.45	1535.34	1533.72	1535.50	1534.75	1535.41	1535.31	1535.53	1535.59
3	1535.57	1535.66	1534.72	1535.66	1535.38	1533.66	1535.53	1534.81	1535.38	1534.91	1535.70	1535.55
4	1535.56	1535.62	1534.31	1535.69	1535.38	1533.63	1535.53	1534.84	1535.38	1535.40	1535.60	1535.70
5	1535.46	1535.63	1535.50	1535.72	1535.34	1533.53	1535.53	1535.13	1535.34	1535.15	1535.56	1535.59
6	1535.57	1535.66	1534.47	1535.75	1535.31	1533.53	1535.53	1535.19	1535.53	1535.47	1535.78	1535.53
7	1535.47	1535.92	1534.72	1535.72	1535.41	1533.59	1535.53	1535.06	1535.59	1535.50	1535.61	1535.53
8	1535.50	1535.94	1534.84	1535.69	1535.09	1533.53	1535.56	1535.16	1535.56	1535.41	1535.50	1535.47
9	1535.51	1535.91	1534.59	1535.48	1534.19	1533.66	1535.63	1535.22	1535.53	1535.38	1535.55	1535.38
10	1535.44	1535.88	1534.72	1535.55	1533.94	1533.56	1535.47	1535.30	1535.56	1535.44	1535.72	1535.56
11	1535.47	1535.78	1534.81	1535.47	1533.69	1533.69	1535.34	1535.25	1535.66	1535.41	1535.70	1535.56
12	1535.44	1535.70	1534.81	1535.53	1533.72	1533.53	1535.34	1535.50	1535.66	1535.31	1535.69	1535.65
13	1535.45	1535.17	1534.84	1535.54	1533.66	1533.66	1535.30	1535.38	1535.75	1535.34	1535.50	1535.52
14	1535.44	1534.35	1534.77	1535.50	1533.75	1534.16	1535.38	1535.34	1535.81	1535.28	1535.38	1535.50
15	1535.66	1534.98	1534.90	1535.51	1533.59	1533.94	1535.40	1535.47	1535.84	1535.19	1535.41	1535.60
16	1535.66	1535.47	1534.84	1535.66	1533.38	1534.19	1535.28	1535.31	1535.84	1535.42	1535.44	1535.56
17	1535.76	1535.50	1534.84	1535.59	1533.41	1534.84	1535.28	1535.31	1535.75	1535.40	1535.47	1535.63
18	1535.66	1535.50	1534.79	1535.53	1533.47	1535.41	1535.31	1535.40	1535.69	1535.53	1535.66	1535.60
19	1535.66	1535.56	1535.13	1535.58	1533.44	1535.47	1535.30	1535.40	1535.69	1535.59	1535.72	1535.47
20	1535.69	1535.56	1535.16	1535.50	1534.00	1535.44	1535.28	1535.40	1535.84	1535.50	1535.65	1535.28
21	1535.59	1535.60	1535.13	1535.41	1533.80	1535.50	1535.25	1535.06	1535.75	1535.20	1535.56	1535.40
22	1535.55	1535.55	1535.13	1535.50	1533.69	1535.50	1535.25	1535.03	1535.75	1535.52	1535.34	1535.40
23	1535.53	1535.55	1535.05	1535.56	1533.59	1535.50	1535.31	1535.03	1535.75	1535.59	1535.34	1535.28
24	1535.47	1535.50	1535.22	1535.47	1533.63	1535.44	1535.41	1535.00	1535.72	1535.56	1535.56	1535.25
25	1535.41	1535.50	1535.29	1535.44	1533.66	1535.53	1534.88	1535.00	1535.75	1535.35	1535.58	1535.31
26	1535.35	1535.59	1535.16	1535.44	1533.65	1535.50	1534.69	1535.03	1535.63	1535.35	1535.72	1535.31
27	1535.34	1535.50	1535.47	1535.53	1533.56	1535.47	1534.69	1535.13	1535.81	1535.53	1535.66	1535.45
28	1535.50	1534.88	1535.47	1535.50	1533.59	1535.53	1534.66	1535.40	1535.72	1535.63	1535.59	1535.68
29	1535.71	1534.14	1535.44	1535.47	1533.66	1535.44	1534.66	1535.41	1535.88	1535.59	1535.69	1535.54
30	1535.84	1533.45	1535.41	1535.41	--	1535.50	1534.66	1535.34	1535.84	1535.60	1535.63	1535.55
31	1535.81	--	1535.50	1535.41	--	1535.53	--	1535.31	--	1535.60	1535.53	--
MAX	1535.84	1535.94	1535.50	1535.75	1535.41	1535.53	1535.63	1535.50	1535.88	1535.63	1535.78	1535.70
MIN	1535.34	1533.45	1534.16	1535.41	1533.38	1533.53	1534.66	1534.69	1535.34	1534.91	1535.34	1535.25
(†)	103300	91550	101700	101300	92580	101900	97510	100800	103400	102200	101900	102000
(†)	+3300	-11750	+10150	-400	-8720	+9320	-4390	+3290	+2600	-1200	-300	+100

CAL YR 1995 MAX 1535.94 MIN 1533.45 AC-FT† +1300  
WTR YR 1996 MAX 1535.94 MIN 1533.38 AC-FT† +2000

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

## SPOKANE RIVER BASIN

323

## 12433000 SPOKANE RIVER AT LONG LAKE, WA

LOCATION.--Lat 47°50'12", long 117°50'25", in NW 1/4 SW 1/4 sec.13, T.27 N., R.39 E., Lincoln County, Hydrologic Unit 17010307, on left bank at Long Lake powerhouse, 1.4 mi upstream from Chamokane Creek, 12.0 mi north of Reardan, and at mile 33.88.

DRAINAGE AREA.--6,020 mi<sup>2</sup>, approximately, of which about 122 mi<sup>2</sup> in the vicinity of Hayden Lake is noncontributing to this station.

PERIOD OF RECORD.--April 1939 to current year.

REVISED RECORDS.--WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,299.00 ft above sea level (levels by Washington Water Power Co.). Oct. 1, 1978, to Sept. 30, 1981, incorrectly published at datum 1,300 ft.

REMARKS.--Flow regulated by Coeur d'Alene Lake and Long Lake (station 12432500) for powerplants of Washington Water Power Co. About 25,000 acres irrigated upstream from station, largely from wells in the Spokane Valley. Chemical analyses October 1958 to September 1986. Specific conductance records March 1973 to September 1981. Water temperature July 1959 to September 1962, October 1966 to September 1970, March 1973 to September 1981.

COOPERATION.--Discharge records furnished by Washington Water Power Co.; three discharge measurements made by U.S. Geological Survey.

AVERAGE DISCHARGE.--57 years (water years 1940-96), 7,725 ft<sup>3</sup>/s, 5,597,000 acre-ft/yr, adjusted for storage in Long Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,700 ft<sup>3</sup>/s Jan. 19, 1974, gage height, 78.40 ft; maximum recorded gage height, 78.66 ft May 24, 1948; minimum daily discharge, 90 ft<sup>3</sup>/s Oct. 23, 1994.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 39,000 ft<sup>3</sup>/s Feb. 13 (measured), gage height, 74.30 ft; maximum gage height, 74.63 ft Feb. 12 (backwater from Little Falls Dam); minimum discharge, 150 ft<sup>3</sup>/s Aug. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1880	4590	18800	11100	8870	21900	11500	27300	18500	6130	1890	2160
2	2710	4590	20900	11000	8490	20900	12700	26000	17200	5110	2490	1550
3	2820	4620	28600	9620	7610	20100	12100	25000	16600	5400	1930	1780
4	3330	4540	29300	10300	7670	19400	12200	24100	16400	2880	2560	1470
5	3340	4540	28200	9800	7670	19200	12200	22200	16200	4510	2520	2020
6	2880	4550	28300	9610	7580	17000	12200	21800	14900	3960	1850	2030
7	3330	4600	26200	9720	14800	16300	12200	21000	14300	4160	2640	1810
8	2870	4800	25700	12300	25800	15600	12200	19400	13900	4490	2330	2410
9	3130	4970	25500	12500	35400	15600	12400	18500	12800	4310	1760	2510
10	3340	5050	22500	11800	34600	16200	14400	16900	11300	3630	1630	2280
11	3270	5540	22500	11900	35000	15900	15200	17200	9390	3810	1840	2510
12	3280	5500	22500	11400	38700	15900	16500	15200	7610	4040	2230	2560
13	3400	5940	23600	11400	38600	15200	17300	15900	8770	3840	2830	2870
14	3670	6640	22700	11500	36900	13800	17700	15300	7600	3630	2740	3120
15	3340	6950	22400	11400	35900	15800	17900	15300	6190	3580	1960	2410
16	3480	8420	23200	11700	33900	14200	18500	16800	7070	2660	2260	2660
17	3680	10800	22700	12500	32000	12900	17900	17100	8470	3210	2080	2930
18	3820	10600	22200	13500	32400	13200	18400	17900	8470	2620	1650	2850
19	3870	10600	20400	13100	34100	14500	18400	19100	8150	2830	1610	3190
20	4320	10900	20400	14600	32300	14600	18800	20000	6680	3310	1670	3360
21	4540	10700	19900	14600	35300	13800	18500	21900	6970	3460	2160	2730
22	4550	10400	18900	13800	35000	13800	18300	21600	7080	1910	2330	2690
23	4540	10000	18300	13700	33200	13600	18200	21600	7860	2080	1850	3440
24	4540	10000	16400	13600	31600	13400	21100	21600	7710	2380	1380	3040
25	4620	9910	15800	12800	29800	13100	26100	21100	7350	3080	1590	2240
26	4550	9880	15500	12300	28200	12900	27000	20600	6710	2510	2270	2970
27	4550	11500	13000	11200	27100	12500	28600	20000	6160	1960	2110	2500
28	4030	15500	12700	11200	24900	12000	29600	19000	7660	2430	2060	2310
29	4030	17100	12400	10300	23300	12000	29100	19500	5790	2820	1740	3270
30	4110	18400	12000	9920	--	11500	28600	19500	5840	2240	1890	3160
31	4600	--	11200	9450	--	11300	--	18800	--	2260	2040	--
TOTAL	114420	252130	642700	363620	776690	468100	545800	617200	299630	105240	63890	76830
MEAN	3691	8404	20730	11730	26780	15100	18190	19910	9988	3395	2061	2561
MAX	4620	18400	29300	14600	38700	21900	29600	27300	18500	6130	2830	3440
MIN	1880	4540	11200	9450	7580	11300	11500	15200	5790	1910	1380	1470
AC-FT	227000	500100	1275000	721200	1541000	928500	1083000	1224000	594300	208700	126700	152400
MEAN†	3745	8210	20894	11720	26626	15249	18138	19951	10034	3374	2055	2564
CFSM†	0.62	1.36	3.47	1.95	4.42	2.53	3.01	3.31	1.67	0.56	0.34	0.43
IN.†	0.72	1.52	4.00	2.25	4.77	2.92	3.36	3.82	1.86	0.65	0.39	0.47
AC-FT†	230300	488400	1285000	720800	1532000	937800	1079000	1227000	596900	207500	126400	152500

CAL YR 1995 TOTAL 3419322 MEAN 9368 MAX 29300 MIN 180 AC-FT 6782000 MEAN† 9367 CFSM† 1.56 IN.† 21.13 AC-FT† 6783000  
WTR YR 1996 TOTAL 4326250 MEAN 11820 MAX 38700 MIN 1380 AC-FT 8581000 MEAN† 11827 CFSM† 1.96 IN.† 26.73 AC-FT† 8583000

† Adjusted for change in contents in Long Lake.

## SPOKANE RIVER BASIN

12433200 CHAMOKANE CREEK BELOW FALLS, NEAR LONG LAKE, WA

LOCATION.--Lat 47°51'42", long 117°51'28", in SE 1/4 SW 1/4 sec.2, T.27 N., R. 39 E., Stevens County, Hydrologic Unit 17010307, Spokane Indian Reservation, on right bank 800 ft downstream from Chamokane Falls, 1.4 mi upstream from mouth, at mile 1.6, and 1.8 mi north of town of Long Lake.

DRAINAGE AREA.--179 mi<sup>2</sup>.

PERIOD OF RECORD.--February 1971 to September 1978, April 1984 to September 1987 (seasonal records), October 1987 to current year.

GAGE.--Water-stage recorder. Datum of gage is 1,418.5 ft above sea level.

REMARKS.--Records excellent except for estimated daily discharges, which are good. No known regulation. Diversions upstream for irrigation, domestic use, and fish hatchery. Pumpage from ground-water wells can cause small fluctuations in discharge. Water temperature records April 1984 to September 1987 (seasonal records); October 1987 to September 1989.

AVERAGE DISCHARGE.--16 years (water years 1972-78, 1988-96), 53.5 ft<sup>3</sup>/s, 4.06 in/yr, 38,770 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 2,200 ft<sup>3</sup>/s Apr. 25, 1975, gage height, 5.06 ft, from rating curve extended above 500 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum discharge, 9.4 ft<sup>3</sup>/s Dec. 30, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 873 ft<sup>3</sup>/s Apr. 24, gage height, 3.67 ft; minimum daily discharge, 24 ft<sup>3</sup>/s Dec. 9, result of freezeup.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	30	28	30	30	e25	e120	131	166	71	e44	e33	32
2	29	28	29	30	e25	120	163	151	68	42	e36	30
3	35	28	28	30	e28	119	141	146	64	41	e32	30
4	30	28	29	30	e30	117	126	137	61	40	e30	31
5	29	28	28	28	e35	105	119	125	58	39	e30	32
6	29	29	27	28	e45	100	118	118	54	38	e30	32
7	29	30	e26	31	e50	96	124	112	52	38	e30	32
8	29	30	e25	32	56	95	131	104	51	37	e30	32
9	29	30	e24	35	67	101	134	99	49	36	e31	31
10	29	29	e26	35	92	117	134	95	48	36	e32	31
11	32	31	30	34	115	165	131	90	48	35	e32	31
12	30	30	41	33	110	204	129	88	47	e35	e32	32
13	30	31	122	32	e125	217	119	88	46	e35	e32	32
14	29	30	162	33	138	218	109	87	45	e35	e33	32
15	29	29	122	48	122	232	102	88	44	e35	e33	33
16	30	29	104	115	114	245	107	88	43	e35	e32	32
17	31	29	83	89	121	236	150	85	43	e36	e32	32
18	29	29	63	75	159	222	134	88	43	e35	e32	32
19	28	27	61	58	363	212	138	84	43	e35	e32	34
20	29	27	52	60	731	204	124	79	43	e35	e32	34
21	29	27	47	55	637	192	125	77	42	e35	e34	33
22	28	27	43	52	458	185	116	90	45	e35	e36	33
23	28	28	35	50	359	177	169	127	45	e34	e34	32
24	28	28	33	48	299	159	619	108	49	e34	e34	32
25	29	34	31	46	249	137	625	93	e48	e34	e34	32
26	29	29	28	42	e190	134	423	85	e46	e34	e34	32
27	28	30	29	41	e140	125	324	80	e50	e33	e35	32
28	28	34	29	e36	e120	117	259	75	e48	e33	e35	32
29	28	31	29	e30	e115	112	219	75	e46	e33	36	32
30	27	29	30	e28	---	105	190	78	e45	e33	35	32
31	28	---	30	e25	---	103	---	77	---	e33	34	---
TOTAL	905	879	1476	1339	5118	4791	5633	3083	1485	1113	1017	959
MEAN	29.2	29.3	47.6	43.2	176	155	188	99.5	49.5	35.9	32.8	32.0
MAX	35	34	162	115	731	245	625	166	71	44	36	34
MIN	27	27	24	25	25	95	102	75	42	33	30	30
AC-FT	1800	1740	2930	2660	10150	9500	11170	6120	2950	2210	2020	1900
CFSM	.16	.16	.27	.24	.99	.86	1.05	.56	.28	.20	.18	.18
IN.	.19	.18	.31	.28	1.06	1.00	1.17	.64	.31	.23	.21	.20

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971 - 1996, BY WATER YEAR (WY)

	MEAN	26.5	27.7	43.7	45.7	66.7	129	145	58.6	33.1	26.4	25.3	25.7
MAX	40.3	47.5	236	221	232	355	564	257	67.9	45.9	41.4	39.1	39.1
(WY)	1976	1974	1974	1974	1995	1995	1975	1975	1975	1975	1975	1975	1975
MIN	18.9	19.1	17.1	17.4	21.2	29.9	22.6	19.6	19.4	18.2	18.4	18.1	18.1
(WY)	1993	1993	1993	1993	1994	1977	1992	1992	1994	1994	1994	1994	1990

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1971 - 1996

ANNUAL TOTAL	30852	27798	
ANNUAL MEAN	84.5	76.0	53.5
HIGHEST ANNUAL MEAN			141
LOWEST ANNUAL MEAN			25.8
HIGHEST DAILY MEAN	915	731	1430
LOWEST DAILY MEAN	20	24	15
ANNUAL SEVEN-DAY MINIMUM	24	26	16
ANNUAL RUNOFF (AC-FT)	61190	55140	38770
ANNUAL RUNOFF (CFSM)	.47	.42	.30
ANNUAL RUNOFF (INCHES)	6.41	5.78	4.06
10 PERCENT EXCEEDS	202	147	108
50 PERCENT EXCEEDS	30	36	28
90 PERCENT EXCEEDS	25	29	20

e Estimated

## 12433542 BLUE CREEK ABOVE MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA

LOCATION.--Lat 47°55'28", long 118°05'18", in NW 1/4 SE 1/4 sec.13, T.28 N., R.37 E., Stevens County, Hydrologic Unit 17010307, Spokane Indian Reservation, on right bank, 2.4 mi downstream from Turtle Lake, and 5.4 mi northwest of Wellpinit.

DRAINAGE AREA.--6.0 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1984 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,070 ft above sea level, from topographic map.

REMARKS.--Records fair except for estimated daily discharges and discharges below 0.2 ft<sup>3</sup>/s, which are poor. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--12 years (water years 1985-96), 1.02 ft<sup>3</sup>/s, 2.31 in/yr, 739 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 33 ft<sup>3</sup>/s Mar. 20, 1995, gage height, 2.33 ft; minimum discharge, 0.01 ft<sup>3</sup>/s Aug. 12, 13, 1992, gage height, 0.86 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20 ft<sup>3</sup>/s Feb. 20, gage height, 2.02 ft; minimum daily discharge, 0.06 ft<sup>3</sup>/s Jan. 30, 31, Feb. 1, 2, result of freeze-up.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.18	.18	.27	e.30	e.06	11	8.2	4.6	2.1	.52	.19	.14
2	.16	.23	.23	e.30	e.06	11	7.4	4.5	1.9	.44	.19	.14
3	.25	.25	.22	e.25	e.08	10	7.0	4.5	1.7	.41	.19	.14
4	.16	.25	e.20	e.20	e.20	10	6.8	4.5	1.6	.39	.19	.14
5	.14	.20	e.18	e.20	e.80	9.1	6.6	4.3	1.5	.36	.21	.14
6	.15	.19	e.13	e.25	e1.5	8.6	6.2	3.9	1.4	.36	.19	.14
7	.15	.20	e.10	e.30	e2.0	8.2	6.2	3.6	1.4	.35	.19	.14
8	.14	.25	e.10	e.35	e2.8	8.0	6.2	3.5	1.4	.33	.18	.14
9	.14	.20	e.15	.33	e3.5	8.5	6.0	3.4	1.3	.32	.17	.14
10	.14	.18	e.15	.31	e2.5	8.9	5.8	3.4	1.3	.31	.17	.13
11	.19	.20	e.20	.31	e2.0	9.2	5.7	3.5	1.3	.30	.17	.12
12	.17	.18	e.30	.31	e2.2	9.2	5.6	3.5	1.2	.28	.17	.12
13	.17	.23	e.36	.31	e2.4	9.3	5.4	3.5	1.1	.27	.16	.12
14	.15	.21	e.40	.32	e2.4	9.6	5.3	3.4	1.1	.27	.16	.12
15	.14	.19	.40	.45	e2.4	10	5.1	3.4	1.1	.26	.15	.13
16	.16	.19	.37	.43	2.9	11	5.1	3.4	1.0	.26	.15	.12
17	.18	.19	.36	e.35	3.8	11	5.1	3.5	1.0	.26	.14	.12
18	.19	.19	.34	e.25	5.9	11	5.2	3.3	1.0	.26	.15	.12
19	.19	.17	.34	e.25	14	11	5.0	3.3	.98	.26	.15	.15
20	.19	.17	.34	e.30	18	11	4.8	3.3	.98	.26	.15	.15
21	.19	.17	.34	e.30	18	11	4.7	3.3	.98	.23	.15	.12
22	.19	.17	.33	e.30	17	10	4.7	3.7	1.0	.21	.15	.12
23	.19	.20	e.30	e.30	17	10	5.3	3.5	.98	.22	.14	.12
24	.19	.20	e.25	e.30	16	9.6	5.3	3.1	1.0	.21	.14	.12
25	.20	.28	e.20	e.25	15	9.1	4.9	2.9	.95	.20	.14	.12
26	.20	.21	e.20	e.20	14	9.0	5.0	2.8	.86	.20	.14	.12
27	.19	.21	e.20	e.20	14	8.5	4.8	2.7	1.0	.20	.14	.12
28	.19	.27	e.20	e.10	13	8.0	4.7	2.5	.87	.19	.14	.12
29	.18	.30	e.25	e.08	12	7.8	4.7	2.4	.72	.19	.14	.12
30	.18	.25	e.25	e.06	---	7.4	4.7	2.2	.62	.19	.14	.12
31	.17	---	e.30	e.06	---	7.3	---	2.1	---	.19	.14	---
TOTAL	5.41	6.31	7.96	8.22	205.50	293.3	167.5	105.5	35.34	8.70	4.98	3.86
MEAN	.17	.21	.26	.27	7.09	9.46	5.58	3.40	1.18	.28	.16	.13
MAX	.25	.30	.40	.45	.18	11	8.2	4.6	2.1	.52	.21	.15
MIN	.14	.17	.10	.06	.06	7.3	4.7	2.1	.62	.19	.14	.12
AC-FT	.11	.13	.16	.16	.408	582	332	209	.70	.17	9.9	7.7
CFSM	.03	.04	.04	.04	1.18	1.58	.93	.57	.20	.05	.03	.02
IN.	.03	.04	.05	.05	1.27	1.82	1.04	.65	.22	.05	.03	.02

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	.16	.20	.20	.49	1.86	3.94	2.95	1.24	.65	.33	.18	.14	
MAX	.23	.37	.34	3.62	12.4	17.2	6.16	3.40	1.18	.65	.36	.24	
(WY)	1985	1985	1988	1995	1995	1995	1995	1996	1996	1984	1984	1984	
MIN	.11	.10	.13	.14	.16	.34	.34	.30	.17	.10	.080	.078	
(WY)	1989	1994	1993	1989	1990	1990	1990	1992	1992	1994	1992	1994	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1984 - 1996
ANNUAL TOTAL	1299.96	852.58	
ANNUAL MEAN	3.56	2.33	1.02
HIGHEST ANNUAL MEAN			3.56
LOWEST ANNUAL MEAN			.19
HIGHEST DAILY MEAN	31 Mar 21	18 Feb 20	31 Mar 21 1995
LOWEST DAILY MEAN	.10 Dec 7	.06 Jan 30	.05 Nov 24 1993
ANNUAL SEVEN-DAY MINIMUM	.14 Sep 12	.07 Jan 28	.06 Aug 14 1992
ANNUAL RUNOFF (AC-FT)	2580	1690	739
ANNUAL RUNOFF (CFSM)	.59	.39	.17
ANNUAL RUNOFF (INCHES)	8.06	5.29	2.31
10 PERCENT EXCEEDS	12	8.3	2.1
50 PERCENT EXCEEDS	.42	.30	.23
90 PERCENT EXCEEDS	.16	.14	.12

e Estimated

12433542 BLUE CREEK ABOVE MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--1980, June 1984 to December 1988, June 1989 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 1984 to December 1988, June 1989 to current year.

pH: July 1984 to December 1988, June 1989 to current year.

WATER TEMPERATURE: June 1984 to December 1988, June 1989 to current year.

INSTRUMENTATION.--Water-quality monitor since June 1984. Electronic data logger, with thirty-minute recording interval. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 255 microsiemens Jan. 2, 1995; minimum recorded, 77 microsiemens

Mar. 16, 1996, but may have been lower during periods of missing record.

pH: Maximum recorded, 9.5 units, July 6, 7, 1986, but may have been higher during periods of missing record;

minimum recorded, 6.2 units June 13, 1986, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum recorded, 23.0°C July 9, 1985, but may have been higher during periods of missing

record that year, July 24, 25, 1994; minimum, 0.0°C on many days during winters.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 243 microsiemens Dec. 8; minimum, 77 microsiemens Mar. 16.

pH: Maximum recorded, 8.0 units several days in October to December; minimum recorded, 7.2 units Mar. 28-31

(more than 20 percent missing record).

WATER TEMPERATURE: Maximum, 17.5°C July 15, 26-28; minimum, 0.0°C during many days October to February.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	136	126	132	169	158	163	183	171	177	130	127	129
2	137	128	132	173	162	167	188	181	185	131	128	129
3	135	117	127	170	159	164	190	178	186	132	128	130
4	139	134	136	164	154	159	196	171	180	129	127	128
5	137	135	135	162	154	157	207	191	196	128	112	122
6	138	132	136	158	154	156	208	191	198	130	127	129
7	139	130	136	158	148	154	217	187	194	129	113	123
8	141	138	139	154	145	150	243	217	234	130	128	130
9	141	140	140	163	151	158	240	207	229	132	129	131
10	144	141	142	168	159	163	207	164	188	130	128	129
11	144	133	138	161	149	154	164	140	150	129	128	129
12	144	141	143	164	161	163	151	117	137	129	128	129
13	145	143	144	163	148	156	158	140	150	129	128	129
14	145	144	145	167	160	163	161	147	154	130	123	129
15	145	144	145	183	166	170	162	151	158	132	123	128
16	148	145	146	173	169	171	165	162	164	137	132	135
17	150	141	145	175	171	174	169	165	167	142	136	138
18	147	144	146	175	169	172	170	167	168	142	136	139
19	146	144	145	191	173	174	167	163	165	137	134	136
20	145	143	144	191	172	175	166	159	162	136	133	134
21	147	144	144	178	169	174	160	155	158	135	132	133
22	146	144	144	175	171	172	157	153	155	136	133	134
23	146	143	145	176	158	169	161	148	153	135	132	133
24	147	145	146	175	155	172	169	152	157	137	132	133
25	147	143	146	173	148	163	160	151	156	134	133	133
26	150	144	148	174	171	173	158	149	154	133	131	132
27	149	147	148	175	161	170	151	142	147	133	130	132
28	149	148	149	171	161	164	142	134	138	133	130	130
29	151	148	149	174	165	169	134	131	132	136	130	133
30	159	149	154	184	174	180	131	125	130	139	133	137
31	165	154	159	---	---	---	130	128	129	138	132	136
MONTH	165	117	143	191	145	166	243	117	166	142	112	131



## SPOKANE RIVER BASIN

327

12433542 BLUE CREEK ABOVE MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	136	131	134	93	82	88	95	84	90	98	93	96
2	134	131	133	93	83	89	94	80	86	98	94	96
3	133	130	132	93	84	89	90	83	87	98	94	96
4	---	---	---	96	81	90	88	81	85	100	95	97
5	124	121	124	95	84	88	90	81	86	99	95	97
6	123	115	120	90	82	87	91	84	89	100	96	98
7	125	120	124	95	86	90	94	84	88	101	96	98
8	127	120	123	94	86	89	98	88	91	101	96	98
9	133	127	130	94	86	90	92	87	90	102	97	99
10	135	129	131	94	84	89	93	87	91	105	99	101
11	131	127	129	97	90	92	93	91	92	103	99	101
12	127	124	126	97	85	92	93	91	92	111	100	102
13	126	120	123	100	90	93	94	91	92	105	101	102
14	124	112	116	96	85	91	94	91	93	105	102	103
15	123	115	119	99	84	94	95	91	93	107	102	104
16	116	112	114	98	77	89	95	92	93	108	102	105
17	113	108	111	93	84	88	95	92	94	108	104	106
18	113	101	107	95	87	90	95	92	94	107	104	106
19	101	81	89	93	86	89	96	93	94	109	104	106
20	90	82	87	92	84	89	97	93	95	109	103	106
21	89	82	86	97	87	90	97	93	95	110	104	106
22	93	84	88	97	88	94	97	94	95	118	104	110
23	90	87	89	96	86	91	97	94	95	114	108	111
24	95	87	91	94	85	90	98	93	95	122	109	112
25	91	83	86	95	86	90	97	94	95	119	110	112
26	92	84	89	94	87	90	96	93	95	121	110	113
27	94	80	87	97	86	91	96	93	95	115	111	113
28	93	84	88	93	87	90	98	93	95	118	113	114
29	93	84	89	92	84	88	106	93	96	123	114	117
30	---	---	---	94	84	88	98	94	95	118	114	116
31	---	---	---	97	89	93	---	---	---	131	114	116
MONTH	---	---	---	100	77,	90	106	80	92	131	93	105

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	131	117	125	126	118	120	115	114	115	122	118	119
2	137	119	125	123	117	119	115	113	114	121	117	119
3	136	123	128	121	117	120	118	113	114	123	120	121
4	133	120	125	122	117	119	116	113	114	123	119	120
5	127	116	119	120	117	118	120	113	118	122	119	121
6	123	118	120	121	118	120	120	117	118	127	120	122
7	132	120	125	122	118	120	118	117	117	126	122	123
8	125	118	121	126	118	121	118	115	117	126	121	124
9	124	117	120	123	118	120	118	116	117	128	123	124
10	125	117	120	122	118	120	118	116	117	126	122	124
11	126	117	119	122	118	120	118	115	117	126	120	123
12	125	118	121	122	118	120	116	114	115	125	120	122
13	130	119	123	122	118	120	116	113	114	125	122	123
14	132	117	120	121	117	119	117	114	115	124	121	123
15	124	115	119	121	116	118	119	114	116	128	121	124
16	122	116	119	119	114	117	118	113	115	125	119	122
17	127	114	118	118	113	115	116	113	114	122	119	120
18	116	112	114	118	114	116	114	112	113	123	120	121
19	116	113	114	117	114	115	114	111	112	126	115	121
20	120	114	115	117	113	115	115	113	114	130	114	126
21	118	111	116	118	114	116	115	113	114	131	128	129
22	117	111	115	118	114	116	116	113	113	131	128	129
23	120	114	117	119	115	116	116	113	114	131	129	130
24	121	115	118	119	114	116	117	113	115	133	130	131
25	127	115	119	118	115	117	116	113	115	135	132	133
26	117	111	114	118	116	117	117	114	115	137	133	134
27	124	111	114	118	115	116	119	115	116	138	135	136
28	132	121	126	118	116	117	122	119	120	139	135	137
29	123	118	120	119	116	117	122	118	120	140	135	137
30	121	117	120	119	116	118	123	119	121	141	136	139
31	---	---	---	118	115	117	123	118	120	---	---	---
MONTH	137	111	120	126	113	118	123	111	116	141	114	126

## SPOKANE RIVER BASIN

12433542 BLUE CREEK ABOVE MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	7.8	7.7	7.7	7.9	7.8	7.8	8.0	7.9	7.9	---	---	---
2	7.8	7.7	7.7	7.8	7.7	7.7	8.0	7.9	8.0	---	---	---
3	7.8	7.7	7.7	7.7	7.7	7.7	8.0	7.9	8.0	---	---	---
4	7.8	7.7	7.7	7.8	7.7	7.7	8.0	7.9	7.9	---	---	---
5	7.8	7.7	7.7	7.8	7.8	7.8	7.9	7.8	7.9	---	---	---
6	7.8	7.7	7.7	7.9	7.8	7.8	7.8	7.8	7.8	---	---	---
7	7.8	7.7	7.8	7.9	7.8	7.8	7.9	7.7	7.8	---	---	---
8	7.8	7.8	7.8	7.9	7.8	7.8	7.7	7.5	7.6	---	---	---
9	7.8	7.8	7.8	7.9	7.9	7.9	7.5	7.4	7.4	---	---	---
10	7.8	7.8	7.8	7.9	7.9	7.9	7.5	7.4	7.5	---	---	---
11	7.8	7.7	7.8	7.9	7.9	7.9	7.6	7.5	7.6	---	---	---
12	7.8	7.8	7.8	7.9	7.9	7.9	7.7	7.6	7.7	---	---	---
13	7.8	7.8	7.8	7.9	7.9	7.9	7.7	7.7	7.7	---	---	---
14	7.8	7.8	7.8	7.9	7.9	7.9	7.7	7.7	7.7	---	---	---
15	7.8	7.8	7.8	7.9	7.9	7.9	---	---	---	---	---	---
16	7.8	7.7	7.8	7.9	7.9	7.9	---	---	---	---	---	---
17	7.8	7.8	7.8	7.9	7.9	7.9	---	---	---	---	---	---
18	7.9	7.8	7.8	7.9	7.9	7.9	---	---	---	---	---	---
19	7.9	7.8	7.9	8.0	7.9	7.9	---	---	---	---	---	---
20	7.9	7.8	7.9	7.9	7.9	7.9	---	---	---	---	---	---
21	7.9	7.9	7.9	8.0	7.9	7.9	---	---	---	---	---	---
22	7.9	7.9	7.9	8.0	7.9	7.9	---	---	---	---	---	---
23	7.9	7.9	7.9	7.9	7.9	7.9	---	---	---	---	---	---
24	7.9	7.9	7.9	7.9	7.9	7.9	---	---	---	---	---	---
25	7.9	7.9	7.9	8.0	7.9	7.9	---	---	---	---	---	---
26	7.9	7.9	7.9	8.0	7.9	8.0	---	---	---	---	---	---
27	8.0	7.9	7.9	8.0	7.9	8.0	---	---	---	---	---	---
28	8.0	7.9	7.9	7.9	7.9	7.9	---	---	---	---	---	---
29	7.9	7.9	7.9	8.0	7.9	7.9	---	---	---	---	---	---
30	7.9	7.9	7.9	8.0	7.9	8.0	---	---	---	---	---	---
31	7.9	7.8	7.9	---	---	---	---	---	---	---	---	---
MAX	8.0	7.9	7.9	8.0	7.9	8.0	---	---	---	---	---	---
MIN	7.8	7.7	7.7	7.7	7.7	7.7	---	---	---	---	---	---

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	7.7	7.6	7.6	7.5	7.4	7.4	---	---	---
2	---	---	---	7.7	7.6	7.6	7.6	7.3	7.4	---	---	---
3	---	---	---	7.7	7.6	7.6	7.6	7.3	7.4	---	---	---
4	---	---	---	7.7	7.6	7.7	7.7	7.3	7.4	---	---	---
5	---	---	---	7.7	7.6	7.7	7.8	7.4	7.5	---	---	---
6	---	---	---	7.7	7.6	7.7	7.7	7.4	7.5	---	---	---
7	---	---	---	7.7	7.6	7.7	7.8	7.4	7.6	---	---	---
8	---	---	---	7.7	7.7	7.7	7.9	7.4	7.6	---	---	---
9	---	---	---	7.7	7.7	7.7	7.9	7.4	7.6	---	---	---
10	---	---	---	7.7	7.7	7.7	7.7	7.4	7.5	---	---	---
11	---	---	---	7.7	7.7	7.7	---	---	---	---	---	---
12	---	---	---	7.7	7.7	7.7	---	---	---	---	---	---
13	---	---	---	7.7	7.7	7.7	---	---	---	---	---	---
14	---	---	---	7.7	7.7	7.7	---	---	---	---	---	---
15	7.6	7.5	7.6	7.8	7.7	7.7	---	---	---	---	---	---
16	7.6	7.6	7.6	7.8	7.7	7.7	---	---	---	---	---	---
17	7.6	7.5	7.6	7.8	7.7	7.7	---	---	---	---	---	---
18	7.6	7.5	7.6	7.8	7.7	7.7	---	---	---	---	---	---
19	7.6	7.4	7.5	7.8	7.7	7.8	---	---	---	---	---	---
20	7.6	7.5	7.6	7.8	7.7	7.8	---	---	---	---	---	---
21	7.6	7.6	7.6	7.8	7.7	7.7	---	---	---	---	---	---
22	7.6	7.5	7.6	7.8	7.6	7.7	---	---	---	---	---	---
23	7.6	7.5	7.6	7.7	7.6	7.6	---	---	---	---	---	---
24	7.6	7.5	7.6	7.6	7.4	7.6	---	---	---	---	---	---
25	7.6	7.6	7.6	7.6	7.4	7.5	---	---	---	---	---	---
26	7.7	7.6	7.6	7.6	7.4	7.4	---	---	---	---	---	---
27	7.7	7.6	7.6	7.5	7.3	7.4	---	---	---	---	---	---
28	7.7	7.6	7.6	7.5	7.2	7.3	---	---	---	---	---	---
29	7.7	7.6	7.6	7.4	7.2	7.3	---	---	---	---	---	---
30	---	---	---	7.5	7.2	7.2	---	---	---	---	---	---
31	---	---	---	7.4	7.2	7.3	---	---	---	---	---	---
MAX	---	---	---	7.8	7.7	7.8	---	---	---	---	---	---
MIN	---	---	---	7.4	7.2	7.2	---	---	---	---	---	---

## SPOKANE RIVER BASIN

329

12433542 BLUE CREEK ABOVE MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MAX	---	---	---	---	---	---	---	---	---	---	---	---
MIN	---	---	---	---	---	---	---	---	---	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	9.0	6.0	7.5	.0	.0	.0	5.0	2.5	4.0	.5	.0	.5
2	8.0	6.0	7.0	.0	.0	.0	3.0	1.0	2.5	.5	.5	.5
3	9.5	7.5	8.5	.0	.0	.0	1.5	.0	1.0	.5	.0	.0
4	8.0	5.5	6.5	.0	.0	.0	1.5	.0	1.0	.0	.0	.0
5	7.0	4.5	5.5	.0	.0	.0	.0	.0	.0	.5	.0	.0
6	8.5	6.0	7.0	.0	.0	.0	.0	.0	.0	.0	.0	.0
7	7.5	5.0	6.5	.0	.0	.0	.0	.0	.0	.5	.0	.0
8	8.0	5.5	6.5	.0	.0	.0	.0	.0	.0	1.0	.5	1.0
9	8.0	5.0	6.5	.5	.0	.0	.0	.0	.0	1.0	1.0	1.0
10	9.0	7.0	8.0	.0	.0	.0	.0	.0	.0	1.5	1.0	1.5
11	9.0	8.0	8.5	.5	.0	.0	.0	.0	.0	1.5	.5	1.0
12	8.0	5.0	6.0	.5	.0	.0	.0	.0	.0	1.0	.0	.5
13	7.0	3.5	5.0	1.5	.5	1.0	.0	.0	.0	1.0	.0	.5
14	7.5	4.0	5.5	3.5	1.5	2.5	.0	.0	.0	1.5	1.0	1.5
15	7.0	4.5	5.5	4.0	2.5	3.5	.0	.0	.0	2.0	1.0	1.5
16	8.5	6.5	7.5	5.0	4.0	4.5	.5	.0	.0	2.0	1.0	1.5
17	8.0	7.0	7.5	6.0	4.0	5.0	1.0	.5	1.0	1.0	.0	.0
18	8.0	5.0	6.5	5.0	3.0	4.5	1.5	.5	1.0	.0	.0	.0
19	5.5	3.0	4.0	3.0	.5	1.5	2.0	1.5	1.5	.0	.0	.0
20	6.0	3.5	4.5	.5	.0	.0	2.0	1.5	2.0	.0	.0	.0
21	6.0	4.0	4.5	.5	.0	.5	2.5	.5	1.5	.0	.0	.0
22	4.0	2.0	3.0	2.5	.5	2.0	1.5	.0	.5	.5	.0	.0
23	5.0	2.0	3.5	4.0	2.5	3.5	.5	.0	.0	.5	.0	.0
24	4.5	2.5	3.5	5.0	4.0	4.5	.0	.0	.0	.5	.0	.5
25	5.0	3.0	4.0	5.5	3.0	4.0	.0	.0	.0	.0	.0	.0
26	5.5	3.0	4.0	4.0	2.0	3.0	.0	.0	.0	.0	.0	.0
27	3.0	1.5	2.0	2.0	.5	1.5	.0	.0	.0	.0	.0	.0
28	3.0	.5	1.5	2.0	.5	1.5	.0	.0	.0	.0	.0	.0
29	1.5	.0	.5	5.5	2.0	4.0	.0	.0	.0	.0	.0	.0
30	.5	.0	.0	5.5	3.0	4.0	.0	.0	.0	.0	.0	.0
31	.0	.0	.0	---	---	---	.0	.0	.0	.0	.0	.0
MONTH	9.5	.0	5.0	6.0	.0	1.7	5.0	.0	.5	2.0	.0	.4

## SPOKANE RIVER BASIN

12433542 BLUE CREEK ABOVE MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	.0	.0	.0	4.0	2.0	2.5	6.0	4.0	5.0	10.0	5.5	7.5
2	.0	.0	.0	4.5	2.0	3.0	7.5	3.5	5.0	8.5	4.0	6.0
3	.0	.0	.0	4.5	2.5	3.5	7.0	2.5	4.5	9.0	4.0	6.0
4	---	---	---	4.5	3.0	3.5	7.5	2.5	4.5	8.0	4.0	6.0
5	.0	.0	.0	4.5	2.0	3.0	8.5	3.5	5.5	9.0	4.0	6.5
6	.0	.0	.0	4.5	2.5	3.5	7.0	4.5	6.0	10.0	4.0	6.5
7	.0	.0	.0	5.0	3.0	4.0	10.0	5.0	7.0	9.0	4.0	6.5
8	.0	.0	.0	5.0	4.0	4.5	10.5	4.5	7.0	9.0	3.5	6.0
9	.0	.0	.0	6.0	3.5	4.5	10.0	5.5	7.0	9.0	4.0	6.5
10	.0	.0	.0	5.5	4.0	4.5	8.5	4.5	6.5	11.0	4.0	7.0
11	.0	.0	.0	6.0	3.5	4.5	7.0	4.0	5.5	9.0	5.5	7.5
12	.0	.0	.0	6.0	3.5	4.5	7.0	4.5	6.0	9.5	6.0	7.5
13	.0	.0	.0	6.0	3.0	4.0	9.0	3.5	6.0	11.0	7.0	8.5
14	---	---	---	6.5	3.0	4.5	9.5	3.5	6.0	11.0	7.5	9.0
15	1.5	.5	1.0	6.5	3.5	4.5	8.5	4.5	6.5	10.5	7.5	8.5
16	2.0	1.0	1.5	6.5	3.0	4.5	8.0	5.5	6.5	12.5	7.0	9.5
17	2.5	1.0	2.0	6.5	3.0	4.0	7.5	3.5	5.5	10.0	7.0	8.5
18	2.5	1.5	2.0	6.5	2.5	4.0	8.0	5.0	6.0	11.5	7.0	9.0
19	2.0	.5	1.0	6.5	3.5	4.5	8.5	3.5	5.5	11.5	5.5	8.5
20	2.5	1.5	2.0	6.5	3.0	4.5	8.5	4.5	6.0	11.0	5.0	8.0
21	2.0	1.5	2.0	6.0	3.0	4.5	10.0	3.5	6.5	9.0	5.0	7.5
22	2.5	1.5	2.0	6.0	4.0	4.5	8.0	4.0	6.0	9.0	7.5	8.0
23	3.0	2.0	2.5	6.5	3.0	4.5	7.5	6.0	7.0	10.0	6.5	8.5
24	3.5	2.0	2.5	4.5	2.0	3.5	8.5	5.5	7.0	14.0	6.0	9.5
25	3.0	1.5	2.5	5.0	1.5	3.0	6.5	4.0	5.5	14.5	6.5	10.0
26	3.0	1.0	2.0	6.0	3.0	4.0	8.5	4.0	6.0	14.0	7.5	10.5
27	3.0	1.5	2.0	6.0	2.5	4.0	8.5	4.0	6.0	13.5	7.0	10.0
28	3.5	1.5	2.0	6.0	1.5	3.5	9.5	3.5	6.0	10.0	6.5	8.5
29	4.0	1.5	2.5	5.0	2.0	3.5	11.0	5.5	7.5	9.0	6.5	8.0
30	---	---	---	6.0	2.0	3.5	10.5	4.5	7.5	9.5	6.0	7.5
31	---	---	---	5.0	3.0	4.0	---	---	---	13.0	5.5	9.0
MONTH	---	---	---	6.5	1.5	4.0	11.0	2.5	6.1	14.5	3.5	7.9

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	13.5	6.5	10.0	15.0	9.5	12.5	16.0	10.5	13.5	13.0	8.5	11.0
2	15.0	8.0	11.0	15.5	10.5	13.0	13.5	11.0	12.0	13.0	9.0	11.0
3	14.0	9.0	11.5	15.5	11.5	13.5	13.5	10.0	11.5	14.0	11.0	12.5
4	14.5	8.5	11.5	14.5	11.5	13.0	12.5	10.0	11.5	12.0	9.0	10.5
5	13.5	7.0	10.5	13.5	8.5	11.0	13.0	10.5	11.5	10.5	7.0	9.0
6	14.0	7.5	11.0	14.0	8.0	11.0	14.5	10.0	12.0	10.5	7.0	9.0
7	15.5	8.5	12.0	14.5	9.0	12.0	15.0	10.0	12.5	12.0	9.0	10.5
8	14.5	8.5	11.5	15.5	10.0	13.0	16.0	11.0	13.0	13.0	9.0	10.5
9	14.0	8.0	11.0	15.5	11.0	13.5	16.5	11.5	13.5	12.5	9.0	11.0
10	13.5	7.0	10.5	15.5	10.5	13.0	17.0	12.0	14.0	12.0	8.0	10.0
11	13.5	7.5	10.5	15.5	10.5	13.0	17.0	12.5	14.5	13.0	8.0	10.5
12	14.0	7.5	10.5	15.5	10.0	13.0	15.0	10.5	13.0	13.5	10.5	12.0
13	13.5	8.0	11.0	16.5	11.0	13.5	15.5	10.0	12.5	13.5	11.5	12.0
14	14.5	8.0	11.5	16.5	11.5	14.0	16.5	11.5	14.0	12.5	10.5	11.5
15	13.5	8.5	11.5	17.5	12.5	14.5	16.5	12.5	14.0	12.0	9.5	11.5
16	13.5	8.0	11.0	16.5	11.5	14.0	15.5	11.0	13.5	10.0	7.0	8.5
17	12.0	9.0	10.5	15.5	11.0	13.0	15.0	11.0	13.0	9.5	5.5	7.5
18	10.5	6.5	8.5	13.5	11.5	12.5	13.5	8.5	11.0	9.5	7.5	8.5
19	12.5	6.0	9.0	11.5	9.5	10.5	14.0	9.0	11.5	10.0	8.0	8.5
20	12.0	6.5	9.5	13.5	9.0	11.0	13.5	11.0	12.0	10.0	7.5	9.0
21	12.5	8.0	10.5	14.5	9.5	12.0	13.5	9.0	11.0	8.5	5.0	7.0
22	11.5	9.5	10.5	15.5	10.5	13.0	13.5	8.5	10.5	8.0	5.5	6.5
23	10.0	8.5	9.5	16.5	11.5	14.0	14.0	9.0	11.5	7.0	3.5	5.0
24	12.0	9.0	10.5	16.0	12.0	14.0	14.5	9.0	11.5	7.0	4.0	5.5
25	12.5	8.0	10.5	17.0	12.0	14.5	15.0	10.0	12.5	6.5	3.5	5.0
26	13.0	9.0	11.0	17.5	12.5	14.5	13.5	10.5	12.5	8.0	4.5	6.0
27	12.0	10.0	10.5	17.5	13.0	15.0	15.0	10.5	12.5	8.5	5.5	7.0
28	12.5	8.0	10.5	17.5	13.0	15.0	16.0	13.0	14.5	9.0	6.0	7.5
29	13.0	7.5	10.5	16.0	15.0	15.5	16.0	12.0	14.0	9.0	6.0	7.5
30	14.0	8.5	11.5	17.0	13.0	15.0	16.0	12.0	14.0	9.0	6.0	7.5
31	---	---	---	17.0	13.0	15.0	14.0	10.0	12.0	---	---	---
MONTH	15.5	6.0	10.6	17.5	8.0	13.3	17.0	8.5	12.6	14.0	3.5	9.0

## SPOKANE RIVER BASIN

331

12433556 MIDNITE MINE DRAINAGE NEAR WELLPINIT, WA

LOCATION.--Lat 47°55'27", long 118°05'20", in NW 1/4 SE 1/4 sec.13, T.28 N., R.37 E., Stevens County, Hydrologic Unit 17010307, Spokane Indian Reservation, on right bank, 2.4 mi downstream from Turtle Lake, 0.1 mi upstream from confluence with Blue Creek, and 5.4 mi northwest of Wellpinit.

DRAINAGE AREA.--1.3 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1984 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 2,070 above sea level, from topographic map.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Three ponds upstream from gage exist for mine surface-water retention; June 1987, three diversions from the upstream channels were added to retain and treat contaminated water for mixing and later release. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--12 years (water years 1985-96), 0.33 ft<sup>3</sup>/s, 237 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5.7 ft<sup>3</sup>/s June 21, 1984, Mar. 7, 1986; maximum gage height, 1.67 ft Mar. 7, 1986; no flow during part of water years 1986 to 1992.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1.8 ft<sup>3</sup>/s May 22, June 27; maximum gage height, 1.45 ft June 27; minimum daily discharge, 0.03 ft<sup>3</sup>/s Jan. 30, 31, Feb. 1-3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	1.1	1.0	e.10	e.03	e.20	1.2	1.2	1.2	1.1	.98	1.1
2	1.2	1.1	.96	e.11	e.03	e.20	1.2	1.2	1.2	1.2	1.0	1.1
3	1.2	1.2	.96	e.12	e.03	e.25	1.2	1.2	1.2	1.2	1.0	1.1
4	1.2	1.2	.98	e.10	e.05	e.30	1.2	1.2	1.1	1.2	1.0	1.1
5	1.2	1.2	.94	e.09	e.10	e.35	1.2	1.1	1.1	1.2	1.1	1.1
6	1.1	1.2	e.90	e.10	e.15	e.30	1.2	1.2	1.1	1.2	1.0	1.0
7	1.0	1.2	e.80	e.12	e.25	e.35	1.2	1.2	1.1	1.2	1.0	.97
8	1.1	1.2	e.60	e.14	e.40	e.40	1.0	1.2	1.1	1.2	1.0	1.0
9	1.1	1.2	e.70	e.15	e.60	.45	1.0	1.2	1.1	1.2	1.0	1.1
10	1.1	1.2	e.70	.17	e.40	.44	1.1	1.2	1.1	1.1	1.0	.59
11	1.2	1.3	e.90	.17	e.30	.49	1.1	1.1	1.1	.85	1.0	.65
12	1.1	1.2	1.2	.17	e.25	.52	1.1	.61	1.1	.93	1.0	.92
13	1.0	1.3	.89	.18	e.25	.56	1.1	1.0	1.1	.88	1.0	1.1
14	.94	1.2	.69	.20	e.25	.60	1.1	1.2	1.1	.97	1.0	1.2
15	.89	1.2	.40	.23	e.30	.65	1.1	1.2	1.1	.94	.99	1.1
16	.89	1.2	.35	.22	e.25	.64	1.1	1.2	1.1	.95	.98	1.2
17	1.0	1.2	.31	e.20	e.25	.61	1.1	1.2	1.1	.98	.99	1.2
18	.99	1.1	.30	e.15	e.50	.71	1.2	1.2	1.1	1.0	1.0	1.2
19	.98	1.1	.28	e.15	e.60	1.1	1.1	1.2	1.1	1.0	1.0	1.2
20	1.1	1.0	.28	e.15	e1.1	1.1	.89	1.2	1.1	1.1	1.1	1.2
21	1.1	1.0	.26	e.15	1.4	1.1	1.1	1.2	1.1	1.2	1.2	1.2
22	1.0	.85	.25	e.15	1.1	1.1	1.1	1.3	1.1	1.2	1.2	1.2
23	1.0	.96	.25	e.15	1.0	1.0	1.2	1.2	1.1	1.0	1.2	1.2
24	1.0	1.1	e.12	e.15	.89	1.0	.90	1.2	1.2	.95	1.2	1.2
25	1.1	1.0	e.10	e.15	.77	.96	1.2	1.2	1.1	.97	1.1	1.2
26	1.1	.98	e.09	e.12	e.60	.96	1.2	1.2	1.1	.98	1.2	1.2
27	1.2	.99	e.09	e.10	e.40	.97	1.2	1.2	1.3	.98	1.1	1.2
28	1.2	1.0	e.10	e.08	e.25	1.0	1.2	1.1	1.1	.98	1.1	1.2
29	1.2	.94	e.10	e.04	e.20	1.1	1.2	1.2	1.1	1.0	1.1	1.3
30	1.2	.99	e.10	e.03	---	1.1	1.2	1.2	1.1	.99	1.1	1.2
31	1.1	---	e.10	e.03	---	1.1	---	1.2	---	.98	1.1	---
TOTAL	33.59	33.41	15.70	4.17	12.70	21.61	33.89	36.21	33.6	32.63	32.74	33.23
MEAN	1.08	1.11	.51	.13	.44	.70	1.13	1.17	1.12	1.05	1.06	1.11
MAX	1.2	1.3	1.2	.23	1.4	1.1	1.2	1.3	1.3	1.2	1.2	1.3
MIN	.89	.85	.09	.03	.03	.20	.89	.61	1.1	.85	.98	.59
AC-FT	67	66	31	8.3	25	43	67	72	67	65	65	66

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	.31	.29	.15	.15	.23	.51	.47	.41	.37	.32	.31	.34	.34
MAX	1.08	1.11	.51	.35	.60	1.41	1.31	1.29	1.12	1.05	1.06	1.11	1.11
(WY)	1996	1996	1996	1995	1986	1986	1995	1995	1996	1996	1996	1996	1996
MIN	.051	.076	.068	.075	.087	.13	.098	.064	.046	.026	.008	.027	.027
(WY)	1992	1991	1993	1989	1993	1992	1992	1992	1992	1988	1992	1989	1989

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1984 - 1996

ANNUAL TOTAL	344.28	323.48	
ANNUAL MEAN	.94	.88	
HIGHEST ANNUAL MEAN			.33
LOWEST ANNUAL MEAN			.88
HIGHEST DAILY MEAN	2.7 Mar 21	1.4 Feb 21	.076 1996
LOWEST DAILY MEAN	.09 Jan 1	.03 Jan 30	.00 Jun 22 1986
ANNUAL SEVEN-DAY MINIMUM	.09 Jan 1	.03 Jan 29	.00 Aug 8 1990
ANNUAL RUNOFF (AC-FT)	683	642	237
10 PERCENT EXCEEDS	1.4	1.2	1.0
50 PERCENT EXCEEDS	1.0	1.1	.14
90 PERCENT EXCEEDS	.28	.15	.04

e Estimated



## SPOKANE RIVER BASIN

12433556 MIDNITE MINE DRAINAGE NEAR WELLPINIT, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--1980, June 1984 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 1984 to current year.

pH: June 1984 to current year.

WATER TEMPERATURE: June 1984 to current year.

INSTRUMENTATION.--Water-quality monitor since June 1984. Electronic data logger, with thirty-minute recording interval. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,550 microsiemens Oct. 30, 31, 1995; minimum recorded, 974 microsiemens Oct. 4, 1994 (more than 20 percent of record missing).

pH: Maximum recorded, 8.3 units Sept. 11, 14, 1985, May 1, 2, 1992, but may have been higher during periods of missing record; minimum recorded, 4.5 units several days in February 1986, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum, 22.0°C July 24, 1994; minimum, 0.0°C many days during winter.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,550 microsiemens Oct. 30, 31; minimum recorded, 1,030 microsiemens, Feb. 19 (more than 20 percent of record missing).

pH: Maximum recorded, 8.1 units several days December and May; minimum recorded, 7.2 units June 19.

WATER TEMPERATURE: Maximum, 21.0°C July 28; minimum, 0.0°C many days December to March.

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	3000	2950	2980	3530	3530	3530	3440	3370	3400	2300	2240	2260
2	3000	2980	2990	3530	3530	3530	3470	3440	3450	2300	2280	2290
3	2990	2850	2910	3530	3530	3530	3470	3370	3440	2300	2210	2270
4	2990	2920	2960	3530	3530	3530	3430	3350	3390	2260	2120	2210
5	3010	2970	2990	3530	3530	3530	3440	3410	3430	2120	1090	1150
6	2980	2800	2920	3530	3520	3530	3440	3420	3430	1780	1080	1210
7	2870	2840	2850	3520	3520	3520	3430	3430	3430	2290	1780	2120
8	2910	2860	2880	3520	3520	3520	3430	3430	3430	2430	2100	2230
9	2940	2900	2920	3520	3520	3520	3440	3430	3440	2430	2400	2410
10	2920	2900	2910	3520	3520	3520	3440	3130	3420	2440	2420	2430
11	2920	2830	2860	3520	3490	3520	3400	3140	3290	2440	2420	2440
12	2930	2860	2890	3520	3510	3520	3340	2940	3160	2440	2430	2440
13	3010	2910	2960	3510	3470	3490	3180	3100	3140	2510	2420	2460
14	3070	3010	3040	3510	3490	3510	3190	2830	3060	2490	2390	2470
15	3110	3060	3080	3510	3490	3510	2830	2740	2790	2400	2330	2370
16	3130	3090	3110	3510	3500	3510	2780	2700	2740	2410	2390	2400
17	3150	3120	3140	3510	3480	3500	2710	2650	2680	2450	---	2370
18	3190	3140	3160	3510	3480	3500	2650	2600	2620	---	---	---
19	3220	3180	3200	3500	3500	3500	2600	2550	2580	---	---	---
20	3250	3210	3230	3500	3500	3500	2560	2510	2530	2430	2390	2410
21	3290	3240	3270	3500	3480	3500	2520	2460	2490	2420	2400	2410
22	3320	3280	3300	3500	3390	3470	2470	2420	2450	2420	2390	2410
23	3340	3310	3320	3460	3380	3420	2430	2280	2410	2410	2380	2400
24	3360	3330	3350	3480	3290	3460	---	---	---	2410	2390	2400
25	3340	3310	3320	3430	3280	3380	---	---	---	2410	2390	2410
26	3410	3320	3360	3460	3430	3440	---	---	---	2420	2370	2400
27	3460	3400	3420	3460	3400	3440	---	---	---	2400	2380	2390
28	3490	3440	3460	3410	3320	3360	---	---	---	2400	2360	2380
29	3520	3470	3500	3400	3340	3360	---	---	---	---	---	---
30	3550	3510	3530	3430	3390	3420	2310	2280	2300	---	---	---
31	3550	3530	3540	---	---	---	2310	2270	2290	---	---	---
MONTH	3550	2800	3140	3530	3280	3490	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	---	---	---	1480	1440	1460	2760	2730	2740	2930	2880	2900
2	---	---	---	1550	1480	1510	2730	2660	2690	2950	2920	2930
3	---	---	---	1580	1550	1570	2690	2670	2680	2980	2940	2960
4	---	---	---	1600	1560	1580	2690	2660	2670	2990	2960	2980
5	---	---	---	1640	1600	1620	2690	2670	2680	3080	2990	3020
6	2310	2020	2200	1660	1640	1650	2680	2650	2670	3150	3080	3110
7	2230	2100	2200	1690	1660	1680	2800	2670	2750	3190	3140	3160
8	2100	1910	1990	1710	1680	1700	2780	2720	2740	3220	3170	3190
9	2180	1880	2010	1720	1700	1710	2740	2700	2720	3240	3120	3200
10	1960	1910	1940	1730	1710	1720	2760	2710	2740	3120	2960	3020
11	1980	1950	1970	1720	1680	1700	2790	2730	2770	2980	2780	2890
12	2000	1980	1990	1690	1610	1670	2810	2770	2790	2780	2370	2570
13	2020	1990	2000	1610	1530	1580	2790	2730	2760	2850	2700	2790
14	2000	1980	2000	1590	1550	1570	2780	2700	2740	2850	2810	2830
15	2010	1970	1990	1570	1540	1560	2750	2700	2720	2830	2780	2810
16	2000	1980	1990	1590	1550	1570	2720	2620	2660	2860	2820	2840
17	2000	1890	1960	1620	1580	1600	2740	2690	2710	2850	2780	2820
18	1900	1740	1850	2450	1610	1850	2740	2590	2660	2870	2830	2850
19	1740	1030	1180	2550	2450	2520	2730	2690	2710	2880	2860	2870
20	1090	1050	1070	2590	2490	2560	2740	2650	2680	2900	2870	2890
21	1100	1050	1070	2510	2460	2480	2760	2710	2740	2910	2850	2890
22	1110	1070	1090	2510	2460	2480	2780	2680	2750	2870	2620	2780
23	1160	1110	1130	2600	2460	2490	2710	2630	2670	2890	2840	2860
24	1200	1150	1170	2590	2560	2570	2730	2600	2660	2920	2870	2900
25	1250	1200	1220	2600	2580	2590	2820	2730	2790	2950	2910	2930
26	1300	1250	1280	2630	2580	2610	2860	2800	2830	2960	2930	2940
27	1340	1300	1320	2650	2630	2640	2880	2840	2860	2980	2950	2960
28	1410	1340	1380	2700	2630	2660	2890	2860	2870	3000	2950	2970
29	1440	1410	1420	2730	2690	2710	2900	2870	2880	3010	2950	2990
30	---	---	---	2790	2720	2760	2920	2880	2900	3030	2980	3010
31	---	---	---	2810	2740	2780	---	---	---	3060	3020	3040
MONTH	---	---	---	2810	1440	2040	2920	2590	2740	3240	2370	2930
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	3090	3050	3070	3190	3160	3170	---	---	---	---	---	---
2	3110	3070	3090									

## SPOKANE RIVER BASIN

12433556 MIDNITE MINE DRAINAGE NEAR WELLPINIT, WA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	---	---	---	7.8	7.7	7.8	7.9	7.9	7.9	7.9	7.9	7.9
2	---	---	---	7.7	7.7	7.7	7.9	7.9	7.9	7.9	7.9	7.9
3	---	---	---	7.7	7.7	7.7	7.9	7.9	7.9	7.9	7.9	7.9
4	---	---	7.5	7.8	7.7	7.7	7.9	7.9	7.9	7.9	7.9	7.9
5	7.5	7.5	7.5	7.8	7.7	7.7	7.9	7.9	7.9	7.9	7.6	7.9
6	7.6	7.5	7.5	7.8	7.7	7.7	8.0	7.9	7.9	7.9	7.8	7.9
7	7.6	7.6	7.6	7.8	7.7	7.7	8.0	7.9	7.9	7.9	7.8	7.9
8	7.6	7.5	7.6	7.8	7.7	7.8	7.9	7.8	7.9	7.9	7.8	7.9
9	7.6	7.5	7.6	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.8	7.8
10	7.6	7.6	7.6	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.8	7.8
11	7.6	7.6	7.6	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9
12	7.6	7.6	7.6	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.9	7.9
13	7.6	7.6	7.6	7.8	7.7	7.8	8.0	7.9	8.0	7.9	7.9	7.9
14	7.6	7.6	7.6	7.8	7.7	7.8	8.1	7.9	8.0	7.9	7.9	7.9
15	7.6	7.6	7.6	7.8	7.7	7.8	8.1	8.0	8.1	7.9	7.9	7.9
16	7.6	7.6	7.6	7.8	7.8	7.8	8.1	8.0	8.1	7.9	7.9	7.9
17	7.6	7.6	7.6	7.8	7.8	7.8	8.1	8.1	8.1	7.9	7.7	7.9
18	7.6	7.6	7.6	7.8	7.8	7.8	8.1	8.0	8.1	7.9	7.7	7.9
19	7.7	7.6	7.6	7.8	7.8	7.8	8.1	8.0	8.0	7.9	7.9	7.9
20	7.7	7.6	7.6	7.9	7.8	7.9	8.1	8.0	8.0	7.9	7.9	7.9
21	7.6	7.6	7.6	7.9	7.9	7.9	8.1	8.0	8.0	7.9	7.9	7.9
22	7.7	7.6	7.7	7.9	7.9	7.9	8.1	8.0	8.0	7.9	7.9	7.9
23	7.7	7.7	7.7	7.9	7.8	7.9	8.0	8.0	8.0	7.9	7.9	7.9
24	7.7	7.7	7.7	7.9	7.8	7.8	8.0	7.9	8.0	7.9	7.9	7.9
25	7.7	7.7	7.7	7.9	7.8	7.9	8.0	7.9	7.9	7.9	7.9	7.9
26	7.7	7.7	7.7	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9
27	7.7	7.7	7.7	7.9	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.9
28	7.7	7.7	7.7	7.9	7.9	7.9	7.9	7.8	7.8	7.9	7.9	7.9
29	7.7	7.7	7.7	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.7	7.8
30	7.7	7.7	7.7	7.9	7.9	7.9	7.9	7.9	7.9	7.7	7.6	7.6
31	7.8	7.7	7.8	---	---	---	7.9	7.9	7.9	7.6	7.6	7.6
MAX	---	---	---	8.0	7.9	7.9	8.1	8.1	8.1	7.9	7.9	7.9
MIN	---	---	---	7.7	7.7	7.7	7.8	7.8	7.8	7.6	7.6	7.6

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
FEBRUARY			MARCH			APRIL			MAY			
1	7.6	7.5	7.5	8.0	7.9	8.0	7.8	7.8	7.8	---	---	---
2	---	---	---	8.0	7.9	7.9	7.8	7.8	7.8	---	---	---
3	---	---	---	8.0	8.0	8.0	7.8	7.8	7.8	---	---	---
4	7.5	7.5	7.5	8.0	7.9	8.0	7.8	7.8	7.8	---	---	---
5	7.6	7.5	7.6	8.0	8.0	8.0	7.8	7.8	7.8	---	---	---
6	7.7	7.6	7.6	8.0	8.0	8.0	7.8	7.8	7.8	---	---	---
7	7.8	7.7	7.7	8.0	7.9	8.0	7.8	7.8	7.8	---	---	---
8	7.9	7.8	7.9	8.0	8.0	8.0	7.9	7.8	7.8	---	---	---
9	7.9	7.8	7.9	8.0	7.9	8.0	7.9	7.8	7.8	---	---	---
10	7.8	7.8	7.8	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.6	7.7
11	7.9	7.8	7.8	7.9	7.8	7.9	---	---	---	7.9	7.7	7.8
12	7.9	7.8	7.9	7.9	7.8	7.9	---	---	---	8.1	7.8	7.8
13	7.9	7.9	7.9	7.9	7.9	7.9	---	---	---	7.9	7.7	7.8
14	7.9	7.9	7.9	8.0	8.0	8.0	---	---	---	7.9	7.7	7.7
15	8.0	7.9	7.9	8.0	8.0	8.0	---	---	---	7.9	7.7	7.7
16	8.0	8.0	8.0	7.9	7.9	7.9	---	---	---	7.9	7.7	7.7
17	8.0	8.0	8.0	7.9	7.9	7.9	---	---	---	7.8	7.7	7.7
18	8.0	7.9	8.0	8.0	7.8	7.9	---	---	---	7.8	7.7	7.7
19	8.0	7.9	8.0	7.8	7.7	7.7	---	---	---	7.8	7.6	7.7
20	8.0	7.9	7.9	7.7	7.7	7.7	---	---	---	7.8	7.6	7.7
21	7.9	7.9	7.9	7.8	7.7	7.8	---	---	---	7.7	7.6	7.7
22	8.0	7.9	7.9	7.8	7.8	7.8	---	---	---	7.7	7.6	7.6
23	8.0	7.9	8.0	7.8	7.7	7.8	---	---	---	7.7	7.6	7.6
24	8.0	7.9	8.0	7.8	7.7	7.7	---	---	---	7.7	7.6	7.6
25	8.0	8.0	8.0	7.8	7.7	7.7	---	---	---	7.7	7.6	7.6
26	8.0	7.9	8.0	7.8	7.8	7.8	---	---	---	7.7	7.6	7.6
27	8.0	7.9	8.0	7.8	7.7	7.8	---	---	---	7.7	7.5	7.6
28	8.0	7.9	8.0	7.8	7.7	7.8	---	---	---	7.6	7.5	7.6
29	8.0	7.8	7.9	7.8	7.7	7.7	---	---	---	7.6	7.5	7.5
30	---	---	---	7.8	7.7	7.8	---	---	---	7.5	7.4	7.5
31	---	---	---	7.8	7.8	7.8	---	---	---	7.6	7.4	7.5
MAX	---	---	---	8.0	8.0	8.0	---	---	---	---	---	---
MIN	---	---	---	7.7	7.7	7.7	---	---	---	---	---	---

## SPOKANE RIVER BASIN

335

12433556 MIDNITE MINE DRAINAGE NEAR WELLPINIT, WA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
JUNE			JULY			AUGUST			SEPTEMBER			
1	7.6	7.4	7.5	7.6	7.6	7.6	7.7	7.6	7.6	7.6	7.5	7.5
2	7.6	7.4	7.5	7.6	7.5	7.6	7.7	7.6	7.7	7.5	7.5	7.5
3	7.5	7.4	7.4	7.6	7.5	7.6	7.7	7.6	7.7	7.5	7.5	7.5
4	7.5	7.4	7.4	7.6	7.5	7.6	7.7	7.6	7.6	7.5	7.5	7.5
5	7.5	7.3	7.4	7.6	7.5	7.6	7.7	7.7	7.7	7.5	7.5	7.5
6	7.5	7.4	7.4	7.6	7.5	7.6	7.7	7.7	7.7	7.5	7.5	7.5
7	7.5	7.4	7.4	7.6	7.5	7.6	7.7	7.7	7.7	7.5	7.5	7.5
8	7.5	7.4	7.5	7.6	7.6	7.6	7.8	7.7	7.7	7.5	7.4	7.5
9	7.5	7.4	7.5	7.6	7.6	7.6	7.8	7.7	7.7	7.5	7.4	7.5
10	7.5	7.4	7.5	7.6	7.6	7.6	7.7	7.7	7.7	7.5	7.4	7.5
11	7.5	7.4	7.5	7.7	7.6	7.6	7.7	7.7	7.7	7.6	7.5	7.5
12	7.5	7.4	7.5	7.6	7.6	7.6	7.7	7.7	7.7	7.6	7.5	7.5
13	7.5	7.5	7.5	7.7	7.6	7.6	7.7	7.6	7.7	7.5	7.4	7.5
14	7.6	7.5	7.5	7.6	7.6	7.6	7.7	7.6	7.6	7.5	7.4	7.4
15	7.6	7.4	7.5	7.6	7.6	7.6	7.7	7.6	7.7	7.5	7.4	7.4
16	7.6	7.4	7.5	7.6	7.6	7.6	7.7	7.7	7.7	7.5	7.4	7.4
17	7.5	7.4	7.5	7.7	7.6	7.6	7.7	7.7	7.7	7.5	7.4	7.4
18	7.5	7.3	7.4	7.7	7.6	7.6	7.7	7.6	7.7	7.5	7.4	7.5
19	7.5	7.2	7.4	7.6	7.6	7.6	7.7	7.6	7.7	7.5	7.4	7.5
20	7.5	7.4	7.4	7.6	7.5	7.6	7.7	7.6	7.6	7.5	7.5	7.5
21	7.5	7.4	7.4	7.6	7.5	7.5	7.6	7.6	7.6	7.5	7.5	7.5
22	7.5	7.4	7.4	7.6	7.5	7.5	7.6	7.6	7.6	7.5	7.5	7.5
23	7.4	7.4	7.4	7.6	7.5	7.6	7.6	7.6	7.6	7.5	7.5	7.5
24	7.5	7.4	7.4	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
25	7.5	7.4	7.5	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.5
26	7.6	7.4	7.5	7.7	7.6	7.7	7.6	7.6	7.6	7.6	7.5	7.5
27	7.6	7.4	7.5	7.7	7.6	7.7	7.6	7.6	7.6	7.6	7.5	7.5
28	7.6	7.5	7.5	7.7	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5
29	7.6	7.5	7.6	7.7	7.6	7.6	7.6	7.5	7.6	7.6	7.5	7.6
30	7.6	7.5	7.6	7.6	7.6	7.6	7.5	7.5	7.5	7.6	7.6	7.6
31	- - -	- - -	- - -	7.6	7.6	7.6	7.6	7.5	7.5	- - -	- - -	- - -
MAX	7.6	7.5	7.6	7.7	7.6	7.7	7.8	7.7	7.7	7.6	7.6	7.6
MIN	7.4	7.2	7.4	7.6	7.5	7.5	7.5	7.5	7.5	7.5	7.4	7.4

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER				NOVEMBER			DECEMBER			JANUARY		
1	13.0	10.5	11.5	5.5	3.5	4.5	7.0	4.5	6.5	1.5	1.5	1.5
2	12.0	10.5	11.5	5.5	3.5	4.5	6.0	4.0	5.0	2.0	1.5	1.5
3	13.0	10.5	12.0	6.0	3.5	4.5	4.5	3.5	4.0	2.0	1.0	2.0
4	12.0	9.5	10.5	5.5	4.0	5.0	4.5	3.0	4.0	1.0	.0	1.0
5	12.0	9.5	10.5	6.5	4.5	5.5	3.5	1.5	2.5	.0	.0	.0
6	12.5	10.5	11.5	6.5	5.0	5.5	2.5	1.5	2.0	.5	.0	.5
7	11.5	9.0	10.5	5.5	4.5	5.0	3.0	.0	2.0	1.5	.5	1.0
8	11.5	10.0	10.5	8.0	5.5	6.5	.5	.0	.0	2.0	1.5	2.0
9	11.5	9.5	10.5	6.5	4.5	6.0	1.0	.0	.5	2.0	1.5	2.0
10	12.5	11.0	11.5	5.0	4.0	4.5	2.5	1.0	2.0	2.0	1.5	2.0
11	11.5	10.0	11.0	5.5	4.5	5.0	3.5	2.5	3.0	2.0	1.5	1.5
12	11.0	8.5	9.5	5.5	4.5	5.0	4.5	3.5	4.0	1.5	.5	1.0
13	11.0	8.5	9.5	6.5	5.5	6.0	4.5	3.5	4.0	2.0	.0	1.0
14	11.5	8.5	10.0	8.0	6.5	7.5	3.5	3.0	3.5	2.5	2.0	2.0
15	12.0	8.5	10.5	8.0	6.5	7.5	4.0	3.0	3.5	2.5	2.0	2.5
16	12.0	10.5	11.0	8.0	7.0	7.5	3.5	3.0	3.0	2.5	1.5	2.0
17	11.0	10.5	10.5	8.5	7.0	8.0	3.0	2.0	2.5	1.5	.0	.0
18	11.0	8.5	10.0	8.0	6.0	7.5	2.5	2.0	2.5	.0	.0	.0
19	10.5	7.5	8.5	6.0	5.0	5.5	3.0	2.5	3.0	.5	.0	.5
20	10.0	8.0	9.0	5.5	4.0	4.5	3.0	2.5	3.0	1.0	.0	.5
21	9.5	7.5	9.0	5.5	4.0	5.0	3.5	1.0	2.5	1.0	1.0	1.0
22	8.5	7.0	7.5	6.5	5.0	5.5	2.5	1.0	1.5	1.0	.5	1.0
23	9.0	7.0	8.0	7.5	6.0	7.0	2.0	.0	1.0	1.0	.0	1.0
24	9.0	7.0	8.0	7.5	7.0	7.5	.0	.0	.0	1.0	.5	1.0
25	9.0	7.5	8.5	7.5	5.5	6.5	.0	.0	.0	.5	.0	.5
26	9.5	7.5	8.5	6.5	4.5	6.0	.0	.0	.0	.0	.0	.0
27	8.5	6.5	7.5	5.0	4.0	4.5	.0	.0	.0	.5	.0	.5
28	8.0	6.0	7.0	5.5	4.5	4.5	.5	.0	.0	.0	.0	.0
29	7.5	5.5	6.5	7.5	5.5	6.5	1.0	.0	.5	.0	.0	.0
30	7.0	4.5	5.5	7.5	5.5	6.5	1.5	1.0	1.0	.0	.0	.0
31	6.5	4.0	5.0	---	---	---	1.5	1.5	1.5	.0	.0	.0
MONTH	13.0	4.0	9.4	8.5	3.5	5.8	7.0	.0	2.2	2.5	.0	1.0

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.0	.0	.0	1.5	.0	.5	6.5	4.5	5.5	11.0	7.5	9.0
2	.0	.0	.0	2.0	.0	1.0	7.5	4.0	5.5	9.5	6.5	8.0
3	.0	.0	.0	2.0	1.0	1.5	7.0	3.5	5.0	10.0	6.0	7.5
4	.0	.0	.0	2.0	1.0	1.5	8.0	3.5	5.5	9.5	6.5	8.0
5	.0	.0	.0	1.5	.5	1.0	9.0	4.5	6.5	9.5	6.0	8.0
6	.0	.0	.0	2.0	1.0	1.5	9.0	6.5	7.5	10.5	6.5	8.5
7	.0	.0	.0	2.0	1.5	1.5	11.5	7.5	9.0	9.5	6.5	8.0
8	1.0	.0	.5	3.0	2.0	2.5	12.0	7.5	9.5	9.5	5.5	7.5
9	1.5	.0	1.0	3.5	2.0	2.5	12.0	8.5	10.0	9.5	6.5	8.0
10	1.5	.5	1.0	3.5	2.5	3.0	11.0	8.0	9.0	11.5	6.0	8.5
11	1.5	.5	1.0	4.0	2.5	3.0	9.0	6.5	8.0	10.5	8.0	9.0
12	1.5	.5	1.0	4.0	2.5	3.0	9.0	6.5	7.5	10.5	8.0	9.0
13	2.0	1.0	1.5	4.5	2.0	3.0	10.5	5.5	7.5	12.0	9.5	11.0
14	2.0	1.0	1.5	5.0	2.0	3.5	11.0	6.0	8.0	12.0	10.5	11.0
15	2.0	1.0	1.5	5.5	2.5	3.5	10.5	7.5	9.0	12.0	10.5	11.0
16	2.0	1.0	1.5	5.5	2.0	3.5	9.5	7.5	9.0	13.5	9.5	11.0
17	2.0	1.5	2.0	5.0	2.0	3.5	9.0	6.0	7.5	12.0	10.0	11.0
18	2.5	2.0	2.0	5.5	1.5	3.5	9.0	6.5	8.0	12.0	9.5	10.5
19	2.5	1.0	2.0	7.0	3.5	5.0	9.5	5.5	7.5	12.5	8.5	10.5
20	3.5	2.0	2.5	6.5	3.0	4.5	9.0	6.0	7.5	11.5	8.0	10.0
21	2.5	2.5	2.5	6.5	3.5	5.0	10.5	5.5	8.0	11.0	8.0	10.0
22	3.0	1.5	2.0	6.5	4.5	5.5	9.5	6.0	8.0	10.5	9.5	10.0
23	3.0	2.0	2.5	7.0	3.5	5.0	9.5	8.5	9.0	11.0	9.0	10.0
24	2.5	1.0	2.0	4.0	1.5	3.0	9.5	7.0	8.5	13.5	9.0	11.0
25	2.0	.0	1.5	4.5	1.0	2.5	8.5	6.0	7.5	14.5	9.5	12.0
26	1.0	.0	.5	5.5	2.5	3.5	9.0	6.0	7.5	14.5	11.0	13.0
27	.5	.0	.0	5.5	2.5	3.5	9.5	5.5	7.0	14.5	11.0	12.5
28	.5	.0	.0	5.5	1.5	3.5	10.0	5.5	7.5	12.5	10.0	11.0
29	.5	.0	.0	5.0	2.0	3.5	12.0	7.5	9.0	11.0	10.0	10.5
30	---	---	---	6.0	2.5	4.0	11.5	7.0	9.0	11.5	9.0	10.5
31	---	---	---	5.5	3.5	4.5	---	---	---	13.0	9.0	11.0
MONTH	3.5	.0	1.0	7.0	.0	3.1	12.0	3.5	7.8	14.5	5.5	9.9
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	14.0	10.0	12.0	17.0	13.5	15.5	19.5	16.0	17.5	17.0	14.0	15.5
2	15.5	11.5	13.5	18.0	15.0	16.5	17.5	15.5	16.5	17.0	14.5	16.0
3	16.0	13.0	14.5	18.5	16.0	17.0	17.5	15.0	16.0	17.5	15.0	16.5
4	15.5	12.5	14.0	17.5	14.5	16.5	17.0	14.5	16.0	16.0	13.5	15.0
5	15.0	11.5	13.0	16.0	13.0	14.5	16.0	14.5	15.5	15.0	12.5	14.0
6	15.5	11.5	13.5	16.5	13.5	15.0	17.0	14.5	16.0	15.0	12.5	14.0
7	17.0	13.0	15.0	17.5	13.5	15.5	18.0	14.5	16.5	16.0	13.5	14.5
8	16.0	13.0	14.5	18.5	15.0	17.0	18.5	15.5	17.0	16.5	13.5	15.0
9	15.5	12.5	14.0	18.5	15.5	17.0	19.0	15.5	17.5	16.5	14.0	15.0
10	15.0	11.5	13.5	18.0	15.0	16.5	19.5	16.5	18.0	16.0	13.0	14.5
11	15.0	12.0	13.5	18.0	14.0	16.0	19.5	17.0	18.0	17.0	13.0	15.0
12	15.5	12.0	14.0	18.0	15.0	16.5	18.5	15.0	16.5	17.5	15.5	16.5
13	16.0	12.5	14.5	19.0	15.0	17.0	19.0	15.0	17.0	16.5	15.0	16.0
14	16.5	13.0	15.0	19.5	16.0	18.0	19.5	16.5	18.0	16.0	14.5	15.0
15	16.5	13.0	15.0	20.0	17.0	18.5	19.5	16.5	18.0	15.0	12.5	14.5
16	16.0	13.0	14.5	19.5	16.5	18.0	19.0	16.0	17.5	14.0	11.5	12.5
17	14.5	13.0	14.0	19.0	16.0	17.0	18.0	15.0	16.5	14.0	11.0	12.5
18	13.5	11.0	12.5	16.5	15.0	16.0	17.5	14.0	15.5	14.0	12.5	13.0
19	14.5	10.5	12.5	16.0	14.0	15.0	17.5	14.0	16.0	13.5	12.0	13.0
20	15.0	11.0	13.0	16.5	14.0	15.5	17.0	15.0	16.5	13.0	11.5	12.5
21	15.5	12.5	14.0	17.5	14.5	16.0	17.0	14.0	15.5	13.0	10.0	11.5
22	14.5	13.5	14.0	18.5	15.5	17.0	17.5	13.5	15.5	12.5	10.5	11.0
23	13.5	12.5	13.5	19.0	16.0	17.5	18.0	14.5	16.5	12.5	9.5	11.0
24	14.5	13.0	13.5	19.5	16.5	18.0	18.5	14.5	16.5	12.0	10.0	11.0
25	14.5	12.0	13.5	20.0	16.5	18.5	19.0	15.5	17.0	12.5	9.5	11.0
26	15.5	13.0	14.5	20.0	17.0	18.5	19.0	16.0	17.5	13.0	10.5	11.5
27	14.5	13.0	14.0	20.5	17.5	19.0	19.0	16.0	17.5	14.0	11.0	12.5
28	14.5	12.0	13.5	21.0	17.5	19.5	19.0	17.5	18.0	14.0	11.5	13.0
29	15.0	11.5	13.5	20.5	19.0	19.5	19.5	16.5	18.0	14.5	11.5	13.0
30	16.0	12.5	14.5	20.5	17.5	19.0	19.5	16.5	18.0	14.5	12.0	13.0
31	---	---	---	20.0	17.0	18.5	18.0	15.0	16.5	---	---	---
MONTH	17.0	10.0	13.8	21.0	13.0	17.1	19.5	13.5	16.9	17.5	9.5	13.6
YEAR	21.0	.0	8.5									



## SPOKANE RIVER BASIN

337

12433558 BLUE CREEK BELOW MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA

LOCATION.--Lat 47°55'24", long 118°05'20", in NW 1/4 SE 1/4 sec. 13, T.28 N., R.37 E., Stevens County, Hydrologic Unit 17010307, Spokane Indian Reservation, 100 ft downstream from mouth of unnamed tributary, and 2.4 mi southwest of Turtle Lake.

DRAINAGE AREA.--7.3 mi<sup>2</sup>.

PERIOD OF RECORD.--1980, June 1984 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 1984 to current year.

pH: June 1984 to current year.

WATER TEMPERATURE: July 1984 to current year.

INSTRUMENTATION.--Water-quality monitor since June 1984. Electronic data logger with thirty-minute recording interval. U.S. Geological Survey satellite telemeter at station. Prior to April 28, 1993, digital recorder with sixty minute recording interval.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,190 microsiemens Nov. 2, 1995; minimum, 93 microsiemens Apr. 5, 1993.

pH: Maximum recorded, 8.4 units Apr. 11-13, 1988, several days during April and May, 1992, but may have been higher during period of missing record; minimum recorded, 5.2 units Feb. 27, 1986, but may have been lower during period of missing record Feb. 28 to Mar. 26, 1986.

WATER TEMPERATURE: Maximum recorded, 21.5°C July 9, 10, 1985, July 23-25, Aug. 3, 1994, but may have been higher during periods of missing record; minimum, 0.0°C on many days during winters.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum, 3,190 microsiemens Nov. 2; minimum, 191 microsiemens Feb. 27.

pH: Maximum, 7.7 units many days December, January, June to September; minimum, 7.2 units Dec. 8, 9, June 18, 19 (more than 20 percent of record missing).

WATER TEMPERATURE: Maximum, 20.0°C July 28; minimum, 0.0°C during many days from December to February.

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	2870	2670	2800	3130	3020	3090	2690	2540	2610	911	894	902
2	2900	2720	2840	3190	3100	3140	2750	2670	2710	898	876	892
3	2880	2500	2620	3180	3080	3130	2770	2640	2740	898	871	885
4	2900	2500	2800	3140	3060	3090	2760	2550	2650	894	870	882
5	2910	2870	2890	3090	3040	3070	2820	2740	2770	983	660	882
6	2900	2580	2810	3090	3040	3060	2840	2770	2800	909	854	874
7	2760	2580	2700	3050	2770	2960	2920	2690	2780	933	788	836
8	2850	2760	2790	2860	2720	2790	3040	2920	3000	854	822	841
9	2860	2830	2850	2980	2810	2930	3040	2860	2960	855	843	849
10	2850	2820	2840	2990	2940	2980	2860	2470	2750	861	851	857
11	2820	2570	2650	2950	2800	2870	2470	2190	2370	867	855	862
12	2800	2670	2740	2960	2920	2950	2530	1890	2190	870	863	866
13	2890	2800	2840	2960	2710	2800	2240	1940	2060	874	866	870
14	2900	2860	2880	2830	2800	2820	2290	1450	1940	916	797	872
15	2920	2870	2890	2860	2820	2840	1540	1380	1420	866	725	796
16	3000	2910	2940	2880	2840	2860	1410	1320	1360	876	709	810
17	3010	2910	2950	2890	2840	2870	1320	1260	1300	1290	704	860
18	2980	2920	2940	2890	2810	2840	1270	1220	1250	974	701	838
19	3010	2870	2960	2920	2870	2890	1220	1160	1190	858	693	784
20	3040	2920	3000	2880	2830	2850	1160	1120	1140	839	675	767
21	3030	2980	3010	2850	2810	2840	1120	1090	1110	814	672	748
22	2990	2960	2970	2870	2520	2730	1100	1070	1090	813	655	749
23	2980	2950	2970	2750	2550	2670	1210	1000	1090	801	666	735
24	2990	2950	2970	2810	2470	2770	1180	1010	1060	787	658	726
25	2980	2850	2940	2700	2360	2560	1160	1010	1080	789	631	730
26	3010	2860	2950	2770	2700	2730	1120	1020	1070	792	643	722
27	3060	3010	3040	2780	2650	2740	1060	980	1030	770	635	700
28	3070	3040	3060	2660	2510	2580	1000	956	980	834	611	714
29	3090	3050	3070	2560	2420	2480	968	929	942	771	651	711
30	3120	3070	3090	2690	2520	2650	938	907	925	772	696	729
31	3090	3040	3070	---	---	---	928	903	913	739	682	718
MONTH	3120	2500	2900	3190	2360	2850	3040	903	1780	1290	611	807

## SPOKANE RIVER BASIN

12433558 BLUE CREEK BELOW MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	721	682	703	204	196	199	675	641	658	975	908	937
2	744	691	715	217	198	204	710	675	691	975	961	969
3	740	688	718	227	208	220	724	703	711	1000	970	980
4	737	703	714	218	208	212	742	721	728	1020	980	999
5	726	705	718	224	210	216	751	731	741	1030	988	1010
6	824	645	724	219	213	217	752	738	744	1080	1020	1050
7	844	654	715	225	219	223	749	737	743	1110	1060	1080
8	758	581	622	233	224	227	740	656	684	1110	1090	1100
9	801	587	667	237	221	228	703	662	677	1160	1110	1130
10	760	634	676	242	223	229	720	697	710	1160	1110	1140
11	769	578	627	237	226	233	721	695	708	1140	857	1090
12	657	521	585	247	235	240	748	709	728	887	498	699
13	521	488	505	248	241	244	763	735	748	1090	887	1020
14	491	466	481	246	239	242	776	740	761	1120	1090	1110
15	467	408	439	241	227	234	798	761	782	1130	1090	1110
16	408	374	392	229	222	226	791	755	768	1150	1120	1130
17	374	353	365	224	219	221	811	771	785	1150	1110	1130
18	386	341	360	405	218	269	811	744	770	1170	1150	1160
19	375	262	302	485	405	456	835	779	802	1190	1160	1180
20	279	246	263	518	481	495	826	670	734	1220	1190	1200
21	246	237	241	518	504	509	869	826	847	1230	1200	1220
22	246	214	232	525	503	514	891	857	880	1220	1050	1130
23	214	200	206	511	495	501	857	764	802	1180	1120	1150
24	218	197	207	526	501	510	818	600	694	1200	1170	1180
25	210	195	202	551	506	529	881	818	858	1230	1200	1210
26	211	192	200	550	519	535	889	857	880	1260	1230	1240
27	205	191	197	562	548	554	918	873	898	1270	1250	1260
28	204	193	198	651	561	598	924	888	909	1290	1240	1260
29	206	194	198	667	649	658	931	895	913	1310	1280	1300
30	---	---	---	700	667	689	942	902	929	1340	1310	1320
31	---	---	---	712	671	700	---	---	---	1340	1310	1330
MONTH	844	191	454	712	196	366	942	600	776	1340	498	1120

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	1390	1320	1350	2010	1930	1960	2590	2500	2540	2910	2840	2870
2	1430	1380	1400	2080	1940	2020	2560	2510	2530	2890	2800	2830
3	1440	1410	1430	2140	2070	2090	2560	2500	2520	2860	2790	2820
4	1480	1420	1450	2180	2090	2130	2560	2510	2540	2870	2810	2830
5	1490	1470	1480	2210	2140	2160	2550	2360	2460	2860	2800	2840
6	1540	1440	1500	2240	2150	2190	2590	2490	2530	2860	2800	2850
7	1550	1480	1520	2250	2170	2210	2600	2560	2580	2860	2800	2820
8	1580	1520	1550	2270	2190	2220	2670	2570	2610	2920	2840	2870
9	1630	1550	1580	2280	2210	2240	2640	2540	2590	2980	2900	2920
10	1640	1570	1600	2260	1880	2190	2600	2510	2550	2970	2010	2720
11	1660	1600	1620	2150	1770	1960	2580	2470	2520	---	---	---
12	1700	1630	1660	2180	1860	2060	2560	2470	2520	---	---	---
13	1750	1670	1690	2160	1890	2060	2570	2480	2530	2860	2710	2790
14	1770	1710	1730	2180	2090	2130	2580	2480	2530	2840	2690	2780
15	1790	1740	1760	2160	2090	2120	2600	2500	2530	2800	2630	2710
16	1810	1760	1780	2210	2090	2150	2620	2480	2550	2810	2690	2770
17	1830	1770	1790	2220	2130	2170	2620	2530	2560	2850	2730	2780
18	1850	1790	1820	2210	2120	2160	2560	2410	2470	2850	2700	2780
19	1880	1810	1840	2210	2150	2180	2560	2470	2510	2830	2520	2740
20	1900	1830	1860	2320	2200	2260	2550	2490	2520	2820	2510	2710
21	1900	1620	1850	2310	2240	2270	2580	2490	2530	2870	2810	2830
22	1840	1620	1730	2360	2260	2300	2560	2460	2510	2890	2850	2870
23	1850	1590	1750	2380	2220	2300	2540	2420	2480	2910	2840	2870
24	1880	1640	1780	2350	2300	2310	2530	2460	2500	2920	2880	2900
25	1910	1740	1840	2390	2300	2340	2520	2460	2490	2940	2880	2910
26	1940	1830	1910	2440	2290	2370	2570	2440	2470	2940	2890	2920
27	1940	1570	1720	2450	2370	2400	2570	2470	2530	2950	2880	2920
28	1820	1670	1770	2430	2360	2400	2840	2460	2620	2940	2850	2900
29	1950	1730	1820	2470	2330	2430	2880	2800	2830	2930	2870	2910
30	1980	1740	1900	2530	2440	2470	2890	2810	2850	2950	2900	2920
31	---	---	---	2570	2430	2500	2910	2820	2860	---	---	---
MONTH	1980	1320	1680	2570	1770	2220	2910	2360	2560	---	---	---



## SPOKANE RIVER BASIN

12433558 BLUE CREEK BELOW MIDNITE MINE DRAINAGE, NEAR WELLPINIT, WA--Continue

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	---	---	---	7.7	7.6	7.7	7.6	7.6	7.6	---	---	---
2	---	---	---	7.7	7.5	7.6	7.6	7.6	7.6	---	---	---
3	---	---	---	7.6	7.5	7.6	7.6	7.6	7.6	---	---	---
4	---	---	---	7.7	7.6	7.6	7.7	7.6	7.6	---	---	---
5	---	---	---	7.6	7.5	7.6	7.7	7.6	7.6	---	---	---
6	---	---	---	7.6	7.5	7.6	7.6	7.6	7.6	---	---	---
7	7.7	7.6	7.6	7.6	7.5	7.6	7.6	7.6	7.6	---	---	---
8	7.7	7.6	7.6	7.7	7.6	7.6	---	---	---	---	---	---
9	7.6	7.5	7.5	7.7	7.6	7.6	---	---	---	---	---	---
10	7.6	7.4	7.5	7.7	7.6	7.6	---	---	---	---	---	---
11	7.6	7.4	7.4	7.7	7.6	7.6	---	---	---	---	---	---
12	7.6	7.3	7.4	7.7	7.6	7.6	---	---	---	---	---	---
13	7.6	7.3	7.4	7.7	7.6	7.6	---	---	---	7.6	7.6	7.6
14	7.6	7.4	7.4	7.7	7.6	7.6	---	---	---	7.6	7.6	7.6
15	7.6	7.3	7.4	7.7	7.6	7.6	---	---	---	7.7	7.6	7.6
16	7.6	7.3	7.4	7.7	7.6	7.6	---	---	---	7.6	7.6	7.6
17	7.5	7.4	7.4	7.7	7.6	7.6	---	---	---	7.6	7.6	7.6
18	7.4	7.2	7.3	7.7	7.6	7.6	---	---	---	7.6	7.6	7.6
19	7.5	7.2	7.4	7.7	7.6	7.6	---	---	---	7.6	7.5	7.6
20	7.5	7.3	7.4	7.6	7.6	7.6	---	---	---	7.6	7.6	7.6
21	7.6	7.4	7.4	7.6	7.6	7.6	---	---	---	7.6	7.6	7.6
22	7.5	7.4	7.4	7.6	7.6	7.6	---	---	---	7.6	7.6	7.6
23	7.5	7.4	7.4	7.6	7.6	7.6	---	---	---	7.6	7.6	7.6
24	7.6	7.3	7.4	7.7	7.6	7.6	---	---	---	7.6	7.6	7.6
25	7.6	7.4	7.5	7.6	7.6	7.6	---	---	---	7.6	7.5	7.6
26	7.6	7.4	7.5	7.6	7.6	7.6	---	---	---	7.6	7.5	7.6
27	7.6	7.4	7.5	7.6	7.6	7.6	---	---	---	7.6	7.5	7.5
28	7.7	7.5	7.6	7.6	7.6	7.6	---	---	---	7.5	7.5	7.5
29	7.7	7.5	7.6	7.6	7.5	7.6	---	---	---	7.5	7.5	7.5
30	7.7	7.5	7.6	7.6	7.6	7.6	---	---	---	7.5	7.5	7.5
31	---	---	---	7.6	7.6	7.6	---	---	---	---	---	---
MAX	---	---	---	7.7	7.6	7.7	---	---	---	---	---	---
MIN	---	---	---	7.6	7.5	7.6	---	---	---	---	---	---

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	12.0	9.0	10.5	4.5	2.5	3.5	6.5	4.0	5.5	.5	.5	.5
2	11.0	9.5	10.5	4.5	2.5	3.5	5.0	3.0	4.0	.5	.5	.5
3	12.0	9.5	11.0	4.5	2.5	3.5	4.0	2.5	3.0	1.0	.5	.5
4	11.0	8.5	9.5	4.5	3.0	4.0	3.5	2.0	3.0	.5	.0	.5
5	11.0	8.0	9.5	5.5	3.5	4.5	2.5	1.0	1.5	.0	.0	.0
6	11.5	9.5	10.5	5.5	4.0	4.5	2.0	.0	1.5	.0	.0	.0
7	10.5	8.0	9.5	4.5	3.5	4.0	2.0	.0	1.5	.5	.0	.0
8	11.0	9.0	9.5	6.0	4.0	5.0	.0	.0	.0	1.5	.5	1.0
9	11.0	8.5	9.5	5.5	3.5	4.5	.5	.0	.0	1.5	1.0	1.5
10	11.5	10.0	11.0	4.0	3.0	3.5	1.5	.5	1.0	1.5	1.5	1.5
11	11.0	9.5	10.5	4.5	3.5	4.0	2.0	1.0	2.0	1.5	1.0	1.0
12	10.0	7.5	8.5	4.5	3.5	4.0	2.5	2.0	2.0	1.0	.0	.5
13	10.0	7.5	8.5	5.5	4.5	5.0	2.5	2.0	2.5	1.0	.0	.5
14	11.0	7.5	9.0	7.0	5.5	6.5	2.0	1.5	2.0	1.5	1.0	1.5
15	10.5	7.5	9.0	7.5	5.5	6.5	1.5	1.5	1.5	2.0	1.0	1.5
16	11.5	9.5	10.5	7.5	6.5	7.0	1.5	1.0	1.5	2.0	1.0	2.0
17	10.0	9.5	10.0	8.0	6.5	7.5	2.0	1.0	1.5	1.0	.0	.0
18	10.0	7.5	9.0	7.5	5.0	6.5	1.5	1.0	1.5	.0	.0	.0
19	9.0	6.5	7.5	5.0	4.0	4.5	2.0	1.5	2.0	.0	.0	.0
20	9.5	7.0	8.0	4.5	3.0	3.5	2.5	2.0	2.0	.0	.0	.0
21	9.0	6.5	8.0	4.5	3.0	3.5	2.5	.5	2.0	.5	.0	.5
22	7.5	5.5	6.5	5.0	4.0	4.5	1.5	.5	1.0	.5	.0	.5
23	8.0	6.0	7.0	6.5	5.0	6.0	1.0	.0	.0	.5	.0	.5
24	8.0	5.5	7.0	7.0	6.0	6.5	.0	.0	.0	1.0	.5	.5
25	8.0	6.5	7.5	7.0	5.0	6.0	.0	.0	.0	.5	.0	.0
26	8.5	6.5	7.5	6.0	4.0	5.0	.0	.0	.0	.0	.0	.0
27	7.5	5.5	6.5	4.0	3.0	3.5	.0	.0	.0	.0	.0	.0
28	7.0	5.0	6.0	4.5	3.5	3.5	.0	.0	.0	.0	.0	.0
29	6.5	4.0	5.0	7.0	4.5	5.5	.0	.0	.0	.0	.0	.0
30	5.5	3.5	4.5	7.0	5.0	6.0	.0	.0	.0	.0	.0	.0
31	5.0	3.0	4.0	---	---	---	.5	.0	.5	.0	.0	.0
MONTH	12.0	3.0	8.4	8.0	2.5	4.8	6.5	.0	1.4	2.0	.0	.5

## 341

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	.0	.0	.0	4.0	1.5	2.5	6.5	4.5	5.0	10.0	6.0	7.5
2	.0	.0	.0	4.5	2.0	3.0	7.5	3.5	5.0	8.5	4.5	6.5
3	.0	.0	.0	4.5	2.5	3.5	7.0	2.5	4.5	9.0	4.0	6.5
4	.0	.0	.0	4.5	3.0	3.5	8.0	3.0	5.0	8.5	4.5	6.5
5	.0	.0	.0	4.5	2.0	3.0	9.0	3.5	6.0	9.0	4.5	6.5
6	.0	.0	.0	4.0	2.5	3.5	7.5	5.0	6.5	10.0	4.5	7.0
7	.0	.0	.0	5.0	3.0	4.0	10.5	6.0	7.5	9.0	4.5	6.5
8	.0	.0	.0	5.0	3.5	4.0	11.0	5.0	7.5	9.0	3.5	6.5
9	.5	.0	.0	6.0	3.5	4.5	10.5	6.0	8.0	9.0	4.5	6.5
10	.5	.0	.0	5.5	3.5	4.0	9.5	5.5	7.0	11.0	4.5	7.5
11	.5	.0	.0	6.0	3.5	4.5	7.5	5.0	6.5	9.5	6.0	7.5
12	.5	.0	.0	5.5	3.5	4.5	7.5	5.5	6.5	9.5	6.5	8.0
13	.5	.0	.5	6.0	3.0	4.0	9.5	4.0	6.5	11.0	7.5	9.0
14	1.5	.0	1.0	6.5	3.0	4.5	10.0	4.0	6.5	11.0	8.5	9.5
15	2.0	1.0	1.5	6.5	3.5	4.5	9.0	5.5	7.0	11.0	8.5	9.5
16	2.0	1.0	1.5	6.5	3.0	4.5	8.5	6.0	7.0	13.0	7.5	10.0
17	2.5	1.5	2.0	6.5	3.0	4.0	8.0	4.5	6.0	10.5	8.0	9.0
18	2.5	2.0	2.5	6.5	2.5	4.0	8.5	5.5	6.5	11.5	8.0	9.5
19	2.0	.5	1.5	7.0	3.5	5.0	9.0	4.0	6.0	11.5	6.5	9.0
20	3.0	1.5	2.0	6.5	3.0	4.5	8.5	4.5	6.5	11.0	6.0	8.5
21	2.5	2.0	2.0	6.5	3.0	4.5	10.0	4.0	7.0	9.5	6.0	8.0
22	3.0	1.5	2.0	6.5	4.0	5.0	8.0	4.5	6.5	9.5	8.0	8.5
23	3.5	2.0	2.5	6.5	3.5	4.5	8.0	7.0	7.5	10.5	7.5	8.5
24	3.5	2.0	2.5	4.5	2.0	3.5	9.0	5.5	7.5	13.5	7.0	10.0
25	3.5	1.5	2.5	5.0	1.5	3.0	7.0	4.5	6.0	14.0	7.5	10.5
26	3.0	1.0	2.0	6.0	3.0	4.0	8.5	4.5	6.5	14.0	8.5	11.5
27	3.0	1.5	2.0	6.0	2.5	4.0	8.5	4.0	6.0	13.5	8.0	11.0
28	3.0	1.5	2.0	6.0	1.5	3.5	9.5	3.5	6.5	10.5	7.5	9.0
29	3.5	1.0	2.0	5.0	2.5	3.5	11.5	6.0	8.0	9.5	7.5	8.5
30	---	---	---	6.0	2.5	4.0	11.0	5.0	7.5	10.0	7.0	8.5
31	---	---	---	5.0	3.0	4.0	---	---	---	12.5	6.5	9.5
MONTH	3.5	.0	1.1	7.0	1.5	4.0	11.5	2.5	6.5	14.0	3.5	8.4
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	13.5	7.5	10.5	16.0	12.0	14.0	18.5	14.0	16.0	16.0	12.5	14.5
2	15.0	9.5	12.0	17.0	13.0	15.0	16.5	14.0	15.0	16.5	13.0	14.5
3	14.5	10.5	12.5	17.5	14.0	16.0	16.0	13.0	14.5	16.5	14.5	15.5
4	14.5	10.0	12.5	16.0	13.5	15.0	15.5	13.0	14.5	15.0	12.5	13.5
5	14.0	8.5	11.5	15.0	11.0	13.5	15.0	13.0	14.0	14.0	11.0	13.0
6	14.5	9.0	12.0	15.5	11.0	13.5	16.5	13.0	14.5	14.0	11.0	12.5
7	16.0	10.5	13.0	16.5	11.5	14.0	17.0	13.0	15.0	15.0	12.5	13.5
8	15.0	10.5	13.0	17.5	13.0	15.5	18.0	14.0	15.5	16.0	12.5	14.0
9	14.5	9.5	12.0	17.5	14.0	16.0	18.0	14.0	16.0	15.5	13.0	14.5
10	14.0	9.0	11.5	17.0	13.5	15.5	19.0	15.0	16.5	14.5	11.5	13.0
11	14.0	9.0	11.5	17.0	12.5	15.0	19.0	15.5	17.0	16.0	11.5	14.0
12	14.5	9.0	12.0	17.0	13.0	15.0	17.5	13.5	15.5	17.0	14.5	15.5
13	14.5	10.0	12.5	18.0	13.0	15.5	18.0	13.5	15.5	16.0	14.5	15.0
14	15.5	10.0	13.0	18.5	14.5	16.5	19.0	15.0	17.0	15.0	14.0	14.5
15	15.0	10.5	13.0	19.0	15.0	17.0	18.5	15.5	17.0	14.5	12.0	14.0
16	14.5	10.0	12.5	18.5	14.5	16.5	18.0	14.5	16.5	13.0	10.5	12.0
17	13.5	11.0	12.0	17.5	14.0	15.5	17.0	14.0	15.5	13.5	10.0	11.5
18	12.0	8.5	10.5	15.5	13.5	14.5	16.5	12.5	14.5	13.0	11.5	12.5
19	13.5	8.0	11.0	14.5	12.0	13.5	16.5	12.5	14.5	13.0	11.0	12.0
20	13.5	9.0	11.5	15.5	12.0	14.0	16.5	14.0	15.5	12.5	10.5	11.5
21	14.0	10.5	12.5	16.5	12.5	14.5	16.0	12.5	14.5	12.0	9.0	10.5
22	13.0	11.5	12.5	17.5	13.5	15.5	16.5	12.0	14.5	11.5	9.0	10.5
23	12.0	11.0	11.5	18.5	14.5	16.5	17.5	13.0	15.0	11.5	8.0	9.5
24	13.5	11.0	12.0	18.5	14.5	16.5	17.5	13.0	15.5	11.0	8.5	9.5
25	14.0	10.0	12.0	19.0	15.0	17.0	18.0	14.0	16.0	11.5	8.0	9.5
26	14.5	11.0	13.0	19.5	15.0	17.5	18.0	14.5	16.0	12.0	9.0	10.5
27	13.5	11.5	12.5	19.5	15.5	17.5	18.0	14.5	16.5	13.0	10.0	11.5
28	13.5	10.0	12.0	20.0	16.0	18.0	18.0	16.5	17.5	13.5	10.5	12.0
29	14.0	9.5	12.0	19.0	17.5	18.5	18.5	15.5	17.0	13.5	10.5	12.0
30	15.0	11.0	13.0	19.0	16.0	17.5	18.5	16.0	17.0	13.5	10.5	12.0
31	---	---	---	19.0	15.5	17.0	17.0	14.0	15.5	---	---	---
MONTH	16.0	7.5	12.1	20.0	11.0	15.7	19.0	12.0	15.6	17.0	8.0	12.6
YEAR	20.0	.0	7.6									



## SPOKANE RIVER BASIN

12433561 BLUE CREEK NEAR MOUTH, NEAR WELLPINIT, WA

LOCATION.--Lat 47°53'49", long 118°08'05", in NE 1/4 SW 1/4 sec.27, T.28 N., R.37 E., Stevens County, Hydrologic Unit 17010307, Spokane Indian Reservation, on right bank, 0.75 mi upstream from Franklin D. Roosevelt Lake, and 7.0 mi west of Wellpinit.

DRAINAGE AREA.--19.1 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1984 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,340 ft above sea level, from topographic map.

REMARKS.--Records fair. Three ponds upstream from gage exist for mine surface-water retention. A small tributary (Midnite Mine drainage) is located approximately 3.0 mi upstream from station and consists of three converging branches. Diversion from all three branches into one of the ponds began in late May 1987, with release of this water after treatment at an on-site plant beginning in October 1992. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--12 years (water years 1985-96), 2.21 ft<sup>3</sup>/s, 1.57 in/yr, 1,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 101 ft<sup>3</sup>/s Feb. 19, 1996, gage height, 3.64 ft; minimum discharge, no flow for many days during most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 101 ft<sup>3</sup>/s Feb. 19, gage height, 3.64 ft; minimum daily discharge, 0.50 ft<sup>3</sup>/s, Jan. 30 to Feb. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1.1	.97	1.4	.99	e.50	23	17	8.5	4.2	2.0	.98	.96
2	1.1	1.0	1.3	1.0	e.50	22	16	8.2	3.9	2.0	1.0	.96
3	1.4	1.1	1.2	1.0	e.50	20	15	8.1	3.8	2.1	1.1	.96
4	1.1	1.1	1.4	.93	e1.0	19	14	7.9	3.6	2.1	1.0	.99
5	1.0	1.1	e1.4	e.80	e3.0	17	13	7.7	3.5	2.0	1.2	.98
6	1.0	1.1	e1.4	e1.0	e6.0	16	13	7.6	3.3	2.0	1.0	.99
7	.95	1.2	e1.2	e1.1	e8.0	15	13	7.4	3.3	1.9	.99	.89
8	.98	1.4	e.90	1.2	e10	15	12	7.1	3.1	1.8	.99	.90
9	.99	1.3	e1.0	1.2	e12	16	12	6.9	3.0	1.7	.96	.95
10	.98	1.2	e1.5	1.2	e8.0	18	11	6.7	2.9	1.7	.94	.80
11	1.1	1.4	e2.5	1.2	e7.0	20	11	6.5	2.9	1.4	.91	.59
12	1.1	1.3	3.6	1.3	e8.0	21	11	5.9	2.8	1.5	.89	.78
13	.98	1.5	3.3	1.3	e8.0	21	10	6.0	2.7	1.3	.88	.91
14	.89	1.4	2.9	1.3	e9.3	22	9.6	6.1	2.6	1.4	.87	1.0
15	.88	1.3	2.9	1.9	9.9	23	9.3	6.1	2.5	1.4	.86	1.0
16	.85	1.2	2.6	2.6	10	23	9.9	6.0	2.5	1.3	.84	1.0
17	.94	1.2	2.3	e2.2	11	23	9.3	5.9	2.4	1.3	.84	1.1
18	.94	1.2	2.0	e1.6	18	22	10	5.8	2.4	1.4	.85	1.1
19	.93	1.1	1.8	e1.5	70	22	9.4	5.4	2.4	1.4	.85	1.3
20	.97	1.1	1.6	e1.5	85	21	8.6	5.2	2.3	1.4	.96	1.4
21	1.0	1.0	1.5	e1.5	76	21	8.4	5.1	2.3	1.4	.97	1.2
22	.94	.98	1.4	e1.2	61	21	8.2	7.5	2.8	1.4	.95	1.2
23	.94	.97	1.3	e1.2	54	20	11	6.8	2.7	1.3	.93	1.2
24	.94	1.1	e1.1	e1.2	44	19	11	6.0	3.2	1.2	.91	1.2
25	1.0	1.5	e1.0	e1.0	38	17	9.8	5.4	2.6	1.1	.90	1.2
26	1.1	1.2	e.90	e1.0	32	17	10	5.1	2.4	1.0	.96	1.2
27	1.0	1.2	e.90	e1.0	27	17	9.5	4.8	3.8	1.0	.93	1.2
28	1.0	1.5	e.90	e.70	23	16	9.2	4.5	2.9	1.0	.92	1.2
29	1.1	1.5	e1.0	e.60	24	15	9.0	4.6	2.2	1.1	.91	1.3
30	1.1	1.4	1.0	e.50	---	15	8.7	4.9	2.1	1.1	.94	1.2
31	1.0	---	1.0	e.50	---	14	---	4.5	---	1.0	.95	---
TOTAL	31.30	36.52	50.20	37.22	664.70	591	328.9	194.2	87.1	45.7	29.18	31.66
MEAN	1.01	1.22	1.62	1.20	22.9	19.1	11.0	6.26	2.90	1.47	.94	1.06
MAX	1.4	1.5	3.6	2.6	85	23	17	8.5	4.2	2.1	1.2	1.4
MIN	.85	.97	.90	.50	.50	14	8.2	4.5	2.1	1.0	.84	.59
AC-FT	62	72	100	74	1320	1170	652	385	173	91	58	63
CFSM	.05	.06	.08	.06	1.20	1.00	.57	.33	.15	.08	.05	.06
IN.	.06	.07	.10	.07	1.29	1.15	.64	.38	.17	.09	.06	.06

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1984 - 1996, BY WATER YEAR (WY)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	.36	.47	.55	1.49	4.60	9.10	5.65	2.25	1.18	.50	.28	.32	
MAX	1.01	1.22	1.62	11.3	22.9	33.1	13.3	6.26	2.90	1.47	.94	1.06	
(WY)	1996	1996	1996	1995	1996	1995	1993	1996	1996	1996	1996	1996	
MIN	.037	.18	.16	.15	.28	.82	.55	.13	.037	.009	.000	.000	
(WY)	1989	1988	1989	1991	1990	1994	1990	1992	1992	1988	1988	1987	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1984 - 1996

ANNUAL TOTAL	2654.58	2127.68	
ANNUAL MEAN	7.27	5.81	2.21
HIGHEST ANNUAL MEAN			7.20
LOWEST ANNUAL MEAN			.44
HIGHEST DAILY MEAN	72	85	85
LOWEST DAILY MEAN	.53	.50	.00
ANNUAL SEVEN-DAY MINIMUM	.76	.54	.00
ANNUAL RUNOFF (AC-FT)	5270	4220	1600
ANNUAL RUNOFF (CFSM)	.38	.30	.12
ANNUAL RUNOFF (INCHES)	5.17	4.14	1.57
10 PERCENT EXCEEDS	22	16	5.0
50 PERCENT EXCEEDS	1.8	1.4	.60
90 PERCENT EXCEEDS	.85	.93	.01

e Estimated

## SPOKANE RIVER BASIN

343

12433561 BLUE CREEK NEAR MOUTH, NEAR WELLPINIT, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--1980, June 1984 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: June 1984 to current year.

pH: June 1984 to current year.

WATER TEMPERATURE: June 1984 to current year.

INSTRUMENTATION.--Water-quality monitor since June 1984. Electronic data logger with thirty-minute recording interval. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 3,260 microsiemens Aug. 7, 11, 1994; minimum recorded, 63 microsiemens

Mar. 15, 1995 (more than 20 percent missing record), but may have been lower during periods of missing record.

pH: Maximum recorded, 9.2 units May 10, 1996, but may have been higher during periods of missing record; minimum recorded, 6.7 units Oct. 6, 1994, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum recorded, 27.5°C July 9, 10, 1985, but may have been higher during periods of missing record; minimum, 0.0°C on many days during winters.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum recorded, 2,950 microsiemens Nov. 3, 4; minimum observed, 181 microsiemens Mar. 12, (more than 20 percent missing record).

pH: Maximum recorded, 9.2 units May 10, but may have been higher during periods of missing record; minimum recorded, 7.1 units, Sept. 23-26, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum, 19.5°C July 28; minimum, 0.0°C many days October to March.

## SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	2760	2680	2710	2890	2850	2860	2130	2000	2050	767	762	765
2	2780	2750	2760	2930	2880	2900	2040	2000	2020	764	747	756
3	2760	2460	2580	2950	2890	2920	2030	1740	1920	747	742	744
4	2710	2560	2630	2950	2890	2910	2080	1670	1970	748	742	745
5	2760	2710	2740	2900	2850	2870	2070	1980	2020	795	743	765
6	2770	2710	2750	2860	2830	2850	2400	1940	2170	744	727	734
7	2740	2600	2660	2850	2540	2730	2390	2310	2330	729	659	693
8	2700	2650	2670	2540	2250	2390	2540	2340	2420	659	655	656
9	2740	2690	2720	2250	2130	2180	2610	2530	2580	662	638	653
10	2740	2720	2730	2190	2020	2120	2570	2280	2460	638	624	630
11	2720	2580	2640	2100	1850	2000	2280	1780	2050	624	615	618
12	2650	2570	2610	2030	1810	1900	1790	1220	1580	615	607	611
13	2680	2650	2670	1890	1660	1780	1220	1110	1160	609	602	605
14	2690	2640	2660	2260	1780	2050	1250	1090	1190	602	584	597
15	2660	2630	2650	2350	2170	2240	1090	856	923	586	503	556
16	---	---	---	2230	2100	2170	863	848	852	503	348	439
17	---	---	---	2320	1960	2110	856	854	855	348	220	262
18	---	---	---	2300	2060	2160	860	855	857	320	243	260
19	---	---	---	2180	2010	2090	860	855	857	348	228	261
20	---	---	---	2270	1920	2100	856	846	849	325	238	278
21	---	---	---	2350	2030	2210	877	845	851	331	235	279
22	---	---	---	2210	2020	2130	846	836	840	348	232	281
23	---	---	---	2360	1940	2130	845	822	834	338	237	286
24	---	---	---	2320	1820	2170	890	821	851	320	237	275
25	---	---	---	2150	1730	1970	920	888	900	341	240	293
26	---	---	---	2040	1890	1970	903	878	889	257	248	253
27	---	---	---	2230	1830	2100	887	843	868	342	249	316
28	---	---	---	1980	1680	1820	846	812	828	316	295	305
29	---	---	---	2140	1560	1840	812	781	792	348	308	333
30	---	---	---	2150	2080	2120	781	761	771	380	348	372
31	---	---	---	---	---	---	766	759	763	415	377	401
MONTH	---	---	---	2950	1560	2260	2610	759	1360	795	220	485

## SPOKANE RIVER BASIN

12433561 BLUE CREEK NEAR MOUTH, NEAR WELLPINIT, WA--Continued

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	450	409	435	---	---	---	---	---	---	---	---	---
2	492	450	474	---	---	---	---	---	---	---	---	---
3	514	491	507	---	---	---	---	---	---	---	---	---
4	518	513	516	---	---	---	---	---	---	---	---	---
5	513	506	511	---	---	---	---	---	---	---	---	---
6	506	460	489	---	---	---	---	---	---	---	---	---
7	498	441	462	---	---	---	---	---	---	---	---	---
8	441	329	401	---	---	---	---	---	---	---	---	---
9	332	294	305	---	---	---	---	---	---	---	---	---
10	333	322	328	---	---	---	---	---	---	798	784	790
11	329	323	326	---	---	---	---	---	---	798	741	790
12	328	323	326	---	---	---	---	---	---	741	447	564
13	324	194	237	---	---	---	---	---	---	773	557	683
14	292	200	246	---	---	---	---	---	---	803	773	787
15	260	251	256	---	---	---	---	---	---	811	776	795
16	251	244	248	---	---	---	---	---	---	823	782	801
17	244	224	237	---	---	---	---	---	---	829	790	809
18	229	205	220	---	---	---	---	---	---	837	805	818
19	---	---	---	---	---	---	---	---	---	858	837	843
20	---	---	---	---	---	---	---	---	---	882	858	865
21	---	---	---	---	---	---	---	---	---	892	859	881
22	---	---	---	---	---	---	---	---	---	859	669	745
23	---	---	---	---	---	---	---	---	---	799	741	768
24	---	---	---	---	---	---	---	---	---	846	799	818
25	---	---	---	---	---	---	---	---	---	878	846	856
26	---	---	---	---	---	---	---	---	---	905	872	881
27	---	---	---	---	---	---	---	---	---	915	899	907
28	---	---	---	---	---	---	---	---	---	916	894	904
29	---	---	---	---	---	---	---	---	---	933	907	923
30	---	---	---	---	---	---	---	---	---	934	907	920
31	---	---	---	---	---	---	---	---	---	980	934	952
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	1010	979	987	1580	1530	1550	2290	2250	2270	2780	2740	2760
2	1040	1010	1020	1670	1580	1610	2320	2200	2270	2790	2750	2770
3	1060	1030	1040	1740	1640	1690	2340	2200	2300	2780	2750	2760
4	1090	1050	1060	1790	1720	1750	2350	2310	2330	2800	2760	2790
5	1100	1090	1100	1810	1760	1780	2350	2210	2270	2820	2780	2790
6	1170	1100	1120	1830	1780	1800	2330	2240	2290	2790	2770	2780
7	1190	1140	1170	1830	1780	1810	2360	2320	2340	2780	2730	2750
8	1210	1180	1190	1850	1790	1820	2410	2350	2380	2760	2730	2740
9	1230	1190	1210	1840	1800	1820	2440	2400	2420	2790	2750	2770
10	1250	1220	1230	1860	1820	1850	2470	2400	2430	2820	2760	2800
11	1260	1230	1240	1860	1600	1710	2480	2430	2450	2770	2500	2630
12	1280	1260	1270	1840	1690	1800	2510	2440	2470	2690	2600	2640
13	1310	1280	1300	1810	1660	1720	2510	2460	2480	2760	2690	2720
14	1350	1310	1330	1830	1760	1810	2510	2460	2480	2810	2750	2790
15	1370	1350	1360	1860	1830	1850	2540	2470	2500	2790	2710	2760
16	1400	1370	1380	1880	1840	1860	2550	2490	2510	2810	2730	2790
17	1420	1400	1410	1930	1870	1900	2540	2490	2520	2840	2790	2820
18	1440	1420	1430	1930	1880	1900	2570	2520	2540	2850	2820	2830
19	1470	1440	1450	1940	1910	1930	2560	2520	2540	2840	2730	2800
20	1490	1470	1480	1990	1930	1950	2570	2520	2550	2770	2590	2680
21	1510	1470	1490	2050	1990	2020	2580	2550	2570	2810	2770	2790
22	1470	1380	1420	2120	2050	2090	2620	2580	2600	2830	2800	2820
23	1460	1410	1440	2150	2070	2100	2640	2590	2610	2850	2820	2830
24	1410	1330	1360	2110	2080	2090	2650	2600	2630	2850	2820	2840
25	1450	1380	1420	2110	2070	2080	2660	2620	2640	2870	2810	2840
26	1510	1450	1490	2140	2100	2120	2680	2630	2650	2860	2840	2850
27	1510	1210	1390	2170	2130	2150	2660	2620	2640	2860	2820	2850
28	1350	1190	1260	2190	2160	2180	2650	2600	2620	2880	2820	2850
29	1490	1350	1420	2210	2180	2190	2660	2640	2650	2880	2840	2860
30	1540	1490	1510	2230	2180	2200	2710	2660	2700	2890	2850	2870
31	---	---	---	2260	2210	2230	2760	2710	2730	---	---	---
MONTH	1540	979	1300	2260	1530	1910	2760	2200	2500	2890	2500	2790

## SPOKANE RIVER BASIN

345

12433561 BLUE CREEK NEAR MOUTH, NEAR WELLPINIT, WA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	7.7	7.6	7.6	---	---	---	---	---	---	7.5	7.3	7.4
2	7.7	7.6	7.6	---	---	---	---	---	---	7.6	7.4	7.5
3	7.7	7.6	7.6	---	---	---	---	---	---	7.6	7.3	7.5
4	7.9	7.6	7.7	---	---	---	---	---	---	7.5	7.2	7.3
5	7.9	7.8	7.8	---	---	---	---	---	---	7.4	7.2	7.3
6	7.9	7.7	7.8	---	---	---	---	---	---	7.4	7.2	7.3
7	7.9	7.7	7.8	---	---	---	7.5	7.3	7.4	7.5	7.4	7.4
8	8.0	7.8	7.8	---	---	---	7.4	7.2	7.3	7.5	7.3	7.4
9	8.0	7.8	7.8	---	---	---	7.3	7.2	7.2	8.0	7.4	7.5
10	7.9	7.7	7.8	---	---	---	7.3	7.2	7.3	---	---	---
11	7.9	7.7	7.8	---	---	---	7.4	7.3	7.4	---	---	---
12	7.9	7.8	7.8	---	---	---	7.6	7.4	7.5	---	---	---
13	8.0	7.8	7.8	---	---	---	7.7	7.6	7.6	---	---	---
14	8.0	7.8	7.8	---	---	---	7.7	7.6	7.6	---	---	---
15	7.9	7.8	7.8	---	---	---	7.7	7.6	7.7	---	---	---
16	7.9	7.8	7.8	---	---	---	7.7	7.6	7.6	---	---	---
17	7.9	7.8	7.8	---	---	---	7.8	7.6	7.6	---	---	---
18	7.9	7.8	7.8	---	---	---	7.7	7.6	7.6	---	---	---
19	7.9	7.8	7.8	---	---	---	7.7	7.5	7.6	---	---	---
20	8.0	7.8	7.8	---	---	---	7.7	7.5	7.5	---	---	---
21	8.0	7.8	7.8	---	---	---	7.7	7.4	7.5	---	---	---
22	7.9	7.8	7.8	---	---	---	7.7	7.5	7.5	---	---	---
23	8.0	7.8	7.8	---	---	---	7.7	7.4	7.5	---	---	---
24	8.0	7.8	7.8	---	---	---	7.5	7.4	7.4	---	---	---
25	7.9	7.8	7.8	---	---	---	7.4	7.4	7.4	---	---	---
26	7.9	7.8	7.8	---	---	---	7.4	7.3	7.4	---	---	---
27	7.9	7.8	7.8	---	---	---	7.5	7.3	7.4	---	---	---
28	8.0	7.8	7.8	---	---	---	7.5	7.4	7.4	---	---	---
29	7.9	7.8	7.8	---	---	---	7.5	7.4	7.5	---	---	---
30	7.9	7.8	7.8	---	---	---	7.6	7.4	7.4	---	---	---
31	7.9	7.8	7.9	---	---	---	7.4	7.3	7.3	---	---	---
MAX	8.0	7.8	7.9	---	---	---	---	---	---	---	---	---
MIN	7.7	7.6	7.6	---	---	---	---	---	---	---	---	---
DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
FEBRUARY			MARCH			APRIL			MAY			
1	---	---	---	---	---	---	7.7	7.5	7.6	8.6	7.9	8.1
2	---	---	---	---	---	---	7.7	7.4	7.5	8.5	7.8	8.0
3	---	---	---	---	---	---	7.7	7.4	7.5	8.5	7.8	8.0
4	---	---	---	---	---	---	7.8	7.4	7.5	8.4	7.8	8.0
5	---	---	---	---	---	---	8.0	7.4	7.7	8.7	7.8	8.1
6	---	---	---	---	---	---	7.9	7.6	7.7	8.7	7.8	8.1
7	---	---	---	---	---	---	8.0	7.6	7.8	8.6	7.9	8.1
8	---	---	---	---	---	---	8.0	7.7	7.8	8.7	7.8	8.1
9	---	---	---	---	---	---	8.0	7.7	7.8	9.0	7.9	8.3
10	---	---	---	---	---	---	8.0	7.5	7.7	9.2	8.2	8.4
11	---	---	---	---	---	---	7.6	7.3	7.4	9.0	8.2	8.4
12	---	---	---	---	---	---	7.5	7.3	7.4	9.0	8.2	8.4
13	---	---	---	7.7	7.3	7.4	7.5	7.2	7.3	8.9	8.0	8.3
14	---	---	---	7.7	7.4	7.5	7.6	7.2	7.4	8.9	8.1	8.2
15	8.1	8.1	8.1	7.6	7.4	7.5	7.6	7.2	7.4	8.6	8.0	8.1
16	8.2	8.1	8.1	7.6	7.4	7.4	7.6	7.2	7.4	8.8	7.9	8.1
17	8.1	8.1	8.1	7.6	7.3	7.4	7.6	7.2	7.4	8.4	7.9	8.0
18	8.1	8.1	8.1	7.6	7.2	7.4	7.6	7.3	7.4	8.5	7.8	8.0
19	---	---	---	7.6	7.3	7.4	7.7	7.2	7.4	8.5	7.8	8.0
20	---	---	---	7.5	7.3	7.4	7.7	7.3	7.4	8.5	7.8	8.0
21	---	---	---	7.6	7.3	7.4	7.9	7.3	7.5	8.2	7.8	7.9
22	---	---	---	7.6	7.4	7.4	7.8	7.4	7.5	8.0	7.8	7.9
23	---	---	---	7.5	7.3	7.4	7.7	7.5	7.6	8.2	7.8	7.9
24	---	---	---	7.5	7.4	7.4	7.9	7.5	7.6	8.2	7.7	7.9
25	---	---	---	7.5	7.4	7.5	7.8	7.4	7.6	8.2	7.8	7.9
26	---	---	---	7.6	7.4	7.5	7.9	7.4	7.6	8.2	7.8	7.9
27	---	---	---	7.6	7.4	7.5	7.9	7.5	7.6	8.2	7.8	7.9
28	---	---	---	7.6	7.4	7.5	8.1	7.5	7.7	8.1	7.8	7.9
29	---	---	---	7.7	7.4	7.5	8.4	7.6	7.9	8.0	7.8	7.9
30	---	---	---	7.7	7.4	7.5	8.6	7.9	8.1	8.1	7.8	7.9
31	---	---	---	7.7	7.5	7.6	---	---	---	8.1	7.8	7.9
MAX	---	---	---	---	---	---	8.6	7.9	8.1	9.2	8.2	8.4
MIN	---	---	---	---	---	---	7.5	7.2	7.3	8.0	7.7	7.9

## SPOKANE RIVER BASIN

12433561 BLUE CREEK NEAR MOUTH, NEAR WELLPINIT, WA--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN	MAX	MIN	MEDIAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	8.1	7.8	7.9	---	---	---	7.8	7.4	7.5	7.8	7.5	7.6
2	8.1	7.9	8.0	---	---	---	7.7	7.4	7.5	7.8	7.6	7.7
3	8.1	7.9	8.0	8.0	7.7	7.7	7.7	7.3	7.4	7.9	7.7	7.7
4	8.2	7.9	8.0	8.0	7.7	7.8	7.6	7.3	7.5	7.9	7.7	7.8
5	8.2	7.9	8.0	7.9	7.7	7.7	7.7	7.4	7.5	7.8	7.6	7.7
6	---	---	---	7.9	7.7	7.7	7.8	7.4	7.5	7.8	7.6	7.7
7	---	---	---	7.9	7.7	7.7	7.7	7.4	7.5	7.9	7.6	7.7
8	---	---	---	7.9	7.7	7.7	7.8	7.5	7.5	7.9	7.6	7.7
9	---	---	---	8.0	7.7	7.8	7.7	7.4	7.5	7.9	7.7	7.7
10	---	---	---	7.9	7.7	7.8	7.7	7.4	7.5	7.9	7.6	7.7
11	---	---	---	8.0	7.7	7.8	7.7	7.4	7.5	8.0	7.6	7.7
12	---	---	---	7.9	7.7	7.8	7.7	7.4	7.4	7.9	7.7	7.7
13	---	---	---	8.0	7.7	7.8	7.7	7.4	7.4	7.9	7.7	7.7
14	---	---	---	7.9	7.7	7.8	7.7	7.4	7.5	7.8	7.6	7.7
15	---	---	---	7.9	7.7	7.7	7.7	7.4	7.5	7.8	7.5	7.6
16	---	---	---	8.0	7.7	7.8	7.7	7.4	7.5	7.6	7.4	7.5
17	---	---	---	8.0	7.7	7.7	7.7	7.4	7.5	7.6	7.3	7.4
18	---	---	---	7.9	7.6	7.7	7.6	7.4	7.4	7.6	7.4	7.4
19	---	---	---	7.8	7.6	7.6	7.6	7.4	7.5	7.7	7.4	7.5
20	---	---	---	7.8	7.5	7.6	7.6	7.4	7.5	7.7	7.4	7.5
21	---	---	---	7.8	7.4	7.6	7.6	7.4	7.5	7.6	7.2	7.4
22	---	---	---	7.8	7.5	7.6	7.7	7.4	7.5	7.5	7.3	7.3
23	---	---	---	7.8	7.5	7.6	7.6	7.4	7.5	7.4	7.1	7.2
24	---	---	---	7.8	7.5	7.6	7.7	7.4	7.5	7.5	7.1	7.3
25	---	---	---	7.8	7.5	7.6	7.8	7.4	7.6	7.4	7.1	7.2
26	---	---	---	7.8	7.5	7.6	7.7	7.5	7.6	7.5	7.1	7.4
27	---	---	---	7.8	7.5	7.5	7.8	7.5	7.6	7.6	7.2	7.4
28	---	---	---	7.8	7.5	7.5	7.9	7.5	7.6	7.6	7.3	7.4
29	---	---	---	7.7	7.5	7.5	7.8	7.6	7.7	7.6	7.3	7.4
30	---	---	---	7.8	7.5	7.6	7.9	7.6	7.7	7.7	7.4	7.5
31	---	---	---	7.8	7.5	7.5	7.8	7.6	7.6	---	---	---
MAX	---	---	---	---	---	---	7.9	7.6	7.7	8.0	7.7	7.8
MIN	---	---	---	---	---	---	7.6	7.3	7.4	7.4	7.1	7.2

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

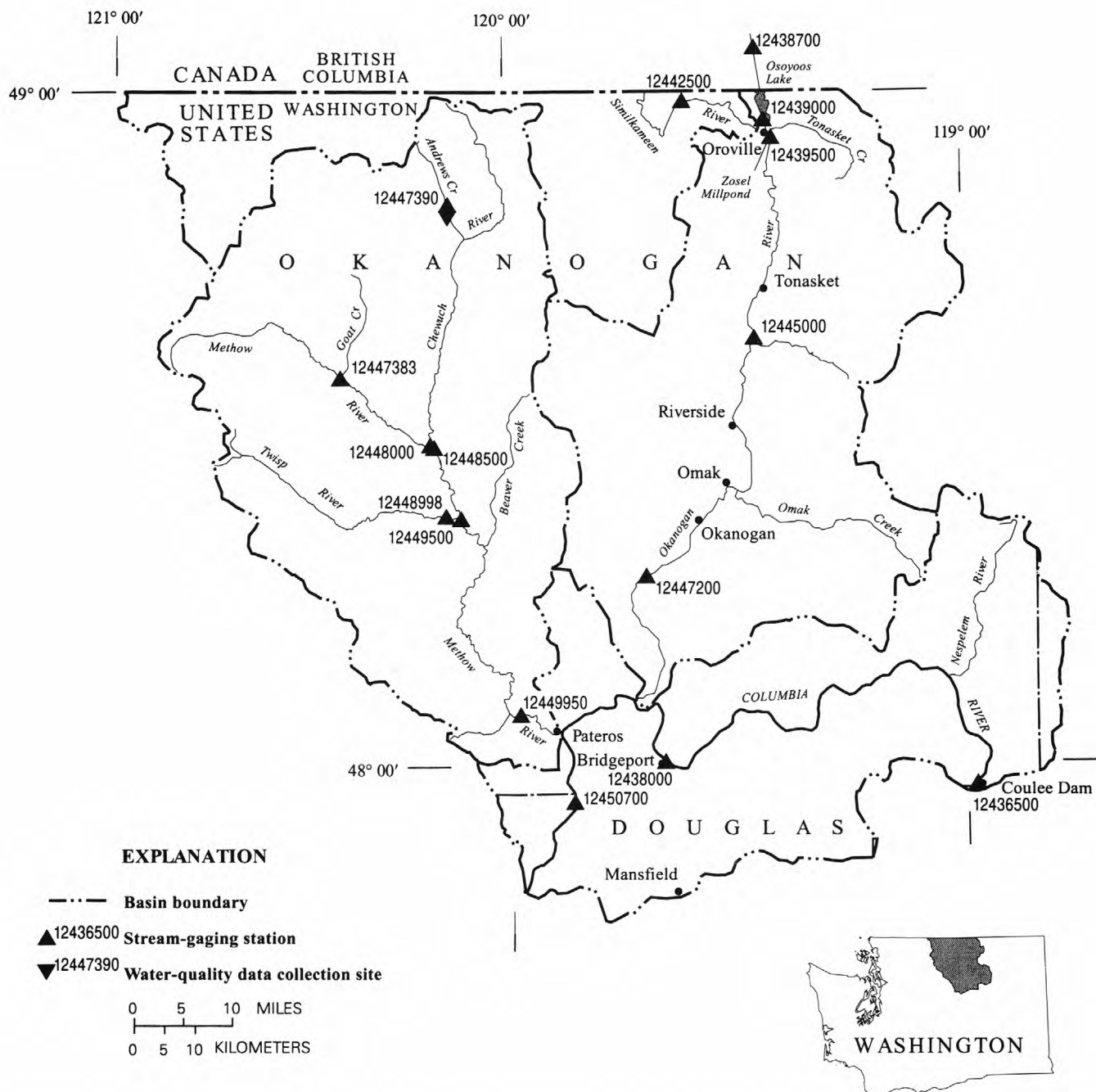
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	10.5	8.0	9.0	.5	.0	.0	6.5	4.0	6.0	1.5	1.0	1.0
2	10.0	8.0	9.0	.0	.0	.0	4.0	2.0	3.5	1.5	1.0	1.5
3	11.5	9.0	10.0	.0	.0	.0	3.0	1.5	2.5	1.5	.0	1.0
4	9.5	7.5	8.5	1.5	.0	1.0	3.5	1.0	2.5	1.0	.0	.5
5	9.0	6.0	7.5	3.0	1.0	2.0	1.0	.0	.5	.0	.0	.0
6	10.0	8.0	9.0	3.0	2.0	2.5	.5	.0	.0	.0	.0	.0
7	9.0	7.0	8.5	2.5	1.5	2.0	1.0	.0	.5	1.0	.0	.0
8	9.5	7.5	8.5	6.0	2.5	4.5	.5	.0	.0	1.5	1.0	1.5
9	9.5	7.0	8.5	5.0	2.0	3.5	.0	.0	.0	2.0	1.0	1.5
10	11.0	9.0	10.0	2.5	1.0	2.0	.5	.0	.0	2.0	1.5	1.5
11	10.5	9.5	10.0	3.0	1.5	2.5	.5	.0	.0	2.0	1.0	1.5
12	9.5	7.0	7.5	3.5	2.5	3.0	1.5	.0	.0	1.5	1.0	1.5
13	9.0	6.0	7.0	4.5	3.5	4.0	2.0	1.5	2.0	1.5	.5	1.0
14	9.0	6.0	7.5	6.0	4.5	5.5	2.5	1.5	2.0	2.0	1.5	2.0
15	9.0	6.5	8.0	6.5	5.5	6.0	3.0	2.5	2.5	2.5	2.0	2.5
16	10.0	8.5	9.0	7.0	6.0	6.5	3.0	2.5	3.0	2.5	1.5	2.0
17	9.5	8.5	9.0	7.5	6.5	6.5	3.0	2.0	2.5	1.5	.0	.0
18	9.5	6.5	8.0	6.5	4.5	6.0	2.5	2.0	2.5	.0	.0	.0
19	7.0	4.5	5.5	4.5	2.5	3.5	3.0	2.5	2.5	.5	.0	.0
20	7.5	5.0	6.5	2.5	1.5	2.0	3.0	2.5	2.5	.5	.0	.0
21	7.5	5.5	6.5	3.0	1.0	2.0	3.5	1.0	2.5	1.5	.0	1.0
22	6.5	4.5	5.5	4.5	3.0	3.5	2.0	1.0	1.5	1.0	.0	.5
23	6.5	4.5	5.5	5.5	4.5	5.0	1.0	.0	.5	1.0	.0	.5
24	6.5	4.5	5.5	6.5	5.5	6.0	.0	.0	.0	1.0	.0	.5
25	7.0	5.0	6.0	6.5	4.5	6.0	.0	.0	.0	.0	.0	.0
26	7.0	5.0	6.0	5.5	3.5	4.5	.0	.0	.0	.0	.0	.0
27	5.0	3.5	4.0	4.0	3.0	3.5	.0	.0	.0	.0	.0	.0
28	5.0	3.0	4.0	5.0	3.0	4.0	.0	.0	.0	.0	.0	.0
29	3.5	2.5	3.0	7.5	5.0	6.5	.0	.0	.0	.0	.0	.0
30	2.5	1.0	1.5	7.0	5.0	6.0	.5	.0	.5	.0	.0	.0
31	2.0	.0	1.0	---	---	---	1.0	.5	1.0	.0	.0	.0
MONTH	11.5	.0	6.9	7.5	.0	3.7	6.5	.0	1.3	2.5	.0	.7



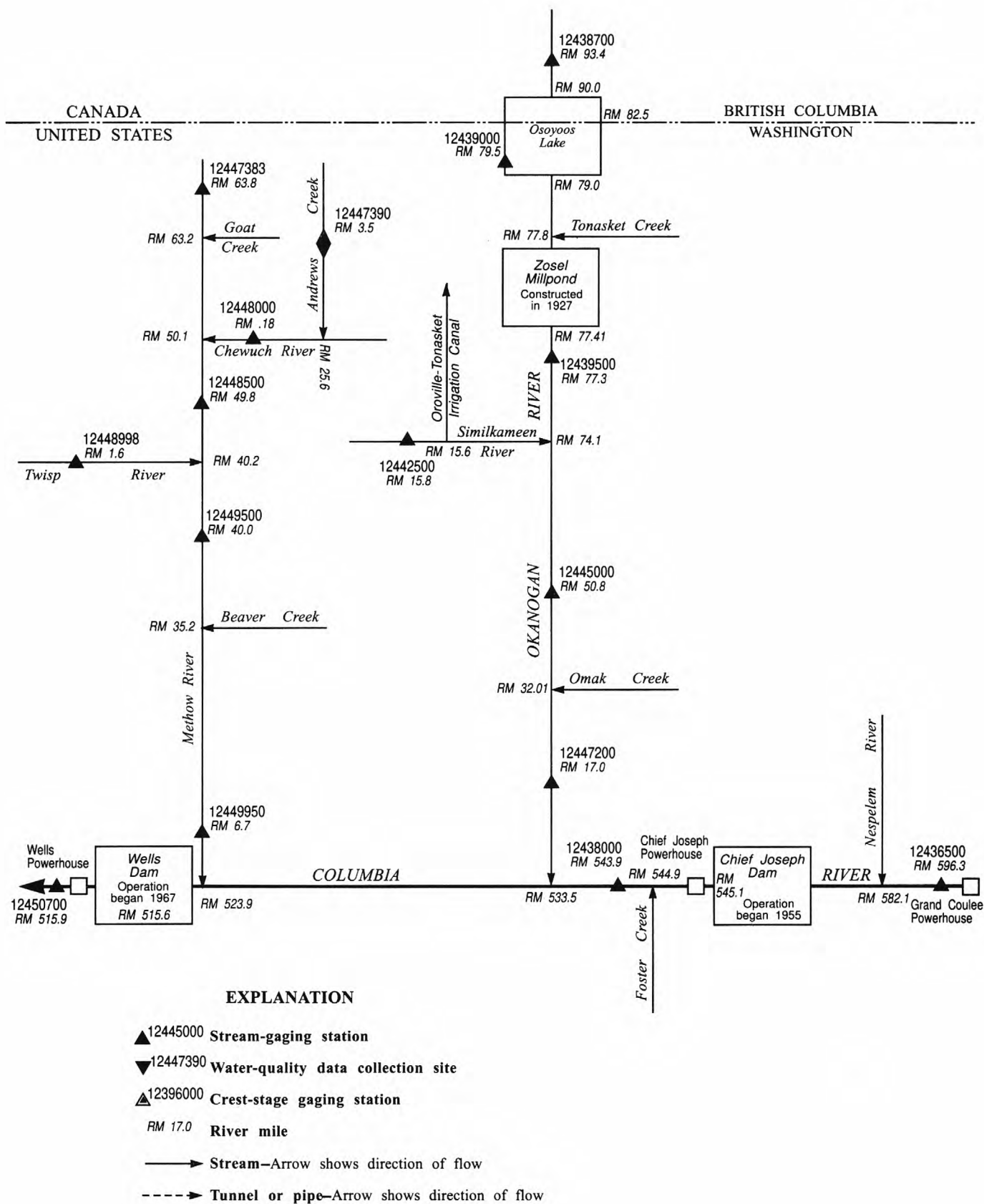
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	.0	.0	.0	2.0	1.0	1.5	6.0	4.0	5.0	10.5	7.0	8.5
2	.0	.0	.0	2.5	1.0	1.5	7.0	3.5	5.0	8.5	5.0	6.5
3	.0	.0	.0	2.5	1.5	2.0	6.5	2.0	4.0	8.5	4.0	6.5
4	.0	.0	.0	3.0	2.0	2.5	7.0	2.0	4.5	8.0	4.5	6.5
5	.0	.0	.0	2.5	1.5	2.0	8.5	3.0	5.5	9.5	4.0	7.0
6	.0	.0	.0	3.0	2.0	2.5	8.0	5.0	6.5	9.5	4.5	7.0
7	.0	.0	.0	3.5	2.5	3.0	10.5	6.0	8.0	8.5	4.5	6.5
8	.0	.0	.0	4.0	3.0	3.5	11.0	5.5	8.0	8.5	3.5	6.0
9	.0	.0	.0	4.0	3.0	3.5	10.5	6.5	8.5	8.5	4.5	6.5
10	.0	.0	.0	4.0	3.5	4.0	9.5	6.0	7.5	10.0	4.5	7.5
11	.0	.0	.0	4.5	3.5	4.0	8.0	5.0	6.5	9.5	6.5	8.0
12	1.0	.0	.0	5.0	3.0	4.0	8.0	5.5	6.5	10.0	7.5	8.5
13	1.5	.5	1.0	5.0	2.0	3.5	8.5	4.0	6.5	11.5	8.5	10.0
14	1.5	.5	1.0	5.0	2.0	3.5	9.5	4.0	6.5	12.0	9.5	10.5
15	1.5	.5	1.0	5.5	3.0	4.0	9.0	5.5	7.5	11.5	9.5	10.0
16	1.5	.5	1.0	5.0	2.5	3.5	9.0	7.0	7.5	13.0	8.5	11.0
17	2.0	1.5	1.5	5.0	2.0	3.5	8.5	4.5	6.5	11.0	9.0	10.0
18	2.5	1.5	2.0	5.0	2.0	3.5	9.0	6.0	7.0	12.0	8.5	10.0
19	2.0	.0	1.5	6.0	3.0	4.0	8.5	4.0	6.0	12.0	7.5	9.5
20	3.0	1.5	2.5	5.5	2.5	4.0	9.0	5.5	7.0	11.0	6.5	9.0
21	3.0	2.5	2.5	5.5	2.5	4.0	10.0	4.5	7.0	9.5	6.5	8.0
22	2.5	1.5	2.0	6.0	3.0	4.5	8.0	4.5	6.5	10.0	9.0	9.0
23	3.0	2.5	2.5	5.5	2.5	4.0	8.5	7.5	8.0	10.5	8.0	9.0
24	3.0	2.0	2.5	4.0	1.5	2.5	9.0	7.0	8.0	13.0	7.0	10.0
25	2.5	1.5	2.0	3.5	.0	1.5	7.0	4.5	6.0	14.0	8.0	11.0
26	2.0	.5	1.0	5.0	2.0	3.0	8.0	4.5	6.5	14.5	10.0	12.0
27	1.0	.0	.5	5.0	2.0	3.5	8.0	4.0	6.0	14.0	9.5	11.5
28	1.5	.5	1.0	4.5	.5	2.5	9.0	3.5	6.5	11.0	8.0	10.0
29	1.5	.0	1.0	4.5	1.5	3.0	11.5	6.5	8.5	10.0	8.0	9.0
30	---	---	---	5.0	1.5	3.0	10.5	5.5	8.0	10.0	7.5	8.5
31	---	---	---	4.5	2.5	3.5	---	---	---	12.5	7.0	10.0
MONTH	3.0	.0	.9	6.0	.0	3.2	11.5	2.0	6.7	14.5	3.5	8.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	13.5	8.0	11.0	16.5	11.5	14.0	17.5	12.5	15.0	14.0	10.5	12.5
2	15.5	10.0	12.5	17.5	12.5	14.5	15.0	13.0	14.0	14.0	10.5	12.5
3	15.0	11.5	13.5	18.0	14.0	16.0	15.0	12.0	13.5	15.5	12.5	14.0
4	15.5	11.5	13.5	16.5	13.5	15.5	14.5	12.0	13.5	13.5	11.0	12.0
5	15.0	9.5	12.0	15.0	10.5	13.0	15.0	13.0	14.0	12.0	9.5	11.0
6	15.0	10.0	12.5	15.5	10.0	12.5	16.0	12.0	14.0	12.0	9.0	11.0
7	16.5	11.0	13.5	16.0	10.5	13.5	16.5	11.5	14.0	13.5	11.0	12.0
8	16.0	11.5	13.5	17.5	12.0	14.5	17.0	12.5	14.5	14.0	11.0	12.5
9	15.0	10.5	12.5	17.5	13.0	15.0	17.5	13.0	15.0	14.0	11.0	12.5
10	14.5	9.5	12.0	17.5	12.5	15.0	18.0	13.0	15.5	13.5	10.0	12.0
11	14.5	9.5	12.0	17.5	12.5	15.0	18.0	13.5	15.5	14.0	10.0	12.0
12	15.0	9.5	12.0	17.5	12.0	14.5	16.5	12.0	14.5	14.0	11.5	13.0
13	15.0	10.0	12.5	18.0	12.5	15.0	16.5	11.5	14.0	15.0	13.0	13.5
14	16.0	10.5	13.0	18.5	13.5	16.0	17.5	13.0	15.0	14.0	12.5	13.0
15	15.5	10.5	13.0	19.0	14.5	16.5	17.5	14.0	15.5	13.5	11.5	13.0
16	15.0	10.5	12.5	18.5	14.0	16.0	17.0	13.0	15.0	12.0	9.5	10.5
17	13.5	11.5	12.5	17.5	13.0	15.0	16.0	12.5	14.5	11.0	8.5	10.0
18	11.5	8.5	10.5	15.5	13.0	14.5	14.5	10.5	12.5	11.5	9.5	10.5
19	13.5	7.5	10.5	13.5	11.5	12.5	15.0	11.0	13.0	11.5	10.0	10.5
20	14.5	8.0	11.0	15.0	11.0	13.0	15.0	13.0	14.0	11.5	9.5	10.5
21	15.0	10.0	12.0	16.0	11.5	13.5	14.5	10.5	12.5	10.0	7.5	9.0
22	13.0	12.0	12.5	17.5	12.5	14.5	14.5	10.0	12.0	10.0	8.0	9.0
23	12.0	10.5	11.5	18.0	13.0	15.5	15.0	11.0	13.0	8.5	6.0	7.5
24	13.5	11.0	12.0	18.0	13.5	15.5	15.5	11.0	13.0	9.0	6.5	7.5
25	14.0	10.0	12.0	19.0	14.0	16.5	16.0	11.5	13.5	8.5	5.5	7.0
26	15.5	11.0	13.0	19.0	14.0	16.5	14.5	12.5	13.5	9.5	6.5	8.0
27	13.5	12.0	13.0	19.0	14.5	16.5	16.0	12.5	14.0	10.5	7.5	9.0
28	14.0	10.5	12.0	19.5	15.0	17.0	17.5	15.5	16.0	11.0	8.0	9.5
29	14.5	10.0	12.0	18.5	17.0	17.5	17.0	13.5	15.5	11.0	8.0	9.5
30	15.0	10.5	13.0	19.0	15.5	17.5	17.0	13.5	15.5	11.0	8.5	10.0
31	---	---	---	19.0	15.0	16.5	15.5	12.5	14.0	---	---	---
MONTH	16.5	7.5	12.3	19.5	10.0	15.1	18.0	10.0	14.2	15.5	5.5	10.8
YEAR	19.5	.0	7.1									



**Figure 53.** Location of surface-water and water-quality stations in the Columbia River Basin from Coulee Dam to Wells Dam including Okanogan River and Methow River Basins.



**Figure 54.** Schematic diagram showing surface-water stations in the Columbia River Basin from Grand Coulee Dam including Okanogan River and Methow River Basins.

# DIVERSION AT GRAND COULEE DAM

## 12435500 FEEDER CANAL AT GRAND COULEE, WA

LOCATION.--Lat 47°57'05", long 118°59'40", on line between secs.1 and 2, T.28 N., R.30 E., Grant County, Hydrologic Unit 17020001, on left bank at Grand Coulee, 0.2 mi downstream from headworks structure, and 0.5 mi southwest of Grand Coulee Dam.

PERIOD OF RECORD.--October 1951 to current year.

GAGE.--Daily discharge determined from flow through pumps or reverse flow through generators. Datum of gage is 1,500.00 ft above sea level (Bureau of Reclamation datum, adjustment of 1937). May 1, 1952, to Jan. 10, 1978, at datum 50.00 ft higher. Jan. 11, 1978, to Feb. 22, 1981, nonrecording gage at datum 1,500.00 ft lower. Water-stage recorder for Franklin D. Roosevelt Lake (station 12436000) also used to determine head. May 1, 1952, to Oct. 13, 1960, auxiliary gage 0.6 mi downstream from base gage at same datum.

REMARKS.--Since 1951, water has been pumped (lift about 280 ft) from Franklin D. Roosevelt Lake into the two-mile long Feeder Canal, which empties into Banks Lake. From Banks Lake, it is distributed through a system of canals to the Columbia Basin Project for irrigation. Between May 1951, and December 1974, six pumps were used. Since December 1974, six pump generators, which can also generate power during peak demand periods by returning water from Banks Lake, via the Feeder Canal, to Franklin D. Roosevelt Lake have been added; two in December 1974 and one each in April, June, and November 1983 and April 1984. Discharge is computed from relations between pump operation and head.

COOPERATION.--Discharge records furnished by U.S. Bureau of Reclamation; two discharge measurements made by U.S. Geological Survey.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 19,800 ft<sup>3</sup>/s July 20, 1996; minimum daily discharge, -7,580 ft<sup>3</sup>/s Jan. 31, 1996, reverse flow from Banks Lake.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 19,800 ft<sup>3</sup>/s July 20; minimum daily discharge, -7,580 ft<sup>3</sup>/s Jan. 31, reverse flow from Banks Lake.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	9310	.00	1260	.00	-3330	-1600	993	4410	10100	6640	7110	15400
2	3700	.00	3830	.00	-2020	.00	3240	4380	10100	2050	1480	15700
3	1270	.00	3830	.00	9100	-404	4940	3160	5620	6660	12500	3280
4	961	.00	956	-651	8250	-4010	4160	9300	1920	14300	12400	1440
5	.00	.00	.00	-3990	-1350	-1990	3530	9430	-2830	13600	259	4250
6	881	.00	-969	948	-5370	2430	5600	3950	7020	10600	1010	2960
7	7030	.00	-2260	.00	-4540	1770	5310	1570	6800	7900	7060	13400
8	7020	.00	-3030	622	-4080	.00	4320	650	12000	-2930	8630	5310
9	7010	.00	275	.00	-4330	5230	2600	2230	14300	11400	13300	7020
10	1750	.00	3830	-2870	2310	5250	3740	5640	912	8270	4310	4020
11	-1120	.00	-62	-328	7000	1210	5850	10700	5510	21	15800	1100
12	-1130	.00	.00	.00	-1140	.00	4550	10700	4810	9140	5240	5640
13	910	.00	257	.00	-4160	.00	8600	7420	15000	19700	6300	4730
14	6970	.00	-821	.00	-2820	-833	8600	6910	5920	14700	6180	5450
15	6970	.00	-1810	.00	632	.00	4300	7440	14600	421	2990	13200
16	1740	.00	7620	.00	2570	-679	4610	5640	13900	6590	5270	1740
17	.00	.00	7600	.00	9410	.00	4110	9650	666	13100	16000	35
18	.00	.00	-433	.00	9360	-637	3230	10800	6070	6010	15300	.00
19	-1130	.00	-559	.00	488	.00	6490	7120	9790	5180	5330	.00
20	-265	.00	-102	.00	-256	.00	4490	5200	11200	19800	6320	8.1
21	5660	.00	20	.00	25	.00	8400	5200	8710	9300	12000	12000
22	5660	.00	.00	-2210	-7330	100	4510	5200	12700	-4490	2650	12300
23	2090	.00	.00	-4280	-4370	.00	4520	4990	12000	2320	2110	2630
24	.00	.00	.00	-3970	8990	-1160	4010	3900	4420	11800	3570	.00
25	.00	.00	.00	-3960	3870	-1660	4020	3900	6410	9650	17400	.00
26	.00	.00	.00	-2160	-6130	.00	2560	4000	6140	9290	4600	10
27	257	.00	.00	9160	-1870	.00	2570	4000	5200	4570	2800	.00
28	3770	448	.00	9160	-838	100	2580	4030	6270	12500	2870	7420
29	3930	1260	.00	-13130	.00	.00	2930	4060	16000	7810	5640	7990
30	.00	1260	.00	-5640	---	.00	3980	4080	17300	13100	4760	4350
31	.00	---	.00	-7580	---	.00	---	4760	---	14400	4790	---
TOTAL	73244.00	2968.00	19432.00	-20879.00	8071.00	3117.00	133343	174420	248558	263402	215979	151383.10
MEAN	2363	98.9	627	-674	278	101	4445	5626	8285	8497	6967	5046
MAX	9310	1260	7620	9160	9410	5250	8600	10800	17300	19800	17400	15700
MIN	-1130	.00	-3030	-7580	-7330	-4010	993	650	-2830	-4490	259	.00
AC-FT	145300	5890	38540	-41410	16010	6180	264500	346000	493000	522500	428400	300300
CAL YR 1995	TOTAL	1556138.00	MEAN	4263	MAX	17900	MIN	-3030	AC-FT	3087000		
WTR YR 1996	TOTAL	1273038.10	MEAN	3478	MAX	19800	MIN	-7580	AC-FT	2525000		

## COLUMBIA RIVER MAIN STEM

351

12436000 FRANKLIN D. ROOSEVELT LAKE AT GRAND COULEE DAM, WA

LOCATION.--Lat 47°57'20", long 118°59'02", near center of sec.1, T.28 N., R.30 E., Grant County, Hydrologic Unit 17020001, in block 12 of Grand Coulee Dam on Columbia River, and at mile 596.6.

DRAINAGE AREA.--74,700 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--April 1938 to current year. Prior to October 1943, published as Columbia River Reservoir at Grand Coulee Dam.

REVISED RECORDS.--WSP 1286: 1942, 1945(M). WSP 1316: 1942 (May monthend contents). WSP 1933: Drainage area. WDR WA-73-1: 1965, 1967. WDR WA-75-1: 1974 monthend contents.

GAGE.--Water-stage recorder. Datum of gage is sea level (Bureau of Reclamation datum), adjustment of 1937, or 1,425 ft above sea level (levels by Bureau of Reclamation). Prior to Apr. 24, 1942, nonrecording gage at site 2,000 ft upstream at same datum.

REMARKS.--Reservoir is formed by concrete dam; construction of dam began in 1934; completed in 1941; storage began early in construction period. Capacity, 5,022,000 acre-ft between elevations 1,208 ft, proposed lower limit of operation, and 1,288 ft, top of gates. Capacity increased to 5,185,000 acre-ft by use of 2 ft flashboards installed after high-water period each year beginning August 1961. Storage below 1,208 ft, 4,209,000 acre-ft. Figures given herein represent total contents. Water is used for power development and irrigation. Flow is regulated by nine major reservoirs and numerous smaller reservoirs and powerplants. Diversion by Feeder Canal (station 12435500) for irrigation of about 600,000 acres in the United States plus additional diversions in Canada for irrigation of about 66,500 acres.

COOPERATION.--Reservoir elevations provided by U.S. Bureau of Reclamation at Grand Coulee Dam beginning June 7, 1996.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents recorded, 9,586,000 acre-ft July 17, 1942, June 3, 1945, elevation, 1,290.3 ft; maximum elevation, 1,290.36 ft Aug. 6, 1976; minimum contents observed, 16,200 acre-ft Aug. 29, 1938, elevation, 956.1 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 9,366,000 acre-ft July 22, elevation, 1,289.65 ft; minimum contents, 5,146,000 acre-ft May 11, elevation, 1,227.01 ft.

Capacity table dated October 24, 1975 (elevation, in feet, and contents, in acre-ft)  
(Prepared by Geological Survey from data furnished by Bureau of Reclamation)

1,210.0	4,301,000	1,270.0	7,864,000
1,230.0	5,309,000	1,291.0	9,477,000
1,250.0	6,502,000		

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1287.64	1284.85	1289.57	1284.76	1277.30	1273.44	1243.99	1230.18	1244.11	1283.60	1286.96	1280.45
2	1287.13	1284.20	1289.55	1284.98	1276.48	1272.96	1243.33	1230.26	1245.12	1284.40	1287.39	1280.25
3	1286.80	1283.68	1289.55	1285.12	1275.90	1272.36	1241.92	1229.51	1246.63	1285.30	1288.69	1279.90
4	1287.07	1283.47	1289.61	1285.23	1276.21	1271.31	1240.69	1228.46	1249.18	1285.80	1289.35	1279.90
5	1287.29	1283.82	1289.47	1284.87	1276.59	1270.17	1239.93	1228.09	1252.29	1286.60	1289.45	1280.40
6	1287.39	1283.41	1289.33	1284.29	1277.18	1268.90	1238.77	1227.87	1255.06	1287.00	1289.30	1281.15
7	1287.33	1283.52	1289.53	1284.83	1278.31	1267.62	1237.79	1227.40	1257.20	1287.80	1288.65	1281.25
8	1287.27	1283.36	1289.13	1284.74	1280.65	1266.58	1236.56	1227.38	1259.00	1288.45	1287.90	1282.00
9	1287.19	1283.56	1288.72	1284.10	1282.51	1265.46	1236.00	1227.60	1261.20	1288.40	1287.30	1281.65
10	1286.93	1283.52	1288.65	1284.01	1283.86	1264.91	1235.81	1227.32	1263.45	1288.80	1287.40	1281.40
11	1286.30	1284.22	1288.64	1283.94	1284.33	1263.69	1235.65	1227.01	1265.80	1288.85	1286.80	1281.05
12	1285.35	1285.03	1288.57	1283.76	1284.25	1262.58	1235.79	1227.78	1266.95	1288.50	1286.05	1280.10
13	1285.15	1285.70	1288.20	1283.48	1284.28	1261.15	1236.20	1227.57	1267.85	1288.00	1285.50	1279.85
14	1285.35	1286.23	1288.29	1283.25	1284.56	1259.90	1235.59	1227.60	1268.85	1287.95	1284.75	1280.75
15	1285.56	1286.48	1288.15	1282.57	1284.45	1258.70	1235.63	1228.82	1269.75	1287.95	1284.25	1280.90
16	1285.15	1286.71	1288.13	1282.34	1283.97	1257.95	1234.95	1229.69	1270.50	1288.70	1284.30	1280.90
17	1284.88	1287.15	1288.05	1282.27	1283.55	1257.79	1233.93	1230.11	1271.60	1289.30	1284.40	1280.80
18	1285.03	1287.88	1288.29	1281.31	1283.12	1256.47	1233.22	1230.82	1273.10	1289.15	1283.90	1281.00
19	1285.23	1288.61	1287.95	1280.44	1283.15	1254.71	1232.25	1231.94	1274.10	1289.20	1283.40	1281.25
20	1285.07	1288.55	1287.35	1279.59	1283.28	1254.08	1231.88	1232.43	1275.10	1289.30	1282.85	1281.55
21	1285.21	1288.46	1286.77	1279.69	1283.03	1252.96	1231.55	1232.79	1276.00	1289.60	1282.30	1280.90
22	1285.21	1288.60	1286.05	1279.31	1283.25	1251.95	1231.02	1233.55	1277.10	1289.65	1282.90	1280.30
23	1285.06	1289.21	1285.09	1279.00	1282.47	1250.96	1230.02	1234.22	1278.10	1289.15	1283.50	1279.80
24	1284.98	1289.52	1284.20	1278.65	1280.82	1250.20	1230.51	1234.97	1278.95	1288.85	1283.60	1279.70
25	1284.60	1289.24	1283.71	1278.50	1279.68	1248.91	1230.50	1236.44	1279.70	1288.30	1282.80	1279.75
26	1284.69	1289.38	1282.82	1278.04	1278.20	1247.86	1230.68	1238.06	1280.10	1287.85	1282.70	1279.90
27	1284.90	1289.25	1282.26	1277.96	1276.97	1246.48	1230.92	1239.46	1280.75	1287.85	1282.05	1280.10
28	1285.30	1289.56	1282.14	1278.82	1275.48	1245.64	1231.24	1240.57	1280.90	1288.55	1281.50	1280.40
29	1285.45	1289.25	1282.25	1278.90	1274.18	1245.46	1231.46	1241.46	1281.60	1288.30	1280.75	1281.50
30	1285.29	1289.03	1282.96	1278.54	--	1245.12	1230.66	1242.35	1282.60	1287.70	1280.15	1281.70
31	1285.17	--	1283.95	1278.11	--	1244.84	--	1243.15	--	1287.00	1280.30	--
MAX	1287.64	1289.56	1289.61	1285.23	1284.56	1273.44	1243.99	1243.15	1282.60	1289.65	1289.45	1282.00
MIN	1284.60	1283.36	1282.14	1277.96	1274.18	1244.84	1230.02	1227.01	1244.11	1283.60	1280.15	1279.70
(†)	9005000	9315000	8909000	8461000	8168000	6177000	5345000	6073000	8803000	9151000	8626000	8734000
(‡)	-169000	+310000	-406000	-448000	-293000	-1991000	-832000	+728000	+2730000	+348000	-525000	+108000

CAL YR 1995 MAX 1289.61 MIN 1253.21 AC-FT† -140000  
WTR YR 1996 MAX 1289.65 MIN 1227.01 AC-FT† -440000

† Total contents, in acre-feet, at end of month.  
‡ Change in contents, in acre-ft.



## COLUMBIA RIVER MAIN STEM

12436500 COLUMBIA RIVER AT GRAND COULEE DAM, WA

LOCATION:--Lat 47°57'56", long 118°58'54", in SW 1/4 SE 1/4 sec.36, T.29 N., R.30 E., Douglas County, Hydrologic Unit 17020005, in pier 3 on west side of bridge on State Highway 155, 3,200 ft downstream from Grand Coulee Dam, 14.2 mi upstream from Nespelem River, and at mile 596.3.

DRAINAGE AREA.--74,700 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--April 1915 to June 1923 (monthly discharge only), July to December 1923, January 1924 to May 1928 (monthly discharge only), June 1928 to current year. Published as "at Grand Coulee near Nespelem" prior to 1936 and as "at Grand Coulee" 1936-42.

REVISED RECORDS.--WSP 1286: 1942, 1947. WSP 1933: Drainage area.

GAGE.--Daily discharge determined from flow through turbines plus spillway flow when present. Datum of gage is sea level (Bureau of Reclamation datum), adjustment of 1937. June 27 to Dec. 31, 1923, June 12, 1928, to Mar. 31, 1931, nonrecording gage at site 0.5 mi upstream at datum 2.4 ft lower. Apr. 1, 1931, to Dec. 31, 1935, water-stage recorder 850 ft downstream at present datum. Jan. 1, 1936, to June 11, 1955, water-stage recorder at present site and datum. June 12, 1955, to July 18, 1988, water-stage recorder at present site and datum with auxilliary water-stage recorder 5.3 mi downstream at datum 1.42 ft lower.

REMARKS.--Flow is regulated by nine major reservoirs and numerous smaller reservoirs and powerplants. Feeder Canal diversion (station 12435500) for Columbia Basin project is used to irrigate approximately 600,000 acres in the United States. An additional 66,500 acres in Canada are irrigated by other diversions.

COOPERATION.--Discharge records provided by U.S. Bureau of Reclamation at Grand Coulee Dam through the Corps of Engineers, North Pacific Division, Reservoir Control Center. The U.S. Geological Survey made 3 discharge measurements at this site during the year.

AVERAGE DISCHARGE.--83 years (water years 1914-96), 108,600 ft<sup>3</sup>/s, 78,681,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 637,800 ft<sup>3</sup>/s June 12, 1948, elevation, 987.90 ft; minimum discharge, 14,900 ft<sup>3</sup>/s Dec. 17, 1956, elevation, 934.37 ft; minimum daily discharge, 15,300 ft<sup>3</sup>/s Feb. 1, 1937.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood in June 1894 reached a discharge of 725,000 ft<sup>3</sup>/s, estimated.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 225,000 ft<sup>3</sup>/s Feb. 27; minimum daily discharge, 50,400 ft<sup>3</sup>/s Feb. 8.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	51700	87500	93100	92000	193000	184000	128000	196000	202000	153000	142000	67800
2	95700	88300	118000	122000	192000	158000	122000	180000	201000	156000	116000	79100
3	82100	83600	130000	116000	167000	154000	139000	199000	191000	151000	97100	101000
4	67700	73900	121000	128000	132000	174000	133000	204000	172000	150000	142000	94200
5	69000	65400	137000	146000	135000	188000	125000	186000	160000	155000	151000	83800
6	75500	97000	147000	135000	141000	175000	135000	178000	158000	167000	158000	74000
7	73100	81900	152000	105000	103000	178000	140000	181000	172000	160000	170000	88800
8	66500	79200	169000	136000	50400	166000	148000	164000	194000	175000	160000	74300
9	84700	80900	160000	151000	54700	165000	128000	156000	193000	176000	146000	105000
10	82300	81000	146000	148000	56800	143000	126000	161000	196000	178000	117000	110000
11	109000	59800	147000	152000	116000	174000	136000	152000	187000	193000	134000	121000
12	113000	58400	138000	165000	158000	172000	141000	121000	214000	191000	152000	131000
13	83500	83400	169000	156000	174000	183000	131000	145000	220000	198000	149000	106000
14	57200	73700	140000	145000	185000	178000	164000	150000	219000	169000	164000	67300
15	57000	90100	156000	172000	206000	171000	156000	121000	210000	177000	152000	74000
16	91100	90500	136000	151000	221000	175000	176000	149000	210000	141000	127000	93700
17	88900	93700	145000	147000	206000	132000	196000	166000	210000	148000	123000	91400
18	64700	75600	143000	181000	185000	155000	189000	180000	202000	173000	124000	85500
19	78800	90900	158000	172000	172000	164000	194000	181000	202000	168000	145000	80700
20	84800	120000	158000	175000	171000	142000	182000	203000	195000	143000	145000	80200
21	72300	114000	159000	154000	182000	154000	174000	202000	184000	158000	137000	102000
22	86300	99800	160000	184000	178000	152000	182000	202000	160000	171000	103000	108000
23	90700	76600	165000	182000	211000	145000	202000	200000	161000	186000	94100	108000
24	84000	101000	161000	173000	223000	144000	170000	202000	177000	160000	109000	92400
25	96200	118000	152000	175000	208000	153000	195000	180000	184000	165000	124000	92200
26	78900	108000	157000	178000	220000	149000	190000	182000	191000	149000	112000	89700
27	73200	123000	139000	164000	225000	161000	183000	186000	186000	118000	133000	86700
28	66200	115000	123000	139000	224000	132000	190000	202000	191000	79100	121000	79700
29	88600	136000	120000	178000	199000	108000	187000	202000	159000	136000	124000	65200
30	98000	111000	101000	183000	---	117000	208000	203000	146000	144000	114000	92400
31	86900	---	86800	197000	---	118000	---	205000	---	149000	92100	---
TOTAL	2497600	2757200	4386900	4802000	4888900	4864000	4870000	5539000	5647000	4937100	4077300	2725100
MEAN	80570	91910	141500	154900	166800	156900	162300	178700	188200	159300	131500	90840
MAX	113000	136000	169000	197000	225000	188000	208000	205000	220000	198000	170000	131000
MIN	51700	58400	86800	92000	50400	108000	122000	121000	146000	79100	92100	65200
AC-FT	4954000	5469000	8701000	9525000	9697000	9648000	9660000	10990000	11200000	9793000	8087000	5405000
CAL YR 1995	TOTAL 35024700 MEAN 95960 MAX 169000 MIN 32700 AC-FT 69470000											
WTR YR 1996	TOTAL 51992100 MEAN 142100 MAX 225000 MIN 50400 AC-FT 103100000											

## 353

LOCATION: --Lat 48°00'24", long 119°39'51", in SW 1/4 SW 1/4 sec.14, T.29 N., R.25 E., Douglas County, Hydrologic Unit 17020005, on left bank at Bridgeport, 1.0 mi downstream from Foster Creek, 1.6 mi downstream from Chief Joseph Dam, and at mile 543.9.

GAGE.--Daily discharge determined from flow through turbines plus spillway flow when present. Datum of gage is sea level (levels by Corps of Engineers). Apr. 4, 1952, to Aug. 4, 1988, water-stage recorder; May 26, 1967, to Aug. 4, 1988, auxiliary water-stage recorder 4,800 ft upstream from base gage at same datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 495,800 ft<sup>3</sup>/s June 11, 1961; maximum elevation, 792.20 ft June 7, 1956; minimum observed discharge, 4,220 ft<sup>3</sup>/s Mar. 22, 1966, elevation, 746.91 ft; minimum daily discharge, 22,300 ft<sup>3</sup>/s Nov. 11, 1973.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	51700	89000	102000	93600	204000	201000	131000	201000	206000	152000	145000	68600
2	96300	90400	119000	125000	202000	171000	124000	175000	205000	150000	117000	77300
3	83700	85100	130000	121000	171000	172000	141000	200000	195000	154000	101000	100000
4	68900	78000	120000	128000	134000	182000	143000	204000	177000	154000	145000	94600
5	70900	68000	140000	150000	138000	198000	120000	183000	161000	160000	149000	86800
6	73200	99000	152000	140000	148000	183000	136000	180000	167000	172000	159000	77300
7	75300	84200	152000	109000	105000	182000	143000	177000	170000	165000	168000	88300
8	69800	83300	169000	134000	54600	183000	150000	175000	194000	179000	162000	77600
9	87500	83800	159000	156000	55300	177000	133000	156000	191000	178000	157000	106000
10	81600	82600	150000	152000	52300	152000	129000	164000	199000	182000	116000	112000
11	112000	62300	154000	154000	115000	179000	138000	163000	185000	196000	138000	122000
12	117000	58600	132000	167000	154000	173000	145000	124000	214000	191000	152000	133000
13	89200	85000	174000	157000	177000	185000	135000	152000	231000	201000	149000	106000
14	58700	78500	153000	149000	184000	181000	165000	139000	227000	169000	168000	74500
15	58200	88900	156000	172000	213000	172000	156000	128000	224000	181000	161000	74900
16	91900	92700	142000	157000	229000	182000	181000	142000	227000	149000	125000	96500
17	88200	96800	149000	149000	220000	133000	197000	164000	222000	155000	124000	89600
18	68400	79600	148000	181000	194000	162000	194000	179000	215000	174000	124000	86200
19	79300	93400	158000	175000	183000	168000	196000	183000	207000	169000	145000	83900
20	86600	121000	162000	181000	175000	144000	184000	198000	201000	148000	149000	84100
21	72900	118000	163000	158000	186000	157000	173000	208000	195000	161000	140000	102000
22	87800	102000	163000	188000	187000	156000	188000	201000	154000	174000	106000	109000
23	94100	79100	164000	186000	214000	146000	198000	201000	167000	175000	93100	109000
24	85300	102000	168000	175000	245000	145000	180000	205000	180000	174000	109000	94300
25	98100	121000	154000	175000	218000	157000	194000	182000	187000	170000	126000	91600
26	81900	108000	162000	184000	236000	154000	191000	185000	197000	154000	114000	91000
27	74600	124000	143000	166000	241000	161000	177000	190000	197000	123000	131000	88600
28	67700	120000	124000	142000	232000	139000	186000	209000	188000	85500	125000	80300
29	90400	129000	122000	176000	217000	116000	184000	200000	159000	137000	127000	71800
30	99100	116000	102000	186000	---	116000	208000	207000	138000	145000	120000	94900
31	88900	---	89500	194000	---	119000	---	205000	---	151000	89500	---
TOTAL	2549200	2819300	4475500	4880600	5084200	5046000	4920000	5580000	5780000	5028500	4134600	2771700
MEAN	82230	93980	144400	157400	175300	162800	164000	180000	192700	162200	133400	92390
MAX	117000	129000	174000	194000	245000	201000	208000	209000	231000	201000	168000	133000
MIN	51700	58600	89500	93600	52300	116000	120000	124000	138000	85500	89500	68600
AC-FT	5056000	5592000	8877000	9681000	10080000	10010000	9759000	11070000	11460000	9974000	8201000	5498000
CAL YR 1995	TOTAL 35797600		MEAN 98080		MAX 174000		MIN 39100		AC-FT 71000000			
CAL YR 1996	TOTAL 53069600		MEAN 145000		MAX 245000		MIN 51700		AC-FT 105300000			

## OKANAGAN RIVER BASIN

12438700 OKANAGAN RIVER NEAR OLIVER, BRITISH COLUMBIA  
(International gaging station)

LOCATION.--Lat 49°06'53", long 119°33'50", approximately 75 ft upstream from drop structure No. 3, 0.8 mi downstream from Testalinden Creek, 4.2 mi south of Oliver, and at mile 93.4.

DRAINAGE AREA.--2,930 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1961 to current year in reports of U.S. Geological Survey. March 1944 to December 1948 and April 1952 to current year in reports of Water Survey of Canada.

GAGE.--Water-stage recorder.

REMARKS.--Regulation by control dams at outlets of Okanagan and Skaha Lakes. Diversion for irrigation.

COOPERATION.--Discharge records furnished by Water Resources Branch of Canada. This station is maintained by Canada under agreement with the United States subsequent to Feb. 14, 1965.

AVERAGE DISCHARGE.--46 years (water years 1945-47, 1953-56, 1958-96), 639 ft<sup>3</sup>/s, 463,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,740 ft<sup>3</sup>/s June 11, 1990, gage height, 7.52 ft; minimum, 55.9 ft<sup>3</sup>/s Jan. 30, 1963, gage height, 0.63 ft.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge 3,360 ft<sup>3</sup>/s June 1, 3; minimum daily discharge, 222 ft<sup>3</sup>/s Nov. 4, 5.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	374	239	352	922	e939	951	1860	1600	3360	2630	1410	1280
2	379	230	348	927	e939	953	1900	1590	3350	2610	1420	1290
3	400	226	344	928	e939	951	1960	1560	3360	2590	1450	1190
4	412	222	344	929	e939	948	1950	1560	3350	2570	1450	985
5	407	222	336	930	938	946	1990	1560	3260	2540	1450	923
6	350	225	332	930	946	944	2020	1560	3180	2520	1440	878
7	346	230	335	929	950	976	2060	1650	3170	2500	1420	882
8	342	226	338	927	948	1240	2140	1980	3190	2410	1410	887
9	335	224	331	925	946	1260	2390	2040	3120	2100	1400	883
10	339	225	340	922	948	1270	2590	2070	3050	1970	1400	875
11	349	226	346	923	950	1370	2530	2150	3020	1960	1390	830
12	384	225	351	925	950	1570	2230	2170	2980	1950	1380	545
13	386	226	357	927	951	1650	2040	2250	2980	1930	1370	454
14	385	226	364	931	951	1810	2020	2380	2940	1910	1370	453
15	378	227	376	929	952	1840	2040	2390	2910	1900	1370	505
16	387	227	376	928	953	1840	2130	2250	2860	1860	1360	525
17	410	227	376	929	955	1830	2180	2250	2790	1490	1360	418
18	416	229	372	930	965	1830	2080	2290	2750	1260	1360	394
19	418	232	373	931	975	1820	2020	2150	2710	1220	1360	385
20	411	228	375	934	977	1820	1980	2060	2690	1150	1350	379
21	409	228	376	937	980	1810	1960	2110	2680	1110	1350	376
22	410	227	377	941	975	1810	1940	2630	2700	1120	1350	374
23	410	228	376	942	973	1800	1960	2800	2770	1120	1340	367
24	409	228	376	942	966	1800	2080	2720	2860	1100	1340	359
25	404	229	375	943	963	1800	1980	2670	2840	1080	1340	355
26	405	230	374	943	962	1800	1940	2680	2810	1080	1310	349
27	417	231	373	943	960	1810	1880	2740	2780	1080	1270	345
28	410	253	443	939	954	1810	1860	2750	2750	1070	1270	344
29	408	305	570	e939	950	1830	1800	2830	2710	1130	1270	341
30	406	351	713	e939	---	1830	1670	2970	2670	1330	1270	336
31	378	---	908	e939	---	1840	---	3020	---	1390	1280	---
TOTAL	12074	7052	12327	28903	27694	47759	61180	69430	88590	53680	42310	18507
MEAN	389	235	398	932	955	1541	2039	2240	2953	1732	1365	617
MAX	418	351	908	943	980	1840	2590	3020	3360	2630	1450	1290
MIN	335	222	331	922	938	944	1670	1560	2670	1070	1270	336
AC-FT	23950	13990	24450	57330	54930	94730	121400	137700	175700	106500	83920	36710

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	395	291	266	379	540	738	770	1235	1222	1010	900	561		
MAX	539	511	514	932	1206	1965	2248	2566	3099	2408	2092	976		
(WY)	1990	1983	1983	1996	1991	1983	1983	1983	1990	1990	1993	1993		
MIN	194	185	175	160	149	160	246	267	238	221	203	205		
(WY)	1989	1989	1989	1989	1988	1989	1992	1992	1987	1988	1988	1988		

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1983 - 1996
ANNUAL TOTAL	258851	469506	
ANNUAL MEAN	709	1283	693
HIGHEST ANNUAL MEAN			1333
LOWEST ANNUAL MEAN			235
HIGHEST DAILY MEAN	2560	May 10	3660
LOWEST DAILY MEAN	193	Jan 8	110
ANNUAL SEVEN-DAY MINIMUM	196	Jan 3	134
ANNUAL RUNOFF (AC-FT)	513400		502200
10 PERCENT EXCEEDS	1100		1840
50 PERCENT EXCEEDS	551		385
90 PERCENT EXCEEDS	229		194

e Estimated

## 355

LOCATION.--Lat 48°57'24", long 119°26'18", in NW 1/4 NE 1/4 sec.21, T.40 N., R.27 E., Okanogan County, Hydrologic Unit 17020006, on west shore 1.0 mi north of Oroville, 3.0 mi south of international boundary, and at mile 79.5.

PERIOD OF RECORD.--July 1928 to current year.

REVISED RECORDS.--WSP 1346: Drainage area. WDR WA-75-1: Drainage area.

GAGE...Water-stage recorder. Datum of gage is sea level. Prior to Sept. 2, 1928, nonrecording gage, and Sept. 2, 1928, to Nov. 9, 1929, water-stage recorder, 100 ft south of international boundary. Nov. 10, 1929, to Sept. 7, 1930, Mar. 22, 1952, to Sept. 23, 1953, June 25, 1955, to Apr. 11, 1956, nonrecording gage, and Sept. 8, 1930, to Mar. 21, 1952, Sept. 24, 1953, to June 24, 1955, Apr. 12, 1956, to Feb. 7, 1959, water-stage recorder, at site 1.0 mi south of international boundary. All elevations prior to Oct. 1, 1944, at datum 2.39 ft lower. To convert from present datum to Geodetic Survey of Canada 1934 datum, subtract 1.63 ft; to convert from present datum to 1947 joint adjustment of U.S. Coast and Geodetic Survey and Geodetic Survey of Canada, subtract 0.26 ft.

REMARKS.--Approximately 44,000 acres are irrigated upstream from station in Canada. Elevation may occasionally be affected by dam at Zosel's mill in Oroville and by backwater from the Similkameen River during extreme high water. Diversion of water from the Similkameen River to Osoyoos Lake often occurs in summer months during drought conditions, there was no diversion this year. U.S. Geological Survey satellite telemeter at station.

COOPERATION.--This station is maintained by the United States under agreement with Canada.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 917.11 ft June 2, 3, 1972; minimum, 908.82 ft, present datum, Oct. 14, 1929.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 29, 1894, reached an elevation of 918.8 ft plus or minus 0.5 ft, present datum, 1.0 mi downstream from present lake outlet, from floodmark on old Okanogan Hotel Building, documented in 1930 from the diary of Mr. and Mrs. Stansbury, operators of the hotel in 1894.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 914.07 ft June 9, 10; minimum, 910.11 ft Feb. 27, 28.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	911.38	911.22	911.16	910.85	910.35	910.26	911.02	911.27	912.83	912.45	911.42	911.28
2	911.34	911.15	911.01	910.93	910.33	910.34	911.10	911.33	912.96	912.40	911.41	911.31
3	911.37	911.12	910.99	910.96	910.32	910.42	911.17	911.38	913.09	912.35	911.41	911.34
4	911.37	911.08	911.07	910.97	910.30	910.48	911.23	911.41	913.29	912.32	911.43	911.35
5	911.36	911.07	911.11	910.92	910.30	910.49	911.26	911.41	913.56	912.25	911.44	911.37
6	911.38	911.08	911.14	910.89	910.31	910.49	911.31	911.41	913.74	912.21	911.44	911.38
7	911.37	911.09	911.19	910.88	910.30	910.50	911.35	911.40	913.83	912.17	911.44	911.38
8	911.36	911.12	911.17	910.85	910.30	910.56	911.40	911.43	913.93	912.14	911.44	911.40
9	911.34	911.14	911.15	910.82	910.28	910.67	911.44	911.43	914.04	912.07	911.44	911.41
10	911.33	911.15	911.14	910.79	910.25	910.77	911.53	911.44	914.01	911.93	911.43	911.41
11	911.32	911.15	911.19	910.74	910.23	910.86	911.62	911.46	913.88	911.79	911.42	911.40
12	911.31	911.17	911.24	910.71	910.21	910.94	911.67	911.48	913.70	911.69	911.39	911.34
13	911.31	911.19	911.22	910.68	910.19	911.01	911.61	911.49	913.54	911.62	911.37	911.26
14	911.31	911.21	911.12	910.66	910.18	911.01	911.52	911.52	913.38	911.57	911.35	911.21
15	911.32	911.23	911.02	910.64	910.17	911.00	911.45	911.57	913.24	911.54	911.34	911.32
16	911.33	911.24	910.88	910.64	910.16	911.01	911.42	911.60	913.11	911.52	911.35	911.42
17	911.34	911.25	910.74	910.61	910.15	911.00	911.43	911.60	912.98	911.44	911.36	911.41
18	911.36	911.28	910.63	910.57	910.14	910.99	911.43	911.63	912.85	911.38	911.37	911.34
19	911.37	911.29	910.58	910.53	910.15	910.98	911.40	911.66	912.74	911.38	911.38	911.26
20	911.38	911.31	910.52	910.50	910.16	910.99	911.35	911.63	912.65	911.37	911.39	911.20
21	911.41	911.30	910.49	910.49	910.18	910.98	911.31	911.59	912.56	911.34	911.39	911.17
22	911.43	911.28	910.48	910.45	910.17	910.98	911.28	911.67	912.50	911.32	911.40	911.15
23	911.43	911.26	910.48	910.45	910.16	910.98	911.33	911.87	912.48	911.31	911.42	911.17
24	911.45	911.25	910.47	910.44	910.15	910.94	911.42	912.01	912.54	911.31	911.42	911.19
25	911.46	911.25	910.47	910.42	910.14	910.89	911.44	912.09	912.57	911.34	911.42	911.21
26	911.48	911.23	910.46	910.41	910.13	910.90	911.43	912.16	912.58	911.37	911.42	911.22
27	911.45	911.23	910.46	910.39	910.12	910.91	911.39	912.22	912.57	911.41	911.39	911.23
28	911.42	911.27	910.45	910.37	910.13	910.90	911.33	912.29	912.57	911.43	911.35	911.24
29	911.											



## OKANOGAN RIVER BASIN

12439500 OKANOGAN RIVER AT OROVILLE, WA  
(International gaging station)

LOCATION. --Lat 48°55'51", long 119°25'09", in SE 1/4 SW 1/4 sec.27, T.40 N., R.27 E., Okanogan County, Hydrologic Unit 17020006, on left bank in Orville, 20 ft downstream from Burlington Northern trestle, 0.5 mile downstream from Tonasket Creek, 1.7 mile downstream from Osoyoys Lake, 3.2 mile upstream from Similkameen River, and at mile 77.3.

DRAINAGE AREA. - - 3,195 mi<sup>2</sup>.

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

REVISED RECORDS.--WRD WA-75-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to Oct. 26, 1944, nonrecording gage at Zosel milldam 200 ft upstream, Oct. 26, 1944, to Mar. 6, 1948, water-stage recorder on railroad trestle 20 ft upstream, both at same datum. Auxiliary water-stage recorder 0.5 mi downstream used during high-water periods; May 15, 1946 to Apr. 9, 1948, nonrecording gage at same site, both at datum 900.00 ft above sea level. To convert to 1947 joint adjustment of U.S. Coast and Geodetic Survey and Geodetic Survey of Canada, subtract 0.26 ft.

REMARKS:--Records good except for estimated daily discharges and backwater periods, Nov. 29 to Dec. 4 and May 17 to July 6, which are fair. Diversions made to irrigate approximately 44,000 acres in Canada and minor diversions in the United States upstream from station. Natural regulation in several large lakes and artificial regulation in Okanagan Lake 46.7 mi upstream for flood control and irrigation; also regulated by Zosel dam at Oroville, 500 ft upstream from gage. Water temperature April 1986 to September 1987.

COOPERATION.--This station is maintained by the United States under agreement with Canada.

AVERAGE DISCHARGE.--54 years (water years 1943-96), 676 ft<sup>3</sup>/s, 490,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD:--Maximum discharge, 3,730 ft<sup>3</sup>/s June 14, 1972; maximum elevation, 916.89 ft June 2, 1972, at datum then in use, backwater from Similkameen River; minimum daily discharge, -2,270 ft<sup>3</sup>/s reverse flow May 29, 1948; minimum elevation, 903.98 ft Mar. 1, 1948, at datum then in use.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,460 ft<sup>3</sup>/s June 11, 12; maximum elevation, 913.22 ft June 9, result of backwater from Similkameen River; minimum discharge, 132 ft<sup>3</sup>/s Nov. 30, result of backwater from Similkameen River; minimum elevation, 905.74 ft Nov. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	518	479	879	579	e870	706	1600	1520	2860	2680	1280	1090
2	402	401	626	786	e890	721	1640	1390	2970	2630	1280	1030
3	354	295	283	914	e910	735	1670	1390	2850	2570	1280	1060
4	353	294	212	990	e940	840	1730	1470	2490	2560	1280	947
5	353	271	205	1010	e970	917	1790	1540	2360	2520	1290	797
6	358	239	219	989	e970	912	1830	1530	2640	2500	1290	797
7	357	221	275	987	e970	920	1860	1530	2780	2440	1290	797
8	355	210	300	1020	1040	936	1930	1720	2670	2390	1290	800
9	353	211	300	1030	1060	966	2100	1920	2790	2340	1290	800
10	353	213	300	1030	1040	990	2240	1920	3140	2230	1280	815
11	353	210	302	1030	1030	1120	2360	1940	3390	2120	1270	824
12	353	210	385	1010	1030	1270	2410	1990	3410	2040	1270	772
13	353	212	599	1000	1020	1560	2340	2120	3350	1990	1260	643
14	353	215	723	998	1010	1770	2260	2190	3270	1880	1260	430
15	353	215	780	991	1000	1810	2200	2260	3180	1820	1200	309
16	358	215	788	1010	1000	1810	2190	2310	3100	1800	1150	415
17	357	215	752	1010	997	1810	2260	2320	3020	1700	1150	550
18	361	215	673	1010	996	1800	2280	2270	2950	1370	1150	631
19	363	215	589	e940	1010	1780	2230	2250	2910	1160	1150	589
20	364	239	521	e940	1010	1790	2160	2220	2890	1210	1160	477
21	364	262	431	e940	1020	1780	2060	2200	2840	1140	1160	430
22	364	291	391	e940	1010	1800	1940	2250	2780	1100	1160	353
23	365	287	391	e940	1010	1810	1900	2410	2760	1060	1180	255
24	367	282	391	e940	1010	1800	2040	2510	2770	976	1220	257
25	369	278	391	e940	1010	1730	2170	2520	2730	820	1220	262
26	421	273	391	e900	1000	1730	2140	2520	2730	845	1220	269
27	528	266	391	e900	953	1740	2090	2490	2720	852	1210	269
28	551	264	390	e900	887	1730	2020	2500	2720	875	1200	269
29	548	240	393	e900	772	1730	1950	2560	2710	959	1190	269
30	509	483	401	e880	- - -	1700	1740	2600	2700	1170	1180	269
31	487	- - -	455	e860	- - -	1620	- - -	2690	- - -	1290	1150	- - -
TOTAL	12197	7921	14127	29314	28435	44333	61130	65050	86480	53037	37960	17475
MEAN	393	264	456	946	981	1430	2038	2098	2883	1711	1225	582
MAX	551	483	879	1030	1060	1810	2410	2690	3410	2680	1290	1090
MIN	353	210	205	579	772	706	1600	1390	2360	820	1150	255
AC - FT	24190	15710	28020	58140	56400	87930	121300	129000	171500	105200	75290	34660

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1943 - 1996, BY WATER YEAR (WY)

MEAN	516	479	466	479	563	644	737	1118	1125	791	643	552
MAX	1430	1551	1404	1190	1185	1918	2475	2870	3107	2439	1918	1482
(WY)	1949	1949	1949	1949	1983	1983	1983	1983	1990	1990	1993	1948
MIN	179	148	149	162	140	74.1	115	180	111	126	150	81.7
(WY)	1989	1971	1971	1968	1971	1977	1968	1992	1992	1947	1963	1944

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1943 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	250415		457459			
ANNUAL MEAN	686		1250		676	
HIGHEST ANNUAL MEAN					1432	1983
LOWEST ANNUAL MEAN					213	1988
HIGHEST DAILY MEAN	2310	May 21	3410	Jun 12	3680	Jun 14 1972
LOWEST DAILY MEAN	119	Mar 31	205	Dec 5	-2270	May 29 1948
ANNUAL SEVEN-DAY MINIMUM	160	Jul 9	212	Nov 8	-1080	May 24 1948
ANNUAL RUNOFF (AC-FT)	496700		907400		490000	
10 PERCENT EXCEEDS	1240		2520		1440	
50 PERCENT EXCEEDS	487		1010		506	
90 PERCENT EXCEEDS	215		286		202	

e Estimated



e Estimated

## OKANOGAN RIVER BASIN

12445000 OKANOGAN RIVER NEAR TONASKET, WA

LOCATION.--Lat 48°37'57", long 119°27'38", in lot 3, sec.8, T.36 N., R.27 E., Okanogan County, Hydrologic Unit 17020006, on right bank 1,000 ft upstream from Chewiliken Creek, 5.2 mi south of Tonasket, and at mile 50.8.

DRAINAGE AREA.--7,260 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--April 1929 to current year.

REVISED RECORDS.--WSP 862: 1937. WSP 1316: 1934(M), 1938(M). WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 860.78 ft above sea level.

REMARKS.--Records excellent except for estimated daily discharges, which are fair. Diversions upstream from station for irrigation of about 10,700 acres in the United States and 55,000 acres in Canada. Flow affected by regulation of Okanogan and Skaha Lakes and by natural storage in other lakes. U.S. Geological Survey satellite telemeter at station. Water temperature April 1986 to September 1987.

AVERAGE DISCHARGE.--67 years (water years 1930-96), 2,940 ft<sup>3</sup>/s, 2,130,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 44,700 ft<sup>3</sup>/s June 2, 1972, gage height, 22.54 ft; minimum discharge recorded, 126 ft<sup>3</sup>/s Sept. 5, 1931, gage height, 3.43 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20,400 ft<sup>3</sup>/s June 9, gage height, 15.36 ft; minimum discharge, 805 ft<sup>3</sup>/s Nov. 4, gage height 4.57 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	944	1200	14600	2330	e1550	2130	3270	7570	14600	9390	3010	1750
2	959	1130	11100	2440	e1600	2160	3290	7260	14500	9200	2910	1700
3	868	945	8560	2590	e1700	2210	3290	6940	14900	9240	2860	1700
4	882	827	7330	2840	e1750	2250	3290	6670	16600	9290	2870	1760
5	997	824	6520	3010	e1850	2310	3340	6460	18700	9100	2840	1560
6	1120	887	5750	2830	e2000	2300	3410	6260	19500	8490	2860	1600
7	1080	948	4940	2680	e2100	2280	3550	6100	19200	7810	3080	1590
8	1030	919	e3500	2880	e2180	2290	3920	5970	19600	7370	2890	1560
9	996	1040	e2500	3070	e2310	2310	5060	5910	20300	7150	2740	1550
10	973	3940	e2800	3090	e2470	2340	e6500	5880	19700	7000	2630	1530
11	979	2930	e3100	3000	e2510	2440	e8300	5820	18100	6670	2540	1580
12	1090	2360	e3800	2930	e2470	2700	e9000	5750	16700	6260	2470	1540
13	1420	2210	4700	2890	e2400	2910	e8800	5700	15700	5910	2390	1410
14	1310	2130	4280	2850	e2400	3240	e8600	5780	15000	5650	2340	1280
15	1220	3560	4330	2850	e2440	3350	e8300	e7000	14300	5440	2280	1140
16	1230	4860	4210	2880	e2480	3430	e8100	e8000	13900	5250	2130	1280
17	1360	4030	3750	2980	e2560	3630	e8600	e8800	13200	5050	2100	1430
18	1460	3620	3520	e2600	e2670	3650	e9100	e9500	12300	4780	2080	1540
19	1520	3890	3280	e2000	e2790	3650	e9300	10000	11300	4640	2050	1510
20	1470	4150	3130	e1800	e2950	3660	e9100	10600	10500	4530	2020	1390
21	1380	3600	2950	e1700	e3020	3680	e8800	10700	10100	4290	2010	1240
22	1300	3360	2770	e1700	3080	3690	e8500	10700	9830	3970	1990	1200
23	1290	3180	2630	e1700	2980	3690	e8300	10600	9750	3720	1990	1060
24	1250	3100	2430	e1700	2880	3670	e8300	10600	9780	3530	1990	1000
25	1210	3990	2330	e1700	2810	3580	e8900	10700	10600	3300	1970	994
26	1190	4430	2180	e1700	2710	3490	e9200	11800	10900	3160	1930	980
27	1270	4220	2120	e1650	2620	3520	e9000	13000	10800	3090	1910	966
28	1390	3920	2080	e1650	2440	3530	e8700	13900	10500	2980	1870	948
29	1450	3760	2120	e1600	2320	3470	8100	13900	10200	2940	1840	935
30	1380	10000	2230	e1600	--	3430	7860	14100	9770	2980	1820	913
31	1270	--	2270	e1500	--	3370	--	14700	--	3120	1800	--
TOTAL	37288	89960	131810	72740	70040	94360	211780	276670	420830	175300	72210	40636
MEAN	1203	2999	4252	2346	2415	3044	7059	8925	14030	5655	2329	1355
MAX	1520	10000	14600	3090	3080	3690	9300	14700	20300	9390	3080	1760
MIN	868	824	2080	1500	1550	2130	3270	5700	9750	2940	1800	913
AC-FT	73960	178400	261400	144300	138900	187200	420100	548800	834700	347700	143200	80600

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

	1210	1453	1341	1170	1280	1415	2721	8509	9731	3682	1452	1077
MEAN	1210	1453	1341	1170	1280	1415	2721	8509	9731	3682	1452	1077
MAX	2849	4618	4252	2564	2964	3131	13220	16190	27720	10210	4095	3039
(WY)	1960	1991	1996	1981	1991	1991	1934	1972	1972	1972	1993	1948
MIN	403	413	399	360	532	525	770	3790	2650	605	231	231
(WY)	1932	1930	1930	1930	1937	1931	1931	1941	1992	1940	1931	1940

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR				FOR 1996 WATER YEAR				WATER YEARS 1929 - 1996			
ANNUAL TOTAL	1243223				1693624							
ANNUAL MEAN	3406				4627				2940			
HIGHEST ANNUAL MEAN									6019			
LOWEST ANNUAL MEAN									1142			
HIGHEST DAILY MEAN	15000				Jun 1	20300	Jun 9	44200	Jun 2	1972		
LOWEST DAILY MEAN	470				Jan 4	824	Nov 5	132	Sep 5	1931		
ANNUAL SEVEN-DAY MINIMUM	490				Jan 2	913	Nov 3	146	Aug 31	1931		
ANNUAL RUNOFF (AC-FT)	2466000				3359000				2130000			
10 PERCENT EXCEEDS	10200				10500				7570			
50 PERCENT EXCEEDS	2120				2980				1450			
90 PERCENT EXCEEDS	829				1250				643			

e Estimated

## 12447200 OKANOGAN RIVER AT MALOTT, WA

LOCATION.--Lat 48°16'53", long 119°42'12", in SW 1/4 sec.9, T.32 N., R.25 E., Okanogan County, Hydrologic Unit 17020006, on right bank 75 ft upstream from highway bridge at Malott, 0.1 mi upstream from Loup Loup Creek, and at mile 17.0.

DRAINAGE AREA.--8,080 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--April 1958 to current year. April 1958 to September 1965, published as "near Malott." Records published for both sites December 1965 to July 1967.

REVISED RECORDS.--WDR WA-75-1: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 783.55 ft above sea level. April 1958 to November 1965, water-stage recorder at site 3.9 mi downstream at sea level.

REMARKS.--Records excellent except for estimated daily discharges, which are fair. Diversions upstream from station for irrigation of about 22,000 acres in the United States and 55,000 acres in Canada. Flow regulated by Okanogan and Skaha Lakes and by natural storage in other lakes. U.S. Geological Survey satellite telemeter at station. Daily water temperature records November 1969 to June 1971. Chemical analyses 1959-62, 1963-70 (partial record station), 1972, 1975-94. Published as "near Brewster" prior to 1964 and as "near Malott" 1963-66 (station 12447300).

AVERAGE DISCHARGE.--38 years (water years 1959-96), 3,063 ft<sup>3</sup>/s, 2,219,000 acre-ft/yr, includes records for "near Malott" site located 3.9 miles downstream, water years 1959-65.

31 years (water years 1966-96), 3,075 ft<sup>3</sup>/s, 2,227,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 45,600 ft<sup>3</sup>/s June 3, 1972, gage height, 22.16 ft; minimum observed, 288 ft<sup>3</sup>/s Sept. 4, 1970, gage height, 2.03 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 20,100 ft<sup>3</sup>/s June 9, gage height, 14.07 ft; minimum discharge, 898 ft<sup>3</sup>/s Oct. 4 (result of discharge measurement); minimum gage height, 3.03 ft Nov. 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	920	1300	13800	2330	e1550	2280	3330	7380	14600	9850	3080	1740
2	1010	1230	12900	2390	e1600	2170	3300	6980	14500	9570	2980	1700
3	1010	1170	9460	2530	e1650	2200	3290	6660	14600	9550	2930	1640
4	931	1000	7930	2640	e1700	2260	3280	6430	15800	9600	2900	1680
5	946	917	6850	3020	e1800	2280	3300	6280	17700	9510	2910	1650
6	1060	911	5930	2960	e1900	2300	3350	6140	19200	9110	2870	1540
7	1150	980	5000	2770	e2140	2310	3450	6020	19200	8410	3020	1570
8	1110	1020	e4300	2770	e2250	2300	3710	5900	19200	7880	3060	1560
9	1070	1000	e3500	2980	e2320	2300	4560	5990	19900	7580	2870	1550
10	1040	2160	e2600	3110	e2440	2320	6370	6030	19900	7400	2750	1520
11	1020	3460	e2800	3070	e2500	2370	8100	5910	18500	7170	2650	1510
12	1030	2610	e3100	2990	e2550	2550	9050	5810	17000	6730	2550	1540
13	1220	2270	e3600	2940	e2400	2780	8990	5780	15800	6330	2460	1490
14	1400	2200	e4300	2890	e2430	3070	8550	6110	15000	6040	2380	1370
15	1310	2170	e4200	2840	e2410	3340	8220	7170	14400	5750	2310	1300
16	1240	5010	e4300	2860	e2450	3400	8160	8210	14000	5550	2210	1220
17	1290	4350	e4200	2930	e2520	3560	8570	8750	13600	5330	2090	1330
18	1380	3870	e3800	2910	e2600	3660	9260	9400	12800	5060	2060	1450
19	1490	3560	e3500	e2400	e2680	3660	9290	10300	12000	4820	2010	1540
20	1510	4360	e3200	e2000	e2700	3650	9040	10800	11100	4750	1980	1480
21	1460	3870	3110	e1800	e2950	3680	8690	10900	10500	4530	1960	1360
22	1380	3480	2920	e1750	e3050	3700	8390	11100	10200	4210	1940	1260
23	1330	3320	2760	e1750	e3100	3690	8220	11200	10200	3900	1920	1220
24	1310	3140	2590	e1750	e3000	3680	8210	11100	10200	3660	1920	1080
25	1280	3510	2440	e1750	e2900	3630	8950	11100	10700	3460	1920	1050
26	1250	4340	2320	e1700	2820	3540	9380	11600	11300	3210	1890	1040
27	1240	4530	2210	e1700	2700	3490	8960	12700	11200	3150	1860	1030
28	1320	4120	2170	e1650	2560	3530	8510	13700	11000	3060	1820	1020
29	1440	3850	2150	e1650	2410	3500	8170	14100	10600	2970	1790	1000
30	1460	6310	2220	e1600	---	3430	7790	14100	10300	2940	1770	988
31	1390	---	2290	e1600	---	3410	---	14500	---	3050	1760	---
TOTAL	37997	86018	136450	74030	70080	94040	210440	278150	425000	184130	72620	41428
MEAN	1226	2867	4402	2388	2417	3034	7015	8973	14170	5940	2343	1381
MAX	1510	6310	13800	3110	3100	3700	9380	14500	19900	9850	3080	1740
MIN	920	911	2150	1600	1550	2170	3280	5780	10200	2940	1760	988
AC-FT	75370	170600	270600	146800	139000	186500	417400	551700	843000	365200	144000	82170

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1966 - 1996, BY WATER YEAR (WY)

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	1136	1437	1313	1222	1398	1721	2789	8443	10150	4055	1652	1146																			
MAX	1714	4747	4402	2970	2979	3946	7015	16420	29290	10990	4150	2321																			
(WY)	1983	1991	1996	1984	1991	1983	1996	1972	1972	1991	1993	1982																			
MIN	605	574	565	540	618	601	975	4319	2625	938	434	372																			
(WY)	1988	1988	1971	1988	1988	1988	1970	1977	1992	1977	1977	1988																			

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1966 - 1996
ANNUAL TOTAL	1282898	1710383	
ANNUAL MEAN	3515	4673	3075
HIGHEST ANNUAL MEAN			6312
LOWEST ANNUAL MEAN			1565
HIGHEST DAILY MEAN	15300	Jun 1	45300
LOWEST DAILY MEAN	500	Jan 5	288
ANNUAL SEVEN-DAY MINIMUM	520	Jan 3	296
ANNUAL RUNOFF (AC-FT)	2545000	3393000	2227000
10 PERCENT EXCEEDS	10400	10800	7890
50 PERCENT EXCEEDS	2200	2980	1480
90 PERCENT EXCEEDS	908	1300	693

e Estimated

## METHOW RIVER BASIN

12447383 METHOW RIVER ABOVE GOAT CREEK NEAR MAZAMA, WA

LOCATION.--Lat 48°34'32", long 120°23'05", in NE 1/4 SE 1/4 sec.31, T.36 N., R.20 E., Okanogan County, Hydrologic Unit 17020008, on left bank, 0.6 mi upstream from Goat Creek, and 1.5 mi southeast of Mazama, and at mile 63.8.

DRAINAGE AREA.--373 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1991 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 2,040 ft above sea level, from topographic map. Crest-stage gage since September 1992.

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

AVERAGE DISCHARGE.--5 years (water years 1992-96), 457 ft<sup>3</sup>/s, 330,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,280 ft<sup>3</sup>/s May 15, 1993, gage height, 19.46 ft, from crest-stage gage; maximum gage height, 19.6 ft May 21, 1991, from outside high-water mark; minimum discharge, no flow for all or part of many days during water years 1992 to 1995.

EXTREMES FOR CURRENT YEAR.--Peak discharge greater than base discharge of 2,500 ft<sup>3</sup>/s and minimum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	1600	3,570	17.92	June 7	2400	*5,390	19.11
May 27	1330	3,010	17.56	June 7	--	(a)	*19.19
June 4	0730	5,340	19.08	July 4	0400	2,840	17.43

Minimum discharge, 3.0 ft<sup>3</sup>/s Oct. 9.  
(a) From crest-stage gage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	8.5	18	1810	166	e64	109	270	927	1980	2100	517	105
2	8.2	27	1480	163	e68	104	256	882	2320	2380	456	93
3	9.9	25	1240	180	e71	103	244	835	3900	2560	412	95
4	9.1	18	1080	165	e64	100	240	786	4950	2560	367	96
5	7.8	17	922	157	e66	97	255	751	4230	2120	347	85
6	6.5	16	812	155	e68	93	314	729	3950	1750	315	78
7	5.4	20	751	154	68	91	535	713	4590	1600	290	73
8	4.2	96	640	147	66	89	1010	688	4880	1750	273	68
9	3.7	239	617	143	63	90	1590	661	3950	2020	266	66
10	9.1	179	584	140	65	96	1800	643	3250	1870	265	61
11	14	188	560	135	69	107	1760	632	2880	1630	269	56
12	11	172	515	132	69	128	1590	631	2770	1610	259	53
13	8.8	159	487	130	66	139	1400	765	2810	1650	235	62
14	7.6	190	442	131	65	159	1300	1100	2760	1710	221	63
15	9.5	278	404	133	68	250	1240	1390	2810	1660	217	76
16	21	311	371	129	76	299	1350	1540	2690	1510	205	77
17	34	320	345	122	89	323	1420	1710	2340	1330	189	70
18	40	426	323	118	110	344	1340	1950	2030	1210	171	63
19	35	394	302	113	122	365	1230	1880	1760	987	155	58
20	33	359	280	113	136	387	1130	1780	1660	841	143	53
21	30	332	264	113	145	405	1060	1710	1630	744	133	50
22	26	307	250	111	143	404	1020	1600	1660	758	123	47
23	24	312	236	109	142	393	1190	1460	1920	821	114	43
24	22	371	214	107	136	374	1740	1420	2140	842	110	39
25	22	456	188	99	130	357	1510	1750	2100	856	106	35
26	24	426	e160	95	125	346	1340	2410	2130	796	106	30
27	21	404	181	91	121	333	1200	2880	2200	779	111	27
28	17	566	201	88	116	315	1090	2780	2230	769	115	25
29	15	2320	196	82	114	304	1010	2500	2080	756	114	22
30	13	2580	187	e60	--	290	968	2200	1980	694	112	21
31	16	--	176	e62	--	278	--	1980	--	615	113	--
TOTAL	516.3	11526	16218	3843	2705	7272	32402	43683	82580	43278	6829	1790
MEAN	16.7	384	523	124	93.3	235	1080	1409	2753	1396	220	59.7
MAX	40	2580	1810	180	145	405	1800	2880	4950	2560	517	105
MIN	3.7	16	160	60	63	89	240	631	1630	615	106	21
AC-FT	1020	22860	32170	7620	5370	14420	64270	86650	163800	85840	13550	3550

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1996, BY WATER YEAR (WY)

	6.23	79.5	105	24.8	20.1	168	652	1991	1870	874	186	35.3
MEAN	6.23	79.5	105	24.8	20.1	168	652	1991	1870	874	186	35.3
MAX	16.7	384	523	124	93.3	405	1080	2781	2876	1945	391	73.8
(WY)	1996	1996	1996	1996	1996	1992	1996	1995	1991	1991	1991	1991
MIN	.000	.000	.000	.000	.000	.000	20.4	1409	802	234	35.1	.65
(WY)	1995	1993	1993	1992	1993	1993	1993	1996	1994	1994	1994	1994

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1991 - 1996
ANNUAL TOTAL	243881.60	252642.3	
ANNUAL MEAN	668	690	457
HIGHEST ANNUAL MEAN			690
LOWEST ANNUAL MEAN			286
HIGHEST DAILY MEAN	5340	May 30	5460
LOWEST DAILY MEAN	.00	Jan 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jan 1	.00
ANNUAL RUNOFF (AC-FT)	483700	501100	330700
10 PERCENT EXCEEDS	2320	1990	1810
50 PERCENT EXCEEDS	220	257	95
90 PERCENT EXCEEDS	.00	27	.00

e Estimated



## METHOW RIVER BASIN

361

12447390 ANDREWS CREEK NEAR MAZAMA, WA  
(Hydrologic bench-mark station)

LOCATION.--Lat 48°49'23", long 120°08'41", in NE 1/4 sec.1, T.38 N., R.21 E., Okanogan County, Hydrologic Unit 17020008, Okanogan National Forest, on left bank 50 ft upstream from Blizzard Creek, 3.5 mi upstream from mouth, and 20 mi northeast of Mazama.

DRAINAGE AREA.--22.1 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

REVISED RECORDS.--WDR WA-76-2: 1975. WDR WA-77-2: 1976.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 4,300 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records poor. No regulation or diversion.

AVERAGE DISCHARGE.--28 years (water years 1969-96), 31.1 ft<sup>3</sup>/s, 19.13 in/yr, 22,540 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 1,120 ft<sup>3</sup>/s June 10, 1972, gage height, 4.00 ft, from rating curve extended above 440 ft<sup>3</sup>/s; minimum discharge, 1.2 ft<sup>3</sup>/s Nov. 4, Dec. 30, 1968, Nov. 20, 1970, Apr. 7, 1975.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 3	2200	338	2.79	June 14	2200	297	2.66
June 7	2300	*375	2.90	June 24	1800	243	2.47
June 7	--	(a)	*3.19	July 1	2000	273	2.58
June 12	2100	303	2.68	July 3	2000	270	2.57

Minimum discharge, 3.5 ft<sup>3</sup>/s Oct. 30.

(a) From crest-stage gage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	5.7	3.9	15	6.2	5.4	4.7	6.4	35	126	218	31	9.9
2	5.8	3.9	12	6.1	5.4	4.7	6.4	33	170	231	32	9.6
3	7.4	4.4	10	6.7	5.4	4.7	6.3	32	267	232	33	9.6
4	6.7	4.7	10	6.3	5.4	4.7	6.3	30	309	209	29	10
5	6.0	4.8	8.4	6.1	5.4	4.6	6.6	29	283	170	28	9.8
6	5.9	4.8	9.1	6.0	5.4	4.6	7.3	29	284	155	27	9.6
7	5.8	4.9	9.6	6.0	5.4	4.6	9.6	29	327	150	25	10
8	5.7	5.4	9.4	5.9	5.4	4.6	14	27	341	153	23	10
9	5.6	6.9	9.4	5.9	5.3	4.6	22	27	302	153	22	10
10	7.1	6.1	9.4	5.9	5.3	4.8	29	26	265	136	21	9.1
11	7.5	5.7	9.4	5.8	5.3	5.2	28	26	249	124	20	8.7
12	6.8	5.6	9.4	5.7	5.3	5.1	27	26	251	115	19	8.4
13	6.2	5.3	9.0	5.7	5.3	4.9	26	37	263	109	18	10
14	6.3	5.5	8.4	5.7	5.2	4.9	26	54	254	103	18	14
15	7.2	6.0	8.1	5.7	5.1	5.6	26	64	261	96	17	21
16	7.3	5.7	7.9	5.6	5.1	5.6	31	73	235	88	16	16
17	7.3	5.6	7.8	5.5	5.0	5.6	34	93	202	90	16	13
18	7.0	8.4	7.5	5.5	4.8	5.7	32	107	170	93	15	11
19	6.2	6.9	7.3	5.4	4.8	5.8	31	100	154	85	15	11
20	6.5	6.1	7.2	5.4	4.7	5.9	29	95	155	78	15	10
21	6.2	6.1	7.1	5.4	4.7	6.1	28	92	157	68	14	9.7
22	5.7	5.7	6.9	5.4	4.7	6.2	28	86	158	63	13	9.4
23	6.1	5.8	6.8	5.4	4.7	6.2	45	81	186	58	13	9.1
24	5.8	6.1	6.7	5.4	4.7	6.2	67	84	223	54	12	8.9
25	5.8	6.5	6.7	5.3	4.7	6.3	52	110	202	52	12	8.7
26	5.9	5.8	6.7	5.3	4.6	6.4	46	144	195	47	11	8.6
27	5.5	5.8	6.6	5.4	4.7	6.4	42	156	194	44	11	8.7
28	4.9	6.2	6.6	5.4	4.7	6.4	39	142	190	40	11	8.1
29	4.9	15	6.5	5.4	4.7	6.4	37	132	184	38	10	7.8
30	4.3	25	6.4	5.4	--	6.4	36	122	195	36	10	7.6
31	4.4	--	6.2	5.4	--	6.4	--	117	--	33	10	--
TOTAL	189.5	198.6	257.5	176.3	146.6	170.3	823.9	2238	6752	3321	567	307.3
MEAN	6.11	6.62	8.31	5.69	5.06	5.49	27.5	72.2	225	107	18.3	10.2
MAX	7.5	25	15	6.7	5.4	6.4	67	156	341	232	33	21
MIN	4.3	3.9	6.2	5.3	4.6	4.6	6.3	26	126	33	10	7.6
AC-FT	376	394	511	350	291	338	1630	4440	13390	6590	1120	610
CFSM	.28	.30	.38	.26	.23	.25	1.24	3.27	10.2	4.85	.83	.46
IN.	.32	.33	.43	.30	.25	.29	1.39	3.77	11.37	5.59	.95	.52

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1968 - 1996, BY WATER YEAR (WY)

MEAN	6.56	5.96	4.70	3.98	3.53	3.78	15.3	110	152	45.1	13.7	8.62
MAX	19.1	19.9	12.4	10.3	6.53	6.85	49.9	170	419	111	34.7	40.8
(WY)	1979	1982	1982	1984	1982	1992	1994	1971	1974	1972	1976	1978
MIN	2.58	2.72	2.17	1.69	2.01	2.07	2.95	36.3	52.3	13.7	5.36	3.28
(WY)	1971	1971	1971	1971	1988	1973	1975	1984	1977	1977	1973	1970

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1968 - 1996

ANNUAL TOTAL	15168.5	15148.0	
ANNUAL MEAN	41.6	41.4	31.1
HIGHEST ANNUAL MEAN			59.1
LOWEST ANNUAL MEAN			12.9
HIGHEST DAILY MEAN	380	May 30	874
LOWEST DAILY MEAN	3.0	Jan 2	1.2
ANNUAL SEVEN-DAY MINIMUM	3.1	Jan 1	4.3
ANNUAL RUNOFF (AC-FT)	30090	30050	22540
ANNUAL RUNOFF (CFSM)	1.88	1.87	1.41
ANNUAL RUNOFF (INCHES)	25.53	25.50	19.13
10 PERCENT EXCEEDS	184	153	98
50 PERCENT EXCEEDS	6.6	8.8	6.4
90 PERCENT EXCEEDS	3.3	5.1	2.9



## METHOW RIVER BASIN

12447390 ANDREWS CREEK NEAR MAZAMA, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD--Water years 1972 to current year.

## WATER-QUALITY DATA

DATE	TIME	DIS-CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	SPE-CIFIC CON-DUCT-ANCE (US/CM) (00095)	PH, FIELD (STAND-ARD UNITS) (00400)	TEMPER-ATURE WATER (DEG C) (00010)	TUR-BID-ITY (NTU) (00076)	OXYGEN, DIS-SOLVED (MG/L) (00300)	OXYGEN, DIS-SOLVED (PER-CENT SATUR-ATION) (00301)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./100 ML) (31625)	STREP-TOCOCCI, FECAL, KF AGAR (COLS. PER 100 ML) (31673)	HARD-NESS (MG/L AS CACO3) (00900)
		HARD-NESS, NONCAR-BONATE (MG/L AS CACO3) (00904)	CALCIUM, DIS-SOLVED (MG/L AS CA) (00915)	MAGNE-SIUM, DIS-SOLVED (MG/L AS MG) (00925)	SODIUM, DIS-SOLVED (MG/L AS NA) (00930)	SODIUM AD-SORP-TION PERCENT RATIO (00932)	POTAS-SIUM, DIS-SOLVED (MG/L AS K) (00935)	ALKA-LINITY, DIS IT, FIELD CACO3 (39086)	BICAR-BONATE, DIS IT, FIELD HCO3 (00453)	CAR-BONATE, DIS IT, FIELD CO3 (00452)	SULFATE, DIS-SOLVED (MG/L AS SO4) (00945)
OCT 1995 13...	1245	5.1	57	7.7	3.5	0.1	11.1	96	K1	K4	23
JUN 1996 11...	1115	230	24	7.2	3.0	0.2	11.5	100	K1	K2	8
OCT 1995 13...	0	7.5	1.1	2.3	17	0.2	0.5	29	36	0	0.5
JUN 1996 11...	0	2.6	0.43	1.2	23	0.2	0.3	11	14	0	0.5
DATE	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)	SILICA, DIS-SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L) (70300)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L) (70301)	SOLIDS, DIS-SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS-SOLVED (TONS PER DAY) (70302)	NITRO-GEN, NITRITE, DIS-SOLVED (MG/L AS N) (00613)	NITRO-GEN, NO2+NO3, DIS-SOLVED (MG/L AS N) (00631)	NITRO-GEN, AMMONIA, DIS-SOLVED (MG/L AS N) (00608)	
OCT 1995 13...	0.2	<0.10	11	34	41	0.05	0.47	<0.01	<0.05	<0.015	
JUN 1996 11...	0.1	<0.10	7.8	23	20	0.03	14.3	<0.01	<0.05	<0.015	
DATE	NITRO-GEN, AM-MONIA + ORGANIC, TOTAL (MG/L AS N) (00625)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00665)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P) (00666)	PHOS-PHORUS ORTHO, DIS-SOLVED (MG/L AS P) (00671)	ALUM-INUM, DIS-SOLVED (UG/L AS AL) (01106)	BARIUM, DIS-SOLVED (UG/L AS BA) (01005)	COBALT, DIS-SOLVED (UG/L AS CO) (01035)	IRON, DIS-SOLVED (UG/L AS FE) (01046)	LITHIUM, DIS-SOLVED (UG/L AS LI) (01130)	MANGA-NESE, DIS-SOLVED (UG/L AS MN) (01056)	
OCT 1995 13...	<0.2	<0.01	<0.01	<0.01	20	24	<3	<3	4	<1	
JUN 1996 11...	<0.2	<0.01	<0.01	<0.01	48	10	<3	13	<4	<1	
DATE	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO) (01060)	NICKEL, DIS-SOLVED (UG/L AS NI) (01065)	SELE-NIUM, DIS-SOLVED (UG/L AS SE) (01145)	SILVER, DIS-SOLVED (UG/L AS AG) (01075)	STRON-TIUM, DIS-SOLVED (UG/L AS SR) (01080)	VANA-DIUM, DIS-SOLVED (UG/L AS V) (01085)	RADIUM 226, DIS-SOLVED, RADON METHOD (PCI/L) (09511)	URANIUM, NATURAL, DIS-SOLVED (UG/L AS U) (22703)	SEDI-MENT, SUS-PENDED (MG/L) (80154)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY) (80155)	
OCT 1995 13...	<10	<1	<1	<1	76	<6	--	--	2	0.03	
JUN 1996 11...	<10	<1	<1	<1	30	<6	0.02	0.19	1	0.62	

K - Results based on colony count outside the acceptable range (non-ideal colony count).

## METHOW RIVER BASIN

363

## 12448000 CHEWUCH RIVER AT WINTHROP, WA

LOCATION.--Lat 48°28'38", long 120°11'07", SW 1/4 NW 1/4 sec.2, T.34 N., R.21 E., Okanogan County, Hydrologic Unit 17020008, on right bank, 80 ft downstream from State Road 20 bridge crossing, at northwest end of Winthrop, WA, and at mile 0.18.

DRAINAGE AREA.--525 mi<sup>2</sup>.

PERIOD OF RECORD.--1912 to 1913, seasonal records only. October 1991 to current year. Prior to October 1991 published as "Chewack River at Winthrop, WA".

GAGE.--Water-stage recorder. Datum of gage is 1,736.26 ft above sea level (Okanogan County Public Works Bench Mark). Prior to November 1991, nonrecording gage 10 ft upstream from bridge, and at datum 8.74 ft higher.

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

AVERAGE DISCHARGE.--5 years (water years 1992-96), 367 ft<sup>3</sup>/s, 266,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,040 ft<sup>3</sup>/s May 30, 1995, gage height, 8.12 ft; maximum gage height, 8.64 ft May 30, 1995, from crest-stage gage; minimum discharge, 24 ft<sup>3</sup>/s Sept. 28-30, Oct. 1, 1994, gage height, 2.26 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,100 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 8	0700	*4,790	7.97	June 25	0230	2,320	6.20
June 8	--	(a)	*8.45				

Minimum discharge, 54 ft<sup>3</sup>/s Nov. 2, gage height, 2.57 ft.  
(a) From crest-stage gage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58	72	245	e110	e90	e96	226	849	1880	1760	322	88
2	81	68	214	115	e92	e105	222	804	2080	1830	303	88
3	104	72	179	115	e98	e103	217	757	2920	1850	315	87
4	106	78	e170	113	e96	103	219	720	3790	1780	300	92
5	109	78	e160	109	e100	100	231	690	3800	1570	283	93
6	109	79	e150	112	e105	99	255	681	3560	1380	276	93
7	106	82	e140	107	e110	98	304	665	4050	1270	263	91
8	103	91	e130	107	e115	98	440	630	4430	1220	244	91
9	100	93	e140	104	e110	102	674	602	3820	1220	222	90
10	105	91	e150	104	e105	107	855	581	3210	1140	212	86
11	118	83	e160	103	e100	115	908	568	2850	1030	202	81
12	114	112	e150	102	e96	123	872	561	2660	954	190	78
13	109	92	e140	96	e93	127	814	654	2730	898	181	83
14	105	89	e135	106	e91	134	778	846	2570	852	175	102
15	104	89	e135	104	e93	159	778	1030	2540	798	170	150
16	105	91	e130	104	e95	180	924	1130	2430	738	163	182
17	106	92	126	e96	e97	187	1040	1320	2170	693	158	151
18	105	107	125	e90	e99	196	957	1640	1960	816	152	132
19	102	110	124	e100	103	210	886	1580	1750	778	148	122
20	99	97	121	e98	108	222	836	1500	1660	714	143	114
21	97	97	118	e100	110	230	803	1470	1620	628	139	110
22	95	94	115	e98	105	242	782	1400	1660	566	134	109
23	93	94	113	e96	104	242	969	1310	1780	526	127	107
24	93	95	110	e98	102	235	1540	1300	2170	489	117	104
25	93	108	90	e96	100	229	1320	1570	2100	466	114	101
26	98	106	e85	e92	97	236	1160	1930	1970	442	108	98
27	92	102	e95	e94	108	234	1050	2200	1890	416	101	95
28	88	107	e105	e94	98	231	979	2130	1850	394	95	93
29	83	151	e120	e90	e90	231	918	2070	1760	376	94	90
30	80	280	e115	e86	--	227	882	1940	1720	364	90	87
31	75	--	110	e88	--	224	--	1850	--	349	88	--
TOTAL	3035	3000	4200	3127	2910	5225	22839	36978	75380	28307	5629	3088
MEAN	97.9	100	135	101	100	169	761	1193	2513	913	182	103
MAX	118	280	245	115	115	242	1540	2200	4430	1850	322	182
MIN	58	68	85	86	90	96	217	561	1620	349	88	78
AC-FT	6020	5950	8330	6200	5770	10360	45300	73350	149500	56150	11170	6130

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1992 - 1996, BY WATER YEAR (WY)

	1992	1993	1994	1995	1996
MEAN	81.7	79.2	74.4	63.5	70.0
MAX	114	100	135	101	100
(WY)	1994	1996	1996	1996	1996
MIN	58.4	63.4	44.1	40.2	49.1
(WY)	1995	1995	1993	1993	1993

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1992 - 1996

	1995 CALENDAR YEAR	1996 WATER YEAR	WATER YEARS 1992 - 1996
ANNUAL TOTAL	197211	193718	
ANNUAL MEAN	540	529	367
HIGHEST ANNUAL MEAN			529
LOWEST ANNUAL MEAN			223
HIGHEST DAILY MEAN	4720	May 30	4720
LOWEST DAILY MEAN	44	Jan 4	25
ANNUAL SEVEN-DAY MINIMUM	47	Jan 2	26
ANNUAL RUNOFF (AC-FT)	391200	384200	266200
10 PERCENT EXCEEDS	2010	1730	1010
50 PERCENT EXCEEDS	121	130	100
90 PERCENT EXCEEDS	58	91	49

e Estimated

LOCATION:--Lat 48°28'25", long 120°10'34", in NE 1/4 SW 1/4 sec.2, T.34 N., R.21 E., Okanogan County, Hydrologic Unit 17020008, on left bank at Winthrop, 0.3 mi downstream from Chewuch River, and at mile 49.8.

PERIOD OF RECORD.--January to October 1912, August 1971 to June 1972 (destroyed by flood of May 31, 1972), November 1989 to current year. Published as "near Winthrop" January to October 1912.

GAGE.--Water-stage recorder. Elevation of gage is 1,718.09 ft above sea level. January to August 1912, nonrecording gage at site 0.6 mi downstream at different datum. August 1971 to June 1972, water-stage recorder at same site at different datum.

REMARKS.--No estimated daily discharges. Records good. No known regulation. Diversions for irrigation of about 1,170 acres upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--6 years (water years 1991-96), 1,155 ft<sup>3</sup>/s, 836,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 24,400 ft<sup>3</sup>/s May 31, 1972, gage height, 20.90 ft, from outside high-water mark; minimum discharge, 134 ft<sup>3</sup>/s several days in September and October, 1994, gage height, 9.53 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	0015	4,690	14.02	May 27	1130	6,160	14.77
Apr. 24	0645	4,320	13.81	June 8	0430	*10,900	*16.88
May 18	1015	4,350	13.83	June 25	0045	5,040	14.21

Minimum discharge, 227 ft<sup>3</sup>/s Oct. 2, gage height, 9.76 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	233	262	2750	531	351	487	868	2360	4470	4250	1140	376
2	257	254	2220	532	371	485	844	2250	4960	4630	1050	362
3	283	260	1860	563	379	486	818	2150	7480	4830	1010	359
4	283	276	1660	546	371	482	812	2050	9580	4840	952	372
5	285	279	1410	525	392	472	844	1960	8870	4190	902	362
6	285	280	1220	520	399	464	933	1920	8260	3570	863	353
7	281	288	1120	517	414	460	1220	1890	9190	3260	811	346
8	277	305	977	509	450	456	2020	1820	10200	3320	771	338
9	275	530	912	497	438	463	3130	1750	8700	3620	731	331
10	287	494	925	491	421	481	3630	1690	7420	3450	716	322
11	301	483	934	483	413	512	3590	1660	6630	3080	704	309
12	297	482	915	480	408	553	3320	1650	6290	2960	682	298
13	293	466	897	472	400	591	2980	1890	6380	2940	651	319
14	290	479	863	484	398	632	2780	2460	6140	2950	624	345
15	290	572	847	487	402	793	2690	3000	6150	2870	605	412
16	291	627	822	480	417	929	2990	3280	5930	2670	584	450
17	304	646	780	447	443	973	3210	3650	5250	2420	562	409
18	313	757	755	375	486	1010	3020	4230	4600	2430	539	381
19	310	759	726	439	510	1060	2810	4100	4020	2160	517	363
20	309	713	701	436	540	1090	2620	3910	3760	1930	496	347
21	308	686	679	438	560	1090	2490	3800	3650	1720	476	341
22	302	653	657	438	547	1100	2410	3610	3690	1630	458	337
23	298	648	636	430	546	1080	2740	3350	4060	1640	437	329
24	297	707	606	438	535	1040	4060	3250	4850	1630	418	321
25	300	805	541	421	527	1000	3600	3810	4690	1630	406	311
26	310	797	498	394	512	989	3220	4940	4530	1540	395	299
27	295	773	517	405	518	969	2920	5910	4520	1490	390	290
28	286	850	564	402	489	942	2700	5780	4550	1460	388	284
29	279	2760	572	366	470	924	2530	5450	4300	1430	388	277
30	271	3910	559	340	- - -	896	2440	4910	4110	1360	382	275
31	267	- - -	544	348	- - -	876	- - -	4470	- - -	1260	378	- - -
TOTAL	8957	21801	29667	14234	13107	23785	74239	98950	177230	83160	19426	10218
MEAN	289	727	957	459	452	767	2475	3192	5908	2683	627	341
MAX	313	3910	2750	563	560	1100	4060	5910	10200	4840	1140	450
MIN	233	254	498	340	351	456	812	1650	3650	1260	378	275
AC-FT	17770	43240	58840	28230	26000	47180	147300	196300	351500	164900	38530	20270

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1996, BY WATER YEAR (WY)

MEAN	255	406	361	253	256	482	1464	4214	4411	1544	532	276
MAX	304	915	957	459	452	878	2475	7042	10110	2944	781	364
(WY)	1972	1991	1996	1996	1996	1992	1996	1972	1972	1991	1993	1912
MIN	181	188	189	181	173	177	245	2358	1676	615	219	150
(WY)	1995	1995	1995	1995	1912	1912	1993	1990	1994	1994	1994	1994

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1912 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	570390		574774			
ANNUAL MEAN	1563		1570		1155	
HIGHEST ANNUAL MEAN					1570	1996
LOWEST ANNUAL MEAN					758	1994
HIGHEST DAILY MEAN	11500	May 30	10200	Jun 8	21400	Jun 9 1972
LOWEST DAILY MEAN	160	Jan 4	233	Oct 1	134	Sep 21 1994
ANNUAL SEVEN-DAY MINIMUM	168	Jan 1	267	Oct 29	136	Sep 24 1994
ANNUAL RUNOFF (AC-FT)	1131000		1140000		836800	
10 PERCENT EXCEEDS	4780		4130		3440	
50 PERCENT EXCEEDS	586		668		373	
90 PERCENT EXCEEDS	199		301		194	

12448998 TWISP RIVER NEAR TWISP, WA

LOCATION.--Lat 48°22'12", long 120°08'51", in SE 1/4 SE 1/4 sec.12, T.33 N., R.21 E., Okanogan County, Hydrologic Unit 17020008, on left bank, 20 ft downstream from county road bridge, 0.8 mi west of the Twisp city limits, and at mile 1.6.

DRAINAGE AREA.--245 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1975 to September 1979, October 1989 to current year.

GAGE.--Water-stage recorder and crest-stage gage. Elevation of gage is 1,640 ft above sea level, from topographic map, May 1975 to September 1979, water-stage recorder at same site. Crest-stage gage since September 1992.

REMARKS.--Records good except those below 150 ft<sup>3</sup>/s and estimated daily discharges, which are fair. No known regulation. Several diversions upstream from station for irrigation. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--11 years (water years 1976-79, 1990-96), 256 ft<sup>3</sup>/s, 185,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,440 ft<sup>3</sup>/s May 19, 1991, gage height, 11.77 ft; minimum discharge, 15 ft<sup>3</sup>/s Oct. 2-4, 1989, Sept. 28-30, Oct. 1-3, 1994.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 29, 1948, had a discharge of 9,440 ft<sup>3</sup>/s, by slope-area measurement made about 1,000 ft upstream from mouth.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	2245	*2,480	11.05	June 4	0500	2,360	10.95
Nov. 29	--	(a)	*11.28	June 8	0215	2,350	10.94
Apr. 10	0400	1,240	9.83	July 4	0200	1,260	9.81
May 27	2400	1,260	9.86				

Minimum discharge, 40 ft<sup>3</sup>/s Oct. 1.  
(a) From crest-stage gage.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58	75	1060	167	e110	187	298	624	946	1000	305	80
2	68	73	806	165	e115	184	290	588	1100	1110	277	76
3	70	76	657	188	e120	183	285	551	1670	1150	259	76
4	68	81	577	175	e115	181	285	526	2170	1170	232	78
5	67	82	486	166	e125	179	289	505	1820	1000	220	73
6	67	83	400	164	e130	176	309	493	1700	853	211	70
7	66	88	378	164	e150	174	411	484	1900	789	198	69
8	65	134	314	160	e180	173	704	468	2080	842	186	68
9	65	304	301	157	e175	176	1060	450	1680	971	182	66
10	70	211	344	155	e170	184	1220	437	1420	923	180	64
11	84	183	349	153	e165	191	1160	429	1290	817	178	61
12	78	177	322	151	e165	198	1060	424	1270	819	172	57
13	76	158	301	150	e160	207	951	474	1290	853	161	60
14	75	182	280	155	155	219	883	605	1280	866	151	62
15	78	244	261	164	155	268	842	724	1300	853	145	74
16	86	240	248	162	161	309	891	795	1270	796	141	78
17	105	227	240	152	170	330	889	877	1130	709	133	70
18	121	272	233	117	181	345	841	942	1010	629	126	65
19	113	249	223	e150	188	360	796	907	898	519	119	61
20	108	226	216	e150	199	370	755	868	874	450	112	59
21	103	214	210	e145	204	374	720	857	889	419	108	57
22	99	206	204	e140	202	380	697	815	901	412	103	56
23	97	213	198	e135	203	373	749	755	992	438	98	55
24	94	265	190	e140	200	360	922	729	1070	457	91	55
25	93	291	172	e135	197	349	839	848	1010	467	88	53
26	104	270	161	e125	195	343	790	1100	973	424	86	50
27	97	256	169	e130	193	336	738	1230	996	412	86	47
28	90	363	194	e130	190	325	696	1210	1020	413	86	45
29	87	1510	186	e120	185	318	663	1160	997	415	86	44
30	83	1760	176	e100	--	309	643	1040	961	392	83	42
31	79	--	171	e105	--	302	--	940	--	357	82	--
TOTAL	2614	8713	10027	4570	4858	8363	21676	22855	37907	21725	4685	1871
MEAN	84.3	290	323	147	168	270	723	737	1264	701	151	62.4
MAX	121	1760	1060	188	204	380	1220	1230	2170	1170	305	80
MIN	58	73	161	100	110	173	285	424	874	357	82	42
AC-FT	5180	17280	19890	9060	9640	16590	42990	45330	75190	43090	9290	3710

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1975 - 1996, BY WATER YEAR (WY)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	60.3	116	114	71.2	77.6	127	348	799	878	415	105	50.9										
MAX	111	350	323	152	168	270	723	1383	1509	859	302	110										
(WY)	1979	1991	1996	1976	1996	1996	1996	1995	1975	1991	1976	1978										
MIN	34.2	44.8	36.3	31.6	29.2	39.6	89.3	201	282	56.9	23.7	16.4										
(WY)	1990	1978	1994	1993	1994	1977	1993	1977	1977	1977	1977	1994										

SUMMARY STATISTICS

	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1975 - 1996
ANNUAL TOTAL	141872	149864	
ANNUAL MEAN	389	409	256
HIGHEST ANNUAL MEAN			413
LOWEST ANNUAL MEAN			82.9
HIGHEST DAILY MEAN	2610	May 30	3200
LOWEST DAILY MEAN	35	Sep 23	15
ANNUAL SEVEN-DAY MINIMUM	36	Sep 20	15
ANNUAL RUNOFF (AC-FT)	281400	297300	185600
10 PERCENT EXCEEDS	1130	1000	811
50 PERCENT EXCEEDS	194	210	98
90 PERCENT EXCEEDS	42	75	34

e Estimated

## 12449500 METHOW RIVER AT TWISP, WA

LOCATION.--Lat 48°21'55", long 120°06'54", in NE 1/4 NW 1/4 sec.17, T.33 N., R.22 E., Okanogan County, Hydrologic Unit 17020008, on left bank, 0.25 mi downstream from Twisp River, 0.3 mi east of center of Twisp, and at mile 40.

DRAINAGE AREA.--1,301 mi<sup>2</sup>.

PERIOD OF RECORD.--June 1919 to September 1962, April 1991 to current year. Monthly discharge only for some periods, published in WSP 1316. Miscellaneous measurements in 1967, 1970, 1976, 1978-90. For 1976, 1978-80 published as "at site 2.7 mi downstream", in error.

GAGE.--Water-stage recorder. Elevation of gage is 1,580 ft above sea level, from topographic map. Prior to Oct. 3, 1919, several staff gages in the immediate vicinity at different datum. Oct. 3, 1919 to Sept. 30, 1929, and Oct. 31 to Nov. 6, 1933, chain gage on road bridge 40 ft upstream at same datum as staff gages. Nov. 7 to Dec. 18, 1933, staff gage at present site at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. No known regulation. Numerous diversions for irrigation upstream from station.

AVERAGE DISCHARGE.--48 years (water years 1919-62, 1992-96), 1,326 ft<sup>3</sup>/s, 960,700 acre-ft/yr.. Includes discharge for water years 1930-34, which were estimated for WSP 1316.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 40,800 ft<sup>3</sup>/s May 29, 1948, gage height, 12.94 ft, in gage well, from rating curve extended above 18,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum observed, 134 ft<sup>3</sup>/s Sept. 4, 5, 1926, Sept. 9, 10, 1929, but may have been less during period of ice effect Jan. 6 to Mar. 4, 1937.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 5,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	2330	6,830	4.21	June 8	0800	*12,400	*6.15
May 27	0930	6,960	4.26	July 4	0700	6,390	4.03

Minimum discharge, 324 ft<sup>3</sup>/s Sept. 30, but may have been lower during period of missing record, Jan. 29 to Feb. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	351	363	3820	610	e390	536	1070	2930	5310	5240	1400	433
2	371	353	3000	607	e420	542	1040	2790	5800	5740	1280	419
3	395	357	2460	651	e470	546	1010	2650	8320	5990	1220	416
4	392	374	2180	632	e450	545	996	2500	11000	6060	1140	429
5	389	379	1810	606	e490	531	1030	2390	10300	5260	1080	423
6	389	382	1540	596	e540	519	1110	2340	9580	4460	1040	413
7	384	399	1400	594	e560	511	1450	2290	10500	4040	966	405
8	380	445	1260	584	569	509	2490	2200	11700	4110	907	402
9	375	821	1250	569	507	517	3990	2120	10100	4520	860	390
10	388	726	1250	565	460	541	4740	2040	8630	4370	846	382
11	414	681	1220	556	435	578	4720	2000	7740	3870	829	371
12	408	671	1150	545	428	626	4360	1980	7400	3750	804	358
13	401	632	1100	535	417	668	3920	2230	7470	3750	765	375
14	397	658	1040	551	410	717	3640	2920	7270	3770	726	397
15	397	811	1010	564	420	893	3490	3610	7280	3690	701	461
16	402	873	974	558	438	1080	3770	3970	7130	3450	682	519
17	433	882	926	525	470	1160	4040	4400	6370	3110	663	487
18	463	1020	893	439	519	1230	3820	5070	5610	3060	629	452
19	450	1020	856	516	550	1290	3570	4970	4930	2700	603	427
20	443	949	823	501	593	1340	3340	4740	4620	2390	577	411
21	434	909	795	497	620	1350	3170	4620	4520	2130	551	403
22	425	868	768	498	612	1370	3070	4400	4580	2020	529	397
23	420	862	739	487	612	1350	3350	4060	4990	2040	506	392
24	413	970	706	491	602	1300	4880	3890	5930	2040	483	382
25	413	1090	640	471	587	1250	4410	4500	5760	2050	468	373
26	438	1080	578	458	573	1230	3980	5770	5530	1920	458	359
27	417	1040	588	469	575	1200	3630	6780	5540	1850	450	351
28	403	1170	648	446	546	1170	3360	6740	5600	1820	448	344
29	392	3820	662	e400	524	1150	3160	6420	5350	1790	449	336
30	380	5640	641	e360	---	1110	3050	5860	5110	1700	438	331
31	369	---	625	e370	---	1080	---	5350	---	1570	435	---
TOTAL	12526	30245	37352	16251	14787	28439	93656	118530	209970	104260	22933	12038
MEAN	404	1008	1205	524	510	917	3122	3824	6999	3363	740	401
MAX	463	5640	3820	651	620	1370	4880	6780	11700	6060	1400	519
MIN	351	353	578	360	390	509	996	1980	4520	1570	435	331
AC-FT	24850	59990	74090	32230	29330	56410	185800	235100	416500	206800	45490	23880

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1919 - 1996, BY WATER YEAR (WY)

	420	469	408	314	320	436	1594	4951	4863	1718	488	308
MEAN	420	469	408	314	320	436	1594	4951	4863	1718	488	308
MAX	1383	1183	1205	578	958	1773	7692	9515	11030	4392	1205	727
(WY)	1960	1934	1996	1935	1935	1934	1934	1957	1950	1954	1954	1959
MIN	189	234	222	178	183	204	180	1546	846	289	162	148
(WY)	1937	1940	1926	1937	1929	1936	1929	1920	1926	1926	1926	1929

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1919 - 1996
ANNUAL TOTAL	697825	700987	
ANNUAL MEAN	1912	1915	1347
HIGHEST ANNUAL MEAN			2231
LOWEST ANNUAL MEAN			467
HIGHEST DAILY MEAN	13200	11700	32500
LOWEST DAILY MEAN	175	331	134
ANNUAL SEVEN-DAY MINIMUM	184	354	141
ANNUAL RUNOFF (AC-FT)	1384000	1390000	976100
10 PERCENT EXCEEDS	5970	5150	4080
50 PERCENT EXCEEDS	726	837	430
90 PERCENT EXCEEDS	246	397	224

e Estimated



LOCATION.--Lat 48°04'39", long 119°59'02", in SE 1/4 SW 1/4 sec.20, T.30 N., R.23 E., Okanogan County, Hydrologic Unit 17020008, on right bank 1.4 mi downstream from Black Canyon Creek, 4.3 mi northwest of Pateros, and at mile 6.7.

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

REVISÉD RECORDS.--WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 900 ft above sea level, from topographic map. Prior to Dec. 17, 1964, nonrecording gage at same site and datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Diversions for irrigation of about 11,000 acres upstream from station (1959 Bureau of Reclamation land classification). U.S. Geological Survey satellite telemeter at station. Water temperature October 1968 to October 1970.

AVERAGE DISCHARGE.--37 years (water years 1960-96), 1,539 ft<sup>3</sup>/s, 1,115,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,800 ft<sup>3</sup>/s May 31, 1972, gage height, 12.25 ft; minimum daily discharge, 150 ft<sup>3</sup>/s Jan. 8-10, 1974, result of freezeup.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge since 1894, 46,700 ft<sup>3</sup>/s May 29, 1948, determined by slope-area measurement of peak flow at site 1 mi downstream.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7.000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
June 8	1245	*12,700	*8.44	No other peak greater than base discharge.			
Minimum daily discharge, 378 ft <sup>3</sup> /s Oct. 1.							

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	378	402	4170	717	e410	712	1280	3310	5590	5370	1580	524
2	407	392	3300	715	e450	724	1250	3170	5870	5790	1440	519
3	430	389	2720	731	e520	724	1210	3040	7930	6060	1370	508
4	442	398	2430	754	e500	724	1180	2900	10900	6130	1300	518
5	439	411	2050	719	e540	718	1200	2770	10600	5530	1230	528
6	438	417	1730	707	e570	699	1260	2690	9810	4740	1180	522
7	436	440	1550	696	e600	693	1470	2630	10200	4280	1110	514
8	428	447	1390	693	e620	686	2260	2540	11900	4240	1050	508
9	422	650	1210	678	e580	686	3710	2450	10600	4590	988	498
10	421	790	1290	670	e560	705	4700	2370	8950	4620	953	488
11	450	745	1360	657	e540	744	4930	2310	7940	4140	934	480
12	460	699	1330	650	e530	784	4680	2290	7520	3940	911	469
13	451	686	1290	642	e530	832	4270	2290	7510	3930	884	475
14	446	670	1230	635	e520	874	3970	2980	7400	3940	843	496
15	442	759	1170	646	e540	1010	3800	3670	7360	3890	808	555
16	442	863	1130	655	e560	1220	3970	4120	7290	3680	788	610
17	450	889	1080	633	637	1330	4350	4500	6660	3340	770	611
18	474	962	1040	543	680	1390	4180	5230	5970	3240	740	581
19	483	1070	1000	549	724	1460	3940	5280	5320	2970	719	559
20	478	1010	960	587	764	1520	3710	5060	4940	2650	694	539
21	471	960	929	604	804	1530	3520	4930	4790	2370	661	527
22	465	925	900	603	804	1550	3400	4840	4830	2200	638	521
23	460	896	872	595	797	1550	3530	4500	5000	2180	616	518
24	455	950	838	595	790	1520	4970	4280	6010	2180	591	511
25	451	1060	794	580	777	1460	4860	4650	6020	2180	570	501
26	463	1120	698	529	764	1440	4460	5770	5730	2080	555	492
27	462	1080	703	e520	750	1410	4070	6840	5700	1990	543	478
28	447	1080	732	e520	724	1380	3790	7000	5780	1950	537	466
29	438	2440	777	e460	699	1350	3570	6720	5580	1920	535	456
30	423	5770	760	e380	--	1310	3430	6270	5340	1850	530	447
31	412	--	744	e390	--	1290	--	5750	--	1730	524	--
TOTAL	13764	29370	42177	19053	18274	34025	100920	127280	215040	109700	26592	15419
MEAN	444	979	1361	615	630	1098	3364	4106	7168	3539	858	514
MAX	483	5770	4170	754	804	1550	4970	7000	11900	6130	1580	611
MIN	378	389	698	380	410	686	1180	2290	4790	1730	524	447
AC-FT	27300	58260	83660	37790	36250	67490						

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

MEAN	480	529	485	427	424	613	1571	4873	5897	2128	693	450
MAX	1458	1327	1361	938	803	1407	3364	9768	13150	4800	1860	1196
(WY)	1960	1991	1996	1981	1968	1968	1996	1972	1972	1972	1976	1978
MIN	294	294	270	248	268	237	366	1415	1757	471	284	252
(WY)	1988	1988	1995	1995	1994	1977	1993	1977	1977	1977	1977	1994

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1959 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	734534		751614			
ANNUAL MEAN	2012		2054		1539	
HIGHEST ANNUAL MEAN					2963	1972
LOWEST ANNUAL MEAN					565	1977
HIGHEST DAILY MEAN	13800	May 30	11900	Jun 8	27200	May 31 1972
LOWEST DAILY MEAN	220	Jan 4	378	Oct 1	150	Jan 8 1974
ANNUAL SEVEN-DAY MINIMUM	229	Jan 1	403	Oct 31	154	Jan 5 1974
ANNUAL RUNOFF (AC-FT)	1457000		1491000		1115000	
10 PERCENT EXCEEDS	6270		5350		4370	
50 PERCENT EXCEEDS	794		918		555	
90 PERCENT EXCEEDS	312		459		306	

e Estimated

LOCATION.--Lat 47°56'48", long 119°51'56", in SW 1/4 SE 1/4 sec.6, T.28 N., R.24 E., Chelan County, Hydrologic Unit 17020005, at powerhouse of Wells Dam, 0.7 mi northeast of Azwell, and at mile 515.9.

PERIOD OF RECORD.--October 1967 to current year. October 1953 to September 1967 (monthly discharge only) in the files of the U.S. Geological Survey.

GAGE.--Daily discharge determined from flow through turbines plus spillway flow when present. Datum of gage is sea level (levels by Bechtel Corporation). Prior to Oct. 1, 1970, at site 0.8 mi downstream at same datum. Oct. 1, 1970, to July 20, 1988, water-stage recorder at present site and datum with auxiliary water-stage recorder 6.8 mi downstream from base gage at same datum.

REMARKS.--Flow regulated by nine major reservoirs and numerous smaller reservoirs and powerplants. Feeder Canal diversion (station 12435500) for Columbia Basin project is used to irrigate approximately 600,000 acres in the United States. An additional 66,500 acres in Canada are irrigated by other diversions.

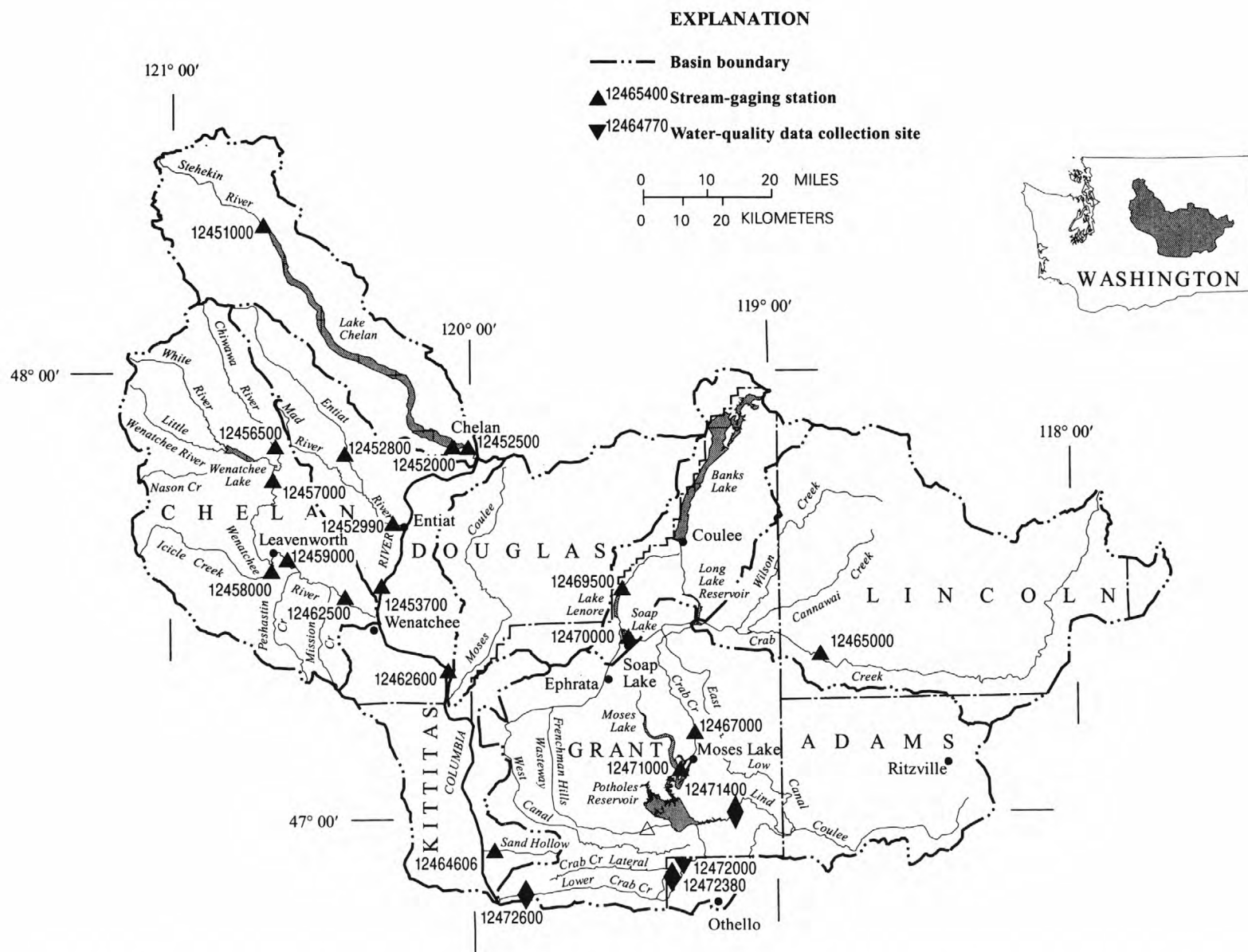
COOPERATION.--Discharge records provided by Public Utility District No. 1 of Douglas County at Wells Dam through the Corps of Engineers, North Pacific Division, Reservoir Control Center. The U.S. Geological Survey made 6 discharge measurements at this site during the year.

AVERAGE DISCHARGE.--43 years (water years 1954-96), 115,000 ft<sup>3</sup>/s, 83,320,000 acre-ft/yr, unadjusted.

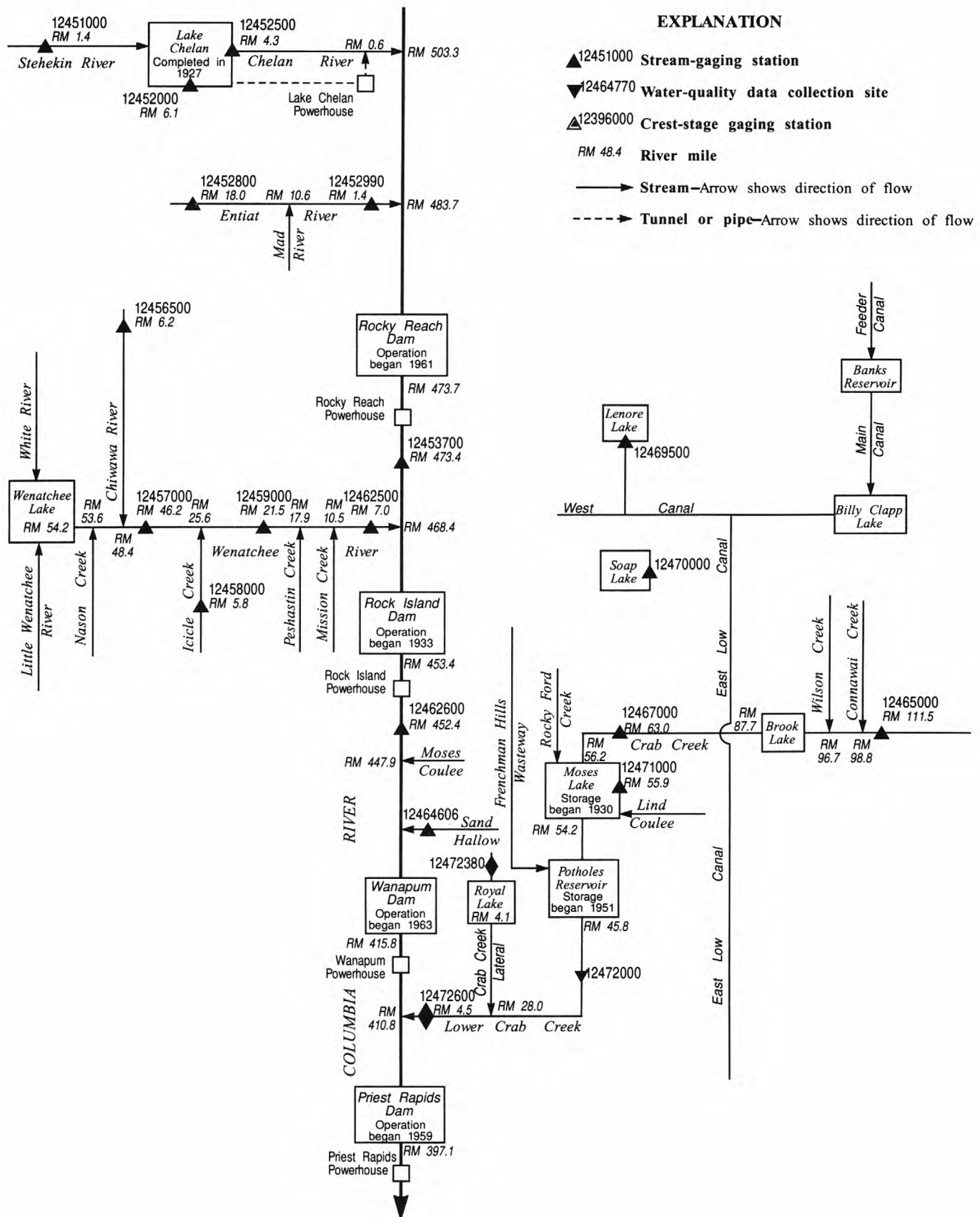
EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 402,000 ft<sup>3</sup>/s June 15, 1972; maximum elevation, 731.92 ft June 16, 1972; minimum discharge, 17,900 ft<sup>3</sup>/s Oct. 5, 1970 (from powerplant records); minimum elevation, 703.55 ft Sept. 28, 1980.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 264,000 ft<sup>3</sup>/s June 16; minimum daily, 55,200 ft<sup>3</sup>/s Feb. 10.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57000	90800	120000	97400	206000	216000	135000	226000	234000	167000	151000	69000
2	97100	90500	135000	126000	204000	175000	127000	188000	237000	155000	125000	80900
3	85000	87000	144000	122000	176000	178000	147000	212000	227000	174000	102000	101000
4	71300	77000	131000	132000	138000	183000	146000	220000	217000	169000	148000	97100
5	73900	68000	147000	149000	141000	203000	124000	198000	203000	178000	158000	86400
6	81900	101000	155000	142000	150000	188000	145000	193000	198000	190000	168000	78000
7	78900	84400	158000	115000	109000	185000	152000	185000	203000	193000	183000	90300
8	75700	82800	178000	135000	59000	192000	156000	190000	235000	189000	161000	77800
9	88700	84700	161000	157000	55400	182000	144000	166000	231000	191000	152000	107000
10	80300	86000	152000	156000	55200	161000	144000	173000	239000	198000	134000	114000
11	80300	65300	155000	156000	118000	182000	150000	172000	224000	205000	132000	124000
12	123000	63100	133000	168000	154000	183000	161000	135000	247000	206000	154000	132000
13	88500	87200	189000	161000	174000	190000	151000	161000	255000	209000	152000	107000
14	57600	83800	158000	151000	186000	196000	180000	148000	260000	182000	167000	72200
15	56800	88300	162000	171000	123000	180000	176000	139000	258000	189000	164000	78900
16	94700	96400	143000	161000	237000	192000	193000	157000	264000	164000	127000	94600
17	90300	101000	150000	154000	228000	145000	215000	176000	261000	164000	126000	92000
18	71100	81600	153000	180000	201000	164000	211000	192000	247000	185000	127000	87800
19	77400	98700	163000	177000	191000	174000	213000	207000	224000	176000	146000	84900
20	81500	129000	161000	183000	177000	156000	201000	217000	218000	159000	150000	87800
21	68600	117000	162000	164000	188000	164000	193000	230000	208000	169000	144000	102000
22	80500	109000	166000	184000	193000	168000	199000	227000	168000	181000	106000	108000
23	97300	82400	166000	188000	219000	149000	223000	222000	184000	194000	95800	114000
24	87500	104000	167000	177000	260000	154000	200000	223000	197000	176000	108000	98200
25	96500	122000	158000	176000	224000	164000	216000	205000	205000	176000	127000	90400
26	81200	115000	161000	183000	252000	155000	214000	215000	218000	164000	118000	92300
27	73100	133000	145000	173000	258000	169000	194000	214000	218000	132000	130000	91100
28	67600	122000	126000	145000	250000	147000	200000	247000	207000	97500	126000	80800
29	91300	138000	123000	178000	223000	121000	192000					



**Figure 55.** Location of surface-water and water-quality stations in the Columbia River Basin from Chelan River to Priest Rapids gage including Chelan River, Entiat River and Crab Creek Basins.



**Figure 56.** Schematic diagram showing surface-water and water-quality stations in the Columbia River Basin from Chelan River to Priest Rapids gage including Chelan River, Entiat River, Wenatchee River and Crab Creek Basins.

## 12451000 STEHEKIN RIVER AT STEHEKIN, WA

LOCATION.--Lat 48°19'47", long 120°41'26", in NE 1/4 SE 1/4 sec.26, T.33 N., R.17 E., Chelan County, Hydrologic Unit 17020009, Lake Chelan National Recreation Area, on left bank 1,100 ft upstream from Boulder Creek, 1.4 mi upstream from Lake Chelan, and 2.1 mi northwest of Stehekin.

DRAINAGE AREA.--321 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1910 to October 1915, October 1926 to current year. Monthly discharge only for some periods, published in WSP 1316.

REVISED RECORDS.--WSP 412: 1914. WSP 1316: 1911(M), 1914-15(M). WSP 1446: 1912(M). WSP 1933: Drainage area. WDR-80-2: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,098.5 ft above sea level. Prior to Aug. 17, 1911, nonrecording gage 0.4 mi upstream from mouth at Lake Chelan at different datums (datum change made June 13, 1911). Aug. 17, 1911 to Oct. 31, 1915, nonrecording gage 0.2 mi downstream from Boulder Creek at different datum.

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

AVERAGE DISCHARGE.--75 years (water years 1911-14, 1926-96), 1,406 ft<sup>3</sup>/s, 59.48 in/yr, 1,019,000 acre-ft/yr, includes monthly discharge values published in WSP 1316.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 20,900 ft<sup>3</sup>/s Nov. 29, 1995, gage height, 29.58 ft, from rating curve extended above 11,000 ft<sup>3</sup>/s on basis of slope-area measurement at 18,800 ft<sup>3</sup>/s; minimum discharge, 56 ft<sup>3</sup>/s Jan. 12, 1930.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1815	7,620	24.24	June 4	0100	8,090	24.49
Nov. 29	unknown	*20,900	*29.58	June 7	2400	7,600	24.25

Minimum discharge 356 ft<sup>3</sup>/s Oct. 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	505	456	5760	678	520	645	751	1620	3120	3730	1870	917
2	462	426	4120	701	554	632	733	1510	3900	4400	1660	799
3	778	418	3290	878	577	624	709	1400	6410	4830	1530	760
4	592	414	2870	824	579	611	697	1320	6970	4860	1240	703
5	484	420	2470	779	539	594	713	1270	5540	3790	1550	649
6	423	405	2160	772	521	579	813	1270	5370	3200	1220	620
7	395	437	1910	778	567	1680	1250	6370	3170	1170	639	
8	381	4490	1660	754	674	555	3060	1200	6500	3880	1160	829
9	373	3600	1500	728	770	565	4160	1150	5210	4620	1280	833
10	874	2300	1440	723	792	623	4160	1110	4410	4010	1400	718
11	965	e2000	1390	710	717	693	3700	1090	4210	3770	1500	698
12	781	e1900	1340	695	681	755	3200	1090	4240	4240	1330	774
13	653	e2200	1350	693	661	787	2770	1580	4200	4640	1180	818
14	911	e2600	1270	819	653	833	2490	2680	4260	4870	1230	787
15	1120	e2700	1200	1040	665	1070	2320	3030	4370	4840	1250	783
16	1820	e2500	1140	1050	691	1150	2450	3160	4210	4380	1130	683
17	1720	e2200	1080	962	731	1130	2540	3330	3690	3610	1010	600
18	1610	e2200	1040	913	835	1120	2410	3530	3190	2910	894	545
19	1200	e2100	985	884	900	1120	2190	3270	2830	2380	816	544
20	1040	e2000	939	852	916	1100	2020	3070	2840	2020	792	521
21	947	e1900	907	824	921	1070	1900	2860	2980	1930	775	500
22	839	e1900	876	792	885	1060	1860	2630	3100	2350	739	488
23	764	e2500	844	777	857	1040	2470	2450	3470	2920	776	462
24	701	e3500	816	751	813	1000	3420	2530	3430	3240	835	442
25	682	e3100	778	722	780	955	2940	3320	3370	3190	882	424
26	816	e2900	749	702	751	919	2570	4220	3480	2870	983	416
27	706	e5000	742	683	721	883	2230	4430	3600	3010	1060	453
28	642	e8000	737	667	690	843	1950	4020	3570	3220	1070	461
29	589	e18000	730	609	665	825	1770	3710	3370	3260	1040	466
30	539	e9300	711	495	--	796	1700	3320	3320	3020	1070	485
31	500	--	699	510	--	762	--	3080	--	2500	1130	--
TOTAL	24812	91866	47503	23765	20640	25906	66376	75500	125530	109660	35572	18817
MEAN	800	3062	1532	767	712	836	2213	2435	4184	3537	1147	627
MAX	1820	18000	5760	1050	921	1150	4160	4430	6970	4870	1870	917
MIN	373	405	699	495	520	555	697	1090	2830	1930	739	416
AC-FT	49210	182200	94220	47140	40940	51380	131700	149800	249000	217500	70560	37320
CFSM	2.49	9.54	4.77	2.39	2.22	2.60	6.89	7.59	13.0	11.0	3.57	1.95
IN.	2.88	10.65	5.51	2.75	2.39	3.00	7.69	8.75	14.55	12.71	4.12	2.18

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1996, BY WATER YEAR (WY)

	606	691	535	406	401	528	1447	3530	4127	2602	1242	695
MEAN	606	691	535	406	401	528	1447	3530	4127	2602	1242	695
MAX	1869	3192	1896	1577	1209	1546	4644	5810	7738	5479	2716	1399
(WY)	1960	1991	1976	1984	1971	1934	1934	1958	1950	1950	1974	1959
MIN	230	147	125	86.0	115	194	549	1475	1680	1157	681	409
(WY)	1988	1930	1930	1930	1937	1937	1955	1977	1915	1977	1944	1942

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1911 - 1996

ANNUAL TOTAL	657151	665947	
ANNUAL MEAN	1800	1820	1401
HIGHEST ANNUAL MEAN			2008
LOWEST ANNUAL MEAN			871
HIGHEST DAILY MEAN	18000	Nov 29	18000
LOWEST DAILY MEAN	178	Jan 28	373
ANNUAL SEVEN-DAY MINIMUM	183	Jan 22	425
ANNUAL RUNOFF (AC-FT)	1303000	1321000	1015000
ANNUAL RUNOFF (CFSM)	5.61	5.67	4.37
ANNUAL RUNOFF (INCHES)	76.16	77.18	59.31
10 PERCENT EXCEEDS	4250	3930	3600
50 PERCENT EXCEEDS	1040	1070	746
90 PERCENT EXCEEDS	376	562	243

e Estimated



## CHELAN RIVER BASIN

## 12452000 LAKE CHELAN AT CHELAN, WA

LOCATION.--Lat 47°50'11", long 120°03'37", near center of sec.15, T.27 N., R.22 E., Chelan County, Hydrologic Unit 17020009, on south shore of Lake Chelan at Lakeside, 2.1 mi west of Chelan.

DRAINAGE AREA.--924 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1897 to December 1899, January to June 1905 and December 1910 to September 1911 (fragmentary gage heights only), October 1911 to current year. Records of change in contents prior to October 1911, published in WSP 482 and 492 in conjunction with records for Chelan River near Chelan, have been found to be unreliable and should not be used. Monthend contents October 1911 to September 1950 published in WSP 1316.

REVISED RECORDS.--WSP 1246: 1951. WSP 1286: 1952. WSP 1933: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder. Datum of gage is sea level, datum of 1912. To convert to National Geodetic Vertical Datum of 1929, subtract 1.73 ft. Prior to Jan. 1, 1900, nonrecording gage at Lakeside about 1 mi west of Chelan at datum 1,070.18 ft above National Geodetic Vertical Datum of 1912. Jan. 1 to June 30, 1905, nonrecording gage at upper highway bridge at Chelan at different datum. Dec. 5, 1910, to Nov. 13, 1927, nonrecording gage at Forest Service boat landing at Chelan at datum 1,076.07 ft above National Geodetic Vertical Datum of 1912.

REMARKS.--Reservoir is formed by low concrete dam at lake outlet completed Sept. 3, 1927. Usable capacity between elevations 1,079 ft and 1,100 ft 677,400 acre-ft. Regulation between these elevations is allowed by stipulation of the Federal Power Commission. Water is used for power development. Elevation of lake maintained between 1,092 ft and 1,100 ft during period Aug. 16 to Sept. 15 for scenic effect and recreational purposes. Diversions for irrigation of about 6,280 acres with an annual depletion of about 11,000 acre-ft, 1946 estimate. Chemical analyses June 1971 to August 1972.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 1,100.16 ft June 30, 1981 (affected by seiche action); maximum contents, 679,300 acre-ft June 30, 1981, elevation, 1,100.06 ft, mean of seiche; minimum elevation since completion of dam in 1927, 1,079.68 ft Apr. 3, 4, 1937, Apr. 3, 1970, contents, 21,350 acre-ft; minimum elevation, 1,076.78 ft, Jan. 27, 28, Dec. 2-5, 1898.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 671,100 acre-ft Sept. 2, elevation, 1,099.81 ft; minimum contents, 417,400 acre-ft May 13, 14, 15, elevation, 1,092.05.

Capacity table (elevation, in feet, and usable contents, in acre-feet)  
(Based on data by the Pacific Northwest Coordination Agreement)

1,080	31,540	1,090	350,900	1,100	677,400
1,085	190,200	1,095	513,300		

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1098.28	1096.96	1099.45	1098.51	1096.81	1093.71	1093.44	1093.38	1093.25	1098.78	1099.63	1099.76
2	1098.20	1096.88	1099.21	1098.46	1096.72	1093.65	1093.42	1093.27	1093.29	1099.01	1099.67	1099.73
3	1098.19	1096.81	1099.09	1098.42	1096.64	1093.59	1093.36	1093.15	1093.49	1099.13	1099.69	1099.70
4	1098.14	1096.72	1099.27	1098.35	1096.58	1093.56	1093.29	1093.05	1093.91	1099.26	1099.65	1099.64
5	1098.04	1096.67	1099.32	1098.30	1096.53	1093.64	1093.18	1092.94	1094.21	1099.24	1099.65	1099.58
6	1097.99	1096.66	1099.36	1098.26	1096.52	1093.71	1093.08	1092.83	1094.43	1099.19	1099.63	1099.50
7	1097.92	1096.67	1099.36	1098.24	1096.56	1093.78	1093.03	1092.74	1094.70	1099.18	1099.59	1099.41
8	1097.85	1096.81	1099.37	1098.18	1096.62	1093.81	1093.08	1092.62	1095.05	1099.26	1099.58	1099.36
9	1097.81	1097.11	1099.39	1098.12	1096.63	1093.77	1093.25	1092.50	1095.20	1099.48	1099.59	1099.31
10	1097.81	1097.12	1099.43	1098.07	1096.47	1093.72	1093.47	1092.40	1095.23	1099.60	1099.60	1099.24
11	1097.79	1097.25	1099.48	1098.00	1096.30	1093.68	1093.63	1092.29	1095.30	1099.58	1099.64	1099.18
12	1097.76	1097.25	1099.51	1097.93	1096.12	1093.66	1093.78	1092.18	1095.42	1099.59	1099.67	1099.14
13	1097.69	1097.25	1099.46	1097.86	1095.95	1093.62	1093.86	1092.11	1095.58	1099.60	1099.63	1099.08
14	1097.63	1097.28	1099.40	1097.80	1095.78	1093.60	1093.90	1092.09	1095.76	1099.60	1099.64	1099.02
15	1097.61	1097.38	1099.34	1097.80	1095.62	1093.64	1093.94	1092.11	1095.92	1099.58	1099.70	1099.03
16	1097.65	1097.47	1099.31	1097.81	1095.46	1093.64	1093.97	1092.15	1096.08	1099.58	1099.71	1098.99
17	1097.65	1097.52	1099.28	1097.74	1095.33	1093.64	1093.94	1092.23	1096.22	1099.51	1099.71	1098.92
18	1097.69	1097.64	1099.25	1097.69	1095.22	1093.63	1093.91	1092.33	1096.37	1099.46	1099.68	1098.84
19	1097.64	1097.72	1099.22	1097.67	1095.11	1093.65	1093.83	1092.42	1096.45	1099.44	1099.62	1098.78
20	1097.61	1097.76	1099.19	1097.63	1095.02	1093.66	1093.77	1092.48	1096.56	1099.49	1099.59	1098.69
21	1097.60	1097.78	1099.14	1097.60	1094.91	1093.66	1093.67	1092.53	1096.71	1099.52	1099.57	1098.61
22	1097.54	1097.79	1099.09	1097.53	1094.76	1093.67	1093.59	1092.56	1096.89	1099.54	1099.52	1098.51
23	1097.50	1097.84	1099.04	1097.48	1094.65	1093.66	1093.60	1092.56	1097.11	1099.60	1099.48	1098.40
24	1097.46	1097.98	1098.99	1097.44	1094.48	1093.64	1093.69	1092.56	1097.38	1099.70	1099.47	1098.30
25	1097.41	1098.21	1098.92	1097.37	1094.31	1093.63	1093.71	1092.59	1097.59	1099.69	1099.47	1098.22
26	1097.43	1098.36	1098.85	1097.29	1094.15	1093.61	1093.74	1092.73	1097.79	1099.60	1099.49	1098.19
27	1097.33	1098.44	1098.78	1097.23	1093.97	1093.60	1093.69	1092.89	1098.01	1099.60	1099.49	1098.21
28	1097.26	1098.62	1098.71	1097.15	1093.82	1093.57	1093.61	1093.00	1098.22	1099.62	1099.53	1098.25
29	1097.18	1099.27	1098.67	1097.07	1093.77	1093.55	1093.54	1093.12	1098.40	1099.60	1099.58	1098.28
30	1097.13	1099.61	1098.63	1096.99	---	1093.50	1093.45	1093.20	1098.57	1099.62	1099.64	1098.29
31	1097.04	---	1098.58	1096.90	---	1093.45	---	1093.24	---	1099.66	1099.73	---
MEAN	1097.67	1097.56	1099.16	1097.77	1095.54	1093.64	1093.58	1092.65	1095.97	1099.46	1099.61	1098.94
MAX	1098.28	1099.61	1099.51	1098.51	1096.81	1093.81	1093.97	1093.38	1098.57	1099.70	1099.73	1099.76
MIN	1097.04	1096.66	1098.58	1096.90	1093.77	1093.45	1093.03	1092.09	1093.25	1098.78	1099.47	1098.19
†	578500	664200	628600	573900	469700	464200	461600	457100	634200	666200	669800	620400
‡	-44200	+85700	-35600	-54700	-104200	-5500	-2600	-4500	+177100	+32000	+3600	-49400
CAL YR 1995	MEAN 1094.48	MAX 1099.84	MIN 1085.82	AC-FT†	+277700							
WTR YR 1996	MEAN 1096.81	MAX 1099.76	MIN 1092.09	AC-FT†	-2300							

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

‡ Change in contents, in acre-feet.

## CHELAN RIVER BASIN

373

## 12452500 CHELAN RIVER AT CHELAN, WA

LOCATION.--Lat 47°50'05", long 120°00'43", in SE 1/4 NE 1/4 sec.30, T.27 N., R.23 E., Chelan County, Hydrologic Unit 17020009, at Chelan River powerplant tailrace, 4.3 mi downstream from control dam at outlet of Lake Chelan, and 3.0 mi southeast of Chelan.

DRAINAGE AREA.--924 mi<sup>2</sup>.

PERIOD OF RECORD.--November 1903 to current year. Published as "below Chelan Lake" 1904-05. Adjusted records for October 1903 to September 1911, published in WSP 482, 492, and 870 are unreliable and should not be used.

REVISED RECORDS.--WSP 482: 1904-13. WSP 612: 1924. WSP 1246: 1951. WSP 1286: 1952. WSP 1933: Drainage area. See also PERIOD OF RECORD.

GAGE.--Water-stage recorder and watt-hour meters on each turbine. Datum of gage is sea level, datum of 1912. To convert to National Geodetic Vertical Datum of 1929, subtract 1.62 ft. See WSP 1933 for history of changes prior to Mar. 20, 1939. Water-stage recorder for Lake Chelan at Chelan (station 12452000) also used to determine head and spill discharge. Mar. 20, 1939, to Sept. 30, 1981, gage at site 1.7 mi downstream from the Lake Chelan gage, at same datum, and published as the gage of record, used to determine head and spill discharge.

REMARKS.--Daily discharge determined from flow through turbines computed from relation between loading and head, plus flow through two irrigation pipes which divert water from the penstock just above the turbines, plus flow over the spillway computed from relation between discharge, Lake Chelan elevations, and gate openings. Unmeasured water that is diverted for irrigation upstream from station is a small percentage of total runoff. Public Utility District No. 1 of Chelan County diverts water at Chelan to develop about 40,000 kW and to irrigate 900 acres near Chelan. This quantity is included in records of daily discharge. Diversions for irrigation of about 6,280 acres with an annual depletion of about 11,000 acre-ft, 1946 estimate. Flow regulated by Lake Chelan (station 12452000).

COOPERATION.--Records completely furnished by Public Utility District No. 1 of Chelan County.

AVERAGE DISCHARGE.--92 years (water years 1905-96), 2,041 ft<sup>3</sup>/s, 30.00 in/yr, 1,479,000 acre-ft/yr, adjusted for storage since October 1911.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 18,400 ft<sup>3</sup>/s June 3, 1968; no flow part of day Jan. 30, 1917, when lake outlet was blocked with ice, and at other times owing to artificial regulation.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 17,000 ft<sup>3</sup>/s Nov. 30; minimum daily discharge, 104 ft<sup>3</sup>/s Mar. 7.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1610	1940	12900	2210	2030	2030	2210	4600	4220	2310	2740	626
2	1610	1620	9820	2210	2210	2120	2210	4600	4220	4120	2220	1850
3	1460	1610	3790	2210	2210	2210	2210	4600	4220	5220	2220	1460
4	1440	1610	2210	2210	2210	809	2710	4600	4280	5750	2220	1920
5	1540	1610	2210	2210	2120	105	3130	4510	4600	5580	2120	1920
6	1610	853	2120	2210	2030	105	3130	4600	4600	4780	2040	1920
7	1610	1380	2210	2210	2120	104	3130	4600	4710	3840	2040	1920
8	888	1840	2210	2210	2210	1540	3130	4600	5810	3850	1770	1920
9	1350	2210	2210	2210	3320	1950	3130	4600	6740	3860	1770	1920
10	1390	2210	2210	2210	4210	1860	3130	4600	6020	4770	1670	1920
11	1550	2210	2210	2030	4210	2150	3130	4600	4650	5270	1670	1920
12	1590	2120	2920	2210	4210	2000	3040	4600	4010	5520	1620	1920
13	1610	2210	3560	2210	4210	2210	3130	4600	3780	6240	1840	1840
14	1470	2210	3270	2210	4210	2210	3130	4600	3820	7120	1470	1920
15	1710	2180	2710	2210	4210	2210	3130	4580	3820	6490	1420	1920
16	1710	2180	2210	2210	4210	2210	4600	4610	3880	6260	1570	1460
17	1710	2210	2210	2210	4210	2170	4600	4610	3100	5090	1610	1910
18	1710	2210	2120	2210	4210	2190	4600	4610	2810	4400	1570	1910
19	1710	2180	2210	2160	3710	2210	4600	4610	2530	2990	1590	1910
20	1710	2210	2210	2210	4020	2110	4600	4610	2380	2320	1570	1910
21	1710	2210	2210	2210	4210	2200	4600	4610	2290	2320	1400	1920
22	1230	2210	2210	2210	4210	2210	4600	4470	1580	2330	1390	1960
23	1380	2210	2210	2210	4210	2210	4600	4110	1360	2330	1240	1980
24	1710	2210	2210	2210	4210	2210	4600	4110	1530	3110	1330	1710
25	1710	1560	2210	2210	4210	2210	4600	4120	2160	5530	682	1810
26	1710	2210	2210	2210	4210	2210	4600	4120	2380	4300	1460	109
27	1710	2210	2210	2210	4210	2210	4600	4120	2380	3440	914	109
28	1710	1780	2210	2210	2930	2200	4380	4120	2380	4380	810	109
29	1390	8040	2210	2210	2210	2210	4600	4200	2370	4150	718	109
30	1910	17000	2210	2210	---	2210	4600	4220	2340	3330	689	1360
31	1750	---	2210	2210	---	2210	---	4220	---	3470	439	---
TOTAL	48908	80443	91830	68280	100690	58793	112460	138360	104970	134470	47812	47172
MEAN	1578	2681	2962	2203	3472	1897	3749	4463	3499	4338	1542	1572
MAX	1910	17000	12900	2210	4210	2210	4600	4610	6740	7120	2740	1980
MIN	888	853	2120	2030	2030	104	2210	4110	1360	2310	439	109
AC-FT	97010	159600	182100	135400	199700	116600	223100	274400	208200	266700	98480	93570
MEAN†	859	4123	2382	1312	1660	1806	3707	4389	6477	4857	1601	742
CFSM†	0.93	4.46	2.58	1.42	1.80	1.96	4.01	4.75	7.01	5.26	1.73	0.80
IN.†	1.07	4.98	2.97	1.64	1.94	2.25	4.47	5.48	7.82	6.06	2.00	0.90
AC-FT†	52810	245300	146500	80700	95500	111100	220500	269900	385300	298700	98440	44170

CAL YR 1995 TOTAL 869735.7 MEAN 2383 MAX 17000 MIN 3.9 AC-FT 1725000 MEAN† 2766 CFSM† 2.99 IN.† 40.64 AC-FT† 2002700  
WTR YR 1996 TOTAL 1034188 MEAN 2826 MAX 17000 MIN 104 AC-FT 2051000 MEAN† 2823 CFSM† 3.06 IN.† 41.57 AC-FT† 2048700

† Adjusted for change in contents in Lake Chelan.



## 12452990 ENTIAT RIVER NEAR ENTIAT, WA

LOCATION.--Lat 47°39'48", long 120°14'58", in NW 1/4 SE 1/4 sec.18, T.25 N., R.21 E., Chelan County, Hydrologic Unit 17020010, on left bank 200 ft upstream from bridge, 1.2 mi west of Entiat High School, and at mile 1.4.

DRAINAGE AREA.--419 mi<sup>2</sup>.

PERIOD OF RECORD.--March to September 1996.

GAGE.--Water-stage recorder. Datum of gage is 745 ft above sea level.

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

EXTREMES FOR PERIOD MARCH TO SEPTEMBER.--Maximum discharge, 3,140 ft<sup>3</sup>/s June 5, gage height, 9.98 ft; minimum discharge, 138 ft<sup>3</sup>/s Sept. 30, gage height, 6.62 ft.

DISCHARGE, CUBIC FEET PER SECOND, MARCH TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	540	1020	1650	1560	564	225
2	---	521	989	1730	1720	506	211
3	---	497	948	2300	1790	470	200
4	---	487	910	2990	1810	431	204
5	---	489	880	2950	1680	415	195
6	---	517	855	2700	1460	387	189
7	---	642	837	2670	1330	364	185
8	---	928	809	2980	1340	351	183
9	---	1360	784	2730	1520	349	181
10	---	1650	769	2390	1520	351	175
11	---	1670	767	2090	1380	359	169
12	---	1560	763	2030	1360	356	167
13	---	1410	850	1970	1420	333	174
14	---	1320	1010	1970	1460	315	180
15	675	1250	1170	1990	1460	315	215
16	746	1280	1290	1980	1360	306	216
17	760	1260	1430	1870	1220	291	189
18	761	1220	1560	1680	1070	276	178
19	762	1180	1550	1520	913	260	173
20	757	1120	1490	1440	789	248	169
21	749	1070	1450	1410	708	240	166
22	749	1050	1380	1400	680	230	166
23	731	1150	1310	1460	716	223	162
24	700	1370	1270	1550	776	218	159
25	663	1340	1410	1510	820	221	156
26	650	1290	1700	1430	749	222	150
27	628	1220	1910	1420	719	231	147
28	599	1160	1970	1520	728	237	145
29	579	1100	1870	1550	735	237	143
30	559	1060	1710	1510	703	230	140
31	545	---	1640	---	651	231	---
TOTAL	---	32711	38301	58390	36147	9767	5312
MEAN	---	1090	1236	1946	1166	315	177
MAX	---	1670	1970	2990	1810	564	225
MIN	---	487	763	1400	651	218	140
AC-FT	---	64880	75970	115800	71700	19370	10540

LOCATION.--Lat 47°31'28", long 120°18'04", in SW 1/4 NW 1/4 sec.2, T.23 N., R.20 E., Chelan County, Hydrologic Unit 17020010, on right bank 0.5 mi downstream from Rocky Reach Dam, 1.5 mi downstream from Swakane Creek, 7.4 mi north of Wenatchee, and at mile 473.4.

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

GAGE.--Daily discharge determined from flow through turbines plus spillway flow when present. Datum of gage is sea level. Oct. 1, 1960, to July 22, 1988, water-stage recorder with auxiliary water-stage recorder 1.9 mi downstream from base gage at same datum.

REMARKS.--Flow regulated by nine major reservoirs and numerous smaller reservoirs and powerplants. Feeder Canal diversion (station 12435500) for Columbia Basin project is used to irrigate approximately 600,000 acres in the United States. An additional 66,500 acres in Canada are irrigated by other diversions.

COOPERATION.--Discharge records provided by Public Utility District No. 1 of Chelan County at Rocky Reach Dam through the Corps of Engineers, North Pacific Division, Reservoir Control Center. The U.S. Geological Survey made 5 discharge measurements at this site during the year.

AVERAGE DISCHARGE.--36 years (water years 1961-96), 114,400 ft<sup>3</sup>/s, 82,880,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 535,000 ft<sup>3</sup>/s June 10, 1961, elevation, about 635.50 ft; minimum daily discharge, 25,100 ft<sup>3</sup>/s Nov. 11, 1973.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 252,000 ft<sup>3</sup>/s Feb. 27; minimum daily, 55,400 ft<sup>3</sup>/s Oct. 15.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	593000	92800	136000	102000	208000	216000	139000	229000	230000	167000	152000	722000
2	100000	94200	148000	130000	198000	175000	129000	190000	227000	156000	131000	85000
3	89400	88800	150000	125000	183000	182000	148000	212000	225000	183000	101000	104000
4	72900	79700	133000	137000	146000	181000	152000	218000	212000	171000	147000	101000
5	76800	66800	151000	152000	148000	204000	129000	199000	201000	181000	160000	91400
6	84000	103000	159000	147000	158000	188000	145000	197000	200000	188000	173000	81400
7	81000	90800	158000	123000	115000	188000	156000	184000	199000	197000	179000	92300
8	77900	85400	182000	135000	63700	192000	160000	198000	232000	186000	161000	81900
9	91400	89200	168000	159000	59300	182000	149000	167000	233000	189000	152000	107000
10	78900	90000	157000	165000	62500	167000	147000	174000	235000	198000	138000	115000
11	109000	67800	160000	161000	123000	181000	154000	176000	217000	208000	132000	128000
12	131000	66400	136000	170000	160000	184000	164000	140000	239000	210000	155000	137000
13	95300	89600	193000	164000	176000	191000	159000	164000	245000	209000	152000	112000
14	59100	88800	167000	158000	194000	196000	175000	150000	249000	190000	169000	74800
15	55400	89200	167000	172000	215000	183000	178000	142000	249000	194000	167000	82900
16	99200	99200	148000	169000	238000	193000	195000	159000	250000	179000	131000	97400
17	92300	106000	152000	161000	226000	152000	215000	177000	250000	163000	129000	96800
18	76300	83400	158000	179000	204000	166000	214000	195000	239000	186000	130000	92000
19	79400	106000	167000	182000	196000	175000	213000	200000	218000	179000	145000	88600
20	82800	128000	165000	189000	183000	164000	205000	216000	213000	162000	157000	91400
21	71000	121000	167000	172000	191000	162000	196000	227000	209000	166000	151000	100000
22	82200	116000	171000	185000	198000	168000	202000	224000	166000	183000	108000	110000
23	101000	86800	169000	196000	211000	150000	220000	217000	182000	190000	98500	122000
24	89900	105000	171000	182000	250000	156000	197000	219000	196000	179000	107000	102000
25	98000	122000	163000	183000	223000	168000	216000	212000	204000	177000	133000	92900
26	84100	122000	168000	184000	246000	157000	217000	206000	213000	166000	123000	93800
27	78300	139000	152000	181000	252000	173000	195000	208000	215000	135000	131000	93200
28	68100	126000	132000	151000	241000	154000	204000	239000	208000	107000	130000	80800
29	95000	149000	127000	180000	219000	128000						



## 12456500 CHIWAWA RIVER NEAR PLAIN, WA

LOCATION.--Lat 47°50'15", long 120°39'40", in SE 1/4 sec.13, T.27 N., R.17 E., Chelan County, Hydrologic Unit 17020011, on right bank 3/4 mi upstream from Goose Creek, 5.3 mi north of Plain, 6.2 mi upstream from mouth, 11 mi northeast of Chiwaukum, and at mile 6.2.

DRAINAGE AREA.--170 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1911 to October 1914 (published as Chiwawa Creek near Leavenworth), August 1936 to November 1949, August 1954 to September 1957, May 1991 to current year.

REVISED RECORDS.--WSP 1316: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 2,100 ft above sea level (from river-profile map). May 29, 1911 to Oct. 31, 1914, staff gage at site 3 miles downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--24 years (water years 1912-14, 1937-49, 1955-57, 1992-96), 499 ft<sup>3</sup>/s, 39.86 in/yr, 361,500 acre-ft/yr. Includes discharges for 1912 and 1913, which were estimated for WSP 1316.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,030 ft<sup>3</sup>/s Nov. 30, 1995, gage height, 9.36 ft; minimum daily discharge, 45 ft<sup>3</sup>/s Feb. 25, Mar. 2-5, 1993.

EXTREMES OUTSIDE PERIOD OF RECORD.--Peak Nov. 25, 1990 was 6,810 ft<sup>3</sup>/s, gage height, 9.26 ft, from rating curve extended beyond highest measurement of 5,570 ft<sup>3</sup>/s.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 7,030 ft<sup>3</sup>/s Nov. 30, gage height, 9.36 ft; minimum discharge, 122 ft<sup>3</sup>/s Oct. 8, 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	141	167	3340	337	e220	e410	422	1100	1550	1430	640	241
2	133	157	2360	338	e230	e398	422	1050	1690	1630	578	216
3	170	155	1670	465	e226	e388	404	983	2330	1650	535	202
4	168	154	1310	417	e237	e385	406	922	2830	1710	470	199
5	146	157	1090	377	e236	e370	422	896	2650	1530	487	186
6	134	161	933	367	e250	e352	467	881	2450	1330	443	183
7	128	159	831	370	e380	e340	642	868	2590	1250	425	176
8	125	858	751	357	e660	e332	999	830	2850	1340	410	173
9	125	1380	719	342	e1260	e332	1390	800	2500	1600	431	183
10	254	803	689	335	e1290	e370	1580	782	2100	1570	442	172
11	425	663	678	327	e1000	e420	1560	785	1900	1400	458	167
12	308	587	624	319	e800	e455	1440	788	1860	1450	436	171
13	244	527	721	317	e720	e470	1300	933	1820	1580	393	188
14	217	667	652	350	e640	e495	1210	1150	1850	1630	386	182
15	244	713	596	490	e600	507	1160	1290	1870	1640	398	221
16	364	708	561	503	e575	540	1270	1390	1850	1580	376	209
17	424	643	533	445	e580	539	1320	1560	1670	1340	340	181
18	457	794	512	417	e700	545	1260	1730	1490	1080	304	166
19	357	715	487	403	e840	549	1180	1680	1310	894	280	162
20	314	630	467	392	e810	551	1110	1600	1270	777	261	157
21	289	573	448	381	e780	543	1070	1530	1300	726	251	151
22	258	555	431	367	e700	551	1050	1430	1310	756	239	150
23	238	706	416	350	e665	548	1360	1340	1440	863	231	145
24	223	1090	409	340	e605	524	1910	1310	1410	973	238	140
25	218	1390	405	327	e555	500	1730	1520	1340	1010	244	134
26	287	1140	386	317	e520	488	1570	1860	1330	878	254	130
27	244	982	359	e300	e490	475	1390	2030	1370	881	271	129
28	216	1440	355	e285	e455	460	1270	2000	1400	907	274	129
29	200	4480	355	e260	e430	452	1190	1860	1370	919	264	128
30	185	6050	354	e240	---	435	1150	1670	1340	853	265	129
31	176	---	353	e215	---	421	---	1560	---	767	266	---
TOTAL	7412	29204	23795	11050	17454	14145	33654	40128	54040	37944	11290	5100
MEAN	239	973	768	356	602	456	1122	1294	1801	1224	364	170
MAX	457	6050	3340	503	1290	551	1910	2030	2850	1710	640	241
MIN	125	154	353	215	220	332	404	782	1270	726	231	128
AC-FT	14700	57930	47200	21920	34620	28060	66750	79590	107200	75260	22390	10120
CFSM	1.41	5.73	4.52	2.10	3.54	2.68	6.60	7.61	10.6	7.20	2.14	1.00
IN.	1.62	6.39	5.21	2.42	3.82	3.10	7.36	8.78	11.83	8.30	2.47	1.12

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1996, BY WATER YEAR (WY)

	MEAN	168	226	192	145	144	189	611	1565	1517	782	261	160
	MAX	347	973	768	356	602	488	1266	2683	2679	1473	516	359
	(WY)	1956	1996	1996	1996	1996	1992	1914	1956	1948	1991	1991	1954
	MIN	63.5	77.8	86.7	78.4	68.6	91.4	214	826	659	256	106	80.5
	(WY)	1943	1937	1993	1937	1943	1993	1937	1944	1941	1941	1941	1942

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1911 - 1996

	ANNUAL TOTAL	261824	285216	
	ANNUAL MEAN	717	779	488
	HIGHEST ANNUAL MEAN			783
	LOWEST ANNUAL MEAN			264
	HIGHEST DAILY MEAN	6050	Nov 30	6050
	LOWEST DAILY MEAN	80	Jan 23	45
	ANNUAL SEVEN-DAY MINIMUM	81	Jan 21	131
	ANNUAL RUNOFF (AC-FT)	519300	565700	353700
	ANNUAL RUNOFF (CFSM)	4.22	4.58	2.87
	ANNUAL RUNOFF (INCHES)	57.29	62.41	39.02
	10 PERCENT EXCEEDS	1800	1600	1360
	50 PERCENT EXCEEDS	389	534	202
	90 PERCENT EXCEEDS	121	182	90

e Estimated

## WENATCHEE RIVER BASIN

12457000 WENATCHEE RIVER AT PLAIN, WA

LOCATION.--Lat 47°45'47", long 120°39'54", in NE 1/4 SW 1/4 sec.12, T.26 N., R.17 E., Chelan County, Hydrologic Unit 17020011, on left bank 300 ft downstream from county road bridge at Plain, 0.3 mi downstream from Beaver Creek, 2.2 mi downstream from Chiwawa River, 11.3 mi north of Leavenworth, and at mile 46.2.

DRAINAGE AREA.--591 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1904 to November 1910 estimates of monthly mean discharges are published in Washington State Water-Supply Bulletin No. 5, December 1910 to September 1950 (monthly discharges only for some periods, published in WSP 1316), October 1950 to September 1979, October 1989 to current year. Published as "near Leavenworth" 1911-31.

REVISED RECORDS.--WSP 482: 1911-14. WSP 1316: 1914(M), 1916(M), 1919(M), 1921-23(M), 1927(M).

GAGE.--Water-stage recorder. Elevation of gage is 1,805 ft above sea level, from river-profile map. Prior to Jan. 8, 1932, nonrecording gages at site 0.2 mi downstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Wenatchee Park Land and Irrigation Company diverts water from the Chiwawa River, upstream from the station for irrigation of 1,400 acres near Plain. Natural regulation by Wenatchee Lake 8.0 mi upstream. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--76 years (water years 1911-79, 1990-96), 2,247 ft<sup>3</sup>/s, 51.63 in/yr, 1,628,000 acre-ft/yr. Includes mean discharges for water years 1930 and 1931, which were estimated for WSP 1316.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,100 ft<sup>3</sup>/s Nov. 30, 1995, gage height, 14.97 ft; minimum daily discharge, 160 ft<sup>3</sup>/s Nov. 25, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 36,100 ft<sup>3</sup>/s Nov. 30, gage height, 14.97 ft; minimum discharge, 456 ft<sup>3</sup>/s Sept. 29, 30, gage height, 1.85 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	603	1200	21000	1450	e1070	1970	1820	3810	4780	4550	2240	899
2	603	1110	13100	1470	e1110	1900	1850	3590	5130	5080	1970	819
3	767	1040	9070	2180	e1090	1860	1780	3370	6940	5250	1840	764
4	928	1000	6980	2380	e1140	1830	1750	3170	8950	5480	1640	732
5	829	997	5580	2150	e1130	1770	1780	3050	8580	5050	1660	684
6	752	1020	4650	2020	e1200	1680	1900	2980	7920	4410	1610	680
7	698	1080	4030	2070	1830	1620	2500	2930	8200	4090	1490	666
8	663	3670	3560	2140	3070	1580	3740	2830	8960	4280	1420	648
9	658	9510	3190	2030	6080	1580	5400	2710	8170	4970	1430	683
10	1130	7350	3020	1970	6130	1720	6400	2620	7010	4970	1460	671
11	2640	6060	2890	1900	4870	1970	6370	2580	6370	4560	1510	647
12	2440	5610	2780	1830	4050	2160	5840	2620	6120	4610	1460	649
13	2060	4690	3060	1770	3470	2230	5190	3080	5950	4930	1370	674
14	1720	5650	2970	1940	3090	2240	4710	4120	6010	5120	1320	662
15	1640	6160	2730	2820	2890	2470	4380	4710	6120	5170	1320	735
16	2120	5960	2510	3560	2780	2680	4610	5050	6090	5060	1280	797
17	2940	5200	2330	3280	2770	2700	4960	5290	5610	4470	1180	730
18	3430	5230	2190	2920	3390	2690	4770	5780	4960	3760	1070	670
19	2870	5100	2070	2680	4000	2680	4430	5760	4330	3200	974	630
20	2400	4400	1970	2480	3910	2650	4110	5510	4090	2900	918	611
21	2120	3820	1880	2330	3720	2570	3850	5140	4180	2580	870	581
22	1860	3480	1790	2150	3390	2540	3720	4790	4340	2540	837	580
23	1650	3980	1720	2040	3200	2490	4280	4500	4540	2790	812	566
24	1520	6110	1640	1930	2910	2390	6250	4380	4580	3080	815	545
25	1420	8000	1570	1810	2680	2270	6340	4900	4400	3240	834	521
26	2030	7440	1520	1720	2490	2190	5810	6070	4430	3000	860	499
27	2060	6190	1450	1640	2330	2110	5180	6710	4560	2890	905	483
28	1810	6840	1410	1570	2180	2030	4600	6510	4580	2930	916	471
29	1600	17700	1400	1480	2040	1970	4200	6070	4400	2950	913	462
30	1440	32900	1410	1290	---	1920	4010	5520	4320	2840	924	464
31	1310	---	1470	e1030	---	1850	---	4960	---	2610	928	---
TOTAL	50711	178497	116940	64030	84010	66310	126530	135110	174620	123360	38776	19223
MEAN	1636	5950	3772	2065	2897	2139	4218	4358	5821	3979	1251	641
MAX	3430	32900	21000	3560	6130	2700	6400	6710	8960	5480	2240	899
MIN	603	997	1400	1030	1070	1580	1750	2580	4090	2540	812	462
AC-FT	100600	354000	232000	127000	166600	131500	251000	268000	346400	244700	76910	38130
CFSM	2.77	10.1	6.38	3.49	4.90	3.62	7.14	7.37	9.85	6.73	2.12	1.08
IN.	3.19	11.24	7.36	4.03	5.29	4.17	7.96	8.50	10.99	7.76	2.44	1.21

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1996, BY WATER YEAR (WY)

	MEAN	894	1392	1370	1090	1097	1212	2663	5784	6362	3434	1202	684
MAX	2722	6702	4395	3938	3010	3719	8162	9771	11750	7540	3154	1573	
(WY)	1960	1991	1976	1918	1924	1934	1956	1974	1954	1974	1974	1959	
MIN	251	236	296	335	306	487	913	2613	1861	886	456	312	
(WY)	1943	1937	1953	1929	1929	1917	1917	1915	1915	1941	1941	1942	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR			FOR 1996 WATER YEAR			WATER YEARS 1911 - 1996		
ANNUAL TOTAL	1129256			1178117					
ANNUAL MEAN	3094			3219			2269		
HIGHEST ANNUAL MEAN							3344		
LOWEST ANNUAL MEAN							1266		
HIGHEST DAILY MEAN	32900			Nov 30			32900		
LOWEST DAILY MEAN	393			Sep 27			160		
ANNUAL SEVEN-DAY MINIMUM	426			Sep 22			205		
ANNUAL RUNOFF (AC-FT)	2240000			2337000			1644000		
ANNUAL RUNOFF (CFSM)	5.23			5.45			3.84		
ANNUAL RUNOFF (INCHES)	71.08			74.16			52.17		
10 PERCENT EXCEEDS	6900			6060			5830		
50 PERCENT EXCEEDS	2080			2580			1200		
90 PERCENT EXCEEDS	651			814			485		

e Estimated

12458000 ICICLE CREEK ABOVE SNOW CREEK, NEAR LEAVENWORTH, WA

LOCATION.--Lat 47°32'28", long 120°43'08", in SE 1/4 SE 1/4 sec.28, T.24 N., R.17 E., Chelan County, Hydrologic Unit 17020011, on right bank 1,000 ft upstream from Icicle Canal diversion dam, 0.4 mi upstream from Snow Creek, 4.8 mi southwest of Leavenworth, and at mile 5.8.

DRAINAGE AREA.--193 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1936 to September 1971, October 1993 to current year.

REVISED RECORDS.--WSP 1246: 1936-41. WSP 1286: 1948. WSP 1446: 1943(M).

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

REMARKS.--Records fair. No diversion. Some regulation in headwater lakes. Suspended sediment data are available from the district office.

AVERAGE DISCHARGE.--38 years (water years 1937-71, 1994-96), 625 ft<sup>3</sup>/s, 43.97 in/yr, 452,500 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 19,800 ft<sup>3</sup>/s Nov. 29, 1995, gage height, 16.04 ft, from rating curve extended above 7,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum daily discharge, 44 ft<sup>3</sup>/s Nov. 30, 1936.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 2,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1900	4,800	10.84	Feb. 9	0500	5,390	11.21
Nov. 11	1000	2,720	8.99	June 4	0200	3,090	9.38
Nov. 29	1700	*19,800	*16.04	June 8	0100	3,040	9.33

Minimum discharge, 115 ft<sup>3</sup>/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	167	353	e3800	e470	332	546	423	810	1130	1320	460	162
2	175	329	e3300	e470	327	526	415	760	1510	1420	424	152
3	344	318	e2800	e640	329	509	396	711	2340	1470	424	147
4	371	306	e2200	e760	356	497	394	666	2770	1460	390	154
5	262	306	e1750	e680	352	471	404	643	2150	1190	424	145
6	223	307	e1400	e640	353	449	464	629	2130	1030	401	154
7	210	300	e1200	e660	770	435	719	621	2560	997	362	147
8	201	2470	e1100	e640	2410	421	1170	593	2550	1110	340	142
9	202	2430	e1000	e620	3920	434	1720	571	2030	1270	332	144
10	711	1360	e950	e590	2000	516	1800	556	1660	1130	324	134
11	1200	2160	e900	e560	1440	557	1560	564	1640	1030	323	130
12	748	1690	e860	531	1160	576	1330	618	1610	1090	309	129
13	569	1470	e960	513	1000	570	1130	934	1650	1130	289	129
14	484	2030	e930	615	928	574	1030	1300	1680	1160	279	131
15	465	1800	e860	924	910	646	987	1380	1650	1160	273	176
16	642	1670	e780	974	897	659	1200	1410	1570	1060	250	178
17	739	1400	e720	801	930	647	1170	1550	1370	904	232	154
18	808	1520	e690	709	1260	637	1040	1660	1160	769	218	140
19	627	1300	e640	672	1300	628	948	1490	1010	671	207	141
20	549	1130	e600	635	1140	613	873	1330	1020	604	198	144
21	519	1010	e580	599	1020	596	815	1210	1100	557	191	138
22	463	969	e560	556	916	587	788	1120	1110	571	177	148
23	426	1180	e540	527	854	570	1140	1050	1170	616	171	147
24	404	1620	e520	503	781	549	1710	1050	1130	660	168	138
25	393	2100	e500	477	718	518	1300	1340	1060	647	168	131
26	840	1590	e480	453	664	509	1120	1740	1080	579	169	127
27	649	1350	e470	430	620	492	1030	1760	1140	563	170	124
28	529	2660	e450	408	580	471	927	1540	1140	565	171	121
29	462	14100	e450	377	550	460	869	1410	1080	565	171	119
30	422	8540	e450	321	--	446	844	1220	1160	561	169	119
31	386	--	e480	334	--	430	--	1090	--	523	167	--
TOTAL	15190	59768	32920	18089	28817	16539	29716	33326	46360	28382	8351	4245
MEAN	490	1992	1062	584	994	534	991	1075	1545	916	269	141
MAX	1200	14100	3800	974	3920	659	1800	1760	2770	1470	460	178
MIN	167	300	450	321	327	421	394	556	1010	523	167	119
AC-FT	30130	118500	65300	35880	57160	32810	58940	66100	91960	56300	16560	8420
CFSM	2.54	10.3	5.50	3.02	5.15	2.76	5.13	5.57	8.01	4.74	1.40	.73
IN.	2.93	11.52	6.35	3.49	5.55	3.19	5.73	6.42	8.94	5.47	1.61	.82

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1937 - 1996, BY WATER YEAR (WY)

	243	370	353	272	302	278	666	1726	1946	903	267	161
MEAN	243	370	353	272	302	278	666	1726	1946	903	267	161
MAX	703	1992	1062	813	994	617	1099	2798	3429	2292	764	380
(WY)	1960	1996	1996	1968	1996	1968	1943	1956	1948	1954	1954	1959
MIN	74.5	66.2	72.9	72.4	72.5	112	275	984	779	269	121	89.0
(WY)	1994	1953	1953	1937	1937	1937	1967	1941	1941	1941	1941	1994

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1937 - 1996
ANNUAL TOTAL	310207	321703	
ANNUAL MEAN	850	879	625
HIGHEST ANNUAL MEAN			905
LOWEST ANNUAL MEAN			368
HIGHEST DAILY MEAN	14100	Nov 29	14100
LOWEST DAILY MEAN	113	Sep 27	44
ANNUAL SEVEN-DAY MINIMUM	117	Sep 21	50
ANNUAL RUNOFF (AC-FT)	615300	638100	452500
ANNUAL RUNOFF (CFSM)	4.40	4.55	3.24
ANNUAL RUNOFF (INCHES)	59.79	62.01	43.97
10 PERCENT EXCEEDS	1920	1640	1650
50 PERCENT EXCEEDS	518	638	299
90 PERCENT EXCEEDS	165	171	118

e Estimated

## 12459000 WENATCHEE RIVER AT PESHASTIN, WA

LOCATION.--Lat 47°35'00", long 120°36'46", in SE 1/4 SW 1/4 sec.8, T.24 N., R.18 E., Chelan County, Hydrologic Unit 17020011, on right bank 1.0 mi northwest of Peshastin, 3.5 mi upstream from Peshastin Creek, 4.1 mi downstream from Icicle Creek, and at mile 21.5.

DRAINAGE AREA.--1,000 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1928 to February 1929 (monthly discharge only), March 1929 to current year.

REVISED RECORDS.--WSP 1316: 1929-32(M).

GAGE.--Water-stage recorder. Datum of gage is 1,028.04 ft above sea level. Prior to Mar. 24, 1932, nonrecording gage at site 1.2 mi downstream at different datum.

REMARKS.--Records excellent except for estimated daily discharges, which are good. Numerous diversions upstream for irrigation of an estimated 3,200 acres upstream from station. Diversion from Icicle Creek 5.7 mi upstream from mouth is used for irrigation of a substantial part of the 22,000 acres irrigated downstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--68 years (water years 1929-96), 3,068 ft<sup>3</sup>/s, 2,223,000 acre-ft/yr. Includes discharge for water year 1929 which was estimated for WSP 1316.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,300 ft<sup>3</sup>/s Nov. 30, 1995, gage height, 17.89 ft; minimum discharge, 183 ft<sup>3</sup>/s Oct. 14, 1939; minimum gage height, 1.22 ft Nov. 26, 1993; minimum daily discharge, 210 ft<sup>3</sup>/s Nov. 26, 1993.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 12,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 9	0500	12,800	9.20	June 4	1700	12,700	9.19
Nov. 30	0930	*41,300	*17.89				

Minimum discharge, 569 ft<sup>3</sup>/s Sept. 29, gage height, 1.99 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	787	1700	27000	2260	e1680	3090	2750	5280	6600	6530	3060	1090
2	858	1570	17300	2270	e1730	2970	2760	4980	7180	7180	2680	1000
3	1060	1490	12500	3170	e1720	2890	2650	4680	9770	7490	2500	927
4	1410	1420	9940	3580	e1800	2870	2600	4410	12500	7730	2250	903
5	1210	1400	8130	3240	e1800	2740	2640	4230	11800	7080	2200	843
6	1090	1440	6920	3030	e1910	2600	2840	4110	11000	6200	2210	805
7	1010	1500	6090	3270	3060	2510	3760	4030	11600	5740	2010	809
8	961	5030	5370	3480	6380	2440	5630	3900	12500	5940	1890	778
9	942	12200	4840	3210	11100	2450	7950	3730	11300	6800	1860	797
10	1510	9540	4650	3020	9580	2720	9190	3610	9730	6830	1880	803
11	4140	9050	4520	2880	7570	3170	8980	3560	8930	6270	1930	765
12	3540	8260	4380	2760	6320	3510	8200	3670	8600	6290	1900	751
13	2980	6910	4730	2660	5460	3630	7330	4430	8460	6650	1780	779
14	2450	8360	4620	2850	4910	3640	6680	5970	8540	6890	1680	782
15	2290	8840	4250	4050	4630	4000	6240	6780	8590	7000	1670	857
16	2670	8470	3920	5240	4490	4320	6600	7140	8510	6820	1610	1000
17	3860	7440	3650	4810	4500	4300	6980	7500	7830	6110	1500	920
18	4520	7350	3450	4280	5400	4250	6670	8150	6960	5200	1370	840
19	3920	7170	3260	3940	6340	4190	6210	7980	6120	4420	1240	787
20	3280	6240	3100	3650	6170	4130	5770	7560	5780	3970	1160	765
21	2940	5470	2940	3430	5860	4010	5410	7090	5930	3550	1090	734
22	2590	4960	2820	3180	5340	3940	5190	6640	6090	3460	1040	723
23	2290	5450	2680	3000	5000	3860	5930	6240	6400	3730	992	727
24	2110	8030	2570	2850	4560	3700	8650	6060	6450	4100	978	703
25	1970	10500	2460	2680	4190	3490	8460	6730	6170	4320	993	671
26	2920	9760	2350	2530	3900	3380	7780	8340	6150	4030	1020	641
27	3010	8320	2260	2400	3650	3240	7040	9170	6370	3850	1060	616
28	2610	9640	2210	2310	3400	3100	6310	8840	6450	3880	1100	600
29	2290	25900	2190	2180	3180	3000	5790	8200	6230	3940	1100	584
30	2060	38900	2220	1960	---	2910	5520	7510	6170	3830	1090	613
31	1860	---	2280	e1640	---	2810	---	6810	---	3560	1100	---
TOTAL	71138	242310	169600	95810	135630	103860	178510	187330	244710	169390	49943	23613
MEAN	2295	8077	5471	3091	4677	3350	5950	6043	8157	5464	1611	787
MAX	4520	38900	27000	5240	11100	4320	9190	9170	12500	7730	3060	1090
MIN	787	1400	2190	1640	1680	2440	2600	3560	5780	3460	978	584
AC-FT	141100	480600	336400	190000	269000	206000	354100	371600	485400	336000	99060	46840

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1929 - 1996, BY WATER YEAR (WY)

	1118	1892	1851	1506	1610	1840	3748	7915	8666	4416	1466	822
MEAN	1118	1892	1851	1506	1610	1840	3748	7915	8666	4416	1466	822
MAX	3654	8800	6202	3760	4677	5607	11250	13800	16180	10350	4003	1997
(WY)	1960	1991	1976	1968	1996	1972	1934	1956	1974	1954	1954	1959
MIN	331	329	421	421	476	806	1475	3506	3191	1164	572	426
(WY)	1988	1930	1953	1930	1937	1929	1929	1977	1941	1941	1931	1942

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1929 - 1996
ANNUAL TOTAL	1584924	1671844	
ANNUAL MEAN	4342	4568	3086
HIGHEST ANNUAL MEAN			4830
LOWEST ANNUAL MEAN			1725
HIGHEST DAILY MEAN	38900	Nov 30	38900
LOWEST DAILY MEAN	530	Sep 27	210
ANNUAL SEVEN-DAY MINIMUM	563	Sep 22	633
ANNUAL RUNOFF (AC-FT)	3144000	3316000	2236000
10 PERCENT EXCEEDS	9580		7900
50 PERCENT EXCEEDS	3120		1650
90 PERCENT EXCEEDS	848		610

e Estimated



## WENATCHEE RIVER BASIN

381

12462500 WENATCHEE RIVER AT MONITOR, WA

LOCATION.--Lat 47°29'58", long 120°25'24", in NE 1/4 SW 1/4 sec.11, T.23 N., R.19 E., Chelan County, Hydrologic Unit 17020011, on right bank 1.0 mi north of Monitor, 3.5 mi downstream from Mission Creek, and at mile 7.0.

DRAINAGE AREA.--1,301 mi<sup>2</sup>.

PERIOD OF RECORD.--August to November 1897, October 1962 to current year. Published as "near Wenatchee" 1897.

GAGE.--Water-stage recorder. Elevation of gage is 680 ft above sea level, from topographic map. Aug. 7 to Nov. 7, 1897, nonrecording gage 1 mi downstream at different datum.

REMARKS.--Records good. No regulation. Diversions for irrigation of about 25,000 acres upstream from station. Chelan County Public Utility District No. 1 gage-height telemeter at station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--34 years (water years 1963-96), 3,253 ft<sup>3</sup>/s, 2,356,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 47,500 ft<sup>3</sup>/s Nov. 30, 1995, gage height, 30.02 ft; minimum discharge, 208 ft<sup>3</sup>/s Nov. 26, 1993, gage height, 16.45 ft, but may have been less during period of frozen intakes Nov. 27 to Dec. 11, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 47,500 ft<sup>3</sup>/s Nov. 30, gage height, 30.02 ft; minimum discharge, 582 ft<sup>3</sup>/s Sept. 30, gage height, 17.05 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	726	1830	31600	2270	1830	3560	3020	5600	6760	6450	3120	1090
2	844	1700	19500	2250	1900	3430	2980	5300	7190	7080	2790	1020
3	971	1610	13600	2960	1890	3320	2870	4970	9900	7440	2620	936
4	1410	1540	10600	3600	1980	3290	2800	4660	12700	7740	2470	893
5	1250	1510	8510	3300	1980	3170	2830	4460	12400	7190	2350	850
6	1120	1550	7130	3080	2090	3010	3020	4260	11300	6230	2380	797
7	1030	1620	6210	3280	4110	2910	3900	4070	12000	5680	2240	809
8	976	5030	5450	3620	8440	2830	5930	3930	13000	5770	2100	774
9	943	13500	5030	3430	14100	2810	8240	3850	11700	6590	2010	771
10	1240	10600	4810	3260	11400	3050	9360	3720	10100	6780	2000	794
11	4080	9910	4650	3120	8890	3510	9240	3620	9200	6210	1990	758
12	3610	9140	4480	3000	7300	3930	8590	3680	8820	6130	1990	739
13	3090	7460	4740	2890	6230	4130	7670	4030	8630	6500	1910	766
14	2570	9000	4690	3040	5580	4140	7000	5460	8710	6710	1810	787
15	2380	9650	4350	4350	5220	4470	6530	6500	8810	6890	1800	855
16	2610	9180	4010	5860	5050	4850	6670	6820	8760	6740	1730	1010
17	3860	8040	3730	5350	5020	4840	7140	6960	8050	6080	1660	976
18	4570	7820	3510	4720	5830	4770	6930	7630	7070	5180	1550	900
19	4070	7710	3330	4320	7030	4700	6480	7770	6190	4360	1410	837
20	3410	6670	3150	3970	6990	4610	6040	7590	5760	3870	1280	811
21	3060	5810	3000	3710	6660	4470	5650	6910	5860	3440	1200	785
22	2720	5220	2860	3440	6100	4370	5390	6450	6070	3280	1140	761
23	2430	5610	2730	3240	5720	4290	5780	5950	6360	3520	1070	766
24	2230	8380	2610	3080	5270	4120	8480	5690	6490	3870	1040	746
25	2090	11300	2500	2910	4900	3880	8730	6170	6200	4130	1060	713
26	2870	10700	2400	2750	4550	3760	8210	7870	6100	3940	1060	676
27	3150	9060	2310	2620	4250	3610	7520	9460	6300	3710	1050	647
28	2760	10100	2250	2530	3960	3450	6780	9270	6450	3720	1110	625
29	2440	e29700	2230	2360	3690	3330	6190	8440	6300	3780	1140	616
30	2190	45200	2230	2010	---	3230	5860	7830	6170	3720	1110	600
31	2000	---	2270	1810	---	3130	---	7050	---	3520	1100	---
TOTAL	72700	266150	180470	102130	157960	116970	185830	185970	249350	166250	53290	24108
MEAN	2345	8872	5822	3295	5447	3773	6194	5999	8312	5363	1719	804
MAX	4570	45200	31600	5860	14100	4850	9360	9460	13000	7740	3120	1090
MIN	726	1510	2230	1810	1830	2810	2800	3620	5760	3280	1040	600
AC-FT	144200	527900	358000	202600	313300	232000	368600	368900	494600	329800	105700	47820

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1996, BY WATER YEAR (WY)

	1046	2098	2090	1790	2079	2395	3921	7936	8918	4434	1491	818
MEAN	1046	2098	2090	1790	2079	2395	3921	7936	8918	4434	1491	818
MAX	2345	9636	6983	4309	5447	6853	7260	12970	17020	9880	3971	1628
(WY)	1996	1991	1976	1984	1996	1972	1990	1972	1974	1974	1974	1978
MIN	346	426	611	527	715	1066	1678	3565	4004	1135	576	406
(WY)	1988	1988	1994	1988	1985	1985	1967	1977	1994	1977	1994	1993

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1963 - 1996
ANNUAL TOTAL	1722316	1761178	
ANNUAL MEAN	4719	4812	3253
HIGHEST ANNUAL MEAN			5261
LOWEST ANNUAL MEAN			1745
HIGHEST DAILY MEAN	45200	Nov 30	45200
LOWEST DAILY MEAN	537	Sep 27	221
ANNUAL SEVEN-DAY MINIMUM	564	Sep 22	287
ANNUAL RUNOFF (AC-FT)	3416000	3493000	2356000
10 PERCENT EXCEEDS	10400	8740	8030
50 PERCENT EXCEEDS	3410	3930	1840
90 PERCENT EXCEEDS	882	1050	660

e Estimated



## COLUMBIA RIVER MAIN STEM

12462600 COLUMBIA RIVER BELOW ROCK ISLAND DAM, WA

LOCATION.--Lat 47°19'57", long 120°04'48", in NE 1/4 NW 1/4 sec.9, T.21 N., R.22 E., Douglas County, Hydrologic Unit 17020010, on left bank 1.0 mi downstream from Rock Island Dam, 2.0 mi downstream from Rock Island Creek, 12 mi southeast of Wenatchee, and at mile 452.4.

DRAINAGE AREA.--89,400 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--January to December 1910 (gage heights only), May 1913 to December 1916, October 1930 to current year. Published as "at Wenatchee" January 1910 to December 1916, and as "at Trinidad" October 1930 to May 1961.

GAGE.--Daily discharge determined from flow through turbines plus spillway flow when present. Datum of gage is sea level. Prior to Jan. 1, 1916, nonrecording gage 1.2 mi upstream from highway bridge at Wenatchee, at mile 466.3, at datum 583 ft above sea level. Jan. 1 to Dec. 31, 1916, nonrecording gage on pier of highway bridge at Wenatchee, at mile 465.1, at datum 579.30 ft above sea level. Oct. 1, 1930, to May 31, 1961, water-stage recorder 0.5 mi southwest of Trinidad, at mile 441.7, at datum 499.3 ft above sea level (river-profile survey). June 1, 1961, to July 22, 1988, water-stage recorder at present site and datum; May 21, 1963, to July 22, 1988, auxiliary water-stage recorder 2.0 mi downstream at same datum.

REMARKS.--Flow regulated by nine major reservoirs and numerous smaller reservoirs and powerplants. Feeder Canal diversion (station 12435500) for Columbia Basin project is used to irrigate approximately 600,000 acres in the United States. An additional 66,500 acres in Canada are irrigated by other diversions.

COOPERATION.--Discharge records provided by Public Utility District No. 1 of Chelan County at Rock Island Dam through the Corps of Engineers, North Pacific Division, Reservoir Control Center. The U.S. Geological Survey made 5 discharge measurements at this site during the year.

AVERAGE DISCHARGE.--69 years (water years 1914-16, 1931-96), 119,100 ft<sup>3</sup>/s, 86,290,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 692,600 ft<sup>3</sup>/s June 12, 1948, gage height, 59.35 ft, site and datum then in use; minimum discharge, 4,120 ft<sup>3</sup>/s Feb. 10, 1932, gage height, 11.40 ft, site and datum then in use.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 7, 1894, reached a discharge of about 740,000 ft<sup>3</sup>/s, from floodmarks at Wenatchee.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 257,000 ft<sup>3</sup>/s Feb. 24; minimum daily, 54,000 ft<sup>3</sup>/s Oct. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	58300	92600	160000	103000	203000	217000	141000	234000	232000	177000	159000	74000
2	99000	97700	162000	132000	205000	177000	129000	193000	232000	163000	138000	81800
3	88900	88000	159000	126000	185000	180000	148000	213000	235000	190000	103000	102000
4	72400	79800	141000	138000	147000	183000	153000	221000	219000	181000	151000	101000
5	78200	64900	155000	151000	145000	204000	128000	201000	214000	189000	164000	90400
6	82900	102000	165000	151000	157000	189000	144000	202000	207000	193000	173000	80100
7	79700	90800	160000	124000	118000	185000	157000	190000	204000	203000	185000	90500
8	77600	87700	185000	137000	73000	193000	162000	202000	241000	193000	167000	81400
9	91200	100000	171000	158000	72200	180000	157000	176000	244000	197000	155000	106000
10	76900	98800	161000	166000	72800	168000	156000	179000	242000	204000	143000	113000
11	108000	75600	161000	160000	127000	177000	164000	182000	224000	213000	135000	124000
12	131000	74300	136000	171000	161000	185000	172000	148000	244000	216000	156000	134000
13	100000	94500	193000	163000	177000	190000	166000	170000	251000	212000	154000	112000
14	60300	95700	174000	159000	197000	198000	182000	157000	252000	199000	171000	74500
15	54000	96000	169000	170000	212000	184000	187000	152000	253000	203000	170000	81700
16	97300	105000	151000	174000	240000	193000	199000	165000	256000	188000	134000	96000
17	96500	112000	153000	162000	228000	158000	222000	187000	256000	170000	132000	95100
18	80600	90000	159000	180000	202000	168000	224000	206000	239000	191000	133000	90200
19	81700	110000	168000	181000	201000	174000	219000	205000	222000	186000	144000	87200
20	84200	131000	164000	187000	188000	166000	210000	219000	213000	169000	157000	88200
21	71900	123000	168000	172000	195000	161000	200000	232000	216000	169000	152000	97400
22	83300	119000	172000	181000	199000	172000	201000	227000	170000	187000	109000	108000
23	100000	91100	171000	193000	212000	152000	231000	219000	188000	193000	98400	121000
24	91000	111000	172000	179000	257000	156000	206000	222000	200000	182000	106000	100000
25	98200	129000	164000	181000	224000	167000	222000	218000	210000	179000	132000	91100
26	86300	131000	171000	181000	244000	158000	225000	213000	219000	173000	124000	92400
27	79900	145000	154000	178000	249000	170000	199000	218000	219000	142000	130000	92200
28	69200	130000	132000	149000	240000	158000	207000	240000	216000	113000	132000	78600
29	95000	169000	129000	176000	217000	129000	199000	236000	185000	140000	131000	74500
30	103000	176000	111000	188000	--	127000	220000	230000	189000	153000	130000	93000
31	94300	--	96800	186000	--	129000	--	233000	--	160000	88200	--
TOTAL	2670800	3210500	4887800	5057000	5348000	5348000	5530000	6290000	6692000	5628000	4356600	2851300
MEAN	86150	107000	157700	163100	184400	172500	184300	202900	223100	181500	140500	95040
MAX	131000	176000	193000	193000	257000	217000	231000	240000	256000	216000	185000	134000
MIN	54000	64900	96800	103000	72200	127000	128000	148000	170000	113000	88200	74000
AC-FT	5298000	6368000	9695000	10030000	10610000	10610000	10970000	12480000	13270000	11160000	8641000	5656000

CAL YR 1995 TOTAL 39964800 MEAN 109500 MAX 193000 MIN 43100 AC-FT 79270000  
WTR YR 1996 TOTAL 57870000 MEAN 158100 MAX 257000 MIN 54000 AC-FT 114800000

## CRAB CREEK BASIN

383

12465000 CRAB CREEK AT IRBY, WA

LOCATION.--Lat 47°21'38", long 118°50'56", in NW 1/4 NW 1/4 sec.31, T.22 N., R.32 E., Lincoln County, Hydrologic Unit 17020013, on right bank 8 ft upstream from highway bridge at Irby, 5.4 mi downstream from Lake Creek, 7.5 mi west of Odessa, and at mile 111.5.

DRAINAGE AREA.--1,042 mi<sup>2</sup>.

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

REVISED RECORDS.--WSP 1446: 1949-51. WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,386.30 ft above sea level.

REMARKS.--Records good except those below 0.80 ft<sup>3</sup>/s, and estimated daily discharges, which are poor. Pumpage from ground-water wells for irrigation has been on the increase upstream from station since 1964. Some diversions for irrigation upstream from station. No regulation.

AVERAGE DISCHARGE.--54 years (water years 1943-96), 63.9 ft<sup>3</sup>/s, 46,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 8,370 ft<sup>3</sup>/s Feb. 27, 1957, gage height, 11.94 ft; no flow several days during 1969, 1977, 1978, 1979, 1980, 1989, 1991.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 300 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Jan. 15	1145	333	3.43	Feb. 19	1715	737	4.44
Feb. 10	0330	*2,860	*8.16	Mar. 11	0915	369	3.54

Minimum discharge, 1.4 ft<sup>3</sup>/s Dec. 8, 9.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.2	3.1	2.0	22	e23	300	144	82	42	13	12	7.9
2	3.3	3.1	1.8	21	e21	285	141	79	41	13	12	7.9
3	4.0	3.0	1.9	21	e21	285	144	78	38	13	12	8.1
4	3.9	3.1	2.0	31	e21	283	142	75	36	14	12	8.0
5	3.5	3.3	1.9	41	e22	292	139	74	35	14	12	7.3
6	3.5	3.4	1.7	42	e23	288	134	69	33	14	12	7.3
7	3.6	3.9	1.6	44	e24	276	131	66	31	14	11	7.0
8	3.3	3.4	1.5	48	210	263	127	64	29	14	11	7.0
9	3.3	3.1	1.6	91	1950	280	121	64	27	14	10	7.2
10	3.2	3.2	1.7	120	2300	311	116	64	24	14	10	6.7
11	3.6	3.4	2.3	122	1110	364	112	64	22	14	9.8	6.7
12	3.4	3.0	4.9	142	703	359	107	65	21	14	9.9	6.1
13	3.1	3.0	90	132	534	339	105	64	20	14	9.7	6.2
14	3.1	2.9	38	127	457	314	103	64	20	14	9.6	5.7
15	3.1	2.6	48	212	418	284	101	65	19	14	9.3	6.3
16	3.0	2.8	48	154	393	269	100	65	17	13	9.3	6.1
17	3.1	2.6	45	143	356	252	97	63	16	14	10	6.0
18	3.1	2.5	42	133	380	239	95	62	15	14	10	6.1
19	3.1	2.8	39	117	494	224	92	61	14	13	10	6.3
20	3.0	2.4	36	107	587	212	90	60	14	13	10	6.1
21	3.1	2.6	33	103	602	203	89	59	14	13	10	6.2
22	3.3	2.6	e29	94	511	196	88	60	14	13	10	6.5
23	3.0	2.6	e25	86	467	188	90	57	15	13	9.8	5.9
24	3.1	2.8	e23	82	432	188	86	59	15	12	9.2	6.1
25	3.1	2.8	e20	75	405	171	89	58	15	12	8.8	6.1
26	3.1	2.2	e17	e60	374	165	90	55	15	12	8.6	5.9
27	3.1	2.1	16	e54	348	163	90	53	15	13	8.5	6.0
28	3.0	2.6	15	e48	306	155	90	50	14	12	8.4	6.1
29	3.0	2.0	14	e35	281	149	88	48	14	12	8.3	5.6
30	2.9	1.9	14	e25	---	146	84	46	14	12	7.9	5.4
31	3.0	---	18	e25	---	145	---	43	---	13	8.0	---
TOTAL	100.1	84.8	634.9	2557	13773	7588	3225	1936	659	411	309.1	195.8
MEAN	3.23	2.83	20.5	82.5	475	245	107	62.5	22.0	13.3	9.97	6.53
MAX	4.0	3.9	90	212	2300	364	144	82	42	14	12	8.1
MIN	2.9	1.9	1.5	21	21	145	84	43	14	12	7.9	5.4
AC-FT	199	168	1260	5070	27320	15050	6400	3840	1310	815	613	388

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1942 - 1996, BY WATER YEAR (WY)

	7.34	7.30	16.0	102	224	198	99.4	46.7	34.9	20.0	12.8	8.83
MEAN	7.34	7.30	16.0	102	224	198	99.4	46.7	34.9	20.0	12.8	8.83
MAX	34.7	28.9	295	1163	744	1141	441	169	451	109	61.2	41.9
(WY)	1949	1949	1956	1956	1949	1956	1969	1975	1948	1948	1948	1948
MIN	.33	.58	.27	.26	.63	4.26	8.61	5.46	3.06	1.49	.54	.26
(WY)	1993	1993	1993	1993	1992	1992	1992	1990	1992	1990	1992	1992

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1942 - 1996

ANNUAL TOTAL	24906.06	31473.7	63.9	1956
ANNUAL MEAN	68.2	86.0	299	1992
HIGHEST ANNUAL MEAN			2.73	1957
LOWEST ANNUAL MEAN				1969
HIGHEST DAILY MEAN	729	Feb 1	2300	Feb 10
LOWEST DAILY MEAN	.39	Jan 4	1.5	Dec 8
ANNUAL SEVEN-DAY MINIMUM	.49	Jan 1	1.7	Dec 4
ANNUAL RUNOFF (AC-FT)	49400		62430	
10 PERCENT EXCEEDS	226		265	
50 PERCENT EXCEEDS	12		16	
90 PERCENT EXCEEDS	2.9		3.0	

e Estimated

## CRAB CREEK BASIN

12467000 CRAB CREEK NEAR MOSES LAKE, WA

LOCATION.--Lat 47°11'22", long 119°15'53", in NW 1/4 NE 1/4 sec.35, T.20 N., R.28 E., Grant County, Hydrologic Unit 17020015, on left bank at downstream side of highway bridge, 3.0 mi upstream from Parker Horn, 4.0 mi north of town of Moses Lake, and at mile 63.0.

DRAINAGE AREA.--2,228 mi<sup>2</sup>, of which 219 mi<sup>2</sup> in the vicinity of Long Lake Reservoir is noncontributing.

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

REVISED RECORDS.--WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,070.39 ft above U.S. Bureau of Reclamation datum. Prior to July 14, 1956, at site 300 ft upstream at same datum.

REMARKS.--Records good except for estimated daily discharges, which are fair. Numerous small diversions for irrigation and domestic use upstream from station. Most of natural flow from upper basin passes this station underground. No known regulation. Since 1952, return flow from irrigation on Columbia Basin project has increased runoff during summer months.

AVERAGE DISCHARGE.--45 years (water years 1952-96), 68.4 ft<sup>3</sup>/s, 49,550 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 10,400 ft<sup>3</sup>/s Feb. 28, 1957, gage height, 6.81 ft; no flow for several months each year prior to 1952 and part of each day Jan. 14, 15, 1953.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 922 ft<sup>3</sup>/s Feb. 22, gage height, 4.49 ft; minimum daily discharge, 8.0 ft<sup>3</sup>/s Feb. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	46	33	21	16	e8.2	404	130	47	47	43	49	60
2	47	31	24	16	e8.0	332	125	45	45	42	48	60
3	52	30	21	16	e8.1	310	120	44	43	42	50	65
4	51	30	22	16	e8.4	304	113	43	42	42	55	64
5	49	30	19	15	e8.5	291	107	43	41	44	57	64
6	48	30	18	14	e9.8	270	104	43	39	45	58	64
7	48	36	17	15	e11	259	102	45	38	44	58	62
8	49	35	e15	14	20	247	100	47	35	43	58	59
9	49	30	e13	14	23	235	98	51	33	45	57	58
10	47	28	e14	15	17	225	93	51	33	43	57	59
11	50	30	e15	14	13	234	87	49	33	43	57	60
12	49	30	41	13	12	254	82	50	35	44	56	60
13	48	32	37	13	12	265	78	51	37	45	57	61
14	46	30	29	13	13	263	75	49	37	44	58	59
15	48	27	25	15	14	264	75	50	36	44	58	67
16	46	26	22	16	13	253	76	49	34	43	58	62
17	47	24	20	14	71	245	76	49	34	43	58	63
18	47	23	19	12	501	236	76	50	31	48	58	68
19	44	23	19	e11	514	227	78	50	38	48	59	70
20	44	21	18	e11	559	216	76	51	41	45	61	65
21	45	21	17	e10	773	206	71	52	38	45	61	64
22	45	21	16	e9.6	910	199	68	57	41	46	57	64
23	44	22	16	e9.8	906	194	69	52	43	46	57	66
24	46	22	15	e9.9	829	176	70	52	45	45	59	62
25	48	24	14	e9.7	720	163	65	50	44	45	58	61
26	45	22	14	e9.6	622	155	64	52	45	45	59	60
27	40	22	14	e9.5	540	149	62	49	46	46	62	58
28	36	24	14	e9.1	548	141	59	52	43	47	64	59
29	34	23	14	e8.9	584	133	54	49	45	48	64	61
30	33	21	15	e8.5	---	128	49	47	46	47	61	60
31	32	---	16	e8.3	---	128	---	46	---	56	60	---
TOTAL	1403	801	594	385.9	8276.0	7106	2502	1515	1188	1396	1789	1865
MEAN	45.3	26.7	19.2	12.4	285	229	83.4	48.9	39.6	45.0	57.7	62.2
MAX	52	36	41	16	910	404	130	57	47	56	64	70
MIN	32	21	13	8.3	8.0	128	49	43	31	42	48	58
AC-FT	2780	1590	1180	765	16420	14090	4960	3010	2360	2770	3550	3700

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1996, BY WATER YEAR (WY)

	MEAN	60.5	37.2	23.8	60.7	119	152	77.1	45.8	46.1	59.3	69.8	72.5
MAX	111	68.9	43.8	779	490	1012	582	164	86.3	113	130	136	
(WY)	1975	1974	1974	1959	1970	1956	1969	1975	1974	1974	1972	1971	
MIN	.28	.19	.13	.029	4.31	3.60	6.30	13.2	16.3	25.3	35.2	35.6	
(WY)	1952	1952	1952	1952	1953	1953	1964	1962	1960	1959	1957	1957	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1952 - 1996

ANNUAL TOTAL	14439	28820.9	
ANNUAL MEAN	39.6	78.7	68.4
HIGHEST ANNUAL MEAN			183
LOWEST ANNUAL MEAN			26.3
HIGHEST DAILY MEAN	277	Feb 13	6960
LOWEST DAILY MEAN	11	Jan 3	.00
ANNUAL SEVEN-DAY MINIMUM	12	Jan 1	.00
ANNUAL RUNOFF (AC-FT)	28640	57170	49550
10 PERCENT EXCEEDS	59	167	113
50 PERCENT EXCEEDS	39	46	42
90 PERCENT EXCEEDS	15	14	13

e Estimated

LOCATION.--Lat 47°30'52", long 119°30'06", in SE 1/4 SW 1/4 sec.1, T.23 N., R.26 E., Grant County, Hydrologic Unit 17020014, on east shore 1,000 ft downlake from outlet gate on Alkali Lake, and 8.8 mi north of town of Soap Lake.

PERIOD OF RECORD.--July 1936, March 1938 to December 1956 (fragmentary), January 1957 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level (U.S. Bureau of Reclamation datum). Prior to Dec. 20, 1956, nonrecording gages 0.90 mi uplake at same datum.

REMARKS.--Some diversion from tributaries for irrigation. During extreme high stages of Soap Lake, water is pumped from Soap Lake into Lenore Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation observed, 1,087.73 ft June 12, 1953; minimum, 1,072.72 ft Jan. 2, 1959 (affected by wind).

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum elevation known, 1,092.2 ft, from well-defined alkali line at gage, date unknown.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1,079.90 ft Apr. 16; minimum, 1,075.42 ft Sept. 30.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1075.92	1075.90	1076.28	1077.10	1077.95	1078.77	1079.58	1079.40	1078.71	1077.88	1077.06	1076.19
2	1075.92	1075.90	1076.29	1077.13	1077.96	1078.80	1079.59	1079.37	1078.72	1077.84	1077.02	1076.16
3	1075.92	1075.91	1076.29	1077.17	1077.98	1078.83	1079.61	1079.33	1078.73	1077.82	1076.97	1076.13
4	1075.91	1075.90	1076.32	1077.19	1077.99	1078.88	1079.63	1079.31	1078.73	1077.78	1076.93	1076.10
5	1075.90	1075.92	1076.32	1077.22	1078.05	1078.93	1079.64	1079.28	1078.73	1077.74	1076.88	1076.06
6	1075.91	1075.91	1076.33	1077.26	1078.09	1078.96	1079.67	1079.25	1078.73	1077.69	1076.85	1076.03
7	1075.91	1075.95	1076.32	1077.31	1078.12	1078.99	1079.69	1079.21	1078.70	1077.65	1076.81	1076.01
8	1075.91	1075.98	1076.33	1077.33	1078.17	1079.02	1079.71	1079.17	1078.65	1077.64	1076.79	1075.99
9	1075.91	1075.97	1076.34	1077.36	1078.20	1079.05	1079.73	1079.13	1078.59	1077.62	1076.77	1075.96
10	1075.92	1075.98	1076.37	1077.39	1078.22	1079.10	1079.75	1079.11	1078.55	1077.58	1076.75	1075.94
11	1075.93	1076.02	1076.42	1077.41	1078.24	1079.13	1079.77	1079.07	1078.50	1077.55	1076.72	1075.92
12	1075.92	1076.03	1076.51	1077.44	1078.26	1079.16	1079.77	1079.06	1078.47	1077.54	1076.66	1075.90
13	1075.91	1076.05	1076.56	1077.47	1078.28	1079.17	1079.78	1079.04	1078.43	1077.52	1076.64	1075.88
14	1075.91	1076.06	1076.57	1077.49	1078.30	1079.22	1079.80	1079.02	1078.38	1077.51	1076.62	1075.87
15	1075.91	1076.07	1076.61	1077.53	1078.32	1079.24	1079.82	1078.99	1078.33	1077.49	1076.58	1075.86
16	1075.93	1076.08	1076.62	1077.55	1078.34	1079.25	1079.84	1078.96	1078.28	1077.46	1076.53	1075.82
17	1075.92	1076.09	1076.64	1077.56	1078.37	1079.28	1079.83	1078.95	1078.24	1077.44	1076.49	1075.79
18	1075.91	1076.11	1076.67	1077.58	1078.40	1079.31	1079.78	1078.92	1078.19	1077.41	1076.45	1075.76
19	1075.90	1076.11	1076.69	1077.62	1078.47	1079.33	1079.75	1078.90	1078.15	1077.36	1076.41	1075.73
20	1075.91	1076.12	1076.71	1077.66	1078.52	1079.35	1079.72	1078.86	1078.12	1077.32	1076.38	1075.70
21	1075.90	1076.13	1076.74	1077.70	1078.57	1079.37	1079.69	1078.82	1078.08	1077.27	1076.35	1075.67
22	1075.90	1076.14	1076.76	1077.72	1078.59	1079.40	1079.67	1078.81	1078.04	1077.26	1076.32	1075.64
23	1075.90	1076.15	1076.79	1077.75	1078.61	1079.40	1079.70	1078.78	1078.02	1077.25	1076.30	1075.61
24	1075.91	1076.16	1076.82	1077.78	1078.63	1079.41	1079.66	1078.75	1078.01	1077.25	1076.30	1075.59
25	1075.91	1076.19	1076.84	1077.80	1078.66	1079.44	1079.63	1078.73	1077.98	1077.21	1076.30	1075.57
26	1075.91	1076.20	1076.86	1077.82	1078.68	1079.45	1079.58	1078.69	1077.97	1077.20	1076.30	1

## CRAB CREEK BASIN

12470000 SOAP LAKE NEAR SOAP LAKE, WA

LOCATION.--Lat 47°24'11", long 119°29'11", in NW 1/4 SW 1/4 sec.18, T.22 N., R.27 E., Grant County, Hydrologic Unit 17020014, on east shore 0.9 mi north of town of Soap Lake.

DRAINAGE AREA.--413 mi<sup>2</sup>, of which 281 mi<sup>2</sup> in the vicinity of Banks Lake is noncontributing.

PERIOD OF RECORD.--May to August 1936, March 1938 to February 1957 (fragmentary), March 1957 to current year.

GAGE.--Water-stage recorder. Datum of gage is sea level (U.S. Bureau of Reclamation datum). Prior to Feb. 4, 1953, nonrecording gage at site 0.2 mi uplake. Feb. 4, 1953, to June 8, 1954, nonrecording gage at site 1.5 mi uplake and June 9, 1954, to June 21, 1957, water-stage recorder at site 0.2 mi uplake.

REMARKS.--Some diversion from tributaries for irrigation. During extreme high stages of Soap Lake, water is pumped from Soap Lake into Lenore Lake.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation observed, 1,079.20 ft Jan. 28, 1953; minimum observed, 1,070.87 ft Oct. 21, 1939.

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum elevation known, 1,083.1 ft, from well-defined alkali line at gage, date unknown.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 1,074.23 ft Apr. 10; minimum, 1,072.64 ft Nov. 5, 6.

ELEVATION (FEET USBR), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1072.78	1072.67	1072.94	1073.32	1073.62	1073.98	1074.17	1074.14	1074.07	1073.85	1073.55	1073.14
2	1072.79	1072.67	1072.94	1073.33	1073.62	1073.99	1074.17	1074.13	1074.08	1073.85	1073.53	1073.13
3	1072.79	1072.66	1072.95	1073.34	1073.62	1074.00	1074.17	1074.11	1074.08	1073.85	1073.50	1073.12
4	1072.76	1072.66	1072.96	1073.35	1073.63	1074.03	1074.17	1074.11	1074.07	1073.83	1073.47	1073.10
5	1072.76	1072.66	1072.97	1073.35	1073.65	1074.07	1074.18	1074.12	1074.05	1073.80	1073.44	1073.08
6	1072.75	1072.66	1072.97	1073.37	1073.67	1074.08	1074.18	1074.12	1074.05	1073.79	1073.41	1073.07
7	1072.75	1072.70	1072.97	1073.39	1073.68	1074.09	1074.18	1074.10	1074.05	1073.79	1073.41	1073.07
8	1072.74	1072.72	1072.96	1073.40	1073.72	1074.10	1074.19	1074.09	1074.03	1073.79	1073.41	1073.06
9	1072.74	1072.72	1072.95	1073.41	1073.73	1074.11	1074.19	1074.08	1074.02	1073.78	1073.41	1073.05
10	1072.73	1072.72	1072.96	1073.42	1073.74	1074.13	1074.19	1074.08	1074.00	1073.76	1073.41	1073.05
11	1072.74	1072.76	1073.00	1073.43	1073.75	1074.14	1074.19	1074.08	1073.98	1073.75	1073.40	1073.05
12	1072.73	1072.76	1073.07	1073.44	1073.75	1074.15	1074.18	1074.09	1073.97	1073.75	1073.37	1073.04
13	1072.73	1072.78	1073.09	1073.44	1073.76	1074.15	1074.18	1074.09	1073.98	1073.74	1073.36	1073.05
14	1072.73	1072.79	1073.12	1073.45	1073.77	1074.15	1074.18	1074.10	1073.96	1073.74	1073.36	1073.04
15	1072.73	1072.80	1073.14	1073.46	1073.78	1074.16	1074.19	1074.10	1073.95	1073.74	1073.34	1073.06
16	1072.73	1072.81	1073.14	1073.46	1073.78	1074.16	1074.18	1074.11	1073.93	1073.70	1073.32	1073.06
17	1072.72	1072.82	1073.15	1073.47	1073.79	1074.15	1074.18	1074.10	1073.90	1073.68	1073.28	1073.05
18	1072.71	1072.82	1073.16	1073.47	1073.81	1074.16	1074.18	1074.10	1073.88	1073.68	1073.25	1073.04
19	1072.71	1072.83	1073.16	1073.50	1073.85	1074.17	1074.17	1074.12	1073.87	1073.66	1073.24	1073.04
20	1072.71	1072.86	1073.17	1073.53	1073.88	1074.15	1074.17	1074.11	1073.87	1073.64	1073.22	1073.02
21	1072.70	1072.83	1073.18	1073.55	1073.89	1074.17	1074.17	1074.10	1073.86	1073.63	1073.21	1073.01
22	1072.69	1072.84	1073.19	1073.55	1073.90	1074.17	1074.17	1074.12	1073.85	1073.63	1073.20	1072.99
23	1072.69	1072.85	1073.20	1073.57	1073.91	1074.17	1074.18	1074.12	1073.85	1073.63	1073.20	1072.99
24	1072.69	1072.86	1073.20	1073.59	1073.93	1074.16	1074.19	1074.12	1073.87	1073.63	1073.20	1072.98
25	1072.69	1072.88	1073.21	1073.59	1073.93	1074.14	1074.18	1074.12	1073.87	1073.62	1073.20	1072.98
26	1072.70	1072.88	1073.21	1073.59	1073.94	1074.15	1074.17	1074.11	1073.87	1073.62	1073.20	1072.97
27	1072.69	1072.90	1073.22	1073.61	1073.96	1074.15	1074.16	1074.10	1073.87	1073.62	1073.20	1072.97
28	1072.69	1072.92	1073.23	1073.62	1073.96	1074.14	1074.16	1074.07	1073.87	1073.62	1073.19	1072.97
29	1072.69	1072.92	1073.27	1073.61	1073.97	1074.14	1074.15	1074.08	1073.86	1073.59	1073.19	1072.98
30	1072.68	1072.93	1073.30	1073.61	---	1074.14	1074.14	1074.08	1073.86	1073.59	1073.19	1072.97
31	1072.68	---	1073.31	1073.61	---	1074.15	---	1074.07	---	1073.57	1073.16	---
MEAN	1072.72	1072.79	1073.11	1073.48	1073.79	1074.12	1074.18	1074.10	1073.95	1073.71	1073.32	1073.04
MAX	1072.79	1072.93	1073.31	1073.62	1073.97	1074.17	1074.19	1074.14	1074.08	1073.85	1073.55	1073.14
MIN	1072.68	1072.66	1072.94	1073.32	1073.62	1073.98	1074.14	1074.07	1073.85	1073.57	1073.16	1072.97
CAL YR 1995	MEAN	1073.43	MAX	1074.16	MIN	1072.66						
WTR YR 1996	MEAN	1073.52	MAX	1074.19	MIN	1072.66						



LOCATION.--Lat 47°06'11", long 119°19'02", in SW 1/4 SW 1/4 sec.28, T.19 N., R.28 E., Grant County, Hydrologic Unit 17020015, on east shore 35 ft north of Interstate 90, 1.7 mi upstream from outlet, at town of Moses Lake, and at mile 55.9.

PERIOD OF RECORD...June 1909 to September 1914 and November 1936 to September 1945 (fragmentary), October 1945 to current year. Published as "at Neppel" 1912-14.

GAGE.--Water-stage recorder. Datum of gage is sea level (U.S. Bureau of Reclamation datum). Prior to Apr. 3, 1910, nonrecording gage at site 0.6 mi northeast at different datum. Apr. 3, 1910, to Sept. 30, 1914, and Nov. 19, 1936, to Nov. 24, 1944, nonrecording gages at site 2.8 mi northeast at Parker Horn at various datums. Oct. 30, 1945, to Mar. 12, 1955, water-stage recorder at site near west shore on downstream side of bridge on U.S. Highway 10 at present datum.

EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 1,048.29 ft Mar. 10, 1950; minimum observed, 1,038.17 ft Aug. 27, 1910.

ELEVATION (FEET USBR), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1046.72	1046.65	1042.85	1043.13	1043.09	1044.87	1045.80	1046.60	1046.72	1046.62	1046.79	1046.68
2	1046.72	1046.33	1042.81	1043.12	1043.10	1044.92	1045.79	1046.59	1046.72	1046.65	1046.76	1046.71
3	1046.74	1046.00	1042.82	1043.11	1043.11	1044.97	1045.83	1046.58	1046.71	1046.66	1046.75	1046.73
4	1046.72	1045.72	1042.85	1043.10	1043.13	1045.04	1045.87	1046.57	1046.69	1046.65	1046.74	1046.74
5	1046.71	1045.46	1042.89	1043.09	1043.16	1045.10	1045.92	1046.57	1046.66	1046.65	1046.72	1046.72
6	1046.70	1045.23	1042.95	1043.09	1043.19	1045.15	1046.04	1046.55	1046.65	1046.65	1046.70	1046.70
7	1046.70	1045.07	1043.04	1043.08	1043.23	1045.20	1046.21	1046.53	1046.63	1046.66	1046.70	1046.69
8	1046.69	1044.89	1043.09	1043.07	1043.28	1045.25	1046.29	1046.51	1046.62	1046.67	1046.70	1046.68
9	1046.69	1044.74	1043.14	1043.06	1043.43	1045.30	1046.40	1046.49	1046.60	1046.68	1046.70	1046.67
10	1046.68	1044.60	1043.20	1043.05	1043.63	1045.35	1046.52	1046.50	1046.58	1046.67	1046.70	1046.67
11	1046.70	1044.48	1043.29	1043.04	1043.68	1045.40	1046.59	1046.51	1046.57	1046.68	1046.69	1046.66
12	1046.71	1044.36	1043.40	1043.03	1043.69	1045.46	1046.66	1046.53	1046.60	1046.67	1046.68	1046.65
13	1046.71	1044.27	1043.41	1043.02	1043.72	1045.50	1046.65	1046.55	1046.63	1046.68	1046.68	1046.63
14	1046.71	1044.18	1043.40	1043.01	1043.75	1045.55	1046.64	1046.57	1046.67	1046.69	1046.71	1046.62
15	1046.71	1044.09	1043.39	1043.00	1043.77	1045.62	1046.65	1046.58	1046.71	1046.70	1046.73	1046.66
16	1046.71	1044.02	1043.36	1043.00	1043.81	1045.62	1046.62	1046.59	1046.74	1046.69	1046.73	1046.65
17	1046.71	1043.94	1043.34	1043.00	1043.84	1045.62	1046.66	1046.60	1046.74	1046.67	1046.73	1046.64
18	1046.72	1043.86	1043.32	1042.99	1043.95	1045.62	1046.71	1046.61	1046.74	1046.69	1046.78	1046.64
19	1046.72	1043.80	1043.30	1043.02	1044.14	1045.64	1046.74	1046.62	1046.75	1046.71	1046.80	1046.69
20	1046.72	1043.65	1043.28	1043.03	1044.30	1045.67	1046.76	1046.62	1046.77	1046.72	1046.74	1046.73
21	1046.72	1043.51	1043.27	1043.05	1044.47	1045.69	1046.77	1046.64	1046.79	1046.73	1046.67	1046.77
22	1046.71	1043.39	1043.25	1043.05	1044.69	1045.72	1046.76	1046.67	1046.78	1046.74	1046.61	1046.78
23	1046.71	1043.30	1043.23	1043.06	1044.88	1045.74	1046.73	1046.69	1046.81	1046.74	1046.59	1046.78
24	1046.71	1043.23	1043.21	1043.07	1044.90	1045.69	1046.73	1046.70	1046.81	1046.74	1046.61	1046.73
25	1046.72	1043.15	1043.19	1043.07	1044.82	1045.69	1046.70	1046.71	1046.76	1046.75	1046.63	1046.69
26	1046.79	1043.08	1043.17	1043.08	1044.76	1045.74	1046.68	1046.73	1046.73	1046.75	1046.65	1

## CRAB CREEK BASIN

12472380 CRAB CREEK LATERAL ABOVE ROYAL LAKE, NEAR OTHELLO, WA

LOCATION.--Lat 46°52'37", long 119°20'51", in SE 1/4 NE 1/4 sec.18, T.16 N., R.28 E., Adams County, Hydrologic Unit 17020015, on right bank, 100 ft upstream from drop structure to Royal Lake, and 8 mi northwest of Othello.

DRAINAGE AREA.--Indeterminate.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April 1993 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 900 ft above sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are poor. Flow is directly regulated by an automatic gate located 100 ft upstream from the gage and indirectly by numerous upstream canal turnouts. Most flow is return and waste from water imported for irrigation from the Columbia River at Grand Coulee Dam. The water is distributed through a complex network of canals and reservoirs.

AVERAGE DISCHARGE.--3 years (water years 1994-96), 43.6 ft<sup>3</sup>/s, 31,550 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 139 ft<sup>3</sup>/s Aug. 31, 1996, gage height, 2.37 ft; maximum gage height, 2.39 ft Apr 19, 1993; minimum discharge observed, 0.41 ft<sup>3</sup>/s Mar. 21, 1995, but may have been lower during period of missing record.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 139 ft<sup>3</sup>/s Aug. 31, gage height, 2.37 ft; minimum discharge, 8.9 ft<sup>3</sup>/s Mar. 18, but may have been lower during period of missing record.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	57	e20	e17	e15	e11	e15	66	51	43	46	55	129
2	62	e20	e15	e15	e11	e15	46	44	39	48	56	132
3	69	e20	e17	e15	e11	e15	54	44	43	49	70	115
4	70	e20	e15	e15	e11	e20	52	48	50	44	76	90
5	69	e20	e15	e15	e11	e25	48	50	47	52	73	91
6	71	e20	e15	e15	e12	e25	55	47	53	46	75	91
7	81	e30	e15	e15	14	e25	64	45	47	49	90	92
8	105	e25	e15	e15	18	e25	53	58	48	51	94	97
9	90	e20	e15	e15	49	e25	39	71	61	53	88	105
10	71	e20	e15	e15	53	e25	48	55	57	49	86	107
11	87	e20	18	e15	49	e25	53	58	46	45	85	92
12	102	e20	33	e15	e45	e24	43	64	39	46	90	101
13	102	e20	37	e15	e35	e23	44	58	34	46	95	110
14	103	e25	e35	e15	e40	24	45	44	46	45	98	104
15	102	e23	e30	e15	e35	40	50	51	52	45	92	110
16	102	e20	e25	e15	e30	50	48	66	54	46	90	103
17	99	e20	e15	e15	e25	55	39	64	58	48	89	96
18	102	e20	e15	e15	e20	49	46	64	56	56	90	97
19	100	e20	e15	e14	e15	36	58	61	53	57	94	102
20	95	e20	e15	e14	e15	28	67	66	55	56	97	109
21	98	e20	e15	e13	e15	25	74	63	52	58	96	106
22	94	e20	e15	e13	e15	30	74	74	56	59	94	108
23	103	e20	e15	e13	e15	28	64	68	53	52	88	101
24	101	e25	e15	e12	e15	26	50	59	61	49	92	95
25	108	e27	e15	e12	e15	26	42	65	55	54	101	99
26	91	e27	e15	e12	e15	28	51	60	46	52	98	88
27	49	e30	e15	e11	e15	28	50	62	48	58	96	87
28	47	e30	e15	e11	e15	24	58	69	38	58	98	88
29	e35	e30	e20	e11	e15	24	58	64	50	64	99	85
30	e25	27	e20	e11	---	28	61	48	42	61	104	86
31	e20	---	e15	e11	---	66	---	44	---	51	121	---
TOTAL	2510	679	567	428	645	902	1600	1785	1482	1593	2770	3016
MEAN	81.0	22.6	18.3	13.8	22.2	29.1	53.3	57.6	49.4	51.4	89.4	101
MAX	108	30	37	15	53	66	74	74	61	64	121	132
MIN	20	20	15	11	11	15	39	44	34	44	55	85
AC-FT	4980	1350	1120	849	1280	1790	3170	3540	2940	3160	5490	5980

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
MEAN	65.0	15.6	12.9	11.2	13.8	29.8	55.9	59.3	53.8	52.7	72.3	78.9
MAX	81.0	22.6	18.3	13.8	22.2	49.2	57.3	63.8	63.8	57.0	89.4	101
(WY)	1996	1996	1996	1996	1996	1994	1995	1995	1995	1995	1996	1996
MIN	51.9	11.6	9.40	9.15	9.24	11.1	53.3	56.4	48.1	49.5	61.6	67.8
(WY)	1995	1994	1994	1994	1995	1995	1996	1994	1994	1994	1994	1995

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## FOR 1996 WATER YEAR

## WATER YEARS 1994 - 1996

ANNUAL TOTAL	16142.0	17977	
ANNUAL MEAN	44.2	49.1	43.6
HIGHEST ANNUAL MEAN			49.1
LOWEST ANNUAL MEAN			40.3
HIGHEST DAILY MEAN	108	132	132
LOWEST DAILY MEAN	6.0	11	6.0
ANNUAL SEVEN-DAY MINIMUM	7.2	11	7.2
ANNUAL RUNOFF (AC-FT)	32020	35660	31550
10 PERCENT EXCEEDS	74	97	75
50 PERCENT EXCEEDS	53	47	49
90 PERCENT EXCEEDS	9.3	15	9.5

e Estimated

WATER-QUALITY RECORDS

WATER TEMPERATURE: January to September 1996.

EXTREMES FOR PERIOD JANUARY 30 TO SEPTEMBER 30.--

WATER TEMPERATURE: Maximum recorded, 20.0°C Aug. 30, but 20.5°C was measured on July 30, during a period of missing record; minimum recorded, 0.0 °C Jan. 30, 31, Feb. 1-3, 28.

[illegible]

## CRAB CREEK BASIN

12472380 CRAB CREEK LATERAL ABOVE ROYAL LAKE, NEAR OTHELLO, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	1.0	.0	.5	10.0	4.0	6.5	---	---	---	---	---	---
2	1.5	.0	.5	11.0	5.0	7.5	---	---	---	---	---	---
3	1.0	.0	.5	10.5	7.5	8.5	---	---	---	13.5	10.0	12.0
4	3.0	.5	1.5	9.0	6.0	8.0	---	---	---	14.0	10.0	12.0
5	4.0	1.5	2.5	9.0	5.0	7.0	---	---	---	15.5	11.0	13.0
6	6.0	2.5	4.0	9.5	6.5	8.0	---	---	---	15.5	11.5	13.5
7	6.0	3.5	5.0	9.5	7.0	8.0	---	---	---	14.5	11.5	13.0
8	7.5	5.5	6.5	11.0	8.0	9.0	---	---	---	14.5	10.5	12.5
9	8.0	4.0	6.0	11.5	8.5	10.0	---	---	---	15.0	10.5	12.5
10	6.5	3.0	4.5	12.5	9.5	11.0	---	---	---	15.0	11.0	13.0
11	8.0	4.5	6.0	13.5	9.5	11.0	---	---	---	14.5	12.5	13.5
12	8.5	5.0	7.0	15.0	9.0	11.5	---	---	---	15.0	12.5	13.5
13	9.5	5.5	7.5	14.0	7.5	10.5	---	---	---	---	---	---
14	9.5	6.0	7.5	15.5	8.0	11.5	---	---	---	---	---	---
15	10.0	6.0	8.0	12.5	9.5	11.0	---	---	---	---	---	---
16	10.0	6.5	8.5	10.5	9.0	9.5	---	---	---	---	---	---
17	10.0	8.0	9.0	12.0	8.0	10.0	---	---	---	---	---	---
18	12.0	9.0	10.5	12.5	9.0	10.5	---	---	---	---	---	---
19	11.0	9.0	10.0	12.5	10.5	11.5	---	---	---	---	---	---
20	10.5	8.0	9.0	12.0	10.5	11.0	---	---	---	---	---	---
21	9.0	7.0	8.5	11.5	10.0	10.5	---	---	---	---	---	---
22	9.0	5.5	7.0	---	---	---	---	---	---	---	---	---
23	9.0	6.0	7.5	---	---	---	---	---	---	---	---	---
24	8.5	5.5	7.0	---	---	---	---	---	---	---	---	---
25	8.5	5.5	7.0	---	---	---	---	---	---	---	---	---
26	8.5	4.0	6.0	---	---	---	---	---	---	---	---	---
27	7.0	2.5	5.0	---	---	---	---	---	---	---	---	---
28	5.0	.0	2.5	---	---	---	---	---	---	---	---	---
29	8.5	2.5	5.0	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---	---	---	---
MONTH	12.0	.0	5.9	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	---	---	---	---	---	---	---	---	---	18.5	15.5	17.0
2	---	---	---	---	---	---	---	---	---	18.0	16.0	17.0
3	---	---	---	---	---	---	---	---	---	18.5	16.0	17.0
4	---	---	---	---	---	---	---	---	---	17.0	14.5	16.0
5	---	---	---	---	---	---	---	---	---	16.5	14.0	15.0
6	---	---	---	---	---	---	---	---	---	16.5	14.0	15.0
7	---	---	---	---	---	---	---	---	---	18.0	15.0	16.5
8	---	---	---	---	---	---	---	---	---	18.5	16.0	17.0
9	---	---	---	---	---	---	---	---	---	18.5	16.0	17.5
10	---	---	---	---	---	---	---	---	---	19.0	16.0	17.5
11	---	---	---	---	---	---	---	---	---	19.0	16.0	17.5
12	---	---	---	---	---	---	---	---	---	19.0	17.0	18.0
13	---	---	---	---	---	---	---	---	---	18.5	16.5	17.5
14	---	---	---	---	---	---	---	---	---	17.5	16.0	17.0
15	---	---	---	---	---	---	---	---	---	17.0	16.0	16.5
16	---	---	---	---	---	---	---	---	---	16.5	14.0	15.5
17	---	---	---	---	---	---	---	---	---	16.5	14.0	15.0
18	---	---	---	---	---	---	---	---	---	15.5	14.0	14.5
19	---	---	---	---	---	---	---	---	---	16.5	14.0	15.0
20	---	---	---	---	---	---	---	---	---	15.5	14.0	14.5
21	---	---	---	---	---	---	---	---	---	15.0	12.5	13.5
22	---	---	---	---	---	---	---	---	---	15.0	12.0	13.5
23	---	---	---	---	---	---	---	---	---	14.0	12.0	13.0
24	---	---	---	---	---	---	---	---	---	14.0	12.0	13.0
25	---	---	---	---	---	---	---	---	---	14.5	11.5	13.0
26	---	---	---	---	---	---	---	---	---	15.5	13.0	14.0
27	---	---	---	---	---	---	---	---	---	16.0	13.5	14.5
28	---	---	---	---	---	---	---	---	---	16.5	14.0	15.5
29	---	---	---	---	---	---	---	---	---	17.0	14.5	15.5
30	---	---	---	---	---	---	20.0	18.0	19.0	17.0	14.5	15.5
31	---	---	---	---	---	---	19.5	17.0	18.0	---	---	---
MONTH	---	---	---	---	---	---	---	---	---	19.0	11.5	15.6

## CRAB CREEK BASIN

391

12472600 CRAB CREEK NEAR BEVERLY, WA

LOCATION.--Lat 46°49'48", long 119°49'48", in NW 1/4 SW 1/4 sec. 33, T.16 N., R.24 E., Grant County, Hydrologic Unit 17020015, on right bank 4.9 mi east of Beverly, and at mile 4.5.

DRAINAGE AREA.--4,842 mi<sup>2</sup>, of which 665 mi<sup>2</sup> in the vicinity of Soap Lake is noncontributing.

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

REVISED RECORDS.--WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 500 ft above sea level, from topographic map.

REMARKS.--No estimated daily discharges. Records good except those below 150 ft<sup>3</sup>/s, which are poor. Many diversions upstream from station for irrigation. Flow largely regulated by Potholes Reservoir 41.3 mi upstream. A major portion of flow is return flows, including transbasin diversions, from parts of the Columbia Basin project. Chemical analyses water years 1959-72, 1975-80. Daily water temperatures August 1959 to September 1962, July 1968 to August 1970.

AVERAGE DISCHARGE.--37 years (water years 1960-96), 196 ft<sup>3</sup>/s, 141,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 936 ft<sup>3</sup>/s Mar. 3, 1980, gage height, 6.46 ft; minimum discharge, 10 ft<sup>3</sup>/s Jan. 10, 1963, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 396 ft<sup>3</sup>/s Oct. 17, 18, gage height, 4.14 ft; minimum discharge, 94 ft<sup>3</sup>/s Jan. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	353	245	202	228	197	201	201	249	276	246	254	327
2	355	235	199	225	216	197	232	248	264	250	265	334
3	358	226	197	224	218	199	250	244	253	250	272	345
4	366	215	204	223	219	209	257	233	236	248	279	357
5	376	212	201	215	221	224	259	232	235	253	291	364
6	387	210	197	210	223	225	254	238	223	246	301	361
7	392	218	196	212	226	217	253	245	212	249	297	358
8	391	223	184	219	224	212	259	242	201	281	292	360
9	384	217	181	221	223	209	264	244	190	279	292	361
10	380	207	171	220	227	209	249	254	210	285	288	358
11	391	207	175	215	229	207	239	257	226	283	291	358
12	387	217	241	208	232	201	241	258	221	269	299	363
13	384	215	314	203	234	193	237	270	207	250	298	361
14	386	217	314	199	236	187	229	276	186	245	297	358
15	386	225	286	192	235	171	233	279	193	240	298	364
16	389	236	258	198	236	177	230	275	213	236	294	367
17	394	236	237	200	251	186	244	278	222	230	290	370
18	393	234	228	199	256	197	230	280	245	233	296	367
19	393	230	223	205	259	231	221	281	254	261	300	356
20	391	225	222	212	259	192	204	281	242	270	298	360
21	382	222	215	201	250	184	228	279	250	271	292	364
22	375	220	212	210	233	176	251	274	257	279	289	365
23	371	214	209	213	184	179	260	279	267	284	293	366
24	355	219	206	222	178	166	253	290	271	282	292	365
25	351	222	202	224	222	150	259	286	264	261	287	364
26	346	215	200	219	222	150	250	289	275	251	288	355
27	342	212	200	212	216	167	257	290	274	246	304	344
28	315	223	200	206	204	172	252	286	274	243	313	346
29	295	214	203	199	199	164	246	284	270	251	317	344
30	278	209	209	150	--	159	250	288	257	243	318	343
31	261	--	224	171	--	161	--	291	--	239	318	--
TOTAL	11307	6620	6710	6455	6529	5872	7292	8300	7168	7954	9103	10705
MEAN	365	221	216	208	225	189	243	268	239	257	294	357
MAX	394	245	314	228	259	231	264	291	276	285	318	370
MIN	261	207	171	150	178	150	201	232	186	230	254	327
AC-FT	22430	13130	13310	12800	12950	11650	14460	16460	14220	15780	18060	21230

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1959 - 1996, BY WATER YEAR (WY)

	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
MEAN	253	199	182	175	182	167	182	180	173	176	205	245
MAX	365	310	274	251	358	409	335	276	280	272	303	357
(WY)	1996	1974	1974	1976	1984	1980	1984	1980	1980	1992	1989	1996
MIN	64.4	64.8	58.4	61.9	71.8	55.0	51.6	50.8	48.4	32.5	48.9	66.9
(WY)	1961	1961	1961	1961	1962	1960	1959	1960	1959	1959	1959	1961

## SUMMARY STATISTICS

FOR 1995 CALENDAR YEAR

FOR 1996 WATER YEAR

WATER YEARS 1959 - 1996

ANNUAL TOTAL	94410	94015	196	1980
ANNUAL MEAN	259	257	277	1961
HIGHEST ANNUAL MEAN			62.2	1980
LOWEST ANNUAL MEAN				1961
HIGHEST DAILY MEAN	394	Oct 17	394	Oct 17 1980
LOWEST DAILY MEAN	160	Mar 8	150	Jan 30 1962
ANNUAL SEVEN-DAY MINIMUM	169	Mar 2	160	Mar 25 1962
ANNUAL RUNOFF (AC-FT)	187300	186500	141700	
10 PERCENT EXCEEDS	352	359	294	
50 PERCENT EXCEEDS	253	244	199	
90 PERCENT EXCEEDS	191	199	73	



## CRAB CREEK BASIN

12472600 CRAB CREEK NEAR BEVERLY, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1995 to September 1996.

INSTRUMENTATION.--Water-quality monitor since November 1994. Electronic data logger with sixty-minute recording interval.

REMARKS.--Unpublished temperature data for portions of the 1994 water year are available in the Spokane, Washington field office.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 28.0°C July 13, 14, 26, 27; minimum, 0.0°C for several days in January and February.

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996												
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	16.0	14.0	15.0	6.0	4.5	5.5	8.5	7.5	8.0	4.0	3.5	4.0
2	15.5	14.5	15.0	5.5	3.5	5.0	7.5	5.5	6.5	4.5	4.0	4.0
3	15.5	14.0	15.0	5.5	3.5	5.0	5.5	4.5	5.0	5.0	3.5	4.0
4	14.5	12.5	13.5	5.0	4.5	5.0	5.0	3.5	4.5	4.5	3.5	4.0
5	14.0	12.5	13.5	7.0	4.5	5.5	4.0	2.5	3.5	4.0	3.0	3.5
6	15.0	13.0	14.0	7.0	5.5	6.5	2.5	1.0	2.0	3.5	2.5	3.0
7	15.0	13.0	14.0	7.0	6.5	7.0	2.5	1.5	2.0	4.0	3.0	3.5
8	14.5	13.0	13.5	11.0	7.0	9.0	2.0	.5	1.0	4.0	3.0	3.5
9	14.0	12.5	13.5	9.5	6.5	7.5	1.0	.5	1.0	4.0	3.5	3.5
10	14.0	13.5	14.0	6.5	4.5	5.5	1.5	.5	1.0	4.0	3.0	3.5
11	14.0	13.0	14.0	5.5	4.0	5.0	2.0	.5	1.5	4.5	3.0	3.5
12	13.0	11.5	12.5	7.0	5.5	6.5	3.0	2.0	2.5	4.0	3.0	3.5
13	13.0	11.0	12.0	8.0	7.0	7.5	4.0	3.0	3.5	3.5	3.0	3.5
14	13.0	11.5	12.5	10.0	8.0	9.0	4.5	3.5	4.0	5.0	3.0	3.5
15	13.5	11.5	13.0	10.0	9.0	9.5	4.5	3.5	4.0	7.0	5.0	6.5
16	14.5	13.0	13.5	9.5	9.0	9.5	4.0	4.0	4.0	6.5	4.5	5.5
17	14.0	13.0	13.5	9.5	9.0	9.0	4.5	4.0	4.0	4.5	3.0	4.0
18	13.0	11.0	12.0	9.0	8.5	9.0	4.5	4.0	4.0	3.0	1.0	2.5
19	11.5	10.0	11.0	8.5	7.0	7.5	5.0	4.5	4.5	2.5	.5	1.5
20	11.5	10.5	11.0	7.0	6.0	6.5	5.5	4.5	5.0	1.5	.5	1.0
21	10.5	9.5	10.0	6.5	6.0	6.0	5.5	4.5	5.0	2.0	.5	1.0
22	10.0	8.5	9.5	6.5	5.5	6.0	4.5	3.0	3.5	2.0	.0	1.0
23	10.5	9.5	10.0	6.0	5.0	5.5	3.5	3.0	3.5	2.0	.5	1.5
24	10.5	9.0	9.5	8.0	6.0	7.0	3.5	3.0	3.0	2.5	.5	1.5
25	10.5	10.0	10.5	8.0	7.5	8.0	3.0	2.0	2.5	2.5	1.0	2.0
26	11.0	9.5	10.0	7.5	7.0	7.0	3.0	3.0	3.0	2.0	1.0	1.5
27	10.0	9.0	9.5	7.0	6.0	6.0	3.0	3.0	3.0	1.5	.5	1.0
28	9.5	8.0	8.5	7.5	6.0	6.5	3.5	2.5	3.0	2.0	.0	1.0
29	8.5	7.0	7.5	10.0	7.5	9.0	3.5	2.5	3.0	1.0	.0	.5
30	8.0	6.0	7.0	10.0	8.5	9.0	4.0	3.5	3.5	.0	.0	.0
31	6.5	5.0	6.0	---	---	---	4.0	3.0	3.5	.0	.0	.0
MONTH	16.0	5.0	11.7	11.0	3.5	7.0	8.5	.5	3.5	7.0	.0	2.7

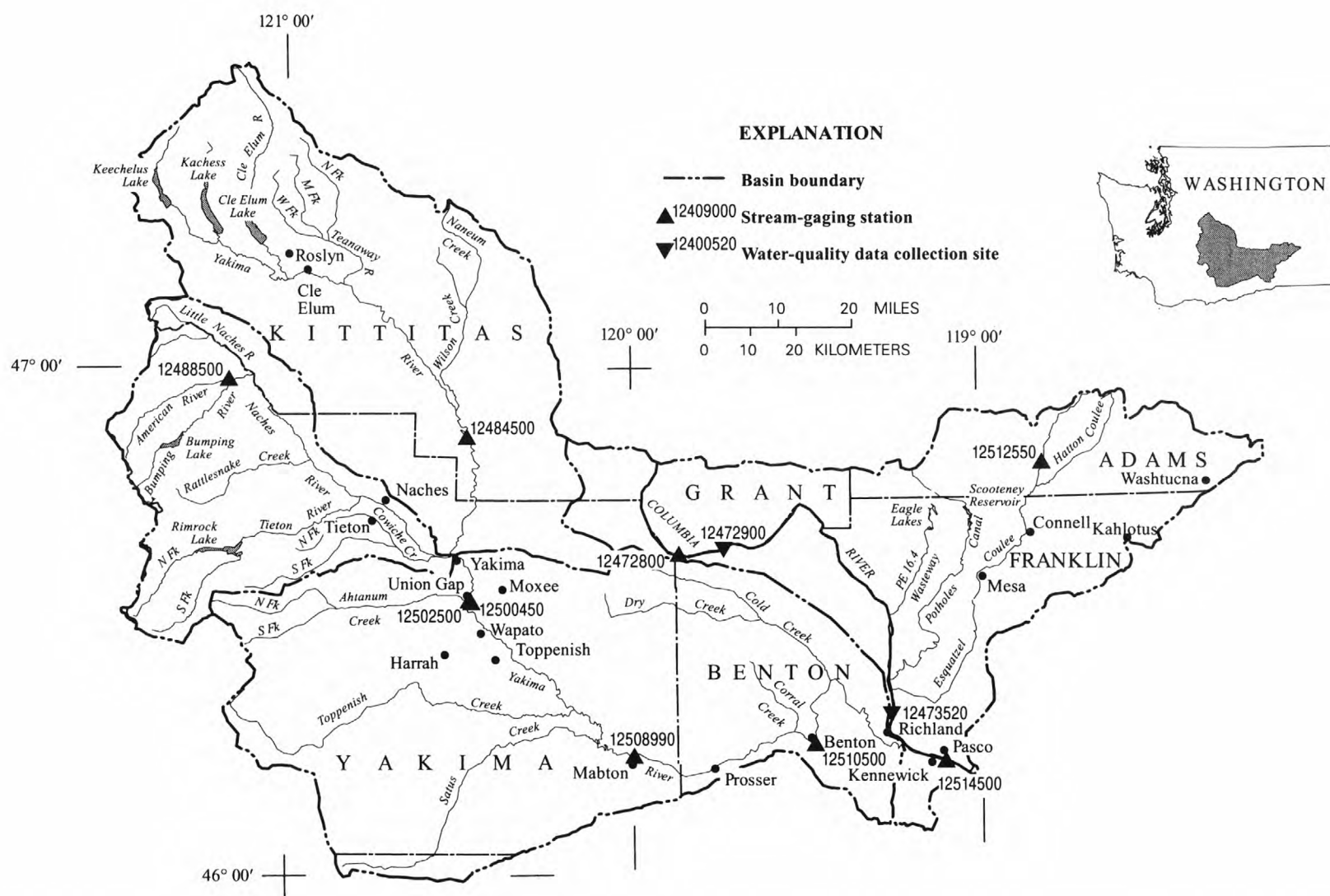
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

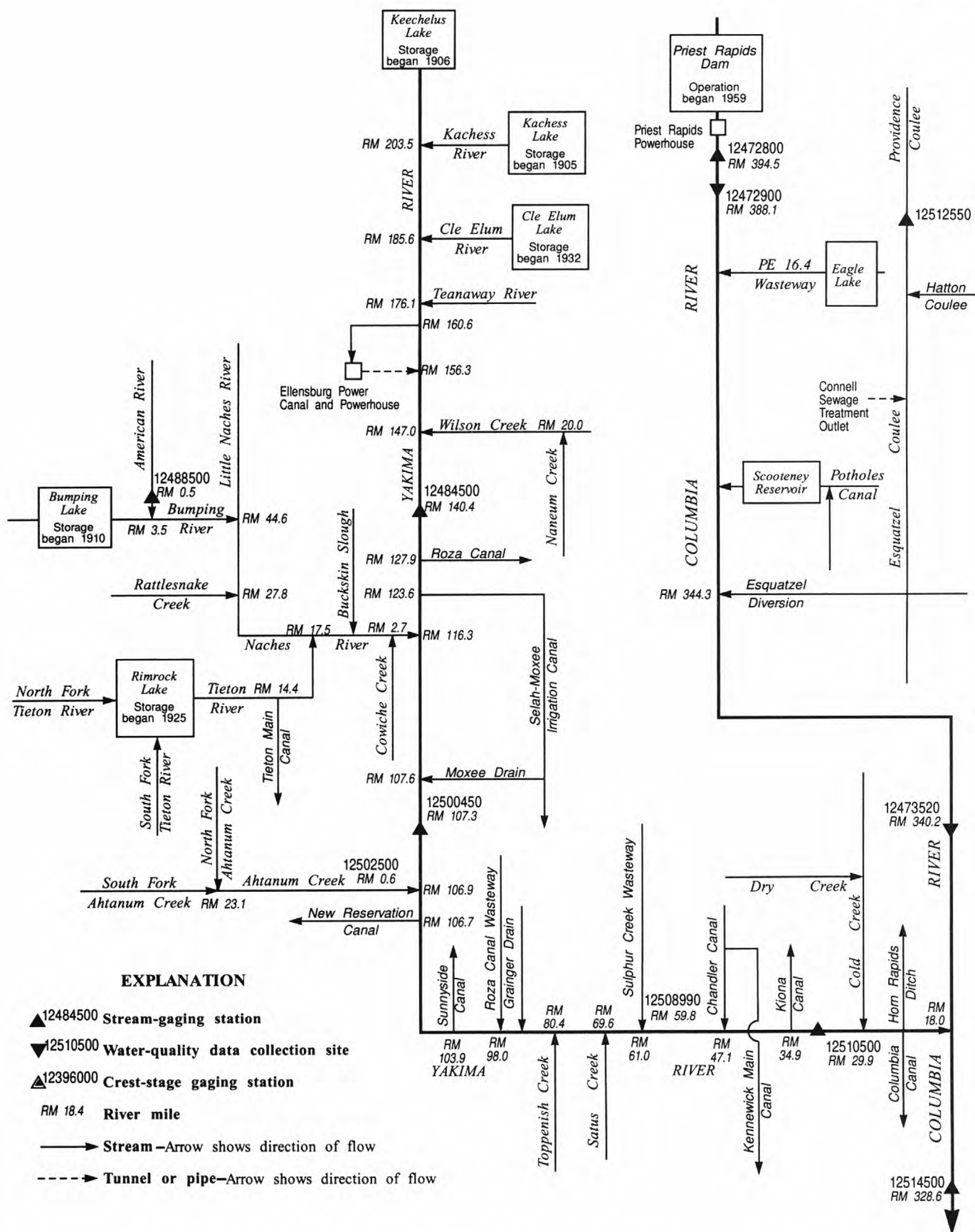
Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
February				March			April			May		
1	.0	.0	.0	6.0	2.0	4.0	11.5	7.5	9.0	14.0	10.5	12.5
2	.0	.0	.0	7.0	3.0	5.0	11.0	8.5	9.5	13.5	10.0	12.0
3	.0	.0	.0	7.5	5.5	6.5	12.5	7.5	10.0	13.5	10.0	12.0
4	.0	.0	.0	7.0	5.0	6.5	13.0	9.5	11.5	16.0	10.5	13.5
5	.0	.0	.0	6.0	4.0	5.0	14.5	10.5	12.5	17.0	12.0	14.5
6	.0	.0	.0	6.5	4.5	5.5	17.0	12.5	14.5	17.5	13.0	15.0
7	2.5	.0	1.0	6.5	6.0	6.5	18.5	14.5	16.5	15.0	12.0	13.5
8	3.0	2.0	2.5	7.5	6.5	7.0	19.0	15.5	17.5	14.0	10.5	12.0
9	3.0	1.5	2.0	9.0	7.0	8.0	18.5	16.0	17.5	15.5	10.5	13.0
10	2.5	.0	1.5	10.0	8.5	9.0	16.5	13.5	15.0	16.0	12.5	14.0
11	2.5	.5	1.5	11.5	8.5	10.0	14.5	12.0	13.0	15.5	14.0	15.0
12	3.0	.5	2.0	12.0	8.5	10.5	13.0	10.5	12.0	15.5	13.5	14.5
13	4.0	2.0	3.0	12.0	8.0	10.0	14.5	9.5	12.0	18.0	15.0	16.5
14	5.0	2.5	4.0	12.5	8.0	10.5	16.0	11.5	14.0	18.0	15.0	16.5
15	5.5	3.0	4.5	11.0	9.0	10.0	16.5	13.5	15.0	19.0	16.0	17.5
16	6.0	3.5	4.5	10.0	7.5	8.5	16.5	14.0	15.0	19.0	15.0	17.0
17	6.5	5.0	5.5	11.5	6.5	9.0	15.0	11.5	13.5	18.5	15.0	17.0
18	8.5	6.0	7.0	12.5	8.0	10.5	14.0	11.5	13.0	17.0	13.5	15.0
19	8.5	7.5	8.0	12.5	9.5	11.0	13.0	10.5	12.0	16.5	14.5	15.5
20	7.5	6.0	7.0	12.5	9.0	10.5	14.0	9.5	12.0	17.5	13.0	15.0
21	7.5	6.0	6.5	11.0	8.5	10.0	15.0	11.5	13.5	17.0	14.5	15.0
22	6.0	4.5	5.5	11.5	8.5	10.0	14.0	12.5	13.5	16.0	13.0	14.5
23	6.5	4.5	5.5	12.0	8.0	10.0	14.0	12.5	13.0	16.5	12.0	14.5
24	5.5	4.5	4.5	10.5	6.5	9.0	14.5	11.0	13.0	20.0	14.5	17.5
25	6.5	3.5	5.0	9.0	4.5	7.0	13.5	11.0	11.5	21.5	17.0	19.0
26	5.5	3.0	4.5	9.0	6.5	7.5	13.0	9.5	11.5	21.0	17.5	19.0
27	4.5	2.0	3.5	10.0	7.0	8.5	14.5	9.5	12.0	18.5	15.5	17.0
28	3.5	.5	2.0	11.0	6.5	8.5	15.0	11.0	13.5	16.5	13.5	15.0
29	4.5	1.0	3.0	10.0	7.0	8.5	16.5	13.5	15.0	17.0	14.0	15.5
30	---	---	---	11.0	6.5	9.0	15.0	12.5	14.0	18.0	13.5	16.0
31	---	---	---	10.0	8.0	9.0	---	---	---	19.5	14.0	17.0
MONTH	8.5	.0	3.2	12.5	2.0	8.4	19.0	7.5	13.2	21.5	10.0	15.2

Day	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean	Max	Min	Mean
June				July			August			September		
1	20.5	16.5	18.5	25.5	20.5	23.0	25.5	21.0	23.0	20.5	17.5	19.0
2	23.0	18.5	21.0	26.0	22.0	24.0	22.0	18.0	20.0	20.0	17.5	19.0
3	23.5	20.0	22.0	26.0	22.0	24.0	20.5	16.5	18.5	20.0	18.0	18.5
4	21.5	18.0	19.5	23.0	19.0	20.5	21.0	17.0	19.0	18.0	16.5	17.5
5	21.5	15.0	18.5	22.0	16.0	19.0	20.0	16.5	18.5	17.0	15.0	16.0
6	24.0	18.0	21.0	24.0	18.5	21.0	22.0	17.5	19.5	17.5	15.0	16.5
7	25.5	20.0	22.5	25.0	20.0	22.5	23.5	19.0	21.5	19.5	16.5	18.0
8	23.0	17.5	20.0	26.0	21.0	23.5	25.0	20.5	23.0	20.5	18.0	19.0
9	21.0	16.0	18.5	25.0	20.0	22.5	26.0	21.5	23.5	20.5	18.0	19.0
10	22.0	16.0	18.5	23.5	17.5	20.5	26.0	21.5	24.0	20.5	17.5	19.0
11	22.5	16.0	19.5	25.5	20.5	23.0	25.0	21.5	23.5	20.5	18.0	19.5
12	24.0	18.5	21.0	26.5	21.5	24.0	23.0	19.0	21.0	21.0	19.0	20.0
13	24.0	19.5	21.5	28.0	22.5	25.0	24.0	20.0	22.0	20.5	18.0	19.5
14	24.0	18.0	20.5	28.0	23.5	26.0	25.0	21.0	23.0	19.0	17.5	18.5
15	22.5	19.0	20.5	27.5	23.0	25.0	24.5	20.5	22.5	18.5	17.0	18.0
16	20.5	17.0	18.5	24.0	19.5	22.0	23.5	20.0	21.5	18.0	15.5	16.5
17	18.0	14.0	16.5	21.5	19.0	20.0	22.0	18.0	20.0	17.5	15.0	16.5
18	18.0	13.0	15.5	21.0	17.5	19.5	21.5	17.0	19.0	16.5	15.0	16.0
19	21.0	15.0	18.0	21.0	17.5	19.5	22.0	18.0	20.0	17.5	15.5	16.0
20	23.0	17.0	20.0	23.0	18.0	20.5	21.0	18.5	19.5	16.5	14.5	15.5
21	21.5	19.0	20.0	24.0	19.0	21.5	21.0	16.5	19.0	15.5	13.5	14.0
22	22.0	17.0	19.5	26.0	20.5	23.5	22.0	18.0	20.5	15.0	12.5	14.0
23	20.0	17.5	19.0	26.5	22.0	24.5	23.0	18.5	21.0	14.5	12.5	14.0
24	21.0	17.5	19.0	27.0	22.5	25.0	23.5	19.5	21.5	14.5	12.5	13.5
25	22.5	18.0	20.0	27.5	23.0	25.0	23.5	20.0	22.0	15.0	12.0	13.5
26	23.0	18.5	21.0	28.0	23.0	25.5	22.5	20.0	21.0	16.0	13.5	14.5
27	22.0	19.0	20.5	28.0	23.0	26.0	20.5	19.0	20.0	17.0	14.0	15.5
28	20.5	16.5	18.5	27.0	23.5	25.5	22.0	19.0	20.5	17.5	15.0	16.5
29	22.0	16.5	19.0	26.0	22.5	24.0	23.5	20.0	21.5	18.0	15.5	17.0
30	24.0	19.0	21.5	27.0	22.5	24.5	22.5	20.5	21.5	18.0	16.0	17.0
31	---	---	---	26.0	20.5	23.0	20.5	18.0	19.5	---	---	---
MONTH	25.5	13.0	19.6	28.0	16.0	23.0	26.0	16.5	21.0	21.0	12.0	16.9

Year	Max	Min	Mean
YEAR	28.0	.0	12.2



**Figure 57.** Location of surface-water and water-quality stations in the Columbia River Basin from Priest Rapids Dam to Kennewick including Eyles Lakes, Scootenay Reservoir, Yakima River and Esquatzel Coulee Basins.



**Figure 58.** Schematic diagram of surface-water and water-quality tations in the Columbia River Basin from Priest Rapids Dam to Kennewick including Eyles Lakes, Scootenay Reservoir, Yakima River and Esquatzel Coulee Basins.

## COLUMBIA RIVER MAIN STEM

## 12472800 COLUMBIA RIVER BELOW PRIEST RAPIDS DAM, WA

LOCATION.--Lat 46°37'44", long 119°51'49", in SE 1/4 NW 1/4 sec.7, T.13 N., R.24 E., Grant County, Hydrologic Unit 17020016, on left bank 2.6 mi downstream from Priest Rapids Dam, 14.7 mi south of Beverly, and at mile 394.5.

DRAINAGE AREA.--96,000 mi<sup>2</sup>, approximately.

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

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

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

REMARKS.--No estimated daily discharges. Records good. Diversions for irrigation of about 600,000 acres upstream from station. Flow regulated by 10 major reservoirs and numerous smaller reservoirs and powerplants. U.S. Geological Survey satellite telemeter at station. Water temperatures March 1980 to April 1993. Temperature records for site "at Vernita Bridge, near Priest Rapids Dam" (station 12472900) for period July 1974 to September 1980 are equivalent.

AVERAGE DISCHARGE.--79 years (water years 1918-96), 119,000 ft<sup>3</sup>/s, 86,216,000 acre-ft/yr, unadjusted. 37 years (water years 1960-96), 118,900 ft<sup>3</sup>/s, 86,120,000 acre-ft/yr, regulated period.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 692,600 ft<sup>3</sup>/s June 12, 1948, gage height, 59.35 ft, site and datum then in use; minimum discharge, 4,120 ft<sup>3</sup>/s Feb. 10, 1932, due to construction at Rock Island Dam, site and datum then in use; minimum daily discharge prior to construction of Rock Island Dam (1932), 22,000 ft<sup>3</sup>/s Feb. 1-7, 1930, site and datum then in use; minimum daily discharge after completion of Rock Island Dam (1932), 20,000 ft<sup>3</sup>/s Jan. 31 to Feb. 10, 1937, site and datum then in use; minimum discharge since completion of Priest Rapids Dam (1959), 28,300 ft<sup>3</sup>/s Nov. 9, 1977.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of June 7, 1894, reached a discharge of about 740,000 ft<sup>3</sup>/s, based on a rating extension for a Weather Bureau gage at Wenatchee.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 350,000 ft<sup>3</sup>/s Feb. 27, elevation, 419.61 ft; minimum discharge, 37,100 ft<sup>3</sup>/s Oct. 22, elevation, 396.52 ft; minimum daily discharge, 50,600 ft<sup>3</sup>/s Oct. 15.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	61900	103000	171000	103000	216000	228000	141000	260000	244000	165000	166000	79200
2	95700	101000	166000	130000	213000	196000	126000	199000	258000	182000	142000	84500
3	96900	98000	169000	134000	199000	174000	136000	217000	247000	182000	106000	99900
4	76300	96900	157000	137000	162000	205000	153000	220000	232000	186000	142000	110000
5	82300	72200	157000	141000	156000	220000	151000	220000	223000	187000	163000	93900
6	84500	82300	170000	160000	144000	200000	147000	209000	214000	199000	169000	79900
7	79700	94500	168000	150000	133000	184000	149000	199000	217000	207000	195000	92900
8	79700	95400	181000	139000	77400	185000	163000	215000	258000	196000	177000	93300
9	96200	92600	183000	139000	69200	190000	169000	187000	268000	202000	138000	103000
10	91600	93200	174000	165000	75900	186000	152000	180000	263000	206000	148000	109000
11	76600	94300	161000	168000	121000	186000	172000	189000	241000	222000	141000	113000
12	131000	95100	139000	177000	173000	197000	168000	137000	253000	226000	154000	139000
13	143000	87100	197000	165000	190000	205000	175000	167000	279000	219000	152000	133000
14	109000	99000	184000	169000	196000	205000	180000	163000	250000	212000	166000	83600
15	50600	99000	173000	172000	229000	193000	193000	154000	272000	206000	179000	80500
16	62100	101000	159000	185000	246000	188000	202000	163000	272000	205000	140000	93400
17	81200	101000	154000	163000	249000	194000	243000	178000	268000	172000	130000	95600
18	88300	102000	165000	189000	244000	153000	228000	213000	260000	184000	131000	92200
19	95500	96500	173000	187000	222000	169000	217000	213000	255000	191000	143000	98900
20	92100	127000	164000	192000	197000	178000	223000	222000	233000	187000	159000	101000
21	87500	145000	176000	183000	199000	146000	207000	226000	235000	157000	155000	93200
22	78600	132000	178000	185000	209000	183000	200000	250000	177000	191000	117000	110000
23	84200	93900	176000	206000	212000	155000	235000	239000	192000	194000	96100	107000
24	89800	98900	179000	192000	254000	165000	222000	244000	208000	194000	99900	112000
25	91000	124000	172000	192000	251000	175000	227000	234000	219000	187000	129000	100000
26	98700	134000	172000	181000	248000	155000	238000	220000	226000	177000	139000	98200
27	98300	148000	164000	191000	270000	172000	206000	231000	228000	150000	118000	94900
28	84300	146000	148000	163000	256000	190000	209000	249000	226000	128000	141000	75100
29	74200	153000	130000	178000	244000	153000	215000	269000	203000	125000	130000	80300
30	97000	186000	113000	199000	---	125000	226000	248000	194000	141000	135000	89300
31	104000	---	104000	186000	---	127000	---	250000	---	166000	104000	---
TOTAL	2761800	3291900	5077000	5221000	5655500	5582000	5673000	6565000	7115000	5746000	4405000	2935800
MEAN	89090	109700	163800	168400	195000	180100	189100	211800	237200	185400	142100	97860
MAX	143000	186000	197000	206000	270000	228000	243000	269000	279000	226000	195000	139000
MIN	50600	72200	104000	103000	69200	125000	126000	137000	177000	125000	96100	75100
AC-FT	5478000	6529000	10070000	10360000	11220000	11070000	11250000	13020000	14110000	11400000	8737000	5823000

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1996, BY WATER YEAR (WY)

	MEAN	80160	87570	98010	104500	108900	108700	116000	162900	209800	159800	110200	79630
MAX	118200	121200	163800	168400	195000	201800	189100	269800	461400	294300	191000	126700	
(WY)	1960	1991	1996	1996	1996	1983	1996	1971	1961	1964	1976	1976	
MIN	61550	56100	52570	55070	72700	58170	57920	79060	78810	71850	66740	60050	
(WY)	1964	1964	1962	1964	1964	1962	1993	1973	1977	1977	1985	1994	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1960 - 1996
ANNUAL TOTAL	41338000	60029000	
ANNUAL MEAN	113300	164000	118900
HIGHEST ANNUAL MEAN			164000
LOWEST ANNUAL MEAN			90330
HIGHEST DAILY MEAN	205000	Jun 26	533000
LOWEST DAILY MEAN	47300	Sep 3	36400
ANNUAL SEVEN-DAY MINIMUM	64200	Sep 3	44700
ANNUAL RUNOFF (AC-FT)	81990000	119100000	86120000
10 PERCENT EXCEEDS	165000	234000	191000
50 PERCENT EXCEEDS	108000	168000	103000
90 PERCENT EXCEEDS	74200	92800	64000



## COLUMBIA RIVER MAIN STEM

397

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

LOCATION.--Lat 46°38'34", long 119°43'54", in NW 1/4 SE 1/4 sec.6, T.13 N., R.25 E., Grant County, Hydrologic Unit 17020016, at State Highway 24 Vernita Bridge crossing, 9.0 mi downstream from Priest Rapids Dam, and at mile 388.1.

DRAINAGE AREA.--96,000 mi<sup>2</sup>, approximately.

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

PERIOD OF DAILY RECORD.--

WATER TEMPERATURES: July 1974 to September 1980.

REMARKS.--October 1971 to September 1972, at site 6.4 mi upstream, published as 12472800 "below Priest Rapids Dam." Prior to October 1971 published as 12472800 "at Vernita Ferry." Discharge determined by routing flows from the gaging station below Priest Rapids Dam (station 12472800) 6.4 miles upstream.

## WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH, FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED (MG/L) (00301)	HARD- NESS (MG/L) AS (CACO3) (00900)	HARD- NESS NONCARB (MG/L) AS (CACO3) (00904)	CALCIUM, DIS- SOLVED (MG/L) AS CA (00915)
JAN 1996 17...	1230	161000	140	8.0	4.5	0.6	13.4	104	66	8	19
MAY 06...	1250	190000	141	8.1	9.5	1.4	13.4	118	62	3	18
JUN 04...	1145	185000	131	8.0	12.0	1.0	13.2	123	56	2	16
SEP 04...	1145	87000	132	7.7	19.0	0.4	12.6	138	59	4	17
DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY, DIS IT, FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE, DIS IT, FIELD (MG/L AS HCO3) (00453)	CAR- BONATE, DIS IT, FIELD (MG/L AS CO3) (00452)	SULFATE, DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
JAN 1996 17...	4.5	2.2	7	0.1	0.8	58	71	0	7.5	1.3	0.1
MAY 06...	4.2	2.3	7	0.1	0.7	59	72	0	8.6	1.0	<0.1
JUN 04...	3.9	2.3	8	0.1	0.8	54	66	0	7.9	0.9	<0.1
SEP 04...	4.0	1.9	6	0.1	0.7	55	67	0	8.6	0.9	<0.1
DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C, DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITU- ENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRITE, DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3, DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA, DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC, TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)
JAN 1996 17...	6.4	84	77	0.11	36500	<0.01	0.14	<0.015	<0.2	0.01	<0.01
MAY 06...	7.5	83	78	0.11	42600	<0.01	0.12	0.02	<0.2	0.05	<0.01
JUN 04...	7.6	95	72	0.13	47500	<0.01	0.10	0.02	<0.2	< 0.01	<0.01
SEP 04...	4.3	73	71	0.10	17100	<0.01	0.09	<0.015	<0.2	< 0.01	<0.01
DATE	PHOS- PHORUS ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM, DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)
JAN 1996 17...	0.002	3	33	<1	4	4	<1	<1	<1	<1	<1
MAY 06...	0.001	6	31	<1	15	<4	2	<1	4	<1	<1
JUN 04...	0.001	12	32	<1	12	<4	1	<1	<1	<1	<1
SEP 04...	<0.001	4	26	<1	7	<4	<1	<1	4	<1	<1

## COLUMBIA RIVER MAIN STEM

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

## WATER-QUALITY DATA

DATE	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	URANIUM NATURAL DIS- SOLVED (UG/L AS U) (22703)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	ACETO- CHLOR, DISS. (UG/L) (49260)	ALA- CHLOR, DISS. (UG/L) (46342)	DEETHYL ATRA- ZINE, DISS. (UG/L) (04040)	ATRA- ZINE, DISS. (UG/L) (39632)	METHYL AZIN- PHOS, DISS. (UG/L) (82686)	BEN- FLUR- ALIN, DISS. (UG/L) (82673)	BUTYL ATE, DISS. (UG/L) (04028)
	JAN 1996 17...	79	<6	<1	1.4	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002
MAY 06...	80	<6	<1	2.2	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
JUN 04...	82	<6	<1	2.1	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
SEP 04...	100	<6	<1	1.7	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
DATE	CAR- BARYL, DISS. (UG/L) (82680)	CARBO- FURAN, DISS. (UG/L) (82674)	CHLOR- PYRIFOS, DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, DISS. (UG/L) (04041)	DCPA, DISS. (UG/L) (82682)	P,P' DDE, DISS. (UG/L) (34653)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN, DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE, DISS. (UG/L) (82660)	DISUL- FOTON, DISS. (UG/L) (82677)	EPTC, DISS. (UG/L) (82668)
JAN 1996 17...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
MAY 06...	<0.003	<0.003	<0.004	<0.004	0.003	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
JUN 04...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
SEP 04...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
DATE	ETHAL- FLUR- ALIN, DIS- SOLVED (UG/L) (82663)	ETHO- PROP- DIS- SOLVED (UG/L) (82672)	FONOFOS, DIS- SOLVED (UG/L) (04095)	ALPHA BHC, DIS- SOLVED (UG/L) (34253)	LINDANE, DIS- SOLVED (UG/L) (39341)	LIN- URON, DIS- SOLVED (UG/L) (82666)	MALA- THION, DIS- SOLVED (UG/L) (39532)	METHYL PARA- THION, DIS- SOLVED (UG/L) (82667)	METO- LACHLOR, DIS- SOLVED (UG/L) (39415)	METRI- BUZIN, DIS- SOLVED (UG/L) (82630)	MOL- INATE, DIS- SOLVED (UG/L) (82671)
JAN 1996 17...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
MAY 06...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
JUN 04...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
SEP 04...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
DATE	NAPROP- AMIDE, DIS- SOLVED (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	PEB- ULATE, DIS- SOLVED (UG/L) (82669)	PENDI- METH- ALIN, DIS- SOLVED (UG/L) (82683)	CIS- PER- METHRIN, DIS- SOLVED (UG/L) (82687)	PHORATE, DIS- SOLVED (UG/L) (82664)	PRON- AMIDE, DIS- SOLVED (UG/L) (82676)	PRO- METON, DIS- SOLVED (UG/L) (04037)	PROP- CHLOR, DIS- SOLVED (UG/L) (04024)	PRO- PANIL, DIS- SOLVED (UG/L) (82679)	
JAN 1996 17...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004	
MAY 06...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004	
JUN 04...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004	
SEP 04...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004	
DATE	PRO- PARGITE, DIS- SOLVED (UG/L) (82685)	SI- MAZINE, DIS- SOLVED (UG/L) (04035)	THIO- BENCARB, DIS- SOLVED (UG/L) (82681)	TEBU- THIURON, DIS- SOLVED (UG/L) (82670)	TER- BACIL, DIS- SOLVED (UG/L) (82665)	TER- BUFOS, DIS- SOLVED (UG/L) (82675)	TRIAL- LATE, DIS- SOLVED (UG/L) (82678)	TRI- FLUR- ALIN, DIS- SOLVED (UG/L) (82661)	SEDI- MENT, DIS- SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	
JAN 1996 17...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	3	1300	
MAY 06...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	3	1540	
JUN 04...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	5	2500	
SEP 04...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	3	705	

E - Concentration is an estimated value because of problems with gas chromatography or extraction (Zaugg and others, 1995), or reported concentration is less than the method detection limit.

## COLUMBIA RIVER MAIN STEM

399

12473520 COLUMBIA RIVER AT RICHLAND, WA

LOCATION.--Lat 46°18'46", long 119°15'28", in NW 1/4 NW 1/4 sec.36, T.10 N., R.28 E., Benton County, Hydrologic Unit 17020016, at city of Richland pumping plant, 4.8 mi upstream from Yakima River, and at mile 340.2.

DRAINAGE AREA.--96,900 mi<sup>2</sup>, approximately.

## PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: July 1974 to March 1993. Unpublished records of stage at site 2.3 miles downstream are available in files of the Geological Survey and U.S. Army Corps of Engineers.

INSTRUMENTATION.--Water-temperature recorder with probe located at city of Richland pumping-plant pier near right bank from July 1974 until January 1977. From January 1977 to March 1993, recorder probe located 200 ft streamward from plant.

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

## EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 22.0°C July 21, Aug. 4, 5, 1985; minimum, 0.0°C Feb. 3, 6-9, 1989.

## WATER-QUALITY DATA

DATE	TIME	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED CENT SATUR- ATION) (00301)	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCAR- BONATE (MG/L AS CACO3) (00904)	CALCIUM, DIS- SOLVED (MG/L AS CA) (00915)
JAN 1996										
18...	1300	141	8.0	3.5	0.6	13.2	100	67	7	19
MAY										
07...	1140	141	8.0	9.5	1.2	13.2	116	57	0	16
JUN										
05...	1415	130	8.1	13.0	1.6	12.5	119	60	5	17
SEP										
05...	1140	135	8.0	18.5	0.5	9.5	102	59	4	17

DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	ALKA- LITY, DIS IT FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE, DIS IT, FIELD (MG/L AS HCO3) (00453)	CAR- BONATE, DIS IT, FIELD (MG/L AS CO3) (00452)	SULFATE, DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SOLIDS, RESIDUE AT 180 DEG. C, DIS- SOLVED (MG/L) (70300)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L AS N) (00613)
JAN 1996									
18...	4.7	60	73	0	7.5	1.4	0.2	85	<0.01
MAY									
07...	4.1	60	73	0	7.7	1.1	0.1	87	<0.01
JUN									
05...	4.2	55	67	0	7.8	1.0	<0.1	96	<0.01
SEP									
05...	4.0	55	67	0	8.9	1.1	<0.1	63	<0.01

DATE	NITRO- GEN, NO2+NO3, DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA, DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC, TOTAL (MG/L AS N) (00625)	PHOS- PHORUS PHOS- PHORUS TOTAL (MG/L AS P) (00665)	PHOS- PHORUS ORTHOPHOS- PHORUS TOTAL (MG/L AS P) (00671)	CHRO- MIUM, DIS- SOLVED (UG/L AS CR) (01030)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	CARBON, ORGANIC, DIS- SOLVED (MG/L AS C) (00681)	SEDI- MENT, SUS- PENDED (MG/L) (80154)
JAN 1996									
18...	0.12	<0.015	<0.2	0.01	<0.01	<1	8	1.3	4
MAY									
07...	0.13	0.02	0.2	0.02	<0.01	<1	12	2.2	6
JUN									
05...	0.09	0.03	<0.2	0.01	<0.01	<1	16	2.0	5
SEP									
05...	0.11	<0.015	<0.2	<0.01	<0.01	11	46	1.5	2

## YAKIMA RIVER BASIN

12484500 YAKIMA RIVER AT UMTANUM, WA

LOCATION...Lat 46°51'46", long 120°28'44", in SW 1/4 NW 1/4 sec.20, T.16 N., R.19 E., Kittitas County, Hydrologic Unit 17030001, on right bank at Umtanum railway siding, 0.5 mi upstream from Umtanum Creek, 4.2 mi upstream from McPherson Canyon, 10 mi south of Ellensburg, and at mile 140.4.

DRAINAGE AREA. - - 1,594 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1906 to current year. Monthly discharge for some months during the 1907, 1908, 1916-31 water years, published in WSP 1316.

REVISED RECORDS.--WSP 412: 1914. WSP 1286: 1910. WSP 1933: Drainage area.

GAGE--Water-stage recorder. Datum of gage is 1,300.00 ft above sea level. Prior to Sept. 28, 1911, nonrecording gage at approximately same site at various datums. Sept. 28, 1911, to Nov. 23, 1936, water-stage recorder at site about 300 ft upstream at datum 26.70 ft higher.

REMARKS.--Records good. Flow partly regulated by Keechelus, Kachess, and Cle Elum Lakes. Diversions upstream from station for irrigation of about 105,000 acres.

AVERAGE DISCHARGE.--63 years (water years 1934-96), 2,443 ft<sup>3</sup>/s, 1,770,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 41,000 ft<sup>3</sup>/s Nov. 15 or 16, 1906, gage height, 41.1 ft, from floodmarks, present datum; minimum recorded discharge, 138 ft<sup>3</sup>/s Oct. 3, 1915, gage height, 2.86 ft, datum then in use.

EXTREMES FOR CURRENT YEAR. - Maximum discharge, 27,200 ft<sup>3</sup>/s Feb. 9, gage height, 38.77 ft; minimum discharge, 740 ft<sup>3</sup>/s Nov. 5, 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1450	839	11000	3020	2030	5100	3070	4040	3700	3360	4310	3670
2	1570	814	7410	2920	e2000	4510	2920	3510	3790	3630	4500	3600
3	1780	773	5450	4010	e2200	4430	2490	2970	4320	3650	4550	3370
4	1700	764	4420	4840	e3000	4620	2180	2720	6340	3650	4470	3070
5	1600	761	4020	4040	e5000	4080	2160	2560	6910	3300	4390	2710
6	1560	767	5360	4030	e7000	3560	2310	2410	5850	3260	4250	2390
7	1530	845	6040	4250	e13000	3390	3110	2670	4930	35800	4260	2020
8	1500	1190	6200	5160	e22000	3300	4730	3130	5300	3840	4340	1700
9	1460	3630	6400	5950	e25400	3290	5990	3050	5500	4040	4370	1410
10	1430	2780	6410	5860	16900	3620	5930	2920	5080	4040	4340	1310
11	1730	2720	6550	5580	10400	4160	5470	3140	4260	4030	4310	1310
12	1910	4060	5320	5270	7920	4720	4730	3620	3890	4110	4280	1260
13	1700	3260	5110	4970	6940	5110	4340	3890	3800	4330	4240	1260
14	1480	3620	5520	5150	6850	5030	4000	4290	3960	4400	4190	1270
15	1400	3810	5550	6320	6950	5550	3680	4630	4120	4240	4180	1350
16	1500	3380	4830	6950	6970	5690	4530	5130	4210	4130	4170	1320
17	1570	2870	4510	6230	7170	5590	5750	5330	4270	4260	4210	1260
18	1410	2680	4320	5290	7930	5430	6160	5730	4140	4480	4190	1220
19	1250	2610	4470	4760	8990	5260	5940	6060	3680	4270	4110	1230
20	1100	2350	4640	4740	8880	5090	5680	6070	3560	4170	4020	1200
21	949	2090	4520	4540	8360	5060	5520	5810	3590	4110	4000	1240
22	878	1890	4340	4220	7850	5060	5280	5570	3760	4230	3980	1230
23	843	1800	3460	4040	8310	4870	4760	5120	3750	4280	3990	1240
24	818	2130	3200	3860	8790	4660	6130	4810	3990	4460	3980	1200
25	785	2930	2700	3720	8590	4410	6030	4650	3560	4470	3940	1150
26	869	3550	2580	3360	8340	4300	7120	4840	3100	4610	3980	1120
27	1080	3310	2090	3170	7820	4150	7170	5670	2920	4620	3990	1090
28	1010	4570	1790	3090	6710	3980	6860	5970	2980	4550	3920	1060
29	952	11600	1660	2940	5570	3430	6470	5420	3040	4550	3900	1040
30	891	16300	1660	2590	---	3200	5070	4500	3280	4450	3760	1050
31	856	---	2130	2270	---	3100	---	3740	---	4310	3710	---
TOTAL	40561	94693	143660	137140	247870	137750	145580	133970	125580	127410	128830	49350
MEAN	1308	3156	4634	4424	8547	4444	4853	4322	4186	4110	4156	1645
MAX	1910	16300	11000	6950	25400	5690	7170	6070	6910	4620	4550	3670
MIN	785	761	1660	2270	2000	3100	2160	2410	2920	3260	3710	1040
AC - FT	80450	187800	284900	272000	491700	273200	288800	265700	249100	252700	255500	97890

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 1996, BY WATER YEAR (WY)

MEAN	1160	1057	1727	1625	1869	2112	3206	3959	3865	3258	3293	2158
MAX	3197	3596	9214	7166	8547	8355	8831	8099	9077	4485	4221	3235
(WY)	1950	1960	1934	1934	1996	1972	1972	1936	1948	1985	1978	1950
MIN	412	352	331	337	463	541	1440	1575	1556	2075	1521	1053
(WY)	1974	1953	1953	1979	1944	1977	1944	1994	1941	1941	1979	1994

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1934 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	1048294		1512394				
ANNUAL MEAN	2872		4132			2443	
HIGHEST ANNUAL MEAN						4203	1972
LOWEST ANNUAL MEAN						1335	1941
HIGHEST DAILY MEAN	16300	Nov 30	25400	Feb 9		29600	Dec 23 1933
LOWEST DAILY MEAN	761	Nov 5	761	Nov 5		151	Apr 16 1944
ANNUAL SEVEN-DAY MINIMUM	795	Nov 1	795	Nov 1		217	Dec 31 1978
ANNUAL RUNOFF (AC-FT)	2079000		3000000			1770000	
10 PERCENT EXCEEDS	4510		6360			4390	
50 PERCENT EXCEEDS	2610		4040			2170	
90 PERCENT EXCEEDS	1130		1260			620	

e Estimated

## YAKIMA RIVER BASIN

401

12488500 AMERICAN RIVER NEAR NILE, WA

LOCATION.--Lat 46°58'40", long 121°10'03", in SE 1/4 NW 1/4 sec.12, T.17 N., R.13 E., Yakima County, Hydrologic Unit 17030002, Snoqualmie National Forest, on right bank 300 ft upstream from Bumping Lake Road bridge, 4.9 mi downstream from Hall Creek, 16.0 mi northwest of Nile, and at mile 0.5.

DRAINAGE AREA.--78.9 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1909 to March 1912, July to September 1913, June to September 1914, June to September 1915, October 1939 to current year. Monthly discharge only for period 1909 to 1915, published in WSP 1316.

REVISED RECORDS.--WSP 982: 1940-42. WSP 1216: Drainage area. WSP 1286: 1911.

GAGE.--Water-stage recorder. Datum of gage is 2,700.00 ft above sea level (Washington State Highway Department bench mark). Prior to Sept. 12, 1915, nonrecording gage at site 300 ft downstream at different datum. Oct. 12 to Dec. 7, 1939, nonrecording gage at present site and datum.

REMARKS.--Records fair. No regulation or diversion. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--57 years (water years, 1940-96), 233 ft<sup>3</sup>/s, 40.04 in/yr, 168,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,230 ft<sup>3</sup>/s Dec. 26, 1980, gage height, 77.99 ft; minimum discharge, 20 ft<sup>3</sup>/s Nov. 22, 1940, Jan. 7, 1993, but may have been lower during period of ice effect that day.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,100 ft<sup>3</sup>/s Feb. 9, gage height, 76.96 ft; minimum daily discharge, 47 ft<sup>3</sup>/s Sept. 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	49	74	1550	220	e90	247	187	410	417	323	99	e58
2	49	67	1060	222	e80	243	193	376	479	358	97	e58
3	57	62	715	295	e70	236	180	352	692	362	98	e57
4	71	68	572	285	e160	231	175	329	925	351	95	e60
5	64	68	461	269	348	221	e175	305	823	297	93	57
6	59	66	e370	257	928	209	180	289	732	265	90	57
7	56	69	350	365	1450	203	239	282	830	253	87	56
8	54	266	264	465	1960	198	359	265	860	265	85	54
9	51	478	192	402	2780	199	516	249	740	278	83	54
10	63	269	243	365	e1800	218	665	238	584	262	81	53
11	167	424	428	340	1290	236	657	242	530	239	79	53
12	146	417	502	314	916	253	559	280	515	234	77	53
13	119	327	669	298	704	256	478	363	512	238	76	52
14	107	350	544	299	567	259	437	524	518	235	74	51
15	101	313	471	402	522	284	415	676	498	228	73	59
16	112	308	414	447	503	290	491	729	461	210	e73	64
17	133	281	376	399	511	290	488	721	404	194	e73	60
18	176	377	351	362	803	290	447	764	356	184	e72	58
19	139	325	324	340	908	288	408	703	315	172	e71	57
20	119	280	300	319	797	282	378	613	302	164	e70	55
21	110	253	281	304	663	273	347	531	315	147	e69	54
22	103	237	265	282	537	266	333	490	322	143	e68	53
23	90	269	250	268	478	251	708	435	333	139	e67	53
24	83	397	235	253	412	241	1470	416	345	134	e66	53
25	80	552	222	238	368	224	1110	443	333	129	e66	52
26	100	432	210	222	332	222	881	577	322	124	e65	51
27	96	359	202	212	304	214	675	673	327	118	e65	50
28	92	739	197	202	e275	205	538	592	324	113	e64	49
29	87	1720	197	e140	e260	200	468	512	299	110	e64	48
30	81	2350	203	e120	---	191	438	459	293	107	e62	47
31	74	---	227	e110	---	186	---	418	---	102	e60	---
TOTAL	2888	12197	12645	9016	20816	7406	14595	14256	14706	6478	2362	1636
MEAN	93.2	407	408	291	718	239	486	460	490	209	76.2	54.5
MAX	176	2350	1550	465	2780	290	1470	764	925	362	99	64
MIN	49	62	192	110	70	186	175	238	293	102	60	47
AC-FT	5730	24190	25080	17880	41290	14690	28950	28280	29170	12850	4690	3250
CFSM	1.18	5.15	5.17	3.69	9.10	3.03	6.17	5.83	6.21	2.65	.97	.69
IN.	1.36	5.75	5.96	4.25	9.81	3.49	6.88	6.72	6.93	3.05	1.11	.77

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1996, BY WATER YEAR (WY)

	MEAN	69.0	128	171	135	160	157	297	628	623	276	89.7	57.0
MAX	248	407	532	464	718	501	595	1172	1312	716	265	99.9	
(WY)	1948	1996	1976	1974	1996	1972	1943	1956	1974	1974	1974	1978	
MIN	28.4	30.3	33.2	31.2	37.7	46.6	103	203	189	67.8	41.1	34.5	
(WY)	1988	1994	1953	1979	1985	1977	1955	1977	1992	1977	1941	1987	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR			FOR 1996 WATER YEAR			WATER YEARS 1940 - 1996		
ANNUAL TOTAL	119089			119001					
ANNUAL MEAN	326			325					
HIGHEST ANNUAL MEAN							233		
LOWEST ANNUAL MEAN							379		
HIGHEST DAILY MEAN							94.2		
LOWEST DAILY MEAN							1977		
ANNUAL SEVEN-DAY MINIMUM							3070		
ANNUAL RUNOFF (AC-FT)							20		
ANNUAL RUNOFF (CFSM)							24		
ANNUAL RUNOFF (INCHES)							Nov 23 1993		
10 PERCENT EXCEEDS							168400		
50 PERCENT EXCEEDS							2.95		
90 PERCENT EXCEEDS							40.04		
							580		
							121		
							46		

e Estimated



## YAKIMA RIVER BASIN

12500450 YAKIMA RIVER ABOVE AHTANUM CREEK, AT UNION GAP, WA

LOCATION.--Lat 46°32'04", long 120°27'58", in NW 1/4 NE 1/4 sec.17, T.12 N., R.19 E., Yakima County, Hydrologic Unit 17030003, on left bank 2,200 ft upstream from Ahtanum Creek, 0.8 mi upstream from Wapato Dam, 1.4 mi southeast of Union Gap, and at about mile 107.3.

DRAINAGE AREA.--3,479 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1966 to current year.

GAGE.--Water-stage recorder. Datum of gage is 900.00 ft above sea level; gage readings have been reduced to elevations above sea level. Prior to Apr. 4, 1967, at site 1,200 ft downstream at same datum.

REMARKS.--Records good except for those below 700 ft<sup>3</sup>/s and estimated daily discharges, which are poor. Diversions upstream from station for irrigation of about 212,000 acres. Flow partly regulated by Keechelus, Kachess, Cle Elum, Bumping, and Rimrock Lakes. Records at this site plus those for Ahtanum Creek at Union Gap (station 12502500) are equivalent to discontinued station 12503000, Yakima River at Union Gap. Chemical analyses, water years 1969, 1971, March 1975 to September 1993. Water temperature, March 1981 to December 1981.

AVERAGE DISCHARGE.--30 years (water years 1967-96), 3,567 ft<sup>3</sup>/s, 2,584,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,300 ft<sup>3</sup>/s Feb. 9, 1996, elevation, 953.88 ft, from high-water mark, from rating curve extended above 18,000 ft<sup>3</sup>/s on basis of discharge information provided by the Bureau of Reclamation for their station on the Yakima River near Parker; minimum daily discharge, 300 ft<sup>3</sup>/s Jan. 1, 1979.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 53,300 ft<sup>3</sup>/s Feb. 9, elevation, 953.88 ft, from high-water mark, from rating curve extended above 18,000 ft<sup>3</sup>/s on basis of discharge information provided by the Bureau of Reclamation for their station on the Yakima River near Parker; minimum discharge, 1,290 ft<sup>3</sup>/s Nov. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2680	1400	e17000	e4800	e2900	8390	4740	e6000	e5600	3910	3560	3480
2	2570	1350	e13000	e5400	e3000	7730	4500	e4500	e6000	3890	3760	3440
3	2740	1320	e9600	e6200	e3300	7510	4200	e4000	e7000	4030	3940	3440
4	2600	1350	e8400	e7200	e3500	7670	3690	e3700	e9000	4060	3910	3450
5	2330	1360	e8600	e7100	e4000	7220	3460	e3500	e10000	3870	3870	3170
6	2280	1370	e9600	e6900	e8000	6500	3600	e3300	e9000	3460	3690	3230
7	2260	1480	e12200	e7200	e12000	6190	4350	e3700	e8400	3440	3610	3140
8	2310	1720	e10300	e8000	e25000	5950	6400	e4200	e8000	3680	3630	2990
9	2320	e3700	e10200	e8800	e44000	5870	8560	e4000	e8500	3890	3610	3040
10	2330	4280	e10100	e9000	e34000	6220	9600	e4500	e9000	3900	3620	3090
11	2610	e3600	e10900	e9000	e24000	6830	8850	e5000	e9200	3790	3680	2830
12	2960	e5700	e11000	e8800	e19000	7510	7900	e5500	5330	3690	3670	2770
13	2620	5120	e10800	e8500	e15000	8020	6890	e6000	5010	3860	3640	2870
14	2170	5590	10400	e8300	e13500	7990	6280	e6600	4970	3960	3670	2910
15	1700	6240	10700	e9200	e13000	8320	5810	e7200	5160	3940	3690	3050
16	1640	5810	9760	e9600	e13500	8650	6230	e8000	5220	3800	3790	2880
17	2380	5180	9140	e10000	e14000	8560	7570	e9000	5200	3770	3770	2790
18	2490	4920	8770	e9000	14300	8300	8120	e10000	5000	4010	3770	2680
19	2300	4940	9000	e8500	16300	8230	7920	e10500	4570	3940	3740	2720
20	2010	4530	9060	e8200	16200	8010	7580	e10500	4200	3800	3610	2650
21	1780	4130	8870	e7800	15500	7820	7310	e10200	4080	3640	3650	2590
22	1610	3780	8490	e7500	14200	7770	7010	e9800	4210	3670	3610	2600
23	1550	3430	7180	e7200	13900	7540	6620	e9000	4290	3570	3600	2590
24	1600	3800	6300	e6900	14000	7270	e8800	e8400	4560	3750	3630	2510
25	1510	e4300	5760	e6600	13500	6780	e9000	e7600	4440	3710	3560	2450
26	1480	e5200	5450	e6200	12900	6500	e9400	e7600	4080	3720	3700	2420
27	1810	e5600	4920	e5800	12300	6280	e9500	e8600	3820	3800	3580	2470
28	1770	e5800	4180	e5500	10600	5980	e9200	e8800	3770	3830	3460	2390
29	1660	e10400	3950	e5200	9090	5370	e8800	e8500	3770	3850	3430	2410
30	1550	e21000	4120	e4000	---	4950	e7800	e7000	3810	3820	3340	2390
31	1450	---	e4500	e3000	---	4790	---	e6000	---	3720	3470	---
TOTAL	65070	138400	272250	225400	414490	220720	209690	211200	175190	117770	113260	85440
MEAN	2099	4613	8782	7271	14290	7120	6990	6813	5840	3799	3654	2848
MAX	2960	21000	17000	10000	44000	8650	9600	10500	10000	4060	3940	3480
MIN	1450	1320	3950	3000	2900	4790	3460	3300	3770	3440	3340	2390
AC-FT	129100	274500	540000	447100	822100	437800	415900	418900	347500	233600	224700	169500

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1967 - 1996, BY WATER YEAR (WY)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	1650	1847	2928	2956	3698	3942	4569	5845	5658	3720	3331	2688																		
MAX	2212	5354	11200	7490	14290	14340	12780	13050	13410	6878	4123	3355																		
(WY)	1973	1991	1976	1976	1996	1972	1972	1972	1974	1974	1974	1974																		
MIN	896	710	882	540	889	752	1608	2475	2641	2747	2351	1411																		
(WY)	1980	1988	1994	1979	1977	1977	1977	1977	1994	1994	1994	1979																		

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1967 - 1996
ANNUAL TOTAL	1718450	2248880	
ANNUAL MEAN	4708	6144	3567
HIGHEST ANNUAL MEAN			6622
LOWEST ANNUAL MEAN			1884
HIGHEST DAILY MEAN	21000	Nov 30	44000
LOWEST DAILY MEAN	1320	Nov 3	300
ANNUAL SEVEN-DAY MINIMUM	1370	Oct 31	387
ANNUAL RUNOFF (AC-FT)	3409000		2584000
10 PERCENT EXCEEDS	8580		6790
50 PERCENT EXCEEDS	3840		3000
90 PERCENT EXCEEDS	2220		1220

e Estimated

## YAKIMA RIVER BASIN

403

12502500 AHTANUM CREEK AT UNION GAP, WA

LOCATION.--Lat 46°32'08", long 120°28'20", in SE 1/4 SW 1/4 sec.8, T.12 N., R.19 E., Yakima County, Hydrologic Unit 17030003, on right downstream wingwall of Union Pacific Railway bridge at Union Gap, 1.0 mi south of town of Union Gap, and at mile 0.6.

DRAINAGE AREA.--173 mi<sup>2</sup>.

PERIOD OF RECORD.--May to November 1904, August 1907 to July 1908, March to October 1910, April 1911 to September 1914, May 1951 to April 1953, August 1960 to current year. Published as "near Yakima" 1904, 1907-08, 1910-12. Records for water years 1913-14 are published in WSP 1286.

REVISED RECORDS.--WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 940 ft above sea level, from topographic map. Prior to Sept. 30, 1914, nonrecording gage at approximately same site at various datums. May 12, 1951 to Sept. 30, 1972, water-stage recorder at present site at datum 3.00 ft higher.

REMARKS.--Records poor. Extreme high flows may include transbasin flow from Wide Hollow Creek. Diversions and ground-water withdrawals for irrigation of about 9,000 acres upstream from station. Return from transbasin irrigation flows contribute to base flow. Chemical data (irrigation seasons only) for 1975-76 water years. Water temperature records March to December 1981.

AVERAGE DISCHARGE.--36 years (water years 1961-96), 77.8 ft<sup>3</sup>/s, 56,340 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,100 ft<sup>3</sup>/s Jan. 16, 1974, gage height, 10.36 ft; maximum gage height, 13.5 ft, from high-water mark, backwater from Yakima River; no flow many days during September and October 1904.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 2,660 ft<sup>3</sup>/s Feb. 9, gage height, 13.5 ft, from high-water mark, backwaters from Yakima River, on basis of contracted-opening measurement of peak flow; minimum discharge, 9.9 ft<sup>3</sup>/s July 26, 27.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	20	e270	135	e65	281	191	217	170	51	18	20
2	18	20	e190	135	e60	269	187	214	175	47	18	24
3	17	20	e170	171	e60	261	181	199	188	47	22	24
4	18	21	e160	193	e65	268	176	187	213	44	23	23
5	18	22	154	187	e70	276	174	181	219	40	23	25
6	19	22	131	183	e80	260	180	168	210	34	21	25
7	18	24	134	187	e350	269	206	154	205	34	21	24
8	16	23	119	203	e1500	252	259	141	198	34	21	24
9	15	23	101	198	e2200	259	300	130	190	29	18	23
10	16	24	105	194	e1300	268	346	131	176	27	21	18
11	17	24	e150	189	1110	278	355	130	163	24	21	12
12	15	65	e200	183	856	300	330	140	159	25	18	12
13	13	46	e500	178	734	309	286	165	154	22	16	13
14	15	52	346	177	656	307	264	192	150	21	16	17
15	13	49	301	207	592	315	247	211	148	20	14	28
16	12	48	254	302	555	312	255	225	145	21	12	27
17	11	38	228	291	549	308	257	238	140	19	15	26
18	11	41	209	267	591	297	243	240	129	28	17	23
19	11	44	190	254	637	290	224	235	116	29	16	22
20	12	40	180	237	628	281	222	220	105	28	15	25
21	14	39	172	224	581	272	205	217	95	27	16	25
22	12	37	163	202	520	263	203	215	93	27	18	23
23	14	37	151	190	478	250	216	195	94	19	20	20
24	16	40	143	188	428	239	330	182	93	15	19	14
25	17	54	134	174	401	224	317	179	86	14	21	13
26	16	69	129	162	364	227	289	185	82	11	21	17
27	16	68	127	171	342	215	265	197	77	15	21	17
28	15	82	124	154	309	200	241	200	59	18	21	17
29	15	e200	127	145	289	194	237	197	61	17	20	14
30	15	e260	126	106	--	193	229	187	61	13	20	13
31	18	--	140	73	--	191	--	178	--	15	20	--
TOTAL	472	1552	5628	5860	16370	8128	7415	5850	4154	815	583	608
MEAN	15.2	51.7	182	189	564	262	247	189	138	26.3	18.8	20.3
MAX	19	260	500	302	2200	315	355	240	219	51	23	28
MIN	11	20	101	73	60	191	174	130	59	11	12	12
AC-FT	936	3080	11160	11620	32470	16120	14710	11600	8240	1620	1160	1210

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1961 1996, BY WATER YEAR (WY)

	20.6	29.4	54.5	76.1	126	137	133	158	135	32.9	15.3	20.2
MEAN	20.6	29.4	54.5	76.1	126	137	133	158	135	32.9	15.3	20.2
MAX	34.4	96.7	210	413	564	408	270	383	438	124	26.2	31.8
(WY)	1983	1963	1978	1974	1996	1972	1974	1995	1972	1974	1976	1978
MIN	9.30	8.99	8.64	10.3	15.7	21.5	16.5	22.8	12.2	8.31	7.33	9.34
(WY)	1978	1995	1989	1993	1994	1994	1977	1977	1992	1994	1977	1981

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1961 - 1996

ANNUAL TOTAL	54705.3	57435	77.8	
ANNUAL MEAN	150	157	171	1974
HIGHEST ANNUAL MEAN			20.2	1994
LOWEST ANNUAL MEAN			2560	Jan 16 1974
HIGHEST DAILY MEAN	1000	Feb 2	2200	Feb 9
LOWEST DAILY MEAN	8.6	Sep 21	11	Oct 17
ANNUAL SEVEN-DAY MINIMUM	10	Sep 17	12	Oct 16
ANNUAL RUNOFF (AC-FT)	108500		113900	56340
10 PERCENT EXCEEDS	366		300	197
50 PERCENT EXCEEDS	113		131	35
90 PERCENT EXCEEDS	14		16	12

e Estimated

## YAKIMA RIVER BASIN

12508990 YAKIMA RIVER AT MABTON, WA

LOCATION.--Lat 46°13'53", long 119°59'54", in SW 1/4 SW 1/4 sec.30, T.9 N., R.23 E., Yakima County, Hydrologic Unit 17030003, on right bank at highway bridge, at east boundary of Yakama Indian Reservation, 1.1 mi north of Mabton, and at mile 59.8.

DRAINAGE AREA.--5,359 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1970 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 643 ft above sea level, from topographic map. Prior to Oct. 1, 1976, at datum 10 ft higher.

REMARKS.--Records fair. Flow affected by storage in five reservoirs, by diversions upstream from station for irrigation upstream and downstream from station of about 424,000 acres, and by return flow. Water temperatures March 1981 to February 1982.

AVERAGE DISCHARGE.--26 years (water years 1971-96), 3,337 ft<sup>3</sup>/s, 2,417,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 49,500 ft<sup>3</sup>/s Feb. 10, 1996, gage height, 28.18 ft present datum, from high-water mark; minimum daily discharge, 320 ft<sup>3</sup>/s Mar. 25, 1977.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 49,500 ft<sup>3</sup>/s Feb. 10, gage height, 28.18 ft, from high water mark; minimum discharge, 1,390 ft<sup>3</sup>/s Aug. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1730	1790	e19000	5770	3950	e12000	e6200	7560	4350	1810	1600	1690
2	1770	1720	e24000	6620	3690	e11000	e6100	6040	4040	1850	1510	1750
3	1840	1670	e18000	6800	e3700	e10000	5950	5070	4210	1780	1410	1800
4	1960	1660	13100	8540	e4000	e9800	5310	4300	5100	1740	1530	1840
5	1840	1660	9960	9170	e4500	e10000	4840	3860	7800	1810	1710	1870
6	1630	1650	9780	8740	5820	e9500	4700	3580	8200	1890	1740	1780
7	1580	1670	11200	8580	10100	e8800	4890	3220	6770	1780	1740	1950
8	1540	1740	11500	9160	16900	e8400	5950	2950	5940	1570	1620	1830
9	1560	2250	11100	10100	29500	e8200	8090	2990	6300	1510	1510	1730
10	1540	4770	11200	11100	e44000	e8000	9990	2810	6320	1570	1470	1690
11	1560	4310	11800	11100	44000	e8400	10700	2690	5560	1640	1460	1780
12	1900	5170	12700	10700	33500	e8800	10100	2840	4490	1660	1500	1600
13	2160	6770	13000	10300	25800	e9500	8920	3580	3680	1560	1520	1560
14	2600	6090	12200	9870	21900	e10000	8060	4320	3270	1470	1500	1640
15	2160	7020	12500	10000	19800	e10000	7480	5030	3320	1570	1520	1800
16	1830	7300	12300	12100	18800	e10200	7000	6400	3460	1700	1490	2000
17	1830	6920	11400	13300	e17500	e10800	7800	7530	3560	1680	1570	1990
18	2240	6260	10700	12100	e17000	e10500	8720	7800	3440	1570	1590	1950
19	2330	6260	10400	10600	e18000	e10200	8850	8180	3140	1620	1660	1910
20	2350	6060	10500	10000	e19500	e10000	8680	8480	2600	1850	1730	1920
21	2300	5570	10400	10100	e20000	e9800	8440	8150	2210	1890	1830	1860
22	2160	5130	10100	9720	e19500	e9400	8130	7500	2110	1800	1810	1850
23	2040	4720	9430	9270	e18500	e9000	7670	7110	2270	1720	1790	1880
24	2010	4500	8110	8880	e17500	e8800	7920	6480	2490	1670	1770	1910
25	2050	5220	7420	8490	e17500	e8600	10800	5930	2810	1560	1710	1790
26	1880	6810	6850	8100	e16500	e8000	10900	5650	e2950	1570	1840	1760
27	1890	7520	6480	7620	e15500	e7800	11600	6090	e2550	1500	1990	1740
28	2080	7300	5700	7380	e14500	e7400	11500	6990	e2150	1500	1950	1750
29	2010	9080	5000	7110	e13500	e7200	10800	7070	e1950	1540	1770	1720
30	1930	13900	4710	6460	---	e6600	9770	6280	e1900	1600	1650	1700
31	1850	---	4800	4930	---	e6200	---	5230	---	1620	1630	---
TOTAL	60150	152490	335340	282710	514960	282900	245860	171710	118940	51600	51120	54040
MEAN	1940	5083	10820	9120	17760	9126	8195	5539	3965	1665	1649	1801
MAX	2600	13900	24000	13300	44000	12000	11600	8480	8200	1890	1990	2000
MIN	1540	1650	4710	4930	3690	6200	4700	2690	1900	1470	1410	1560
AC-FT	119300	302500	665100	560800	1021000	561100	487700	340600	235900	102300	101400	107200

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1971 - 1996, BY WATER YEAR (WY)

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	1866	2403	3716	4010	4879	5032	4593	4597	4013	1829	1498	1718														
MAX	2532	5144	12030	9554	17760	16580	13350	11970	12610	5320	2155	2309														
(WY)	1973	1991	1976	1974	1996	1972	1972	1972	1972	1974	1976	1978														
MIN	856	1333	1427	1214	1019	543	607	936	1014	658	755	814														
(WY)	1980	1988	1994	1979	1977	1977	1977	1977	1994	1994	1979	1979														

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1971 - 1996
ANNUAL TOTAL	1779890	2321820	
ANNUAL MEAN	4876	6344	3337
HIGHEST ANNUAL MEAN			6566
LOWEST ANNUAL MEAN			1215
HIGHEST DAILY MEAN	24000	Dec 2	44000
LOWEST DAILY MEAN	1290	Aug 6	1410
ANNUAL SEVEN-DAY MINIMUM	1390	Aug 1	1490
ANNUAL RUNOFF (AC-FT)	3530000		4605000
10 PERCENT EXCEEDS	9810		11900
50 PERCENT EXCEEDS	3630		5080
90 PERCENT EXCEEDS	1560		1620

e Estimated

## 12510500 YAKIMA RIVER AT KIONA, WA

LOCATION.--Lat 46°15'13", long 119°28'37", in SE 1/4 NE 1/4 sec.19, T.9 N., R.27 E., Benton County, Hydrologic Unit 17030003, on left bank just upstream from abandoned highway bridge pier at Kiona, 0.1 mi upstream from highway bridge, 3.6 mi downstream from Corral Canyon Creek, 5.0 mi downstream from intake of Kiona Canal, and at mile 29.9.

DRAINAGE AREA.--5,615 mi<sup>2</sup>.

PERIOD OF RECORD.--August to December 1895 (gage heights only, fragmentary), August 1896 to March 1915, February 1933 to current year. Monthly discharge only 1887 to 1933, published in WSP 1316 and are available at the Pasco, Washington field office.

REVISED RECORDS.--WSP 214: 1905. WSP 1122: 1934(M). WSP 1216: 1949-50. WSP 1286: 1907(M), 1909, 1936. WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 454.41 ft above sea level. Prior to Mar. 31, 1915, nonrecording gages at approximately same site and datum. Feb. 6, 1933, to July 26, 1934, nonrecording gage at present site and datum.

REMARKS.--Records good. Diversion upstream from station for irrigation of about 424,000 acres. Flow affected by diversions and by Keechelus, Kachess, Cle Elum, Bumping, and Rimrock lakes. The Kiona Canal bypasses station with a mean flow of approximately 23 ft<sup>3</sup>/s for irrigation of about 1,100 acres downstream from station. Diversion by the Kennewick Canal, which bypasses station, began in August 1956, and diverts about 96,000 acre-ft per year. Chemical analyses, Dec. 1952 to Sept. 1994. Water temperatures, Dec. 1952 to Sept. 1980, March 1981 to Feb. 1982. Suspended sediment, June 1977 to Oct. 1980.

AVERAGE DISCHARGE.--63 years (water years 1934-96), 3,510 ft<sup>3</sup>/s, 2,543,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 67,000 ft<sup>3</sup>/s Dec. 23, 1933, gage height, 21.57 ft, from high-water marks; minimum observed discharge, 105 ft<sup>3</sup>/s Sept. 11, 1906.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 49,400 ft<sup>3</sup>/s Feb. 11, gage height, 20.98 ft, from high-water mark, from rating extended above 28,000 ft<sup>3</sup>/s; minimum discharge, 1,440 ft<sup>3</sup>/s Aug. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2130	2340	20800	5300	e3650	12200	6180	8030	4560	1980	1630	1870
2	2190	2280	25600	6360	e3600	11200	6080	6200	4040	1910	1530	1950
3	2290	2230	20900	6640	e3700	10300	5790	5170	4110	1820	1480	2030
4	2380	2200	15000	7600	4100	9990	5270	4290	4500	1850	1630	2080
5	2370	2230	11100	9250	4570	10200	4750	3790	6930	1940	1810	2120
6	2150	2160	10500	9070	5270	9590	4560	3500	8000	1960	1890	2090
7	1970	2150	11500	8690	8470	8900	4620	3240	7060	1790	1850	2130
8	1910	2240	12700	8980	16100	8560	5010	2860	6050	1580	1690	2200
9	1920	2420	12800	9910	24700	8230	7240	2830	6040	1630	1590	2050
10	1870	5200	12600	11000	43600	8110	9100	2790	6330	1650	1540	1940
11	1870	5200	12700	11800	45900	8450	10200	2640	5830	1740	1520	1920
12	1990	5200	13300	11500	33300	8980	10100	2650	4830	1700	1550	1920
13	2430	7200	13900	11100	24600	9620	9150	3080	3950	1580	1580	1770
14	2950	6480	13100	10600	20900	10100	8170	3850	3480	1540	1590	1770
15	2820	7010	13100	10300	19200	10300	7520	4550	3370	1670	1580	1960
16	2570	7590	13300	11300	18300	10500	7020	5820	3500	1760	1590	2160
17	2420	7260	12500	13300	17700	10900	7180	7010	3660	1700	1640	2280
18	2780	6630	11700	13300	17300	10800	8410	7520	3650	1650	1730	2250
19	3030	6400	11200	11700	18200	10400	8680	7870	3420	1780	1780	2140
20	3080	6360	11200	10700	19800	10100	8560	8200	3020	1990	1860	2150
21	3080	5920	11200	10700	20400	9830	8320	8260	2560	2010	1980	2160
22	2920	5500	10900	10400	20000	9480	8030	7670	2330	1880	2080	2120
23	2720	5160	10400	9780	18800	9190	7610	7300	2340	1740	2060	2140
24	2590	4860	8740	9300	17900	8870	7310	6730	2610	1630	2030	2190
25	2610	5250	7730	8830	17600	8710	9780	6110	3130	1520	1960	2110
26	2510	6540	7060	8320	17000	8070	10600	5750	2990	1530	1990	1990
27	2380	7640	6670	7760	15900	7890	10900	5840	2580	1460	2150	1930
28	2580	7460	6070	7370	15000	7570	11200	6720	2210	1460	2280	1930
29	2590	8300	5360	7120	13900	7310	10800	7030	2000	1540	2190	1910
30	2500	12800	4950	6690	---	6650	9970	6460	1980	1620	2000	1870
31	2430	---	4890	5260	---	6310	---	5470	---	1650	1870	---
TOTAL	76030	160210	363470	289930	509460	287310	238110	169230	121060	53260	55650	61130
MEAN	2453	5340	11720	9353	17570	9268	7937	5459	4035	1718	1795	2038
MAX	3080	12800	25600	13300	45900	12200	11200	8260	8000	2010	2280	2280
MIN	1870	2150	4890	5260	3600	6310	4560	2640	1980	1460	1480	1770
AC-FT	150800	317800	720900	575100	1011000	569900	472300	335700	240100	105600	110400	121300

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1934 - 1996, BY WATER YEAR (WY)

	MEAN	2265	2851	4046	3960	4554	4615	4609	5173	4814	1921	1572	1829
MAX	4252	6293	17330	14100	17570	16750	13190	13090	16470	5398	2333	2549	
(WY)	1950	1960	1934	1934	1996	1972	1956	1956	1948	1954	1976	1978	
MIN	1021	1462	1546	1335	1163	486	493	902	869	598	751	784	
(WY)	1980	1988	1936	1937	1977	1977	1977	1977	1994	1994	1979	1979	

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1934 - 1996

ANNUAL TOTAL	1869750	2384850	
ANNUAL MEAN	5123	6516	3510
HIGHEST ANNUAL MEAN			7055
LOWEST ANNUAL MEAN			1293
HIGHEST DAILY MEAN	25600	Dec 2	59400
LOWEST DAILY MEAN	1230	Aug 6	225
ANNUAL SEVEN-DAY MINIMUM	1360	Aug 2	263
ANNUAL RUNOFF (AC-FT)	3709000	4730000	2543000
10 PERCENT EXCEEDS	10400	12700	7200
50 PERCENT EXCEEDS	3780	5200	2390
90 PERCENT EXCEEDS	1640	1770	1360

e Estimated

## ESQUATZEL COULEE BASIN

12512550 PROVIDENCE COULEE NEAR CUNNINGHAM, WA

LOCATION.--Lat 46°48'11", long 118°48'55", in SE 1/4 NE 1/4 sec.8, T.15 N., R.32 E., Adams County, Hydrologic Unit 17020016, on right bank, 0.8 mi upstream from State Highway 26, 0.9 mi downstream from Cunningham Coulee, and 1.4 mi southwest of Cunningham.

DRAINAGE AREA.--52.1 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1977 to current year.

GAGE.--Water-stage recorder. Elevation of gage is 1,115 ft above sea level, from topographic map. Prior to Oct. 1, 1985, at datum 10.00 ft lower.

REMARKS.--No estimated daily discharges. Records good. No known diversions. Undetermined amount of ground-water withdrawal for irrigation upstream from gage. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--8 years (water years 1978-85), 0.89 ft<sup>3</sup>/s, 645 acre-ft/yr. Average discharge is not computed after the 1985 water year because of ground-water withdrawals and return flows from irrigation occurring during the summer months upstream from the gage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 711 ft<sup>3</sup>/s Feb. 9, 1979, gage height, 15.40 ft, present datum; no flow most days each year.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Feb. 21, 1956, reached a discharge of 2,160 ft<sup>3</sup>/s at a site 1.5 mi upstream, at station 12512500 Providence Coulee at Cunningham.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 278 ft<sup>3</sup>/s Feb. 8, gage height, 13.40 ft; no flow most days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
3	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
4	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
5	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
6	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
7	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
8	.00	.00	.00	.00	.91	.00	.00	.00	.00	.00	.00	.00
9	.00	.00	.00	.00	.24	.00	.00	.00	.00	.00	.00	.00
10	.00	.00	.00	.00	.07	.00	.00	.00	.00	.00	.00	.00
11	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01
12	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
13	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
14	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
15	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
16	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
17	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
18	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
19	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
20	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
21	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
22	.00	.00	.00	.00	.00	.00	.00	.29	.00	.00	.00	.00
23	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
24	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
25	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
26	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
27	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
28	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
29	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00
30	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00
31	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
TOTAL	0.00	0.00	0.00	0.00	115.07	0.00	0.00	0.29	0.00	0.00	0.02	0.02
MEAN	.000	.000	.000	.000	3.97	.000	.000	.009	.000	.000	.001	.001
MAX	.00	.00	.00	.00	.91	.00	.00	.29	.00	.00	.01	.01
MIN	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
AC-FT	.00	.00	.00	.00	228	.00	.00	.6	.00	.00	.04	.04
CAL YR 1995	TOTAL	0.00	MEAN .000	MAX .00	MIN .00	AC-FT .00						
WTR YR 1996	TOTAL	115.40	MEAN .32	MAX 91	MIN .00	AC-FT 229						



ESQUATZEL COULEE BASIN

407

12513000 ESQUATZEL COULEE AT CONNELL, WA

LOCATION.--Lat 46°39'49", long 118°51'44", in SW 1/4 SE 1/4 sec.25, T.14 N., R.31 E., Franklin County, Hydrologic Unit 17020016, on right bank, at Clark Street Bridge in Connell, and 7.8 mi downstream from Hatton Coulee.

DRAINAGE AREA.--234 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1952 to current year. Records published for period August 1959 to September 1964 include effluent from sewage treatment plant 0.8 mi downstream; records adjusted to exclude effluent October 1964 to June 1967.

REVISED RECORDS.--WSP 1933: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 820 ft above sea level, from topographic map. Prior to Aug. 7, 1959, at site 0.4 mi downstream at different datum, Aug. 7, 1959, to July 8, 1967, at site 0.9 mi downstream at different datum, July 9, 1967, to Oct. 28, 1981, at site 0.7 mi downstream at different datum, and Oct. 29, 1981, to Sept. 30, 1984 at datum 10 ft lower.

REMARKS.--Records poor. No diversion upstream from station. Most flow for October, and April through September is return and waste from water imported for irrigation, entering about 3 mi upstream on the right bank.

AVERAGE DISCHARGE.--33 years (water years 1953-85), 1.73 ft<sup>3</sup>/s, 1,253 acre-ft/yr, adjusted for effluent from sewage treatment plant 1959-64. Average discharge is not computed after the 1985 water year because of ground-water withdrawals and return flows from irrigation occurring during the summer months upstream from the gage.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,560 ft<sup>3</sup>/s Feb. 21, 1956, gage height, 12.68 ft, site and datum then in use; no flow at times during most years.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 1,130 ft<sup>3</sup>/s Feb. 8, gage height, 17.71 ft; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3.2	.00	.00	.00	.00	.00	.00	2.6	2.3	7.0	12	7.1
2	2.7	.00	.00	.00	.00	.00	.00	2.9	1.5	3.0	9.3	9.6
3	6.0	.00	.00	.00	.00	.00	.00	3.2	1.8	2.0	12	8.3
4	7.3	.00	.00	.00	.00	.00	.00	5.6	2.1	3.8	14	5.6
5	5.2	.00	.00	.00	.00	.00	.00	5.4	2.9	9.3	13	5.4
6	2.4	.00	.00	.00	.00	.00	7.1	4.0	3.1	17	9.9	5.9
7	2.6	.00	.00	.00	.00	.00	7.0	3.1	2.9	3.3	11	7.4
8	4.8	.00	.00	.00	556	.00	8.3	3.6	3.5	2.6	13	6.3
9	7.8	.00	.00	.00	e100	.00	5.0	2.5	6.5	2.4	9.0	2.5
10	5.6	.00	.00	.00	e10	.00	5.5	1.7	9.0	9.3	8.0	6.9
11	3.2	.00	.00	.00	e.00	.00	5.6	4.9	6.5	9.7	8.4	7.4
12	4.1	.00	16	.00	e.00	.00	6.1	5.7	3.4	4.7	6.5	5.9
13	7.0	.00	11	.00	e.00	.00	3.9	4.6	5.7	4.5	5.2	7.0
14	6.8	.00	.55	.00	e.00	.00	4.2	7.1	4.3	3.9	7.5	8.1
15	6.8	.00	.00	.00	e.00	.00	3.1	7.6	3.7	3.0	9.2	8.2
16	6.8	.00	.00	.00	e.00	.00	2.9	8.7	4.4	7.2	12	9.2
17	9.7	.00	.00	.00	e.00	.00	6.7	4.6	3.9	11	7.9	10
18	11	.00	.00	.00	e.00	.00	5.4	2.3	10	20	9.6	9.0
19	10	.00	.00	.00	e.00	.00	6.1	3.8	10	23	12	8.7
20	10	.00	.00	.00	e.00	.00	5.8	4.8	12	19	8.1	9.8
21	7.3	.00	.00	.00	e.00	.00	4.7	11	8.3	14	12	7.7
22	5.1	.00	.00	.00	.00	.00	4.3	4.9	10	8.5	10	7.3
23	6.2	.00	.00	.00	.00	.00	3.2	5.4	5.0	5.7	16	7.7
24	7.5	.00	.00	.00	.00	.00	4.8	3.6	13	3.2	14	6.5
25	10	.00	.00	.00	.00	.00	6.1	3.6	11	3.5	10	6.8
26	1.6	.00	.00	.00	.00	.00	3.5	2.5	11	6.1	9.7	7.4
27	.00	.00	.00	.00	.00	.00	4.5	2.4	18	10	9.8	11
28	.00	.00	.00	.00	.00	.00	3.5	3.1	25	8.7	12	8.9
29	.00	.00	.00	.00	.00	.00	4.9	1.7	15	10	9.7	11
30	.00	.00	.00	.00	---	.00	4.4	3.0	12	7.9	11	12
31	.00	---	.00	.00	---	.00	---	3.2	---	13	7.4	---
TOTAL	160.70	0.00	27.55	0.00	666.00	0.00	126.60	133.1	227.8	256.3	319.2	234.6
MEAN	5.18	.000	.89	.000	23.0	.000	4.22	4.29	7.59	8.27	10.3	7.82
MAX	11	.00	16	.00	556	.00	8.3	11	25	23	16	12
MIN	.00	.00	.00	.00	.00	.00	.00	1.7	1.5	2.0	5.2	2.5
AC-FT	319	.00	55	.00	1320	.00	251	264	452	508	633	465

CAL YR 1995 TOTAL 1420.87 MEAN 3.89 MAX 27 MIN .00 AC-FT 2820  
WTR YR 1996 TOTAL 2151.85 MEAN 5.88 MAX 556 MIN .00 AC-FT 4270

e Estimated

## COLUMBIA RIVER MAIN STEM

12514500 COLUMBIA RIVER ON CLOVER ISLAND, AT KENNEWICK, WA

LOCATION.--Lat 46°13'00", long 119°06'29", in NE 1/4 SW 1/4 sec.31, T.9 N., R.30 E., Benton County, Hydrologic Unit 17020016, on east end of U.S. Coast Guard wharf on south side of Clover Island, at the north city limit of Kennewick, 6.6 mi downstream from mouth of Yakima River, 4.4 mi upstream from mouth of Snake River, and at mile 328.6.

DRAINAGE AREA.--104,000 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.-- November 1987 to current year. Records for October 1963 to September 1966 (discharge) and October 1979 to February 1988 (elevations), published as Columbia River at Pasco (station 12514000) 1.4 mi upstream, are not equivalent for elevations because of fall between sites.

GAGE.--Water-stage recorder. Datum of gage is sea level (Corps of Engineers' bench mark).

REMARKS.--Gage is within the pool formed by McNary Dam.

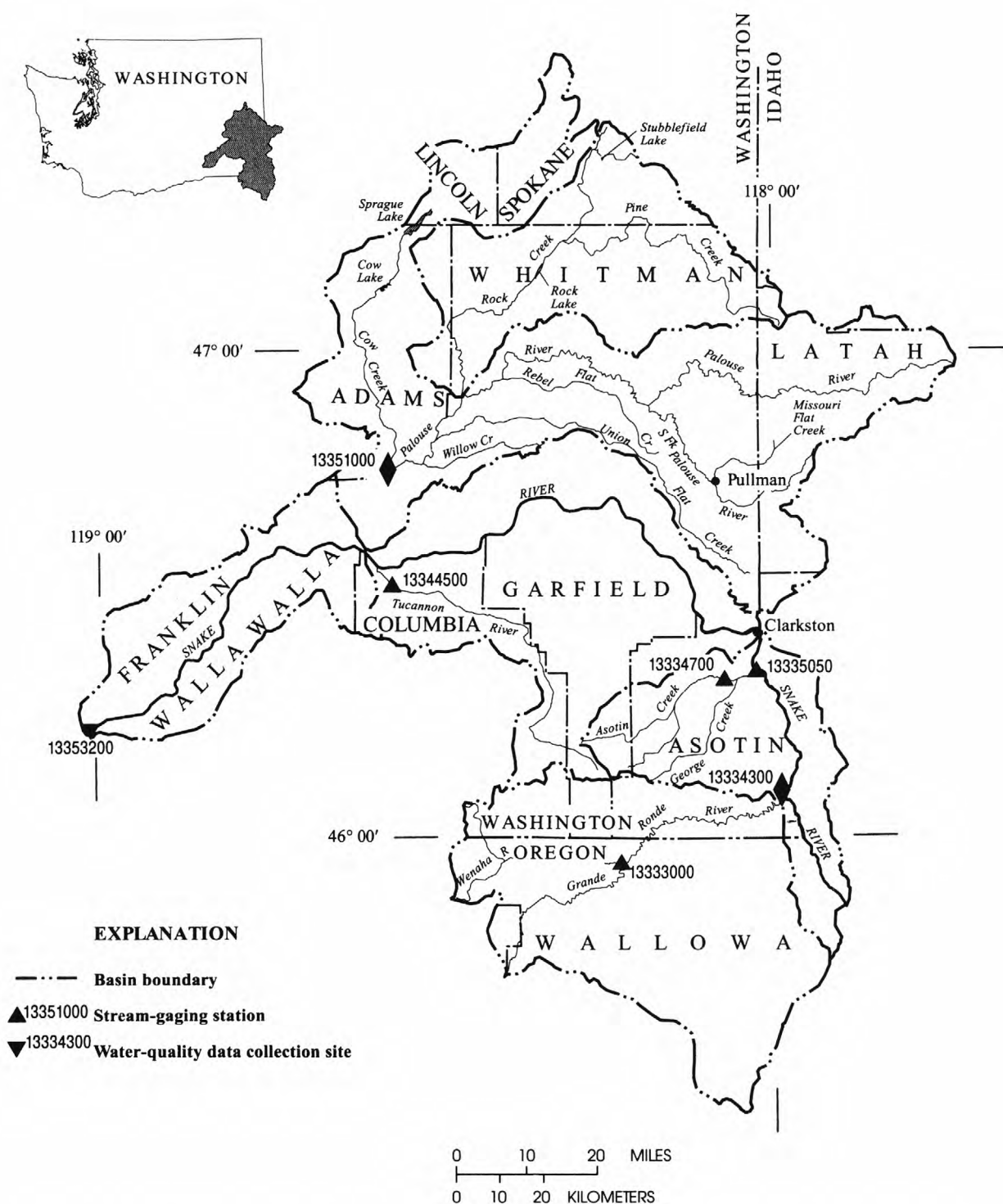
EXTREMES FOR PERIOD OF RECORD.--Maximum elevation, 342.05 ft May 29, 1996; minimum, 335.73 ft Dec. 31, 1988.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 342.05 ft May 29; minimum, 336.43 ft Aug. 4.

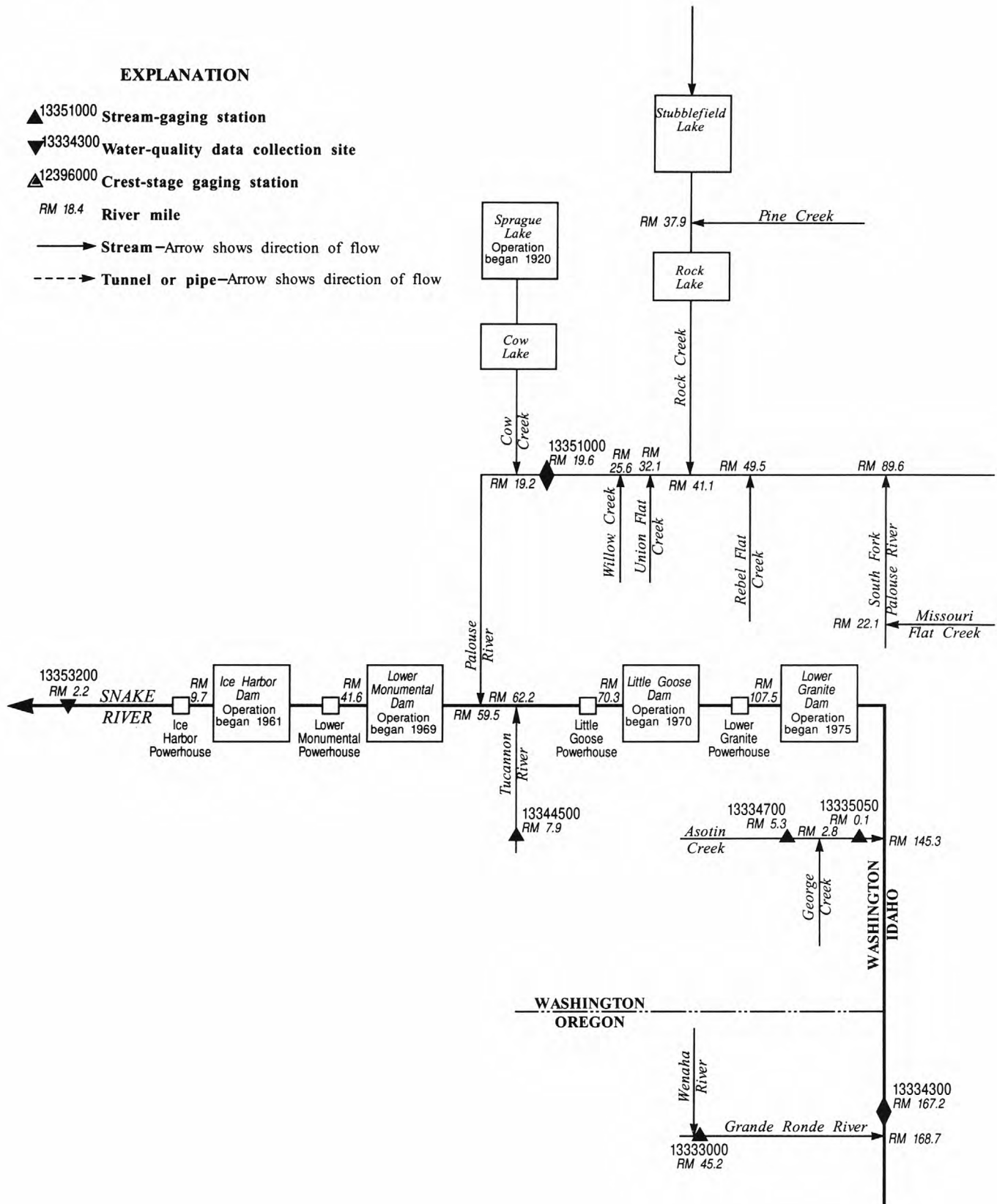
ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	338.90	338.98	341.12	339.27	---	339.97	339.39	340.45	341.01	339.68	338.78	339.94
2	338.89	338.63	341.06	339.28	---	339.67	339.41	340.37	340.63	339.95	338.58	339.55
3	339.71	339.07	340.55	339.40	---	339.09	339.55	340.33	340.76	339.74	337.71	339.53
4	339.60	339.47	340.47	339.37	---	339.46	339.53	340.58	340.99	340.28	337.05	339.12
5	339.13	339.94	340.37	339.64	---	339.96	339.83	340.08	340.50	339.78	338.34	339.36
6	339.05	339.71	340.22	339.82	---	339.72	339.55	340.18	340.58	340.12	338.60	339.20
7	339.24	339.34	340.06	340.04	339.81	339.81	339.29	340.06	340.25	340.79	338.71	338.69
8	339.17	339.59	340.22	340.35	340.60	339.42	338.77	339.99	340.51	340.44	339.64	338.83
9	338.98	339.95	340.02	340.19	340.75	339.57	340.27	339.33	340.98	339.85	339.43	338.66
10	339.03	339.79	339.82	340.41	340.80	339.43	340.78	338.93	341.50	339.03	339.44	338.91
11	338.77	339.84	339.91	340.71	339.72	340.07	340.59	339.57	341.35	339.07	339.97	339.52
12	338.86	339.56	340.19	340.52	339.57	340.07	340.37	340.05	340.69	339.46	340.02	340.24
13	339.58	339.27	339.38	340.37	339.94	340.15	340.07	339.83	340.46	339.70	339.33	340.30
14	339.41	339.44	338.98	340.19	339.58	340.40	340.66	340.39	340.58	339.84	338.52	339.62
15	339.16	338.95	339.64	340.35	339.82	340.43	340.43	339.68	340.81	339.29	338.54	339.14
16	339.08	339.04	340.46	340.52	340.64	340.32	340.02	339.10	341.07	339.36	338.84	338.95
17	339.15	339.35	340.29	340.74	340.64	340.36	340.45	339.83	341.30	339.06	339.35	338.79
18	339.53	339.68	340.46	340.17	340.85	339.71	340.90	340.36	340.99	339.01	339.87	339.22
19	339.43	339.54	340.28	340.58	340.72	340.06	340.78	340.87	340.61	339.62	339.91	339.55
20	339.05	338.98	339.84	340.72	340.92	339.93	340.31	340.88	340.12	340.42	339.86	338.92
21	338.98	339.91	339.62	340.64	340.48	339.50	340.66	340.55	340.19	340.03	340.20	339.15
22	338.96	340.29	339.94	340.33	340.69	339.94	340.51	340.76	340.07	340.63	340.18	339.19
23	338.78	339.76	339.91	339.46	340.41	339.52	340.02	341.35	340.14	340.29	339.05	339.29
24	338.94	338.99	339.64	339.30	340.07	339.34	340.67	341.07	340.05	340.40	337.86	339.88
25	338.95	338.96	339.53	338.82	340.77	339.40	340.88	340.94	340.16	340.28	337.71	340.15
26	339.11	339.63	339.75	338.58	339.93	339.48	340.94	340.70	340.43	340.14	338.46	339.86
27	339.08	340.26	339.83	338.87	340.22	339.16	341.35	340.42	340.45	340.29	338.61	339.58
28	338.88	340.53	339.73	339.21	340.72	339.21	340.49	340.83	340.60	340.17	339.24	339.14
29	338.88	339.85	339.24	339.45	340.55	338.89	340.27	341.70	340.64	339.57	339.75	339.25
30	338.90	340.66	339.49	---	---	338.39	340.20	341.22	339.62	338.24	340.07	339.32
31	339.12	---	339.49	---	---	338.84	---	340.82	---	338.73	340.16	---
MAX	339.71	340.66	341.12	---	---	340.43	341.35	341.70	341.50	340.79	340.20	340.30
MIN	338.77	338.63	338.98	---	---	338.39	338.77	338.93	339.62	338.24	337.05	338.66

CAL YR 1995 MAX 341.12 MIN 337.87



**Figure 59.** Location of surface-water and water-quality stations in the Grand Ronde River, Snake River, Asotin Creek and Palouse River Basins.



**Figure 60.** Schematic diagram showing surface-water and water-quality stations in the Grand Ronde River, Snake River, Asotin Creek and Palouse River Basins.

## 13333000 GRANDE RONDE RIVER AT TROY, OR

LOCATION.--Lat 45°56'45", long 117°27'00", in NE 1/4 NW 1/4 sec.4, T.5 N., R.43 E., Wallowa County, Hydrologic Unit 17060106, on left bank, on upstream side of bridge at Troy, 100 ft downstream from Wenaha River, and at mile 45.3.

DRAINAGE AREA.--3,275 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1944 to current year. Monthly discharge only August 1944, published in WSP 1317.

REVISED RECORDS.--WSP 1397: 1946(M), 1948-50.

GAGE.--Water-stage recorder. Datum of gage is 1,585.98 ft above sea level. Aug. 17, 1944, to Sept. 30, 1949, nonrecording gage at datum 10.85 ft lower. Oct. 1, 1949, to Sept. 5, 1963, water-stage recorder at datum 1.15 ft higher. Sept. 6, 1963 to Oct. 19, 1994, water-stage recorder at site 500 ft downstream, at present datum.

REMARKS.--Records fair. Flow slightly regulated by Wallowa Lake and small reservoirs. Diversions for irrigation upstream from station, chiefly in vicinity of La Grande, Enterprise, and Wallowa; one transbasin diversion from Big Sheep Creek and tributaries in Imnaha River basin for irrigation in Wallowa Valley. U.S. Geological Survey satellite telemeter and National Weather Service telemeter at station.

AVERAGE DISCHARGE.--52 years (water years 1945-96), 3,059 ft<sup>3</sup>/s, 2,216,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,800 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 13.76 ft, from rating curve extended above 20,000 ft<sup>3</sup>; minimum discharge, 321 ft<sup>3</sup>/s Nov. 25, 1993; result of freezeup, but may have been less during period of ice effect that day.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 9,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	1430	20,200	9.37	Apr. 10	1430	9,490	7.55
Dec. 15	1200	9,980	7.21	Apr. 24	1230	19,500	9.85
Feb. 9	1130	*a51,800	*13.76	May 18	0630	13,700	8.61
Feb. 19	0730	25,200	10.89	June 9	0730	9,490	7.46
Mar. 13	0230	10,900	7.94				

Minimum discharge, 822 ft<sup>3</sup>/s Oct. 1.

a From rating curve extended above 20,000 ft<sup>3</sup>/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	827	1000	18000	6680	e2160	5660	4540	7420	6480	3840	1300	980
2	858	919	15300	6690	e2200	5300	6330	6730	6370	4470	1240	984
3	1080	885	12200	7360	2400	5260	6480	6040	7010	5210	1260	975
4	1470	901	10600	7820	2620	5570	6150	5470	7940	4940	1240	967
5	1160	940	8880	6910	2660	5730	5790	4990	8360	4270	1220	979
6	1050	998	7460	6120	3730	5340	5720	4590	7460	3540	1170	997
7	1030	1050	6470	5560	25900	5120	6130	4280	7260	3070	1100	971
8	988	1210	5650	5510	40200	5600	7120	3960	8240	2920	1070	984
9	961	2290	5130	5980	e42200	6610	8400	3780	8560	2920	1020	954
10	953	1890	4860	7340	e28400	7720	9220	3610	7550	3000	1020	973
11	1020	2620	5360	7340	e20500	9320	8830	3610	6730	2740	1020	1010
12	1230	5060	12300	6710	e18500	10500	8260	3980	6090	2530	989	963
13	1190	4010	13700	6070	16600	10500	7600	4850	5550	2410	973	928
14	1100	5460	11100	5520	14100	9780	6870	6730	5590	2280	962	884
15	1040	4480	9970	5420	12700	9240	6340	8900	5760	2200	968	874
16	1010	3880	8910	6090	11700	8620	6270	11100	5600	2100	972	924
17	1000	3430	7780	6340	11800	7930	6540	12000	5800	1910	971	926
18	1080	3210	6900	5770	18600	7310	6300	13200	4960	1820	982	928
19	1110	3020	6190	5500	23400	6810	6060	12300	4150	1730	991	918
20	1040	2750	5640	5240	20100	6410	5800	11100	3610	1560	978	918
21	1010	2560	5220	5040	17600	5980	5500	10200	3240	1430	979	910
22	1030	2440	4730	4650	15500	5970	5230	10700	2960	1380	971	892
23	996	2440	4110	4270	13200	5780	7460	10600	2880	1360	960	872
24	975	2370	3640	4150	11300	5520	16800	9850	3310	1330	954	896
25	976	3070	3280	3910	9940	4990	15300	9130	3250	1310	960	927
26	1080	3910	3120	3690	8820	4720	13500	8790	3120	1290	949	932
27	1450	3920	2960	3540	7510	4490	11800	8690	3290	1230	939	924
28	1210	9670	2960	3370	6770	4260	10200	8430	3500	1220	976	924
29	1180	13900	3040	3250	6150	4120	9050	7930	3400	1240	1030	905
30	1130	18700	3150	2730	---	3910	8040	7470	3520	1390	987	873
31	1070	---	4960	e2160	---	3770	---	6930	---	1380	955	---
TOTAL	33304	112983	223570	166730	417260	197840	237630	237360	161540	74020	32106	28092
MEAN	1074	3766	7212	5378	14390	6382	7921	7657	5385	2388	1036	936
MAX	1470	18700	18000	7820	42200	10500	16800	13200	8560	5210	1300	1010
MIN	827	885	2960	2160	2160	3770	4540	3610	2880	1220	939	872
AC-FT	66060	224100	443500	330700	827600	392400	471300	470800	320400	146800	63680	55720

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

MEAN	877	1242	2001	2140	3234	4204	6241	7355	5692	2179	850	768
MAX	2559	3766	7212	6280	14390	11520	10780	13820	11610	4951	1385	1291
(WY)	1960	1996	1996	1974	1996	1972	1956	1948	1974	1975	1984	1984
MIN	528	618	685	702	769	888	2257	2368	1501	520	438	414
(WY)	1988	1988	1945	1979	1977	1977	1968	1977	1992	1977	1992	1994

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1945 - 1996
ANNUAL TOTAL	1744999	1922435	
ANNUAL MEAN	4781	5253	3059
HIGHEST ANNUAL MEAN			5253
LOWEST ANNUAL MEAN			1136
HIGHEST DAILY MEAN	18700	Nov 30	42200
LOWEST DAILY MEAN	614	Sep 22	827
ANNUAL SEVEN-DAY MINIMUM	639	Sep 20	905
ANNUAL RUNOFF (AC-FT)	3461000	3813000	2216000
10 PERCENT EXCEEDS	9850	10600	7440
50 PERCENT EXCEEDS	4010	4130	1620
90 PERCENT EXCEEDS	830	968	694

e Estimated



## SNAKE RIVER MAIN STEM

13334300 SNAKE RIVER NEAR ANATONE, WA

LOCATION.--Lat 46°05'50", long 116°58'36", in SE 1/4 SE 1/4 NE 1/4 sec.12, T.7 N., R.46 E., Asotin County, Hydrologic Unit 17060103, on left bank 1.2 mi downstream from Grande Ronde River, 7.8 mi east of Anatone, 22 mi south of Clarkston, and at mile 167.2.

DRAINAGE AREA.--92,960 mi<sup>2</sup>, approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--July 1958 to current year.

REVISED RECORDS.--WDR WA-76-1: 1974 and 1975.

GAGE.--Water-stage recorder. Datum of gage is 806.78 ft above sea level.

AVERAGE DISCHARGE.--38 years (water years 1959-96), 35,290 ft<sup>3</sup>/s, 25,570,000 acre-ft/yr, regulated period.

REMARKS.--Records good except those for Dec. 10 to Jan. 3, Apr. 16, Apr. 20-23, May 4-7, which are poor. Station equipment includes satellite telemetry. Diversions upstream from station for irrigation of about 4,090,000 acres, of which about 750,000 acres are irrigated by withdrawals from ground water. Flow regulated by many reservoirs upstream from station with a total usable capacity of more than 10,000,000 acre-feet, the most effective of which is Brownlee Reservoir 117.8 mi upstream. Diurnal fluctuations caused by Hells Canyon powerplant. U.S. Geological Survey satellite telemeter at station.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 191,000 ft<sup>3</sup>/s June 18, 1974, gage height, 24.45 ft; minimum discharge, 6,010 ft<sup>3</sup>/s Sept. 2, 1958, gage height, 1.29 ft.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 151,000 ft<sup>3</sup>/s June 10, gage height, 20.10 ft; minimum discharge, 12,800 ft<sup>3</sup>/s Sept. 13, gage height, 3.23 ft.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	21300	16000	42000	26800	32400	61000	68400	70700	107000	56100	30600	19200
2	21900	15800	47200	33800	31900	59600	71100	69200	101000	60900	29500	14100
3	21800	15300	43600	41500	30300	58700	73600	62600	102000	65500	30700	13900
4	23000	15000	38000	41100	30900	59300	78200	e60000	118000	61300	28100	13900
5	23700	14900	33400	39400	29700	60800	76900	e50900	130000	60900	28800	15200
6	22900	15200	29500	40600	32000	63500	77000	e48000	136000	59100	27700	13900
7	21800	15700	27000	40000	51300	62400	59000	e49000	136000	53900	28300	14000
8	22600	16000	25300	38500	85800	58600	60500	47500	137000	48300	27600	14000
9	19900	16900	24100	37700	89100	70900	84700	48700	142000	46800	26400	13900
10	22700	17700	24300	39300	73600	71500	91600	50800	148000	43200	27000	14800
11	21600	18000	26600	38700	61400	69000	102000	50400	146000	41000	27400	13200
12	19800	20700	33100	39300	54000	77100	105000	52800	140000	40800	25700	13000
13	21700	20800	53300	38100	56700	81000	102000	59400	132000	41300	26500	13300
14	24200	22400	56800	33600	53000	82400	96100	72100	126000	40100	28600	15800
15	21200	22800	58300	37000	50900	81100	89800	85200	124000	33800	25000	16800
16	22200	21900	55300	38200	47500	86500	75000	103000	115000	43000	23200	15000
17	23800	21100	50300	36300	52100	85800	82900	109000	119000	41500	19500	21700
18	24200	20400	45900	39600	57700	80400	85600	126000	118000	40200	19200	25700
19	23700	20100	39600	38100	67100	75900	84400	132000	107000	39100	19100	25000
20	22400	19800	35700	35900	74700	78500	81400	120000	97000	35400	18900	26800
21	18400	19400	35000	35600	83600	77900	78900	106000	83100	35000	18800	26900
22	22200	18900	33000	37200	80600	77800	78900	98800	76800	32800	18900	23500
23	16200	18600	31100	36500	74100	76400	81000	96100	72800	34700	18500	26400
24	16800	18400	29200	36600	67900	75900	98900	91100	68100	32500	18200	24900
25	16800	18700	27100	35200	65600	76900	103000	89200	69300	32300	17600	24000
26	16300	20900	27600	34600	59900	72000	99700	88200	66600	31100	18100	25000
27	16700	22300	29900	32200	65100	70900	98500	90800	63800	29900	18200	25000
28	16800	24400	29600	32300	67200	70700	91500	94700	67600	30700	19000	25000
29	16500	32100	27300	32500	64600	70200	79400	106000	65400	30400	19700	23200
30	16300	36900	25900	34800	---	69800	72500	115000	58700	29600	22500	22100
31	16100	---	26300	34200	---	68700	---	103000	---	28900	22500	---
TOTAL	635500	597100	1111300	1135200	1689900	2231200	2527500	2545300	3173200	1300100	729800	579200
MEAN	20500	19900	35850	36620	58270	71970	84250	82110	105800	41940	23540	19310
MAX	24200	36900	58300	41500	89100	86500	105000	132000	148000	65500	30700	26900
MIN	16100	14900	24100	26800	29700	58600	59000	47500	58700	28900	17600	13000
AC-FT	1261000	1184000	2204000	2252000	3352000	4426000	5013000	5049000	6294000	2579000	1448000	1149000

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1958 - 1996, BY WATER YEAR (WY)

	MEAN	21510	22810	25440	28830	33090	38990	48170	65690	71650	30670	17840	19200
MAX	31540	36960	41630	48240	72520	90400	88700	118700	134200	63860	26460	27010	
(WY)	1985	1985	1965	1984	1965	1972	1974	1984	1984	1982	1983	1984	
MIN	13760	13620	13570	16750	17090	18680	18880	20610	16850	12830	9765	10180	
(WY)	1989	1993	1993	1993	1993	1977	1977	1977	1992	1977	1992	1992	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1958 - 1996
ANNUAL TOTAL	14392100	18255300	
ANNUAL MEAN	39430	49880	35290
HIGHEST ANNUAL MEAN			58220
LOWEST ANNUAL MEAN			18050
HIGHEST DAILY MEAN	118000	148000	191000
LOWEST DAILY MEAN	13400	13000	6630
ANNUAL SEVEN-DAY MINIMUM	15100	13700	7150
ANNUAL RUNOFF (AC-FT)	28550000	36210000	25570000
10 PERCENT EXCEEDS	82000	97400	73900
50 PERCENT EXCEEDS	31900	38300	25600
90 PERCENT EXCEEDS	17900	18100	15400

e Estimated

## SNAKE RIVER MAIN STEM

413

13334300 SNAKE RIVER NEAR ANATONE, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1973 to May 1984, October 1985 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1959 to May 1984, April 1986 to current year.

INSTRUMENTATION.--Temperature recorder since October 1959.

REMARKS.--Daily water temperature data for water year 1985 were missing due to equipment malfunction.

EXTREMES FOR PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: Maximum, 25.5°C Aug. 26, 28, 1991, Aug. 2-4, 1994; minimum, 0.0°C several days during winter months.

EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum, 23.5°C Aug. 15; minimum, 0.5°C Jan. 31, Feb. 1-3.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	17.5	16.5	17.0	9.0	8.5	8.5	7.5	7.0	7.5	4.5	4.0	4.0
2	17.0	16.5	16.5	8.5	8.0	8.0	7.5	6.0	6.5	5.0	4.5	4.5
3	17.0	16.0	16.5	8.0	7.5	7.5	6.0	5.5	6.0	5.0	4.5	5.0
4	16.0	15.0	16.0	7.5	7.0	7.5	6.0	5.0	5.5	5.0	4.5	4.5
5	16.0	15.0	15.5	8.0	7.5	7.5	5.0	4.0	4.5	4.5	4.0	4.5
6	15.5	15.0	15.5	8.5	8.0	8.0	4.0	3.5	3.5	4.5	4.0	4.5
7	15.5	15.0	15.0	8.5	8.0	8.0	4.0	3.5	3.5	4.5	4.5	4.5
8	15.0	14.5	15.0	8.5	8.0	8.0	3.5	3.0	3.5	5.0	4.5	4.5
9	14.5	14.0	14.5	8.5	7.5	8.0	3.0	3.0	3.0	5.0	4.5	4.5
10	15.0	14.0	14.5	8.0	7.0	7.5	4.0	3.0	3.5	5.0	4.5	4.5
11	15.0	14.0	15.0	7.5	7.5	7.5	5.0	4.0	5.0	5.0	4.5	4.5
12	14.5	13.5	14.0	7.5	6.5	7.0	6.0	5.0	6.0	4.5	4.0	4.0
13	14.0	13.0	13.5	8.0	7.5	8.0	6.5	6.0	6.5	4.0	4.0	4.0
14	14.5	13.5	14.0	8.0	7.5	8.0	6.5	6.0	6.0	4.5	4.0	4.0
15	14.0	13.5	14.0	8.5	7.5	8.0	6.0	5.5	6.0	5.0	4.5	4.5
16	14.5	13.5	14.0	8.5	8.0	8.5	6.0	6.0	6.0	5.0	5.0	5.0
17	14.5	13.5	14.0	9.0	8.5	8.5	6.0	5.5	5.5	5.0	3.5	4.5
18	14.0	13.5	13.5	9.0	8.5	8.5	5.5	5.0	5.0	3.5	3.0	3.0
19	13.5	12.5	13.0	8.5	7.5	8.0	5.0	4.5	5.0	3.0	2.5	2.5
20	13.0	12.0	12.5	7.5	6.5	7.5	5.0	5.0	5.0	3.0	2.5	2.5
21	12.0	11.0	11.5	7.0	6.5	7.0	5.5	5.0	5.0	3.0	2.5	3.0
22	12.5	11.5	12.0	7.0	6.5	7.0	5.0	4.0	4.5	3.5	3.0	3.0
23	11.5	11.0	11.0	8.0	7.0	7.5	4.0	3.5	3.5	3.0	2.5	2.5
24	11.5	10.5	11.0	8.5	8.0	8.0	3.5	2.5	3.0	3.0	2.5	3.0
25	11.5	11.0	11.0	8.5	8.5	8.5	3.0	2.5	2.5	3.0	2.5	2.5
26	11.5	11.0	11.5	8.5	7.5	8.0	3.5	2.5	3.0	3.0	2.5	2.5
27	11.0	11.0	11.0	7.5	7.0	7.0	3.5	2.5	3.0	2.5	2.0	2.5
28	11.0	10.5	10.5	7.0	6.0	6.5	3.5	3.5	3.5	2.5	2.0	2.0
29	10.5	10.0	10.0	7.0	6.0	7.0	3.5	3.0	3.5	2.5	2.0	2.0
30	10.0	9.5	9.5	7.5	7.0	7.5	3.5	3.5	3.5	2.0	1.0	1.5
31	9.5	8.5	9.0	---	---	---	4.0	3.5	4.0	1.0	.5	1.0
MONTH	17.5	8.5	13.3	9.0	6.0	7.7	7.5	2.5	4.6	5.0	.5	3.5

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	FEBRUARY			MARCH			APRIL			MAY		
1	1.5	.5	1.0	4.0	3.0	3.5	9.0	8.5	9.0	11.0	10.0	10.5
2	1.0	.5	.5	4.5	3.5	4.0	9.0	8.5	9.0	10.5	10.0	10.0
3	1.0	.5	.5	5.0	4.5	4.5	9.0	8.0	8.5	10.5	9.5	10.0
4	1.5	1.0	1.0	5.5	4.5	5.0	8.5	7.5	8.0	10.5	9.5	10.0
5	2.0	1.5	1.5	5.5	5.0	5.0	9.0	8.0	8.5	10.5	9.5	10.0
6	2.5	2.0	2.0	5.5	5.0	5.0	9.5	8.5	9.0	11.0	9.5	10.0
7	3.0	1.5	2.0	6.0	5.0	5.5	11.0	9.0	10.0	11.5	10.5	11.0
8	4.0	3.0	3.5	6.5	5.5	6.0	11.0	10.0	10.5	12.0	10.5	11.0
9	4.5	4.0	4.0	6.5	6.0	6.5	11.0	10.0	10.5	12.0	11.0	11.5
10	4.0	3.5	3.5	7.0	6.0	6.5	10.5	10.0	10.5	12.0	11.0	11.5
11	3.5	3.0	3.5	7.0	6.5	7.0	10.0	9.0	9.5	12.5	11.5	12.0
12	3.5	3.0	3.5	7.0	6.5	7.0	10.0	9.0	9.5	13.5	12.5	12.5
13	4.0	3.5	3.5	6.5	6.0	6.5	9.5	9.0	9.5	13.5	13.0	13.0
14	4.5	3.5	4.0	6.5	6.0	6.0	10.0	9.0	9.5	13.0	12.0	12.5
15	4.5	3.5	4.0	7.0	6.0	6.5	10.5	10.0	10.0	12.5	11.0	11.5
16	4.5	3.5	4.0	7.0	6.0	6.5	10.5	10.0	10.0	11.0	10.0	10.5
17	5.0	4.0	4.5	7.0	6.5	7.0	11.0	10.0	10.5	10.5	9.5	10.0
18	5.5	5.0	5.0	7.5	6.5	7.0	11.0	10.5	10.5	10.5	10.0	10.0
19	5.5	5.0	5.5	8.0	7.0	7.5	10.5	10.0	10.5	10.5	9.5	10.0
20	5.0	5.0	5.0	8.0	7.5	7.5	10.5	10.0	10.0	10.5	9.5	10.0
21	5.0	4.5	5.0	8.5	7.5	8.0	10.5	9.0	10.0	10.0	10.0	10.0
22	5.0	4.0	4.0	8.0	8.0	8.0	10.5	9.5	10.0	11.0	10.0	10.5
23	4.0	3.5	3.5	8.0	8.0	8.0	11.0	10.0	10.5	11.0	10.5	10.5
24	3.5	3.5	3.5	8.0	7.0	7.5	10.5	9.5	10.0	11.5	10.0	10.5
25	3.5	3.0	3.5	7.5	6.5	7.0	10.0	9.0	9.0	12.5	11.0	11.5
26	3.5	2.5	3.0	7.5	7.0	7.0	10.0	9.0	9.5	13.5	12.0	12.5
27	3.0	2.0	2.5	8.0	7.0	7.5	10.0	9.5	10.0	14.0	13.0	13.0
28	3.0	2.0	2.5	8.0	7.5	8.0	10.5	9.0	9.5	13.5	12.5	13.0
29	3.0	2.5	3.0	8.0	7.5	7.5	10.5	9.5	10.0	13.0	12.0	12.5
30	---	---	---	8.5	7.5	8.0	10.5	9.5	10.0	12.5	12.0	12.0
31	---	---	---	8.5	8.0	8.5	---	---	---	12.5	11.5	12.0
MONTH	5.5	.5	3.2	8.5	3.0	6.6	11.0	7.5	9.7	14.0	9.5	11.1
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	JUNE			JULY			AUGUST			SEPTEMBER		
1	13.5	12.0	12.5	17.5	16.5	17.0	23.0	21.5	22.0	22.0	20.5	21.0
2	14.0	12.5	13.5	18.0	17.5	18.0	22.0	21.0	21.5	21.0	19.5	20.5
3	14.5	13.5	14.0	19.0	18.0	18.5	21.0	20.5	21.0	21.5	19.5	20.5
4	14.5	13.5	14.0	18.5	17.5	18.0	21.0	20.0	20.5	20.0	19.5	19.5
5	14.0	13.0	13.5	18.0	17.0	17.5	20.5	20.0	20.0	20.5	19.0	19.5
6	14.0	12.5	13.5	18.0	17.0	17.5	21.0	19.5	20.0	20.0	18.5	19.0
7	14.5	13.0	13.5	18.0	17.5	18.0	21.5	20.0	20.5	20.0	18.5	19.0
8	14.5	13.5	14.0	19.0	17.5	18.0	22.0	20.5	21.0	20.5	18.5	19.0
9	14.5	13.5	14.0	19.5	18.0	19.0	22.5	21.0	21.5	20.5	19.0	19.5
10	14.0	13.0	13.5	19.5	18.5	19.0	22.5	21.0	21.5	21.0	19.0	20.0
11	14.0	13.5	14.0	20.0	18.5	19.0	22.5	21.5	22.0	21.5	19.5	20.0
12	14.5	13.5	14.0	20.0	19.0	19.5	22.5	21.5	22.0	21.0	19.5	20.5
13	15.0	14.0	14.5	20.5	19.0	20.0	22.0	21.0	21.5	21.0	19.5	20.0
14	15.5	14.5	15.0	21.0	19.5	20.0	22.5	21.5	22.0	21.0	19.5	20.0
15	15.0	14.5	15.0	21.0	19.5	20.0	23.5	21.5	22.5	20.0	18.5	19.5
16	15.5	14.5	15.0	21.0	20.0	20.5	23.0	22.0	22.5	18.5	18.0	18.5
17	15.0	14.5	15.0	21.0	20.0	20.5	22.5	21.0	22.0	19.0	18.0	18.5
18	14.5	13.5	14.0	20.5	20.0	20.0	21.5	20.5	21.0	18.5	18.0	18.5
19	14.0	13.5	14.0	20.0	19.0	19.5	22.0	20.5	21.0	18.5	18.0	18.0
20	14.5	13.5	14.0	20.0	19.0	19.5	21.5	20.5	21.0	18.0	18.0	18.0
21	14.5	13.5	14.0	20.5	19.0	19.5	22.0	20.5	21.0	18.0	17.5	17.5
22	14.5	14.0	14.0	21.0	20.0	20.5	22.0	20.5	21.0	17.5	16.0	17.0
23	14.5	13.5	14.0	21.5	20.5	21.0	22.0	20.5	21.0	17.0	16.0	16.5
24	14.5	13.5	14.0	22.0	21.0	21.5	22.0	20.5	21.0	17.0	16.0	16.5
25	15.0	14.5	14.5	22.0	21.0	21.5	22.0	20.5	21.5	17.0	16.0	16.5
26	15.5	14.5	15.0	23.0	21.5	22.0	22.0	21.0	21.0	17.0	16.0	16.5
27	15.5	15.0	15.5	22.5	21.5	22.0	21.5	20.5	21.0	17.0	16.5	16.5
28	16.0	15.5	15.5	23.0	22.0	22.5	22.0	20.5	21.0	17.5	16.5	17.0
29	16.5	15.5	16.0	22.5	21.5	22.5	22.5	20.5	21.5	18.0	17.0	17.5
30	17.0	16.0	16.5	22.0	21.0	21.5	22.5	21.0	21.5	20.0	16.5	17.5
31	---	---	---	23.0	21.5	22.0	22.5	21.0	21.5	---	---	---
MONTH	17.0	12.0	14.3	23.0	16.5	19.9	23.5	19.5	21.3	22.0	16.0	18.6
YEAR	23.5	.5	11.2									

## ASOTIN CREEK BASIN

415

13334700 ASOTIN CREEK BELOW KEARNEY GULCH, NEAR ASOTIN, WA

LOCATION.--Lat 46°19'35", long 117°09'06", in SW 1/4 SE 1/4 sec.22, T.10 N., R.45 E., Asotin County, Hydrologic Unit 17060103, on left bank 0.3 mi downstream from Kearney Gulch, 2.5 mi upstream from George Creek, 5.0 mi west of Asotin, and at mile 5.3.

DRAINAGE AREA.--170 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1959 to September 1982, October 1989 to June 1996 (discontinued).

REVISED RECORDS.--WDR WA-80-2: 1979.

GAGE.--Water-stage recorder. Elevation of gage is 1,090 ft above sea level, from topographic map.

REMARKS.--Records fair except for estimated daily discharges, which are poor. Several diversions for irrigation. Prior to Nov. 20, 1959, at a point 3.3 mi upstream, the city of Clarkston diverted about 30 ft<sup>3</sup>/s for municipal use and irrigation. Natural low flows nearly equivalent to those of former station 3.3 mi upstream. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--29 years (water years 1960-82, 1990-95), 72.5 ft<sup>3</sup>/s, 52,550 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, about 3,700 ft<sup>3</sup>/s Jan. 15, 1974; maximum gage height, 8.07 ft Jan. 14, 1974; minimum discharge, 13 ft<sup>3</sup>/s Jan. 11, 1963, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Maximum discharge during period October 1995 to June 1996, 1,760 ft<sup>3</sup>/s Feb. 9, gage height 4.45 ft; minimum discharge during period October 1995 to June 1996, 28 ft<sup>3</sup>/s Oct. 1, 2, 10, 11, 16, Nov. 2, but may have been lower during period of ice effect Feb. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	29	30	454	61	e30	121	114	203	114	---	---	---
2	29	29	361	61	e29	118	142	193	108	---	---	---
3	39	29	249	77	e30	119	144	182	107	---	---	---
4	42	29	211	90	e40	122	138	166	107	---	---	---
5	34	30	179	91	e60	126	131	153	105	---	---	---
6	32	31	152	85	e100	119	129	143	99	---	---	---
7	31	31	134	80	703	117	139	136	94	---	---	---
8	30	33	116	77	1330	116	169	131	92	---	---	---
9	30	60	107	74	1680	121	217	127	88	---	---	---
10	29	47	102	73	920	132	248	123	86	---	---	---
11	33	52	138	69	552	153	228	121	81	---	---	---
12	39	96	501	68	388	174	201	132	e74	---	---	---
13	33	81	455	66	315	176	170	150	e72	---	---	---
14	31	77	283	65	278	164	151	183	e70	---	---	---
15	30	72	212	66	244	154	142	213	e68	---	---	---
16	29	67	171	77	225	144	146	229	e66	---	---	---
17	31	61	144	84	220	136	150	236	e66	---	---	---
18	36	57	123	82	269	130	145	269	e66	---	---	---
19	32	53	108	83	341	125	137	246	e64	---	---	---
20	31	51	99	79	327	121	145	221	e62	---	---	---
21	30	49	91	73	288	117	126	203	e60	---	---	---
22	30	47	83	66	240	124	120	189	e60	---	---	---
23	30	46	77	63	210	116	161	172	e62	---	---	---
24	30	45	71	61	185	113	656	157	e68	---	---	---
25	31	53	66	58	168	104	561	150	e62	---	---	---
26	34	63	62	54	153	101	403	147	e60	---	---	---
27	32	63	59	53	139	100	323	145	e64	---	---	---
28	31	86	57	52	133	98	275	139	e60	---	---	---
29	31	155	56	49	127	95	241	133	e58	---	---	---
30	31	392	57	e36	---	93	218	125	e56	---	---	---
31	31	---	71	e32	---	92	---	119	---	---	---	---
TOTAL	991	2015	5049	2105	9724	3841	6270	5236	2299	---	---	---
MEAN	32.0	67.2	163	67.9	335	124	209	169	76.6	---	---	---
MAX	42	392	501	91	1680	176	656	269	114	---	---	---
MIN	29	29	56	32	29	92	114	119	56	---	---	---
AC-FT	1970	4000	10010	4180	19290	7620	12440	10390	4560	---	---	---

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1996, BY WATER YEAR (WY)

	MEAN	37.2	44.5	64.2	81.0	89.0	90.1	114	145	102	48.4	36.6	35.8
MAX	46.6	86.5	209	487	335	279	209	229	312	85.3	48.1	43.7	
(WY)	1973	1974	1965	1974	1996	1972	1996	1976	1974	1974	1976	1980	
MIN	30.3	29.1	31.4	27.2	28.9	40.5	49.1	52.5	31.6	26.6	22.6	24.6	
(WY)	1994	1994	1991	1993	1994	1977	1977	1977	1992	1994	1994	1994	

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## WATER YEARS 1960 - 1996

ANNUAL TOTAL	31331		
ANNUAL MEAN	85.8	72.5	
HIGHEST ANNUAL MEAN		152	1974
LOWEST ANNUAL MEAN		37.5	1994
HIGHEST DAILY MEAN	501	3500	Jan 15 1974
LOWEST DAILY MEAN	26	15	Dec 23 1990
ANNUAL SEVEN-DAY MINIMUM	28	17	Dec 22 1990
ANNUAL RUNOFF (AC-FT)	62150	52550	
10 PERCENT EXCEEDS	187	145	
50 PERCENT EXCEEDS	62	49	
90 PERCENT EXCEEDS	30	32	

e Estimated

## ASOTIN CREEK BASIN

13335050 ASOTIN CREEK AT ASOTIN, WA

LOCATION.--Lat 46°20'27", long 117°03'18", in SW 1/4 SW 1/4 sec.16, T.10 N., R.46 E., Asotin County, Hydrologic Unit 17060103, on right bank near mouth, at upstream side of bridge on State Highway 129, at Asotin, and at mile 0.1.

DRAINAGE AREA.--323 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1991 to current year.

REVISED RECORDS.--WDR WA-93-1: 1992 (M,m).

GAGE.--Water-stage recorder. Datum of gage is 742.57 ft above sea level.

REMARKS.--Records poor. Several diversions for irrigation. Miscellaneous data from January through September 1989 are available in the Spokane Field Office.

AVERAGE DISCHARGE.--5 years (water years 1992-96), 83.6 ft<sup>3</sup>/s, 60,560 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,030 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 6.50 ft, from high-water mark, from rating curve extended above 550 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow; minimum daily discharge, 19 ft<sup>3</sup>/s Jan. 11, 12, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 3,030 ft<sup>3</sup>/s Feb. 9, gage height, 6.50 ft, from high-water mark, from rating curve extended above 550 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow; minimum discharge, 26 ft<sup>3</sup>/s Oct. 21.

REVISIONS.--The maximum discharge for the 1991 water year has been revised to 962 ft<sup>3</sup>/s, May 19, 1991, gage height, 4.99 ft. These figures supersede those published in the 1991 data report.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	34	33	462	e86	e44	e160	155	367	140	63	36	37
2	33	32	396	e84	e40	e150	197	314	132	65	39	37
3	39	32	296	e100	e44	e160	208	274	130	66	37	37
4	42	32	266	e120	e60	e160	192	246	128	68	36	37
5	36	33	224	e120	e86	e160	181	219	125	69	35	39
6	35	34	188	e115	e120	e160	179	186	118	66	35	38
7	34	35	171	e110	e800	e150	191	170	112	63	33	37
8	34	35	142	e105	e1500	e160	227	159	108	60	33	37
9	35	57	132	e100	e2000	e170	271	149	104	59	32	37
10	34	49	132	e96	e1100	e190	314	141	100	58	32	36
11	37	55	182	e94	e860	e210	299	135	94	50	32	35
12	42	100	e640	e90	e660	e230	317	149	89	42	32	35
13	39	92	e600	e88	e460	e250	274	169	87	41	32	36
14	38	78	e400	e90	e400	e228	247	236	84	46	32	38
15	38	72	e300	e94	e340	219	235	277	81	50	34	40
16	35	66	e240	e105	e280	203	234	321	80	49	32	39
17	36	60	e200	e110	e280	190	243	421	79	48	33	39
18	32	56	e180	e110	e320	181	236	627	78	50	33	38
19	29	53	e150	e110	e360	172	227	463	76	50	34	39
20	28	52	e140	e105	e360	164	235	357	73	49	34	39
21	28	50	e120	e96	e340	e160	200	315	72	48	35	39
22	30	48	e110	e90	e300	e150	187	289	71	48	34	38
23	31	47	e100	e86	e260	e140	260	255	72	48	35	38
24	31	47	e96	e84	e230	e140	1470	229	81	46	34	39
25	32	51	e90	e80	e220	e130	1370	212	75	42	35	38
26	34	56	e86	e76	e200	117	1020	205	72	44	35	38
27	33	57	e80	e72	e190	113	771	199	75	43	35	38
28	32	80	e78	e70	e170	113	610	188	74	41	37	37
29	32	132	e76	e64	e165	117	494	176	69	38	38	37
30	33	371	e80	e50	---	122	413	164	66	41	37	36
31	33	---	e90	e46	---	124	---	152	---	39	37	---
TOTAL	1059	1995	6447	2846	12189	5093	11457	7764	2745	1590	1068	1128
MEAN	34.2	66.5	208	91.8	420	164	382	250	91.5	51.3	34.5	37.6
MAX	42	371	640	120	2000	250	1470	627	140	69	39	40
MIN	28	32	76	46	40	113	155	135	66	38	32	35
AC-FT	2100	3960	12790	5650	24180	10100	22720	15400	5440	3150	2120	2240

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1991 - 1996, BY WATER YEAR (WY)

	1991	1992	1993	1994	1995	1996
MEAN	31.9	43.0	74.4	56.1	162	130
MAX	34.2	66.5	208	91.8	420	211
(WY)	1996	1996	1996	1996	1996	1996
MIN	29.4	30.7	33.4	28.1	35.6	68.5
(WY)	1995	1994	1993	1993	1994	1992

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1991 - 1996
ANNUAL TOTAL	41931	55381	
ANNUAL MEAN	115	151	83.6
HIGHEST ANNUAL MEAN			151
LOWEST ANNUAL MEAN			44.6
HIGHEST DAILY MEAN	640	2000	2000
LOWEST DAILY MEAN	28	28	19
ANNUAL SEVEN-DAY MINIMUM	30	30	21
ANNUAL RUNOFF (AC-FT)	83170	109800	60560
10 PERCENT EXCEEDS	262	304	188
50 PERCENT EXCEEDS	81	85	44
90 PERCENT EXCEEDS	33	34	29

e Estimated



LOCATION.--Lat 46°30'17", long 118°03'55", in NE 1/4 SW 1/4 sec.21, T.12 N., R.38 E., Columbia County, Hydrologic Unit 17060107, on right bank, 180 ft downstream from county road bridge, 0.5 mi downstream from Smith Hollow, 3.0 mi east of Starbuck, 3.3 mi downstream from Pataha Creek, and at mile 7.9.

PERIOD OF RECORD.--October 1914 to September 1917, August 1928 to September 1931, October 1958 to September 1990, October 1994 to current year. Monthly discharge only for October and November 1914, published in WSP 1317.

GAGE.--Water-stage recorder. Elevation of gage is 735.9 ft above sea level, from plane-table survey. Nov. 8, 1914 to Sept. 30, 1917, nonrecording gage at site 2.8 mi upstream at different datum. Aug. 9, 1928 to Sept. 30, 1931, nonrecording gages at site 2.5 mi upstream at various datums.

AVERAGE DISCHARGE.--40 years (water years 1915-17, 1929-31, 1959-90, 1995-96), 171 ft<sup>3</sup>/s, 123,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 7,980 ft<sup>3</sup>/s Dec. 22, 1964, gage height, 9.84 ft, from rating curve extended above 2,500 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum discharge, 15 ft<sup>3</sup>/s July 11, 12, 1990.

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Dec. 1	0700	882	3.43	Feb. 19	1330	892	1.62
Dec. 13	0730	763	3.18	Apr. 25	0430	1,230	2.24
Feb. 9	unknown	*5,580	*7.30				

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	62	94	818	226	e110	387	323	546	251	114	68	66
2	62	e90	733	206	e100	380	345	505	241	112	66	67
3	83	92	575	227	e110	396	340	473	238	107	72	68
4	111	95	479	264	e140	414	333	441	239	102	75	68
5	87	97	410	268	e200	410	322	414	237	103	76	72
6	80	100	365	260	e1500	388	317	391	229	101	77	67
7	76	108	328	250	e4000	385	328	372	224	97	73	63
8	76	111	283	249	e3500	380	369	353	221	94	71	63
9	77	173	250	242	e5000	384	429	340	216	92	69	64
10	76	143	234	258	e3000	397	465	327	208	91	68	67
11	79	142	275	256	1550	428	463	315	202	91	66	62
12	88	261	402	256	1110	545	444	327	191	89	68	60
13	82	229	699	251	865	514	403	332	176	88	63	67
14	79	214	587	240	735	494	370	357	168	86	62	72
15	77	200	497	239	646	479	347	391	161	85	60	78
16	76	190	422	292	605	453	352	404	157	81	60	79
17	85	180	375	346	577	424	365	419	150	80	63	73
18	100	171	341	346	650	402	364	536	150	84	66	73
19	92	161	306	346	844	385	341	471	144	83	68	79
20	92	152	277	338	819	371	339	438	137	83	68	85
21	90	145	251	329	735	360	322	413	135	83	71	83
22	90	139	229	298	617	364	314	413	133	82	71	81
23	90	135	207	271	546	356	353	385	129	76	70	82
24	89	137	190	260	483	347	933	359	140	71	69	85
25	90	158	179	245	492	321	1100	340	140	70	69	e84
26	94	210	170	222	465	319	935	331	133	69	68	e82
27	95	213	162	212	429	312	812	324	143	70	73	81
28	93	300	157	202	411	304	722	314	143	72	70	81
29	93	530	161	189	404	297	653	300	127	71	70	78
30	93	602	191	e160	---	289	589	282	118	77	66	77
31	94	---	278	e130	---	286	---	268	---	75	66	---
TOTAL	2651	5572	10831	7878	30643	11971	14092	11881	5281	2679	2122	2209
MEAN	85.5	186	349	254	1057	386	470	383	176	86.4	68.5	73.6
MAX	111	602	818	346	5000	545	1100	546	251	114	77	85
MIN	62	90	157	130	100	286	314	268	118	69	60	60
AC-FT	5260	11050	21480	15630	60780	23740	27950	23570	10470	5310	4210	4380

MEAN	82.0	108	163	213	267	245	273	293	199	83.2	60.6	70.3
MAX	125	186	673	635	1057	717	668	986	599	203	114	108
(WY)	1960	1996	1965	1974	1996	1972	1917	1917	1974	1974	1974	1972
MIN	51.7	60.0	66.8	49.3	84.0	103	114	93.9	58.9	32.9	21.5	42.2
(WY)	1930	1930	1915	1930	1931	1977	1977	1977	1930	1930	1931	1931

ANNUAL TOTAL	69113		107810				
ANNUAL MEAN	189		295			171	
HIGHEST ANNUAL MEAN						327	1974
LOWEST ANNUAL MEAN						89.6	1977
HIGHEST DAILY MEAN	818	Dec 1	5000	Feb 9	5000		Feb 10 1916
LOWEST DAILY MEAN	41	Aug 29	60	Aug 15	15		Jul 11 1930
ANNUAL SEVEN-DAY MINIMUM	44	Aug 24	63	Aug 11	18		Jul 24 1931
ANNUAL RUNOFF (AC-FT)	137100		213800			123800	
10 PERCENT EXCEEDS	385		508			331	
50 PERCENT EXCEEDS	160		207			117	
90 PERCENT EXCEEDS	54		70			58	

e Estimated

## PALOUSE RIVER BASIN

13351000 PALOUSE RIVER AT HOOPER, WA

LOCATION.--Lat 46°45'31", long 118°08'52", in NE 1/4 SE 1/4 sec.27, T.15 N., R.37 E., Whitman County, Hydrologic Unit 17060108, on left bank 150 ft downstream from bridge on State Highway 26 at Hooper, 0.3 mi upstream from Cow Creek, 3.5 mi downstream from right bank tributary, 6.0 mi downstream from Willow Creek, and at mile 19.6.

DRAINAGE AREA.--2,500 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--April to August 1897 (gage heights only), September 1897 to December 1899, April 1900 to April 1907, June 1908 to July 1912, March 1913 to March 1916, February 1951 to current year. Prior to 1904 sometimes published as "near Hooper."

REVISED RECORDS.--WSP 1287: 1897-1904, 1910(M), 1915-16(M). WSP 1447: 1910. WSP 1934: Drainage area.  
WSP 1447: 1906(M). WSP 1567: 1908-09(M).

GAGE.--Water-stage recorder. Datum of gage is 1,040.8 ft above sea level. Apr. 1 to Aug. 31, 1897, nonrecording gage at site 2.5 mi upstream at different datum. Sept. 9, 1897, to March 1916, various nonrecording gages at site 1.5 mi upstream from present site at different datums. Feb. 8 to Mar. 28, 1951, nonrecording gage at present site and datum.

REMARKS...Records good except for those above 1,000 ft<sup>3</sup>/s and estimated daily discharges, which are fair. Diversions upstream from station for irrigation and municipal use. Specific conductance August 1993 to September 1994. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE...58 years (water years 1898-99, 1901-06, 1909-11, 1914-15, 1952-96), 592 ft<sup>3</sup>/s, 428,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD -Maximum discharge, 33,500 ft<sup>3</sup>/s Feb. 4, 1963, gage height, 19.13 ft, from rating curve extended above 18,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; no flow part or all of each day June 25, 1910, Aug. 1-17, Aug. 28 to Sept. 4, 1968.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 3,700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 9	1915	*28,000	*17.95	Apr. 24	1800	12,600	13.66
Feb. 19	2015	10,500	12.83	May 19	0045	4,090	9.47
Mar. 5	1630	4,680	9.88				

Minimum discharge, 34 ft<sup>3</sup>/s Aug. 30, 31.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	47	114	1190	1330	e200	1900	1060	2000	674	202	54	35
2	50	107	1200	917	e200	1840	2020	1750	625	189	48	35
3	55	101	1080	715	e200	2050	2260	1560	587	174	48	37
4	69	97	798	794	e200	2570	1780	1410	550	165	55	37
5	80	96	640	1100	e400	3840	1520	1290	516	156	52	37
6	112	92	629	806	e600	3480	1360	1180	489	149	49	38
7	107	99	498	683	4840	2670	1250	1080	458	142	50	39
8	120	104	388	918	19600	2540	1170	1010	429	135	46	40
9	104	106	300	2640	25900	2530	1130	930	403	127	44	40
10	94	119	297	2470	21200	2540	1090	870	381	117	47	38
11	91	138	310	2410	11800	2510	1060	827	358	115	49	37
12	90	204	712	1720	6990	2740	1250	808	348	111	49	38
13	88	315	2060	1370	5130	2820	1280	846	335	108	49	42
14	89	482	1890	1160	4200	2540	1290	889	323	101	50	47
15	93	338	1270	1030	3600	2270	1150	1030	304	98	46	49
16	105	277	1170	1120	3240	2060	1060	1390	285	91	42	51
17	111	250	991	1760	3040	1870	1010	1820	267	86	38	51
18	104	224	825	1740	4640	1730	1160	2570	253	83	37	51
19	99	211	701	1280	8160	1600	1220	3680	240	83	37	56
20	100	193	614	1100	8390	1490	1370	2570	233	81	37	61
21	106	181	554	1010	6490	1400	1910	1940	225	76	39	61
22	113	173	505	884	6090	1330	2070	1680	217	77	40	63
23	116	165	460	798	4540	1350	1720	1690	215	75	37	72
24	107	163	409	738	3810	1380	7810	1450	215	75	38	72
25	102	158	357	685	3440	1270	9560	1260	217	72	38	71
26	102	162	334	610	3030	1170	6290	1120	227	68	37	70
27	101	206	312	583	2590	1140	4480	995	231	63	36	70
28	106	293	309	e520	2130	1120	3360	894	227	61	36	71
29	113	290	303	e400	1930	1050	2750	821	218	60	36	69
30	132	789	435	e300	--	1000	2340	770	211	57	35	67
31	128	---	875	e250	--	998	---	724	---	56	34	---
TOTAL	3034	6247	22416	33841	166580	60798	68780	42854	10261	3253	1333	1545
MEAN	97.9	208	723	1092	5744	1961	2293	1382	342	105	43.0	51.5
MAX	132	789	2060	2640	25900	3840	9560	3680	674	202	55	72
MIN	47	92	297	250	200	998	1010	724	211	56	34	35
AC-FT	6020	12390	44460	67120	330400	120600	136400	85000	20350	6450	2640	3060

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1898 - 1996, BY WATER YEAR (WY)

MEAN	65.1	141	427	991	1705	1803	1268	614	248	81.0	32.3	36.8
MAX	151	349	2198	4602	5744	6660	4127	1560	982	291	92.5	90.5
(WY)	1960	1956	1974	1974	1996	1910	1913	1975	1990	1902	1975	1975
MIN	17.7	39.6	36.9	46.6	162	216	203	102	41.6	3.72	.058	3.90
(WY)	1916	1905	1915	1915	1994	1977	1977	1992	1992	1968	1968	1967

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1898 - 1996
--------------------	------------------------	---------------------	-------------------------

ANNUAL TOTAL	238931		420942						
ANNUAL MEAN	655		1150			592			
HIGHEST ANNUAL MEAN						1410			1974
LOWEST ANNUAL MEAN						106			1977
HIGHEST DAILY MEAN	7190	Feb 21	25900	Feb 9	27800			Mar 2	1910
LOWEST DAILY MEAN	27	Aug 6	34	Aug 31		.00		Jun 25	1910
ANNUAL SEVEN-DAY MINIMUM	29	Aug 26	35	Aug 27		.00		Aug 10	1968
ANNUAL RUNOFF (AC-FT)	473900		834900		428800				
10 PERCENT EXCEEDS	1900		2570		1630				
50 PERCENT EXCEEDS	250		352		173				
90 PERCENT EXCEEDS	38		48		29				

e Estimated

## PALOUSE RIVER BASIN

419

13351000 PALOUSE RIVER AT HOOPER, WA--Continued

## WATER-QUALITY RECORDS

## PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: August 1993 to September 1994.

WATER TEMPERATURE: August 1993 to current year.

SUSPENDED SEDIMENT DISCHARGE: October 1992 to current year.

INSTRUMENTATION.--Water-quality monitor since August 1993. Electronic data logger with sixty-minute recording interval except for period Nov. 15, 1994 to Oct. 20, 1995, when the recording interval was ninety-minute.

## EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 447 microsiemens Aug. 14, 1994, but may have been higher during periods of missing record; minimum recorded, 140 microsiemens Mar. 10, 1994, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum recorded 32.5°C July 24, 1994, but may have been higher during periods of missing record; minimum recorded, 0.0°C for several days during winter months.

SEDIMENT CONCENTRATION: Maximum daily mean, 10,100 mg/L Feb. 8, 1996; minimum daily mean, 5 mg/L Dec. 5, 1992, Dec. 24, 26, 28, 1993, July 18, Aug. 17, 1996.

SEDIMENT DISCHARGE: Maximum daily, 527,000 tons Feb. 9, 1996; minimum daily, 0.04 tons Aug. 16, 20, 1994.

## EXTREMES FOR CURRENT YEAR.--

WATER TEMPERATURE: Maximum 28.0°C July 14, but may have been higher during periods of missing record; minimum, 0.0°C for several days during December through February.

SEDIMENT CONCENTRATION: Maximum daily mean, 10,100 mg/L Feb. 8; minimum daily mean, 5 mg/L July 18, Aug. 17.

SEDIMENT DISCHARGE: Maximum daily, 527,000 tons Feb. 9; minimum daily, 1.0 tons July 18, 19, Aug. 17-20.

## WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	15.5	12.5	14.0	4.5	2.0	3.0	8.5	7.5	8.0	2.5	1.5	2.0
2	15.0	13.0	14.0	3.0	1.0	2.0	7.5	5.5	6.0	3.0	2.0	2.5
3	14.5	13.0	14.0	3.0	.5	1.5	5.5	4.5	5.0	4.0	3.0	4.0
4	13.0	11.0	12.0	2.5	1.0	1.5	5.0	3.5	4.5	4.0	3.0	3.5
5	13.5	10.5	12.0	4.0	1.5	2.5	3.5	2.0	2.5	3.0	1.5	2.0
6	13.0	11.0	12.0	4.5	3.0	3.5	2.0	1.5	1.5	2.0	1.0	1.5
7	13.5	11.0	12.0	5.5	4.0	4.5	2.0	1.0	1.5	2.5	1.5	2.0
8	12.5	11.0	11.5	8.0	5.5	7.0	1.0	.0	.0	3.5	2.5	3.0
9	12.5	10.5	11.5	8.0	6.0	7.0	.0	.0	.0	4.0	3.0	3.5
10	12.0	11.0	11.5	6.0	5.0	5.5	.0	.0	.0	3.5	3.0	3.0
11	12.0	11.0	11.5	5.5	5.0	5.5	.0	.0	.0	4.0	3.0	3.5
12	12.0	9.5	10.5	7.0	5.5	6.0	2.5	.0	.5	4.0	2.5	3.0
13	12.0	9.0	10.5	7.0	6.5	6.5	4.0	2.5	3.0	4.0	2.5	3.0
14	12.5	9.0	10.5	8.0	6.5	7.0	4.0	3.0	3.5	5.0	3.5	4.0
15	13.0	10.0	11.5	8.0	7.5	8.0	4.0	3.0	3.5	5.5	4.5	5.0
16	13.5	11.5	12.5	8.0	7.0	7.5	3.5	2.5	3.0	5.5	4.5	5.0
17	12.5	12.0	12.0	9.0	8.0	8.5	3.5	3.0	3.0	4.5	3.0	3.5
18	12.0	10.5	11.5	9.0	8.0	8.5	3.0	2.0	2.5	3.0	1.0	1.5
19	11.0	9.0	10.0	8.0	7.0	7.5	3.0	2.0	2.5	1.5	.5	.5
20	10.0	8.5	9.0	7.0	6.0	6.5	3.0	3.0	3.0	1.0	.5	.5
21	9.5	8.0	8.5	6.0	5.5	6.0	3.0	2.5	3.0	1.0	.5	1.0
22	9.5	7.0	8.0	6.0	5.0	5.5	2.5	1.0	1.5	1.5	.5	1.0
23	8.5	7.0	7.5	6.0	5.0	5.5	1.5	1.0	1.5	2.0	1.0	1.5
24	9.5	7.0	8.0	8.0	6.0	7.0	1.0	.5	1.0	2.0	1.0	1.5
25	9.0	8.0	8.5	8.5	7.5	8.0	.5	.5	.5	1.5	.5	1.0
26	10.0	8.0	9.0	8.0	7.0	7.5	.5	.5	.5	1.0	.5	1.0
27	9.5	7.5	8.5	7.0	5.5	6.0	.5	.0	.0	.5	.0	.5
28	8.0	6.5	7.5	7.5	5.5	6.0	.5	.0	.5	.0	.0	.0
29	7.0	5.5	6.0	9.0	7.5	8.5	1.0	.5	1.0	.0	.0	.0
30	5.5	3.5	4.5	9.0	8.5	9.0	1.5	1.0	1.5	.0	.0	.0
31	4.5	3.0	4.0	---	---	---	2.0	1.5	1.5	.0	.0	.0
MONTH	15.5	3.0	10.1	9.0	.5	5.9	8.5	.0	2.1	5.5	.0	2.1

## PALOUSE RIVER BASIN

13351000 PALOUSE RIGER AT HOOPER, WA--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	.0	.0	.0	3.0	.5	2.0	9.5	7.5	8.0	12.5	11.0	12.0
2	.0	.0	.0	4.0	1.5	2.5	10.0	8.0	9.0	12.5	10.5	11.5
3	.0	.0	.0	4.0	3.0	3.5	10.0	7.5	8.5	12.0	10.0	11.0
4	.0	.0	.0	4.5	3.5	4.0	10.5	7.5	9.0	12.0	10.0	11.0
5	.0	.0	.0	4.0	3.0	3.5	12.0	8.0	10.0	12.5	10.0	11.5
6	.0	.0	.0	4.0	3.0	3.5	13.5	10.0	11.5	13.0	11.0	12.0
7	.0	.0	.0	4.5	3.0	3.5	15.0	12.0	13.0	13.0	11.5	12.0
8	2.5	.0	1.0	6.5	4.0	5.0	16.5	13.5	14.5	12.5	11.0	11.5
9	4.5	2.5	3.5	7.0	6.0	6.5	16.5	15.5	16.0	12.5	11.5	12.0
10	4.0	2.5	3.0	8.5	6.5	7.0	16.0	13.5	14.5	12.5	12.0	12.5
11	3.5	2.5	3.0	10.0	7.5	8.5	13.5	11.5	12.0	13.0	12.5	13.0
12	4.0	2.5	3.5	9.5	8.5	9.0	12.0	10.5	11.0	13.5	12.5	13.0
13	4.5	3.0	3.5	9.5	7.5	8.5	12.0	9.5	11.0	16.0	13.5	14.5
14	5.5	3.5	4.5	9.5	7.0	8.0	13.0	9.5	11.0	16.5	15.5	16.0
15	5.5	4.0	4.5	9.0	7.5	8.5	13.0	11.5	12.0	17.0	16.0	16.5
16	5.5	4.5	5.0	8.5	6.5	7.5	12.5	12.0	12.0	18.0	15.5	16.5
17	6.0	5.0	5.5	8.5	6.0	7.5	12.5	10.5	11.5	18.0	15.5	16.5
18	7.0	6.0	6.5	9.5	6.5	8.0	12.5	10.5	11.5	16.0	13.5	14.5
19	7.0	6.0	6.5	9.5	7.0	8.5	12.0	10.0	11.0	14.5	12.5	13.5
20	6.5	5.5	6.0	9.5	7.5	8.5	11.5	9.5	10.5	15.5	12.0	13.5
21	6.0	4.5	5.5	9.0	7.0	8.0	12.0	9.0	10.5	15.0	12.5	13.0
22	4.5	3.5	4.0	9.0	8.0	8.5	11.5	9.0	10.0	13.5	12.5	13.0
23	4.0	3.5	3.5	9.0	7.5	8.5	11.5	10.5	11.0	14.5	11.5	12.5
24	4.0	3.0	3.0	9.0	4.0	6.0	11.0	10.0	10.5	17.0	12.0	14.0
25	4.0	3.0	3.5	5.5	3.0	4.0	10.0	8.5	9.0	19.0	14.5	16.0
26	3.0	1.5	2.0	6.5	4.0	5.0	9.5	7.5	8.5	19.0	16.5	18.0
27	2.5	1.0	1.5	7.5	5.5	6.5	10.5	7.5	9.0	19.0	17.0	17.5
28	1.5	.0	.5	7.5	5.5	6.5	12.0	8.0	10.0	18.0	14.5	15.5
29	2.0	.0	1.0	7.5	6.0	6.5	12.0	10.0	10.5	14.5	14.0	14.5
30	---	---	---	7.5	5.5	6.5	12.5	10.0	11.5	15.5	14.0	14.5
31	---	---	---	7.5	6.5	7.0	---	---	---	16.0	14.5	15.5
MONTH	7.0	.0	2.8	10.0	.5	6.3	16.5	7.5	10.9	19.0	10.0	13.8

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	18.0	16.0	17.0	25.0	20.5	22.5	24.0	20.0	22.5	---	---	---
2	20.5	18.0	19.5	26.0	21.5	24.0	23.5	18.5	20.0	---	---	---
3	21.5	20.5	21.0	27.0	23.0	25.0	20.5	17.0	19.0	---	---	---
4	21.5	20.0	20.5	24.5	21.5	23.0	20.0	17.0	18.5	---	---	---
5	20.5	19.0	19.5	23.0	19.5	21.0	18.5	16.0	17.5	---	---	---
6	22.0	19.5	20.5	23.5	18.5	21.0	20.5	15.5	18.0	---	---	---
7	23.5	21.0	22.0	24.5	19.5	22.0	23.0	17.0	20.0	---	---	---
8	23.0	21.0	22.0	26.0	20.5	23.5	24.0	19.0	21.5	---	---	---
9	21.0	19.0	20.5	25.5	22.0	24.0	25.0	20.0	22.5	---	---	---
10	21.0	18.5	19.5	25.5	21.0	23.0	25.5	20.5	23.5	---	---	---
11	22.0	19.0	20.5	26.0	20.5	23.0	25.0	21.0	23.0	---	---	---
12	22.5	19.0	20.5	26.5	20.5	23.5	24.0	19.0	21.5	---	---	---
13	23.5	20.0	21.5	27.5	21.5	24.5	24.0	19.0	21.5	---	---	---
14	24.0	20.5	22.0	28.0	22.5	25.5	24.0	21.0	23.0	---	---	---
15	---	---	---	27.0	23.5	25.5	24.0	20.5	22.5	---	---	---
16	---	---	---	25.5	21.5	23.5	23.5	20.0	22.0	---	---	---
17	---	---	---	24.0	20.5	22.5	23.0	20.0	21.0	---	---	---
18	---	---	---	22.0	19.5	20.5	21.0	18.0	20.0	---	---	---
19	---	---	---	21.5	18.0	19.5	21.5	17.5	19.5	---	---	---
20	---	---	---	22.0	18.0	20.0	21.0	18.5	19.5	---	---	---
21	---	---	---	24.0	18.0	21.0	21.0	16.0	18.5	---	---	---
22	---	---	---	25.5	19.5	22.5	---	---	---	---	---	---
23	---	---	---	27.0	20.5	24.0	---	---	---	---	---	---
24	---	---	---	27.5	21.5	25.0	---	---	---	---	---	---
25	---	---	---	27.0	22.5	25.0	---	---	---	---	---	---
26	22.5	18.5	20.5	27.5	22.0	25.0	---	---	---	---	---	---
27	22.0	20.0	21.0	27.0	22.5	25.0	---	---	---	---	---	---
28	21.0	19.0	20.0	27.5	22.5	25.5	---	---	---	---	---	---
29	22.0	17.5	19.5	26.5	22.0	23.5	---	---	---	---	---	---
30	24.0	18.5	21.0	25.0	21.0	23.0	---	---	---	---	---	---
31	---	---	---	25.0	21.5	23.5	---	---	---	---	---	---
MONTH	---	---	---	28.0	18.0	23.2	---	---	---	---	---	---

## PALOUSE RIVER BASIN

421

13351000 PALOUSE RIVER AT HOOPER, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	47	---	9.0	114	---	11	1190	---	2950
2	50	---	10	107	---	10	1200	---	3000
3	55	84	12	101	---	9.0	1080	---	2200
4	69	---	13	97	---	8.0	798	---	940
5	80	---	18	96	---	7.0	640	---	530
6	112	---	26	92	---	6.0	629	---	500
7	107	87	25	99	24	6.0	498	---	275
8	120	---	39	104	---	7.0	388	---	155
9	104	---	27	106	---	7.0	300	---	83
10	94	---	20	119	---	9.0	297	---	81
11	91	---	18	138	---	13	310	---	89
12	90	---	18	204	---	32	712	---	1670
13	88	---	17	315	---	103	2060	---	18100
14	89	---	18	482	---	245	1890	2680	14200
15	93	---	20	338	---	108	1270	---	4170
16	105	110	34	277	---	67	1170	---	2480
17	111	82	24	250	---	54	991	---	1480
18	104	---	20	224	---	42	825	---	800
19	99	---	17	211	---	36	701	---	460
20	100	59	15	193	58	30	614	---	290
21	106	---	15	181	---	26	554	---	205
22	113	---	14	173	---	23	505	---	145
23	116	---	14	165	---	20	460	---	105
24	107	---	13	163	---	20	409	---	50
25	102	---	13	158	---	16	357	---	45
26	102	---	12	162	---	20	334	40	36
27	101	---	12	206	---	30	312	---	33
28	106	---	15	293	---	76	309	---	33
29	113	---	14	290	94	74	303	---	32
30	132	---	13	789	---	900	435	---	55
31	128	---	12	---	---	---	875	---	185
TOTAL	3034	---	547.0	6247	---	2015.0	22416	---	55377

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	1330	---	600	e200	---	5.0	1900	100	513
2	917	---	200	e200	---	5.0	1840	93	463
3	715	---	130	e200	---	5.0	2050	109	622
4	794	---	155	e200	---	5.0	2570	---	1780
5	1100	---	330	e400	---	10	3840	1180	12900
6	806	---	160	e600	---	121	3480	---	6740
7	683	---	120	4840	5190	133000	2670	237	1720
8	918	---	411	19600	10100	522000	2540	---	1440
9	2640	2490	19100	25900	7550	527000	2530	182	1240
10	2470	1390	9490	21200	4290	249000	2540	---	1100
11	2410	---	10200	11800	3100	100000	2510	184	1250
12	1720	---	2870	6990	1550	29900	2740	---	1850
13	1370	---	1080	5130	653	9140	2820	---	2100
14	1160	---	468	4200	396	4500	2540	---	1320
15	1030	---	255	3600	270	2630	2270	132	810
16	1120	---	350	3240	200	1750	2060	---	492
17	1760	---	2250	3040	156	1280	1870	---	410
18	1740	---	2150	4640	909	14200	1730	---	321
19	1280	---	620	8160	2390	55500	1600	---	260
20	1100	---	315	8390	1760	40800	1490	---	214
21	1010	91	249	6490	614	10900	1400	---	176
22	884	---	140	6090	709	11800	1330	---	153
23	798	---	105	4540	414	5150	1350	---	158
24	738	---	80	3810	227	2340	1380	---	170
25	685	---	60	3440	162	1510	1270	---	132
26	610	---	41	3030	140	1150	1170	---	104
27	583	---	36	2590	132	920	1140	---	98
28	e520	---	23	2130	129	744	1120	---	92
29	e400	---	10	1930	111	577	1050	27	76
30	e300	---	9.0	---	---	---	1000	---	66
31	e250	---	7.0	---	---	---	998	---	66
TOTAL	33841	---	52014.0	166580	---	1725942.0	60798	---	38836

e Estimated



## PALOUSE RIVER BASIN

13351000 PALOUSE RIVER AT HOOPER, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
APRIL			MAY			JUNE			
1	1060	---	84	2000	93	500	674	134	241
2	2020	141	1010	1750	71	335	625	---	210
3	2260	---	920	1560	---	240	587	113	177
4	1780	66	307	1410	47	180	550	---	150
5	1520	---	232	1290	---	140	516	84	117
6	1360	50	50	1180	34	110	489	---	165
7	1250	---	126	1080	---	84	458	170	210
8	1170	33	104	1010	25	68	429	---	208
9	1130	---	93	930	---	49	403	189	205
10	1090	253	86	870	17	40	381	---	190
11	1060	---	77	827	---	35	358	149	144
12	1250	426	126	808	15	33	348	---	160
13	1280	---	137	846	---	37	335	197	179
14	1290	---	140	889	18	43	323	---	175
15	1150	---	99	1030	---	77	304	212	172
16	1060	27	77	1390	46	173	285	---	115
17	1010	---	68	1820	---	372	267	95	68
18	1160	32	101	2570	260	2290	253	---	46
19	1220	---	116	3680	---	5040	240	---	30
20	1370	45	166	2570	291	2050	233	---	23
21	1910	---	410	1940	---	1050	225	---	17
22	2070	98	550	1680	144	655	217	---	12
23	1720	---	317	1690	---	557	215	---	12
24	7810	7600	23300	1450	90	356	215	---	12
25	9560	2970	79400	1260	---	530	217	20	12
26	6290	874	15200	1120	111	329	227	---	16
27	4480	423	5120	995	---	324	231	---	20
28	3360	244	2210	894	134	319	227	---	24
29	2750	168	1250	821	---	210	218	49	29
30	2340	120	760	770	63	129	211	---	28
31	---	---	---	724	---	160	---	---	---
TOTAL	68780	---	132636	42854	---	16515	10261	---	3167

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JULY			AUGUST			SEPTEMBER			
1	202	---	27	54	---	3.0	35	---	2.0
2	189	---	26	48	---	3.0	35	---	2.0
3	174	51	24	48	---	3.0	37	---	2.0
4	165	---	19	55	19	3.0	37	---	2.0
5	156	---	14	52	56	8.0	37	---	2.0
6	149	---	10	49	---	8.0	38	---	2.0
7	142	12	6.0	50	---	8.0	39	---	2.0
8	135	---	6.0	46	---	7.0	40	---	2.0
9	127	---	7.0	44	---	7.0	40	---	2.0
10	117	---	7.0	47	---	7.0	38	---	2.0
11	115	26	8.0	49	53	7.0	37	---	2.0
12	111	---	7.0	49	---	6.0	38	---	2.0
13	108	---	7.0	49	---	5.0	42	---	2.0
14	101	---	6.0	50	---	4.0	47	---	3.0
15	98	21	6.0	46	---	3.0	49	---	3.0
16	91	---	4.0	42	---	2.0	51	---	3.0
17	86	---	3.0	38	5	1.0	51	---	3.0
18	83	---	1.0	37	---	1.0	51	---	3.0
19	83	6	1.0	37	---	1.0	56	---	4.0
20	81	---	2.0	37	---	1.0	61	---	4.0
21	76	---	3.0	39	---	2.0	61	---	4.0
22	77	---	4.0	40	18	2.0	63	---	4.0
23	75	23	5.0	37	---	2.0	72	---	5.0
24	75	---	5.0	38	---	2.0	72	---	5.0
25	72	---	5.0	38	---	2.0	71	---	5.0
26	68	---	5.0	37	---	2.0	70	---	5.0
27	63	28	5.0	36	---	2.0	70	---	5.0
28	61	---	4.0	36	---	2.0	71	---	5.0
29	60	---	4.0	36	---	2.0	69	---	5.0
30	57	22	3.0	35	---	2.0	67	---	5.0
31	56	---	3.0	34	---	2.0	---	---	---
TOTAL	3253	---	237.0	1333	---	110.0	1545	---	97.0
YEAR	420942		2027493.0						

## 13353000 SNAKE RIVER BELOW ICE HARBOR DAM, WA

LOCATION.--Lat 46°14'53", long 118°52'43", in NE 1/4 SE 1/4 sec.24, T.9 N., R.31 E., Walla Walla County, Hydrologic Unit 17060110, in powerhouse forebay pier P-1 on south side of Bay 1, at Ice Harbor Dam, 8.0 mi northeast of Burband, and at mile 9.7..

DRAINAGE AREA.--108,500 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1907 to March 1917, (gage heights only October 1907 to August 1909), March 1962 to September 1990, October 1995 to September 1996. Published as "at Burband" prior to 1911 and as "near Burbank" 1912-17.

REVISED RECORDS.--WSP 1317: Drainage area.

GAGE.--Watt-hour meters on each turbine in Ice Harbor Dam powerhouse. Elevations are sea level datum. Oct. 2, 1907 to Mar. 31, 1917, nonrecording gage at site approximately 2 mi downstream at datum 300 ft higher. Mar. 23, 1962 to Sept. 30, 1968, water-stage recorder 1.0 mi downstream at sea level datum.

REMARKS.--No estimated daily discharges. Records computed from power output, flow over spillway, flow through fish ladder, and lockage records at Ice Harbor Dam. Diversions upstream from station for irrigation of over 4,090,000 acres. Flow regulated by Lake Sacajawea and many upstream storage reservoirs and powerplants. Chemical analyses October 1965 to September 1969, October 1971 to September 1972. For records collected at site 1.0 mi downstream see station 13353200.

COOPERATION.--Records furnished by U.S. Corps of Engineers. Records not reviewed.

AVERAGE DISCHARGE.--36 years (water years 1910-16, 1963-90, 1996), 54,660 ft<sup>3</sup>/s, 39,601,000 acre-ft/yr.  
29 years (water years 1963-90, 1996), 53,240 ft<sup>3</sup>/s, 38,570,000 acre-ft/yr, regulated period:

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 312,000 ft<sup>3</sup>/s June 19, 1974; no flow momentarily Aug. 27, 1965 (result of testing at Ice Harbor Dam).

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of May 30, 1948, reached an elevation of 361.1 ft at a site 0.7 mi downstream, from information by U.S. Corps of Engineers.

EXTREMES FOR CURRENT YEAR.--Maximum hourly discharge, 216,000 ft<sup>3</sup>/s June 10; maximum forebay elevation, 440.21 ft Jan. 30; minimum hourly discharge, 200 ft<sup>3</sup>/s Feb. 7; minimum forebay elevation, 437.08 ft Dec. 6.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	25800	23700	117000	55000	42700	96100	85700	103000	139000	73900	38900	32400
2	27200	26200	112000	58100	46700	95500	90800	96100	134000	86000	40700	24500
3	26700	28200	92000	64100	46700	94900	94700	100000	130000	90200	35600	23300
4	28200	24900	75000	68700	44600	95300	101000	102000	159000	87600	40500	23400
5	34500	23700	68300	58000	48500	109000	100000	92200	169000	79100	35000	23300
6	29100	17400	66200	49100	58400	99300	98800	83100	186000	79700	40900	25600
7	27500	20000	64900	56200	77500	105000	87400	87300	172000	71000	38100	23900
8	27700	17600	58200	58600	171000	88400	72200	74600	187000	61800	35600	21700
9	21400	15600	46500	53500	192000	106000	114000	85900	184000	62000	37000	22200
10	29100	21100	31100	53200	155000	107000	128000	93200	192000	58300	36000	27400
11	30100	24100	51800	60600	120000	105000	148000	86800	187000	50400	31700	22200
12	20800	32400	66500	65500	91500	116000	150000	91500	179000	57700	35100	14600
13	28800	42900	92600	58300	97500	120000	147000	103000	171000	52100	33100	14900
14	32600	38800	74700	54200	84700	124000	139000	126000	159000	55900	36100	22900
15	26600	47400	78700	60700	79300	123000	131000	128000	162000	47300	40000	17600
16	27000	45400	80100	60500	79300	125000	109000	150000	156000	53800	46500	18000
17	31100	51900	79000	62600	84600	122000	108000	165000	155000	60600	39800	21900
18	34100	61100	78100	62900	94900	120000	116000	176000	158000	51400	42900	30900
19	33400	55400	61000	63600	125000	116000	112000	191000	141000	51500	43700	28000
20	37300	49800	55300	61500	130000	109000	111000	179000	128000	45600	41000	32400
21	30000	40900	60500	43900	128000	120000	97900	155000	112000	44700	38700	28700
22	33100	37000	65500	61100	122000	109000	90200	141000	97400	49900	43700	28000
23	30400	46800	54000	56200	119000	116000	105000	143000	97200	40000	38500	27100
24	29300	50000	49700	54800	111000	114000	153000	131000	88200	44100	39100	29700
25	33000	37200	42800	55200	112000	109000	156000	123000	96600	42100	39000	25900
26	30300	55400	38300	41800	97400	111000	141000	127000	88400	41000	37500	28700
27	31900	58500	51400	54200	98300	89900	135000	125000	94200	41400	40900	25700
28	31700	59300	50700	43700	108000	84800	122000	131000	93300	38500	42300	28700
29	26400	76100	52300	55300	97200	86300	104000	147000	93600	44600	40800	28200
30	22000	89200	57700	59000	---	83900	104000	145000	83700	36700	38200	21200
31	24800	---	53000	48800	---	91500	---	140000	---	39200	42300	---
TOTAL	901900	1218000	2024900	1758900	2862800	3291900	3451700	3821700	4192600	1738100	1209200	743000
MEAN	29090	40600	65320	56740	98720	106200	115100	123300	139800	56070	39010	24770
MAX	37300	89200	117000	68700	192000	125000	156000	191000	192000	90200	46500	32400
MIN	20800	15600	31100	41800	42700	83900	72200	74600	83700	36700	31700	14600
AC-FT	1789000	2416000	4016000	3489000	5678000	6529000	6846000	7580000	8316000	3448000	2398000	1474000

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1963 - 1996, BY WATER YEAR (WY)

	MEAN	26850	31900	38400	42690	49980	59760	75940	108000	113200	43640	23110	26170
MAX	35310	46560	65870	79610	98720	129100	130500	187600	202800	82090	39010	35820	
(WY)	1985	1984	1976	1974	1996	1986	1974	1971	1974	1982	1996	1984	
MIN	17540	22490	21040	24270	22160	23720	30010	39820	27530	17310	14050	16030	
(WY)	1989	1989	1989	1988	1988	1977	1977	1977	1987	1988	1977	1977	

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1963 - 1996

ANNUAL TOTAL	27214700		
ANNUAL MEAN	74360		
HIGHEST ANNUAL MEAN		53240	
LOWEST ANNUAL MEAN		78070	1974
HIGHEST DAILY MEAN	192000		27100
LOWEST DAILY MEAN	14600		1977
ANNUAL SEVEN-DAY MINIMUM	18900		305000
ANNUAL RUNOFF (AC-FT)	53980000		Jun 19 1974
10 PERCENT EXCEEDS	139000		2700
50 PERCENT EXCEEDS	60600		Feb 4 1979
90 PERCENT EXCEEDS	26900		Aug 10 1977
		38570000	
		114000	
		37500	
		20200	

## SNAKE RIVER MAIN STEM

13353200 SNAKE RIVER AT BURBANK, WA  
(National stream quality accounting network station)

LOCATION.--Lat 46°15'00", long 118°53'45", in SE 1/4 NW 1/4 sec.23, T.9 N., R.31 E., Franklin County, Hydrologic Unit 17060110, and approximately 1.0 mi downstream from Ice Harbor Dam.

DRAINAGE AREA.--108,800 mi<sup>2</sup>.

PERIOD OF RECORD.--Water years 1960-69, 1972 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: March 1973 to September 1979.

WATER TEMPERATURE: April 1973 to September 1981.

REMARKS.--Prior to 1979 sampling location was at U.S. Highway 395/410 bridge at Burbank, 2.2 mi upstream from mouth, and 7.5 mi downstream from Ice Harbor Dam. Discharge is obtained and routed from Ice Harbor Dam 1.0 mi upstream

## WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, INST. (CUBIC FEET PER SECOND) (00061)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH, FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	OXYGEN, DIS- SOLVED CENT SATUR- ATION (00301)	HARD- NESS (MG/L AS CACO3) (00900)	HARD- NESS, NONCARB, (MG/L AS CACO3) (00904)	CALCIUM, DIS- SOLVED (MG/L AS CA) (00915)
OCT 1995											
13...	1040	35000	265	8.0	16.5	1.7	8.6	87	83	0	21
NOV											
07...	1130	20000	328	8.1	11.5	1.3	9.8	90	110	0	27
DEC											
14...	1120	88000	100	7.7	6.0	18	13.6	110	34	0	8.9
JAN 1996											
23...	1230	62400	252	8.0	4.0	14	11.8	91	83	1	20
FEB											
13...	1130	98000	194	7.8	3.0	240	16.0	118	62	2	16
28...	1140	108000	196	8.0	4.0	18	15.8	128	66	2	17
MAR											
18...	1230	119000	188	7.9	7.5	13	15.4	128	66	2	17
APR											
22...	1200	98000	178	8.0	10.5	4.0	13.8	124	59	0	16
MAY											
08...	1200	100000	165	8.2	11.5	4.4	12.4	114	59	1	16
20...	1200	168000	87	7.8	11.5	11	14.5	133	30	0	8.7
JUN											
03...	1200	134000	106	8.0	14.0	4.2	13.4	131	36	0	10
26...	1300	102000	100	7.8	15.5	7.0	12.5	127	35	0	9.5
JUL											
16...	1230	45500	99	7.7	20.0	3.1	10.3	115	35	0	9.5
30...	1130	43400	112	7.7	22.0	2.3	9.3	107	40	2	11
AUG											
20...	1045	30300	171	7.9	21.0	1.2	9.5	107	56	0	15
SEP											
09...	1400	25000	164	7.9	19.0	2.2	8.5	92	54	0	14

DATE	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY, DIS IT, FIELD (MG/L AS CACO3) (39086)	BICAR- BONATE, DIS IT, FIELD (MG/L AS HCO3) (00453)	CAR- BONATE, DIS IT, FIELD (MG/L AS CO3) (00452)	SULFATE, DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)
OCT 1995											
13...	7.4	18	31	0.9	2.9	88	107	0	23	9.7	0.3
NOV											
07...	9.5	23	31	1	3.3	113	138	0	31	12	0.5
DEC											
14...	2.8	6.1	27	0.5	1.5	36	44	0	6.2	2.6	0.2
JAN 1996											
23...	7.9	16	29	0.8	2.6	82	100	0	20	9.2	0.3
FEB											
13...	5.3	11	27	0.6	2.7	60	73	0	14	6.2	0.2
28...	5.6	11	26	0.6	2.1	64	78	0	15	7.3	0.3
MAR											
18...	5.6	12	28	0.6	1.9	64	78	0	12	6.3	0.3
APR											
22...	4.5	10	26	0.6	1.8	62	76	0	13	5.5	0.3
MAY											
08...	4.6	8.2	23	0.5	1.9	58	71	0	12	5.0	0.3
20...	2.1	4.5	24	0.4	1.0	31	38	0	5.7	1.9	0.1
JUN											
03...	2.7	6.0	26	0.4	1.2	38	46	0	6.8	2.5	0.2
26...	2.6	5.3	24	0.4	1.0	36	44	0	6.8	2.6	0.2
JUL											
16...	2.6	4.9	23	0.4	1.3	36	44	0	6.3	2.5	0.2
30...	2.9	6.4	25	0.4	1.2	38	46	0	8.1	2.8	0.2
AUG											
20...	4.5	9.7	27	0.6	1.9	56	68	0	14	5.2	0.3
SEP											
09...	4.5	10	28	0.6	1.9	54	66	0	14	5.2	0.3

## SNAKE RIVER MAIN STEM

425

13353200 SNAKE RIVER AT BURBANK, WA--Continued

## WATER-QUALITY DATA

DATE	SILICA, DIS- SOLVED (MG/L AS SIO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C, DIS- SOLVED (MG/L) (70300)	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	SOLIDS, DIS- SOLVED (TONS PER DAY) (70302)	NITRO- GEN, NITRITE, DIS- SOLVED (MG/L AS N) (00613)	NITRO- GEN, NO2+NO3, DIS- SOLVED (MG/L AS N) (00631)	NITRO- GEN, AMMONIA, DIS- SOLVED (MG/L AS N) (00608)	NITRO- GEN,AM- MONIA + ORGANIC, TOTAL (MG/L AS N) (00625)	PHOS- PHORUS, TOTAL (MG/L AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L AS P) (00666)
OCT 1995											
13...	14	155	151	0.21	14600	0.03	0.36	<0.002	0.2	0.04	0.04
NOV											
07...	18	195	195	0.27	10500	0.01	0.61	<0.015	<0.2	0.08	0.07
DEC											
14...	18	75	70	0.10	17800	<0.01	0.38	<0.015	0.2	0.08	0.04
JAN 1996											
23...	23	159	153	0.22	26800	0.02	1.0	<0.015	<0.2	0.08	0.04
FEB											
13...	21	122	121	0.17	32300	<0.01	1.8	0.07	0.7	0.32	0.08
28...	23	136	124	0.18	39700	0.01	0.83	0.02	0.2	0.09	0.05
MAR											
18...	21	119	118	0.16	38200	0.01	0.65	0.02	0.3	0.09	0.05
APR											
22...	17	110	107	0.15	29100	0.02	0.38	0.03	0.2	0.05	0.04
MAY											
08...	17	110	101	0.15	29700	<0.01	0.27	0.02	0.3	0.05	0.04
20...	12	67	55	0.09	30400	<0.01	0.14	<0.015	0.3	0.09	0.04
JUN											
03...	12	76	65	0.10	27500	<0.01	0.07	0.02	<0.2	<0.01	0.02
26...	9.2	62	59	0.08	17100	<0.01	0.07	<0.015	<0.2	0.02	<0.01
JUL											
16...	9.7	60	59	0.08	7370	<0.01	0.11	0.04	<0.2	<0.01	<0.01
30...	9.4	74	65	0.10	8670	<0.01	0.12	0.02	<0.2	<0.01	<0.01
AUG											
20...	9.6	106	95	0.14	8670	0.03	0.17	0.02	<0.2	0.04	<0.01
SEP											
09...	10	102	93	0.14	6890	0.01	0.17	0.03	<0.2	0.02	0.02
DATE	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L AS P) (00671)	ALUM- INUM, DIS- SOLVED (UG/L AS AL) (01106)	BARIUM, DIS- SOLVED (UG/L AS BA) (01005)	COBALT, DIS- SOLVED (UG/L AS CO) (01035)	IRON, DIS- SOLVED (UG/L AS FE) (01046)	LITHIUM, DIS- SOLVED (UG/L AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L AS SE) (01145)	SILVER, DIS- SOLVED (UG/L AS AG) (01075)
OCT 1995											
13...	0.042	<10	25	<3	6	16	1	10	<1	<1	<1
NOV											
07...	0.060	--	--	--	5	--	2	--	--	--	--
DEC											
14...	0.030	370	16	<3	280	<4	5	<10	<1	<1	<1
JAN 1996											
23...	0.051	6.0	26	<1	20	10	8	1	4	<1	<1
FEB											
13...	0.062	6.0	33	<1	17	6	3	1	3	<1	<1
28...	0.047	8.0	22	<1	7	9	3	1	2	<1	<1
MAR											
18...	0.043	7.0	21	<1	12	8	4	1	1	<1	<1
APR											
22...	0.019	7.0	19	<1	7	8	1	1	1	<1	<1
MAY											
08...	0.005	5.0	18	<1	14	9	1	<1	2	<1	<1
20...	0.002	29	12	<1	41	<4	3	<1	3	<1	<1
JUN											
03...	0.005	22	13	<1	23	<4	<1	<1	<1	<1	<1
26...	0.009	67	12	<1	52	4	2	<1	<1	<1	<1
JUL											
16...	0.009	31	13	<1	35	4	4	<1	<1	<1	<1
30...	0.007	32	16	<1	40	<4	2	1	<1	<1	<1
AUG											
20...	0.003	73	20	<1	37	8	3	2	5	<1	<1
SEP											
09...	0.009	31	19	<1	33	6	2	1	2	<1	<1

## SNAKE RIVER MAIN STEM

13353200 SNAKE RIVER AT BURBANK, WA--Continued

## WATER-QUALITY DATA

DATE	STRON- TIUM, DIS- SOLVED (UG/L AS SR) (01080)	VANA- DIUM, DIS- SOLVED (UG/L AS V) (01085)	URANIUM NATURAL, DIS- SOLVED (UG/L AS U) (22703)	CARBON, ORGANIC DIS- SOLVED (MG/L AS C) (00681)	ACETO- CHLOR, DISS. (UG/L) (49260)	ALA- CHLOR, DISS. (UG/L) (46342)	DEETHYL ATRA- ZINE, DISS. (UG/L) (04040)	ATRA- ZINE, DISS. (UG/L) (39632)	METHYL AZIN- PHOS, DISS. (UG/L) (82686)	BEN- FLUR- ALIN, DISS. (UG/L) (82673)	BUTYL ATE, DISS. (UG/L) (04028)
OCT 1995											
13...	140	<6	--	3.1	--	--	--	--	--	--	--
NOV											
07...	--	--	--	2.1	<0.002	E0.002	E0.003	0.008	<0.001	<0.002	<0.002
DEC											
14...	58	<6	--	5.0	<0.002	<0.002	E0.002	<0.001	<0.001	<0.002	<0.002
JAN 1996											
23...	130	<6	2	2.9	<0.002	<0.002	E0.008	0.008	<0.001	<0.002	<0.002
FEB											
13...	95	<6	<1	3.6	<0.002	<0.002	E0.003	0.004	<0.001	<0.002	<0.002
28...	99	<6	1	2.5	<0.002	<0.002	<0.002	0.004	<0.001	<0.002	<0.002
MAR											
18...	99	<6	1	3.1	<0.002	<0.002	<0.002	0.003	<0.001	<0.002	<0.002
APR											
22...	100	<6	<1	3.0	<0.002	<0.002	<0.002	0.004	<0.001	<0.002	<0.002
MAY											
08...	97	<6	<1	2.4	<0.002	<0.002	E0.004	E0.004	<0.001	<0.002	<0.002
20...	55	<6	<1	2.9	<0.002	<0.002	<0.002	<0.001	<0.001	<0.002	<0.002
JUN											
03...	68	<6	<1	2.6	<0.002	E0.003	E0.001	0.006	<0.001	<0.002	<0.002
26...	68	<6	<1	2.4	<0.002	E0.003	E0.001	E0.003	<0.001	<0.002	<0.002
JUL											
16...	69	<6	<1	1.9	<0.002	0.004	E0.003	0.004	<0.001	<0.002	<0.002
30...	76	<6	<1	1.8	<0.002	<0.002	<0.002	E0.003	<0.001	<0.002	<0.002
AUG											
20...	100	<6	<1	2.2	<0.002	0.005	E0.005	0.008	<0.001	<0.002	<0.002
SEP											
09...	97	<6	<1	1.9	<0.002	<0.002	<0.002	0.005	<0.001	<0.002	<0.002
DATE	CAR- BARYL, DISS. (UG/L) (82680)	CARBO- FURAN, DISS. (UG/L) (82674)	CHLOR- PYRIFOS, DIS- SOLVED (UG/L) (38933)	CYANA- ZINE, DISS. (UG/L) (04041)	DCPA, DISS. (UG/L) (82682)	P,P' DDE, DISS. (UG/L) (34653)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	DI- ELDRIN, DIS- SOLVED (UG/L) (39381)	2,6-DI- ETHYL ANILINE, DISS. (UG/L) (82660)	DISUL- FOTON, DISS. (UG/L) (82677)	EPTC, DISS. (UG/L) (82668)
OCT 1995											
13...	--	--	--	--	--	--	--	--	--	--	--
NOV											
07...	<0.003	<0.003	<0.004	<0.004	E0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
DEC											
14...	<0.003	<0.003	<0.004	<0.004	E0.001	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
JAN 1996											
23...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
FEB											
13...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
28...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
MAR											
18...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
APR											
22...	<0.003	<0.003	<0.004	<0.004	E0.002	<0.006	<0.002	<0.001	<0.003	<0.017	0.003
MAY											
08...	<0.003	<0.003	<0.004	<0.004	E0.002	<0.006	<0.002	<0.001	<0.003	<0.017	0.008
20...	<0.003	<0.003	<0.004	<0.004	<0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002
JUN											
03...	<0.003	<0.003	<0.004	<0.004	0.008	<0.006	<0.002	<0.001	<0.003	<0.017	E0.003
26...	<0.003	<0.003	<0.004	<0.004	E0.003	<0.006	<0.002	<0.001	<0.003	<0.017	0.007
JUL											
16...	<0.003	<0.003	<0.004	<0.004	E0.004	<0.006	<0.002	<0.001	<0.003	<0.017	0.007
30...	<0.003	<0.003	<0.004	<0.004	E0.002	<0.006	<0.002	<0.001	<0.003	<0.017	0.004
AUG											
20...	<0.003	<0.003	<0.004	<0.004	E0.003	<0.006	<0.002	<0.001	<0.003	<0.017	E0.003
SEP											
09...	<0.003	<0.003	<0.004	<0.004	E0.002	<0.006	<0.002	<0.001	<0.003	<0.017	<0.002

E - Concentration is an estimated value because of problems with gas chromatography or extraction (Zaugg and others, 1995), or reported concentration is less than the method detection limit.



## SNAKE RIVER MAIN STEM

427

13353200 SNAKE RIVER AT BURBANK, WA--Continued

## WATER-QUALITY DATA

DATE	ETHAL- FLUR- ALIN, DIS- SOLVED (UG/L) (82663)	ETHO- PROP, DIS- SOLVED (UG/L) (82672)	FONOFOS, DIS- SOLVED (UG/L) (04095)	ALPHA BHC, DIS- SOLVED (UG/L) (34253)	LINDANE, DIS- SOLVED (UG/L) (39341)	LIN- URON, DIS- SOLVED (UG/L) (82666)	MALA- THION, DIS- SOLVED (UG/L) (39532)	METHYL PARA- THION, DIS- SOLVED (UG/L) (82667)	METO- LACHLOR, DIS- SOLVED (UG/L) (39415)	METRI- BUZIN, DIS- SOLVED (UG/L) (82630)	MOL- INATE, DIS- SOLVED (UG/L) (82671)
OCT 1995 13...	--	--	--	--	--	--	--	--	--	--	--
NOV 07...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	0.005	<0.004	<0.004
DEC 14...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
JAN 1996 23...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
FEB 13...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	E0.002	0.008	<0.004
28...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
MAR 18...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
APR 22...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
MAY 08...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
20...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	<0.002	<0.004	<0.004
JUN 03...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	E0.004	<0.004	<0.004
26...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	0.004	<0.004	<0.004
JUL 16...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	0.005	<0.004	<0.004
30...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	E0.003	<0.004	<0.004
AUG 20...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	0.007	<0.004	<0.004
SEP 09...	<0.004	<0.003	<0.003	<0.002	<0.004	<0.002	<0.005	<0.006	0.007	<0.004	<0.004

DATE	NAPROP- AMIDE, DIS- SOLVED (UG/L) (82684)	PARA- THION, DIS- SOLVED (UG/L) (39542)	PEB- ULATE, DIS- SOLVED (UG/L) (82669)	PENDI- METH- ALIN, DIS- SOLVED (UG/L) (82683)	CIS- PER- METHRIN, DIS- SOLVED (UG/L) (82687)	PHORATE, DIS- SOLVED (UG/L) (82664)	PRON- AMIDE, DIS- SOLVED (UG/L) (82676)	PRO- METON, DIS- SOLVED (UG/L) (04037)	PROP- CHLOR, DIS- SOLVED (UG/L) (04024)	PRO- PANIL, DIS- SOLVED (UG/L) (82679)
OCT 1995 13...	--	--	--	--	--	--	--	--	--	--
NOV 07...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
DEC 14...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
JAN 1996 23...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
FEB 13...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
28...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
MAR 18...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
APR 22...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
MAY 08...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
20...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
JUN 03...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
26...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
JUL 16...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
30...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
AUG 20...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004
SEP 09...	<0.003	<0.004	<0.004	<0.004	<0.005	<0.002	<0.003	<0.018	<0.007	<0.004

E - Concentration is an estimated value because of problems with gas chromatography or extraction (Zaugg and others, 1995), or reported concentration is less than the method detection limit.

SNAKE RIVER MAIN STEM  
13353200 SNAKE RIVER AT BURBANK, WA--Continued

WATER-QUALITY DATA

DATE	PRO- PARGITE, DIS- SOLVED (UG/L) (82685)	SI- MAZINE, DIS- SOLVED (UG/L) (04035)	THIO- BENCARB, DIS- SOLVED (UG/L) (82681)	TEBU- THIURON, DIS- SOLVED (UG/L) (82670)	TER- BACIL, DIS- SOLVED (UG/L) (82665)	TER- BUFOS, DIS- SOLVED (UG/L) (82675)	TRIAL- LATE, DIS- SOLVED (UG/L) (82678)	TRI- FLUR- ALIN, DIS- SOLVED (UG/L) (82661)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)
OCT 1995										
13...	--	--	--	--	--	--	--	--	5	473
NOV										
07...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	2	108
DEC										
14...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	0.003	<0.002	21	4990
JAN 1996										
23...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	0.008	<0.002	12	2020
FEB										
13...	<0.013	E0.003	<0.002	<0.010	<0.007	<0.013	0.037	0.006	--	--
28...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	22	6420
MAR										
18...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	20	6430
APR										
22...	<0.013	<0.005	<0.002	<0.010	E0.008	<0.013	0.003	<0.002	7	1850
MAY										
08...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	0.008	<0.002	17	4590
20...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	0.008	<0.002	38	17200
JUN										
03...	<0.013	E0.002	<0.002	<0.010	E0.003	<0.013	<0.001	<0.002	4	1450
26...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	16	4410
JUL										
16...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	10	1230
30...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	8	937
AUG										
20...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	8	654
SEP										
09...	<0.013	<0.005	<0.002	<0.010	<0.007	<0.013	<0.001	<0.002	4	270

E - Concentration is an estimated value because of problems with gas chromatography or extraction (Zaugg and others, 1995), or reported concentration is less than the method detection limit.

## SNAKE RIVER MAIN STEM

429

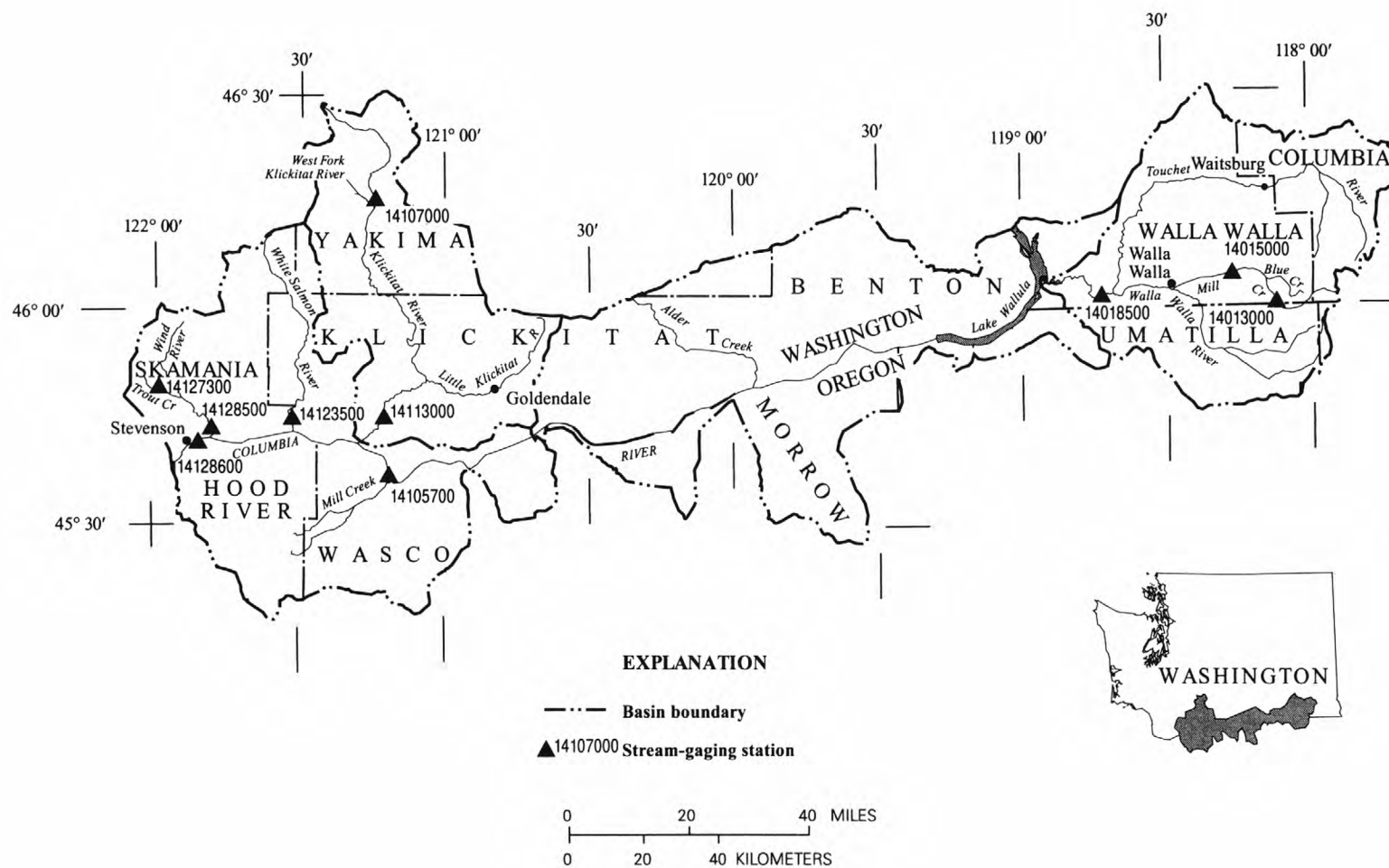
13353200 SNAKE RIVER AT BURBANK, WA--Continued

## WATER-QUALITY DATA

DATE	TIME	SULFUR, SED. SUSP. (PERCENT) (30308)	PHOS- PHORUS, SED. SUSP. (PERCENT) (30292)	ALUM- INUM, SED. SUSP. (PERCENT) (30221)	AN- TIMONY, SED. SUSP. (UG/G) (29816)	ARSENIC, SED. SUSP. (UG/G) (29818)	BARIUM, SED. SUSP. (UG/G) (29820)	BERYL- LIUM, SED. SUSP. (UG/G) (29822)	CADMIUM, SED. SUSP. (UG/G) (29826)	CHRO- MIUM, SED. SUSP. (UG/G) (29829)
OCT 1995										
13...	1040	--	0.19	7.0	1.4	20.7	520	1.9	0.9	--
NOV										
07...	1130	--	0.14	6.0	1.5	16.2	530	1.6	1.6	--
DEC										
14...	1120	--	0.20	9.3	1.0	9.7	650	2.7	0.8	--
FEB 1996										
28...	1140	--	0.17	8.2	1.2	8.3	770	1.9	0.1	56
MAR										
18...	1230	--	0.14	8.2	6.3	9.3	760	1.9	0.2	--
APR										
22...	1200	<0.1	0.20	6.6	1.1	10.7	600	1.8	0.5	67
MAY										
08...	1200	0.2	0.19	6.1	1.0	9.5	500	1.6	0.3	42
20...	1200	0.3	0.17	7.4	1.7	12.1	650	2.0	0.5	45
JUN										
03...	1200	0.2	0.16	6.9	1.3	9.0	580	1.8	0.4	46
26...	1300	0.2	0.14	6.7	1.5	11.3	760	2.0	0.3	59
JUL										
16...	1230	0.1	0.15	7.1	1.7	14.0	650	2.0	0.8	52
30...	1130	0.4	0.13	7.0	3.5	14.7	600	1.9	0.8	61
AUG										
20...	1045	1.1	0.13	5.6	3.1	14.5	500	1.6	0.5	74

DATE	COBALT, SED. SUSP. (UG/G) (35031)	COPPER, SED. SUSP. (UG/G) (29832)	IRON, SED. SUSP. (PERCENT) (30269)	LEAD, SED. SUSP. (UG/G) (29836)	LITHIUM, SED. SUSP. (UG/G) (35050)	MAN- GANESE, SED. SUSP. (UG/G) (29839)	MERCURY, SED. SUSP. (UG/G) (29841)	MOLYB- DENUM, SED. SUSP. (UG/G) (29843)	NICKEL, SED. SUSP. (UG/G) (29845)
OCT 1995									
13...	21	51	4.6	70	30	2400	0.03	--	--
NOV									
07...	20	38	3.8	130	25	2400	--	--	--
DEC									
14...	20	41	5.6	44	57	1300	--	--	--
FEB 1996									
28...	24	59	6.1	30	44	1500	0.06	<5	36
MAR									
18...	28	--	6.3	31	39	1700	0.08	--	--
APR									
22...	23	43	4.9	22	40	1900	0.04	<5	40
MAY									
08...	20	39	4.3	19	39	1600	0.08	<5	27
20...	21	44	4.8	24	36	1300	0.06	<5	25
JUN									
03...	24	41	4.5	20	31	1400	0.07	<5	26
26...	19	33	3.5	24	28	1300	0.09	<5	35
JUL									
16...	22	43	4.6	40	35	1800	0.10	<5	32
30...	21	39	4.6	46	32	1900	0.08	<5	39
AUG									
20...	16	34	3.6	27	32	1600	0.08	7	49

DATE	SELE- NIUM, SED. SUSP. (UG/G) (29847)	SILVER, SED. SUSP. (UG/G) (29850)	STRON- TIUM, SED. SUSP. (UG/G) (35040)	THAL- LIUM, SED. SUSP. (UG/G) (49955)	TITA- NIUM, SED. SUSP. (PERCENT) (30317)	VANA- DIUM, SED. SUSP. (UG/G) (29853)	ZINC, SED. SUSP. (UG/G) (29855)	URANIUM, SED. SUSP. (UG/G) (35046)	CARBON, SED. SUSP. (PERCENT) (30244)
OCT 1995									
13...	0.6	1.9	160	<50	0.43	100	150	<50	--
NOV									
07...	0.6	--	180	<50	0.35	87	210	<50	--
DEC									
14...	1.0	<0.5	190	<50	0.53	120	160	<50	--
FEB 1996									
28...	0.3	0.7	220	<50	0.68	150	200	<50	--
MAR									
18...	0.4	<0.5	200	<50	0.63	150	--	<50	--
APR									
22...	0.6	<0.5	220	<50	0.54	130	130	<50	4.6
MAY									
08...	1.1	<0.5	240	<50	0.49	110	110	<50	5.2
20...	0.5	<0.5	220	<50	0.58	120	130	<50	3.2
JUN									
03...	0.6	<0.5	220	<50	0.51	110	120	<50	3.3
26...	0.4	0.7	260	<50	0.39	89	100	<50	2.5
JUL									
16...	0.5	<0.5	230	<50	0.49	120	130	<50	3.5
30...	0.7	1.5	250	<50	0.47	110	130	<50	4.1
AUG									
20...	0.6	--	320	<50	0.39	93	140	<50	7.9



**Figure 61.** Location of surface-water and water-quality stations in the Columbia River Basin between Wallula Lake and including Walla Walla River, Klickitat River and White Salmon River Basins.





## WALLA WALLA RIVER BASIN

14013000 MILL CREEK NEAR WALLA WALLA, WA

LOCATION.--Lat 46°00'29", long 118°07'03", in SW 1/4 SW 1/4 sec.7, T.6 N., R.38 E., Walla Walla County, Hydrologic Unit 17070102, on left bank 0.1 mi downstream from Railroad Canyon, 4.0 mi downstream from city of Walla Walla diversion dam, 4.4 mi upstream from Blue Creek, 11.5 mi southeast of Walla Walla, and at mile 21.2.

DRAINAGE AREA.--59.6 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1913 to September 1917, April to September 1938, October 1939 to September 1976, October 1979 to current year. Maximum discharge and occasional discharge measurements 1977-79.

REVISED RECORDS.--WSP 1398: 1946-48(M), 1950 (M). WSP 1395: 1959, drainage area.

GAGE.--Water-stage recorder. Datum of gage is 1,995.85 ft above sea level (levels by U.S. Corps of Engineers). Prior to Oct. 1, 1938, nonrecording gages at about same site at different datums.

REMARKS.--Records good except for estimated daily discharges, which are poor. No regulation. City of Walla Walla diverts about 28 ft<sup>3</sup>/s 4.0 mi upstream from station for municipal use. Water temperatures March 1962 to July 1965. Sediment records March 1962 to July 1965.

AVERAGE DISCHARGE.--58 years (water years 1914-17, 1940-76, 1980-96), 95.1 ft<sup>3</sup>/s, 68,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,350 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 20.43 ft, from rating curve extended above 1,600 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; minimum daily discharge, 9.5 ft<sup>3</sup>/s Dec. 9, 10, 1972.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 31 or Apr. 1, 1931, reached a discharge of about 11,000 ft<sup>3</sup>/s, based on slope-area measurement about 900 ft upstream at old city of Walla Walla diversion dam.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	1900	1,400	17.05	Feb. 9	0700	(a)*6,350	*20.43
Nov. 28	1000	2,060	17.73	Feb. 19	0330	777	15.89
Dec. 12	1230	746	16.17	Apr. 24	0900	1,680	17.12
Feb. 7	1130	3,690	18.96				

Minimum discharge, 18 ft<sup>3</sup>/s Oct. 7.

(a) From rating curve extended above 1,600 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	19	22	721	172	e42	e160	e110	197	91	30	32	30
2	20	22	497	162	e38	e150	e140	164	87	32	32	30
3	61	22	347	157	e42	e160	e130	136	85	35	33	30
4	36	22	270	146	e60	e170	e70	123	84	33	32	30
5	24	22	198	130	e80	e190	e74	117	81	32	32	31
6	20	22	160	117	373	e180	e80	112	78	31	32	31
7	19	26	138	125	2300	e170	e100	108	77	31	31	31
8	20	93	116	215	1550	e160	e100	103	76	30	31	31
9	20	270	101	289	3240	e170	e110	102	72	30	31	e31
10	19	103	99	348	1100	e180	e150	98	66	31	31	e30
11	22	601	114	299	594	e200	e140	95	65	31	31	30
12	24	707	556	225	430	e220	e130	98	63	31	31	30
13	22	358	472	177	355	e240	e130	104	50	30	31	31
14	22	265	331	148	330	e230	e130	126	54	30	31	30
15	22	194	291	149	320	e220	e120	135	54	30	31	31
16	22	147	238	188	309	e200	e120	140	46	30	31	30
17	23	116	188	218	331	e180	e120	163	53	31	31	30
18	31	96	158	197	650	e160	e120	241	38	32	31	30
19	24	75	136	187	724	e150	e130	214	34	31	31	32
20	23	66	118	174	572	e140	e140	187	34	31	31	30
21	25	58	102	168	454	e130	e150	161	33	31	31	30
22	26	55	92	144	371	e130	e180	174	33	32	31	30
23	24	52	82	132	324	e140	394	178	34	31	30	30
24	23	54	75	123	285	e130	1370	177	37	31	30	30
25	24	251	70	109	264	e120	777	163	36	31	30	29
26	25	529	66	98	e220	e120	536	145	36	32	30	29
27	24	489	63	95	e190	e120	401	133	45	32	30	29
28	23	1470	63	92	e180	e120	328	121	36	32	30	29
29	22	873	71	84	e170	e100	274	111	32	32	30	29
30	22	800	104	e64	---	e100	229	102	31	32	30	29
31	22	---	156	e50	---	e100	---	97	---	32	30	---
TOTAL	753	7880	6193	4982	15898	4950	6983	4325	1641	970	959	903
MEAN	24.3	263	200	161	548	160	233	140	54.7	31.3	30.9	30.1
MAX	61	1470	721	348	3240	240	1370	241	91	35	33	32
MIN	19	22	63	50	38	100	70	95	31	30	30	29
AC-FT	1490	15630	12280	9880	31530	9820	13850	8580	3250	1920	1900	1790
CAL YR 1995	TOTAL 45075	MEAN 123	MAX 1470	MIN 19	AC-FT 89410							
WTR YR 1996	TOTAL 56437	MEAN 154	MAX 3240	MIN 19	AC-FT 111900							

e Estimated

## WALLA WALLA RIVER BASIN

433

## 14015000 MILL CREEK AT WALLA WALLA, WA

LOCATION.--Lat 46°04'35", long 118°16'21", in NE 1/4 NW 1/4 sec.23, T.7 N., R.36 E., Walla Walla County, Hydrologic Unit 17070102, on left bank 200 ft downstream from diversion dam, 1.5 mi east of Walla Walla, and at mile 10.5.

DRAINAGE AREA.--95.7 mi<sup>2</sup>.

PERIOD OF RECORD.--April 1941 to current year.

REVISED RECORDS.--WSP 1288: Drainage area. WSP 1348: 1943, 1945-46.

GAGE.--Water-stage recorder and concrete control. Datum of gage is 1,165.49 ft above sea level (levels by U.S. Corps of Engineers). April 1941 to June 11, 1941, nonrecording gage, and June 11, 1941, to Jan. 22, 1957, water-stage recorder, at sites 0.8 mi downstream at different datum.

REMARKS.--Records fair except for those below 20 ft<sup>3</sup>, which are poor. Some regulation at diversion dam 200 ft upstream from station where water is diverted into Yellowhawk and Garrison Creeks for stock and irrigation. Since Nov. 19, 1941, water has been diverted 1.0 mi upstream into Mill Creek Reservoir for flood control with release of stored water after flood into Russell Creek, and is also diverted as required to replenish losses from seepage and evaporation from small recreation pool maintained in the reservoir. City of Walla Walla diverts water for municipal supply about 11 mi upstream. Other small diversions upstream from station for irrigation.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 4,190 ft<sup>3</sup>/s Feb. 9, 1996, gage height, 6.89 ft (inside high-water mark), from rating curve extended above 1,500 ft<sup>3</sup>/s; no flow many days.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Mar. 31 or Apr. 1, 1931, discharge not determined, was greatest since at least 1913. A discharge of about 11,000 ft<sup>3</sup>/s, based on a slope-area measurement, was determined for the 1931 peak at old city of Walla Walla diversion dam.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 4,190 ft<sup>3</sup>/s Feb. 9, gage height, 6.89 ft (inside high-water mark), from rating curve extended above 1,500 ft<sup>3</sup>/s; no flow many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	.12	.00	729	176	e46	180	127	208	81	e.05	.00	.14
2	.12	.00	543	188	e44	170	164	183	75	e.06	.00	.17
3	11	.00	373	165	e46	173	113	161	57	.06	.00	.16
4	16	.00	301	154	e70	182	84	151	59	.05	.00	.18
5	6.3	.00	227	141	e100	197	90	138	66	.05	.00	.14
6	.61	.00	173	128	509	187	100	122	56	.07	.00	.14
7	3.2	.00	145	128	1460	179	104	114	46	.07	.00	.13
8	.85	1.8	118	205	1730	185	111	95	40	.03	.00	.11
9	1.8	239	106	288	3070	199	147	107	38	.01	.01	.05
10	.21	107	96	345	1620	217	168	95	34	.18	.01	.06
11	.04	446	115	318	901	232	154	91	31	.43	.01	.06
12	.82	766	492	258	666	242	156	92	18	.11	.01	.00
13	.00	352	528	208	546	242	143	95	.31	.08	.00	.01
14	.00	270	368	173	485	247	135	116	.28	.07	.01	.00
15	.00	198	339	166	451	251	132	138	4.2	e.07	.00	.00
16	.00	143	288	207	418	225	133	147	3.5	e.06	.01	.00
17	.00	113	239	281	427	203	131	187	4.5	e.05	.00	.00
18	.22	100	201	243	777	181	146	381	.31	e.04	.01	.00
19	.00	83	168	233	892	171	138	348	.09	e.03	.03	.00
20	.00	66	142	221	728	158	160	278	.07	e.02	.00	.00
21	.00	53	119	231	606	138	168	219	.05	e.01	.05	.00
22	.00	51	106	200	494	140	172	249	.02	e.00	.05	.00
23	.00	49	93	176	433	145	286	249	.01	.00	.05	.00
24	.00	49	83	162	379	146	908	240	.02	.01	.06	.00
25	.00	166	75	138	338	135	852	216	e.02	.02	.01	.00
26	.00	483	66	128	285	129	552	187	e.03	.01	.03	.00
27	.00	468	47	122	244	128	399	160	e.03	.00	.08	.00
28	.00	1160	62	115	225	125	324	137	e.04	.00	.14	.00
29	.00	871	70	104	200	120	261	119	e.04	.00	.13	.00
30	.00	762	90	76	--	114	227	101	e.05	.00	.14	.00
31	.00	--	152	e54	--	110	--	91	--	.02	.13	--
TOTAL	41.29	6996.80	6654	5732	18190	5451	6785	5215	614.57	1.66	0.97	1.35
MEAN	1.33	233	215	185	627	176	226	168	20.5	.054	.031	.045
MAX	16	1160	729	345	3070	251	908	381	81	.43	.14	.18
MIN	.00	.00	47	54	44	110	84	91	.01	.00	.00	.00
AC-FT	82	13880	13200	11370	36080	10810	13460	10340	1220	3.3	1.9	2.7

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1983 - 1996, BY WATER YEAR (WY)

	MEAN	2.77	65.4	89.3	131	186	186	139	101	32.7	2.27	1.24	1.28
	MAX	12.1	233	215	221	627	332	263	225	162	13.7	7.64	5.90
	(WY)	1986	1996	1996	1989	1996	1984	1985	1993	1984	1984	1989	1986
	MIN	.000	.14	9.23	59.1	25.8	55.9	32.5	3.40	.000	.000	.000	.000
	(WY)	1989	1988	1988	1992	1994	1992	1992	1992	1992	1994	1983	1985

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1983 - 1996

ANNUAL TOTAL	40932.62	55683.64	77.5
ANNUAL MEAN	112	152	152
HIGHEST ANNUAL MEAN			40.8
LOWEST ANNUAL MEAN			1996
HIGHEST DAILY MEAN	1160	Nov 28	3070
LOWEST DAILY MEAN	.00	Jun 1	.00
ANNUAL SEVEN-DAY MINIMUM	.00	Jun 29	.00
ANNUAL RUNOFF (AC-FT)	81190	110400	56140
10 PERCENT EXCEEDS	323	370	210
50 PERCENT EXCEEDS	54	91	36
90 PERCENT EXCEEDS	.00	.00	.00

e Estimated

## WALLA WALLA RIVER BASIN

14018500 WALLA WALLA RIVER NEAR TOUCHET, WA

LOCATION.--Lat 46°01'40", long 118°43'43", in NW 1/4 SE 1/4 sec.6, T.6 N., R.33 E., Walla Walla County, Hydrologic Unit 17070102, on left bank 0.8 mi upstream from Gardena Creek, 2.8 mi southwest of Touchet, 3.4 mi downstream from Touchet River, and at mile 18.2.

DRAINAGE AREA. - - 1,657 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1951 to current year.

REVISED RECORDS.--WSP 1935: Drainage area.

GAGE.--Water-stage recorder. Elevation of gage is 405 ft above sea level, from topographic map. Prior to Nov. 27, 1951, nonrecording gage at same site and datum.

REMARKS.--Records good except those for Feb. 14 to Mar. 18, which are fair, and for estimated daily discharges, which are poor. Many diversions upstream from station for irrigation.

AVERAGE DISCHARGE.--45 years (water years 1952-96), 568 ft<sup>3</sup>/s, 411,800 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD: Maximum discharge, 33,400 ft<sup>3</sup>/s Dec. 22, 1964, gage height, 18.90 ft, from rating curve extended above 15,000 ft<sup>3</sup>/s on basis of slope-area measurement of peak flow; maximum gage height, 20.58 ft Feb. 10, 1996, from high-water mark; no flow July 30 to Aug. 8, Aug. 12, 13, 1968, Oct. 5-7, 1987.

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

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 29	unknown	unknown	unknown	Feb. 19	3330	5,000	11.21
Dec. 13	0130	3,530	10.21	Apr. 24	1900	10,500	15.55
Feb. 10	unknown	*a32,500	*b20.58				

Minimum discharge, 13 ft<sup>3</sup>/s Aug. 27.

a From rating curve extended above 12,000 ft<sup>3</sup>/s, on basis of slope-area measurement of peak flow.

b From high-water mark.

REVISIONS.--The peak discharges and annual maximum (\*) reported for 1992, 1993, and 1995 have been revised as shown in the following table. They supercede figures published in the reports for 1992, 1993, and 1995.

Water Years	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
1992	Dec. 7, 1991	1300	*4,680	*11.40
1993	May 5, 1993	0500	*6,440	*13.00
1995	Feb. 2, 1995	unknown	*4,440	*11.42
	Mar. 15, 1995	2000	3,560	10.14

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e15	e70	e2700	1270	e110	1500	1120	1460	547	180	27	18
2	e15	e84	e2600	1210	e120	1450	1270	1310	505	144	23	23
3	e70	e84	2450	1160	e140	1450	1220	1170	453	114	23	25
4	e220	e86	1870	1140	e170	1600	1100	1060	404	85	27	23
5	e160	e86	1530	1060	e250	1750	1020	965	378	96	30	22
6	e120	e86	1270	984	e1500	1720	998	872	346	104	30	25
7	e90	e200	1100	950	e3500	1650	993	787	305	96	32	32
8	e74	e400	961	1260	e6000	1660	1030	730	279	84	31	30
9	e72	e800	849	1550	e9000	1720	1090	657	254	79	30	27
10	e70	e700	787	2050	e20000	1840	1150	604	237	66	26	21
11	e74	e1800	862	1920	e12000	1960	1120	574	210	64	24	19
12	e80	e2000	1920	1640	e7000	2530	1110	567	189	61	21	17
13	e74	e1500	3140	1420	e3200	2730	1030	580	168	60	18	22
14	e72	e1200	2300	1240	3040	2450	948	665	152	68	18	27
15	e72	e1000	2240	1160	2720	2180	882	875	135	61	16	39
16	e76	e900	1900	1290	2350	1920	862	996	133	56	16	61
17	e86	e800	1580	1930	2240	1690	906	1020	127	46	15	59
18	e100	e700	1350	1700	2740	1500	903	1940	130	45	15	50
19	e80	e600	1180	1530	4410	1390	913	1950	138	57	17	53
20	e76	e560	1040	1340	4660	1310	974	1610	130	66	19	61
21	e84	e520	944	1140	3950	1220	1000	1340	119	58	18	81
22	e84	e500	867	822	3590	1190	993	1420	123	52	18	92
23	e80	e460	788	687	2880	1210	1210	1420	127	46	19	84
24	e74	e450	725	731	2410	1180	6660	1310	150	42	19	73
25	e80	e1000	674	711	2210	1100	6990	1210	171	40	16	70
26	e84	e2200	632	585	2030	1080	4140	1090	162	38	14	72
27	e74	e2100	593	522	1810	1060	2980	962	188	34	15	61
28	e72	e3500	566	487	1690	1020	2340	862	283	30	16	56
29	e72	e4500	589	330	1590	976	1920	775	237	25	19	47
30	e72	e2800	907	e130	- - -	927	1660	687	203	24	20	41
31	e70	- - -	1430	e110	- - -	925	- - -	617	- - -	28	18	- - -
TOTAL	2542	31686	42344	34059	107310	47918	50532	32085	6983	2059	650	1331
MEAN	82.0	1056	1366	1099	3700	1546	1684	1035	233	66.4	21.0	44.4
MAX	220	4500	3140	2050	20000	2730	6990	1950	547	180	32	92
MIN	15	70	566	110	110	925	862	567	119	24	14	17
AC - FT	5040	62850	83990	67560	212800	95050	100200	63640	13850	4080	1290	2640

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1952 - 1996, BY WATER YEAR (WY)

MEAN	79.5	294	795	1087	1298	1180	1070	715	248	41.6	18.7	38.7
MAX	392	1056	2890	2698	3700	3105	2437	1544	1130	139	82.7	181
(WY)	1952	1996	1965	1965	1996	1972	1974	1993	1974	1974	1976	1959
MIN	9.20	55.3	190	306	286	339	242	60.6	21.2	5.85	3.07	3.07
(WY)	1989	1988	1988	1979	1977	1977	1973	1968	1968	1968	1973	1994

SUMMARY STATISTICS                      FOR 1995 CALENDAR YEAR                      FOR 1996 WATER YEAR                      WATER YEARS 1952 - 1996

ANNUAL TOTAL	277260.6		359499				
ANNUAL MEAN	760		982			568	
HIGHEST ANNUAL MEAN						1212	1974
LOWEST ANNUAL MEAN						166	1977
HIGHEST DAILY MEAN	4500	Feb 2	20000	Feb 10	20300		Dec 23 1964
LOWEST DAILY MEAN	9.0	Sep 1	14	Aug 26		.00	Jul 30 1968
ANNUAL SEVEN-DAY MINIMUM	9.2	Aug 29	16	Aug 13		.00	Jul 30 1968
ANNUAL RUNOFF (AC-FT)	549900		713100			411800	
10 PERCENT EXCEEDS	1920		2200			1430	
50 PERCENT EXCEEDS	560		596			287	
90 PERCENT EXCEEDS	14		25			12	

e Estimated

## COLUMBIA RIVER MAIN STEM

435

14105700 COLUMBIA RIVER AT THE DALLES, OR

LOCATION.--Lat 45°36'27", long 121°10'20", in SW 1/4 SW 1/4 sec.34, T.2 N., R.13 E., Wasco County, Hydrologic Unit 17070105, Corps of Engineers land, on left bank 0.3 mi downstream from Mill Creek, 2.6 mi downstream from The Dalles Dam, and at mile 188.9.

DRAINAGE AREA.--237,000 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1857 to September 1877 (annual maximum only, at Lower Cascades Landing, published in WSP 1318), June 1878 to current year. Published as "near The Dalles" 1936-56.

REVISED RECORDS.--WSP 534: 1920(m). WSP 1094: 1894. WSP 1248: 1866, 1888, 1899, 1909. WSP 1518: 1876(M).

GAGE.--Acoustic velocity meter (AVM) with water-stage and velocity-index recorder. Datum of gage is sea level. See WSP 1738 for history of changes prior to Mar. 16, 1957. Mar. 16, 1957, to Sept 30, 1968, water-stage recorder at site 0.4 mi upstream at same datum.

REMARKS.--Records good. Daily discharge estimates for period Jan. 30 to Feb. 4, Feb. 7, Feb.9 to Sept. 30 determined from records provided by U.S. Army Corps of Engineers. Considerable regulation by many large reservoirs. Diurnal fluctuations caused by powerplant and gates at The Dalles Dam. Many diversions for irrigation upstream from station. Continuous water-quality records for the period October 1957 to February 1985 have been collected at this location.

AVERAGE DISCHARGE.--118 years (water years 1879-1996), 191,200 ft<sup>3</sup>/s, 138,600,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge (since 1858), 1,240,000 ft<sup>3</sup>/s June 6, 1894, elevation, 106.5 ft; minimum discharge (since 1878), 12,100 ft<sup>3</sup>/s Apr. 16, 1968 (due to closure of John Day dam, recorded by AVM).

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 456,000 ft<sup>3</sup>/s June 11; maximum elevation, 83.94 ft June 11; minimum daily discharge, 84,200 ft<sup>3</sup>/s Oct. 16.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	98200	165000	298000	192000	e254000	e364000	e235000	e345000	e399000	e241000	e193000	e133000
2	110000	148000	303000	195000	e250000	e325000	e240000	e346000	e391000	e248000	e203000	e97600
3	113000	126000	340000	212000	e248000	e274000	e248000	e312000	e372000	e256000	e175000	e136000
4	130000	112000	316000	220000	e224000	e299000	e265000	e328000	e393000	e268000	e136000	e122000
5	120000	86300	251000	223000	231000	e370000	e244000	e317000	e416000	e260000	e181000	e127000
6	117000	110000	245000	216000	265000	e318000	e292000	e323000	e420000	e255000	e222000	e137000
7	117000	123000	247000	216000	e266000	e309000	e257000	e284000	e402000	e269000	e201000	e116000
8	111000	116000	261000	227000	350000	e326000	e224000	e292000	e421000	e272000	e207000	e122000
9	120000	111000	268000	218000	e311000	e312000	e235000	e304000	e432000	e261000	e199000	e132000
10	132000	127000	247000	220000	e376000	e278000	e313000	e275000	e454000	e270000	e170000	e137000
11	139000	131000	242000	273000	e375000	e321000	e349000	e247000	e456000	e256000	e149000	e126000
12	130000	150000	274000	279000	e349000	e338000	e353000	e261000	e452000	e264000	e200000	e118000
13	152000	153000	316000	247000	e345000	e339000	e344000	e241000	e439000	e273000	e206000	e148000
14	167000	153000	303000	265000	e373000	e353000	e339000	e288000	e418000	e258000	e216000	e155000
15	122000	171000	271000	254000	e337000	e357000	e342000	e322000	e400000	e258000	e208000	e98600
16	84200	154000	279000	261000	e353000	e338000	e319000	e319000	e424000	e241000	e185000	e120000
17	109000	156000	279000	265000	e369000	e332000	e333000	e337000	e418000	e258000	e157000	e122000
18	124000	173000	241000	275000	e372000	e324000	e360000	e386000	e426000	e210000	e157000	e116000
19	141000	175000	236000	277000	e376000	e296000	e356000	e409000	e406000	e235000	e187000	e127000
20	150000	183000	245000	288000	e408000	e314000	e333000	e416000	e366000	e224000	e190000	e141000
21	119000	173000	266000	275000	e368000	e301000	e331000	e406000	e334000	e192000	e182000	e138000
22	121000	196000	264000	303000	e370000	e303000	e322000	e379000	e292000	e244000	e201000	e137000
23	120000	171000	270000	279000	e374000	e303000	e354000	e404000	e276000	e211000	e159000	e135000
24	123000	166000	253000	289000	e383000	e289000	e383000	e386000	e288000	e249000	e158000	e135000
25	142000	164000	245000	271000	e400000	e291000	e384000	e385000	e282000	e214000	e157000	e137000
26	119000	171000	210000	264000	e383000	e293000	e393000	e354000	e327000	e240000	e157000	e137000
27	144000	202000	247000	248000	e381000	e288000	e396000	e360000	e300000	e196000	e145000	e144000
28	129000	254000	227000	213000	e382000	e296000	e407000	e366000	e312000	e159000	e160000	e105000
29	121000	306000	197000	259000	e398000	e288000	e339000	e404000	e319000	e187000	e166000	e103000
30	117000	272000	186000	e249000	---	e237000	e327000	e430000	e297000	e173000	e159000	e114000
31	118000	---	180000	e249000	---	e208000	---	e372000	---	e189000	e163000	---
TOTAL	3859400	4898300	8007000	7722000	9871000	9584000	9617000	10598000	11332000	7331000	5549000	3816200
MEAN	124500	163300	258300	249100	340400	309200	320600	341900	377700	236500	179000	127200
MAX	167000	306000	340000	303000	408000	370000	407000	430000	456000	273000	222000	155000
MIN	84200	86300	180000	192000	224000	208000	224000	241000	276000	159000	136000	97600
AC-FT	7655000	9716000	15880000	15320000	19580000	19010000	19080000	21020000	22480000	14540000	11010000	7569000

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1879 - 1996, BY WATER YEAR (WY)

	MEAN	103700	107100	113600	115600	125700	144600	203100	340800	442800	302800	172900	120000
MAX	174800	200800	258300	252600	340400	345000	386400	624400	1002000	793300	385700	198200	
(WY)	1960	1928	1996	1974	1996	1983	1881	1897	1894	1880	1880	1880	
MIN	69430	57830	52380	42430	51420	69820	98350	136100	123700	88600	91970	75760	
(WY)	1930	1937	1937	1937	1937	1937	1944	1977	1977	1977	1994	1994	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1879 - 1996
ANNUAL TOTAL	67848900	92184900	
ANNUAL MEAN	185900	251900	191200
HIGHEST ANNUAL MEAN			313600
LOWEST ANNUAL MEAN			118100
HIGHEST DAILY MEAN	340000	Dec 3	456000
LOWEST DAILY MEAN	67400	Sep 10	84200
ANNUAL SEVEN-DAY MINIMUM	92500	Sep 4	112000
ANNUAL RUNOFF (AC-FT)	134600000		182800000
10 PERCENT EXCEEDS	277000		383000
50 PERCENT EXCEEDS	174000		254000
90 PERCENT EXCEEDS	116000		123000
			79800

e Estimated



## KLICKITAT RIVER BASIN

14107000 KLICKITAT RIVER ABOVE WEST FORK NEAR GLENWOOD, WA

LOCATION.--Lat 46°15'54", long 121°14'38", in NW 1/4 SW 1/4 sec.18, T.9 N., R.13 E., Yakima County, Hydrologic Unit 17070106, Yakima Indian reservation, on right bank 0.8 mi upstream from Swamp Creek, 1.9 mi upstream from West Fork, 17.0 mi north of Glenwood, and at mile 64.7.

DRAINAGE AREA.--151 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1944 to September 1977, July 1991 to current year. Monthly discharge only for October 1944, published in WSP 1318.

GAGE.--Water-stage recorder. Elevation of gage is 2,720 ft above sea level, from river-profile map.

REMARKS.--Records good except for those above 3,000 ft<sup>3</sup>/s, which are fair and for estimated daily discharges, which are poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--38 years (water years 1945-77, 1992-96), 325 ft<sup>3</sup>/s, 29.24 in/yr, 235,400 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 5,500 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 5.70 ft, from high-water mark, from rating curve extended above 2,600 ft<sup>3</sup>/s; minimum discharge, 4.4 ft<sup>3</sup>/s Feb. 1, 1957 (result of freezeup, discharge measurement).

EXTREMES OUTSIDE PERIOD OF RECORD.--Maximum discharge, 4,850 ft<sup>3</sup>/s Dec. 2, 1977, from high-water mark.

EXTREMES FOR CURRENT PERIOD.--Peak discharges greater than base discharge of 900 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	1930	1,210	2.65	Feb. 19	unknown	unknown	unknown
Dec. 2	1900	3,020	4.15	Apr. 24	0130	1,360	2.65
Dec. 6	1700	1,340	2.62	May 17	2130	946	2.16
Jan. 15	2100	920	2.12	June 4	0730	920	2.12
Feb. 8	unknown	*5,500	*5.70				

Minimum discharge, 78 ft<sup>3</sup>/s Nov. 4, result of freeze-up, but may have been lower during period of ice effect Nov. 1-3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	111	e125	1950	539	e190	e530	e410	689	597	316	181	123
2	106	e120	2810	547	e160	e500	e400	657	651	333	180	123
3	154	e118	2490	778	e140	e470	e380	615	772	340	183	123
4	151	119	1980	718	e300	e450	e360	578	893	338	178	123
5	127	122	1710	659	e1000	e440	e350	557	817	296	179	123
6	120	121	1390	618	e1700	e420	e370	534	744	276	174	128
7	116	129	1150	775	e3000	e420	e450	526	774	269	171	122
8	113	274	1030	848	e5000	e450	e600	502	792	268	169	120
9	113	459	968	769	e4800	493	e800	489	710	273	165	118
10	115	269	853	708	e3300	524	e940	479	640	269	163	117
11	191	741	e750	651	e2400	e580	e960	487	596	253	161	115
12	178	720	1180	607	e1800	e640	803	560	572	254	159	115
13	157	618	1510	575	e1500	e670	710	657	560	251	155	115
14	148	748	1180	575	e1300	e680	655	795	551	249	154	116
15	148	531	981	795	e1200	e670	643	851	535	248	152	130
16	157	483	850	833	e1100	e600	716	838	514	240	148	124
17	188	400	759	746	e1200	e560	687	887	478	233	147	120
18	226	458	691	688	e1600	e520	639	918	437	229	146	116
19	181	378	632	653	e1650	e480	599	872	396	227	144	118
20	163	317	581	e600	e1600	e460	562	792	372	219	143	117
21	153	279	543	e540	e1400	e450	542	737	383	212	142	116
22	143	267	503	e500	e1100	e440	540	698	397	206	139	116
23	137	279	460	e460	e990	e430	912	639	398	210	136	115
24	132	443	e430	e420	e870	e420	1250	615	393	210	133	114
25	130	597	e400	e380	e780	e400	1050	652	372	207	132	113
26	203	764	e390	e360	e700	e390	933	748	352	201	132	112
27	170	608	e380	e340	e650	e380	834	800	350	199	130	111
28	157	515	e370	e320	e640	e370	759	746	339	196	129	110
29	148	1120	e420	e290	e560	e360	725	683	322	193	127	109
30	140	1800	474	e260	---	e370	720	634	312	189	125	109
31	130	---	649	e230	---	e380	---	605	---	185	124	---
TOTAL	4606	13922	30464	17782	42630	14947	20299	20840	16019	7589	4701	3531
MEAN	149	464	983	574	1470	482	677	672	534	245	152	118
MAX	226	1800	2810	848	5000	680	1250	918	893	340	183	130
MIN	106	118	370	230	140	360	350	479	312	185	124	109
AC-FT	9140	27610	60430	35270	84560	29650	40260	41340	31770	15050	9320	7000
CFSM	.98	3.07	6.51	3.80	9.74	3.19	4.48	4.45	3.54	1.62	1.00	.78
IN.	1.13	3.43	7.51	4.38	10.50	3.68	5.00	5.13	3.95	1.87	1.16	.87

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1945 - 1996, BY WATER YEAR (WY)

MEAN	124	188	241	215	270	234	439	923	731	292	137	103
MAX	263	464	983	615	1470	713	748	1714	1730	637	257	164
(WY)	1948	1996	1996	1974	1996	1972	1951	1956	1974	1974	1974	1972
MIN	58.1	61.3	71.1	69.3	78.3	98.1	170	224	170	89.8	61.7	57.4
(WY)	1994	1994	1993	1993	1994	1977	1955	1977	1992	1977	1994	1994

SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1945 - 1996

ANNUAL TOTAL	173044	197330	
ANNUAL MEAN	474	539	
HIGHEST ANNUAL MEAN			325
LOWEST ANNUAL MEAN			539
HIGHEST DAILY MEAN	2810	Dec 2	5000
LOWEST DAILY MEAN	91	Sep 24	106
ANNUAL SEVEN-DAY MINIMUM	92	Sep 20	111
ANNUAL RUNOFF (AC-FT)	343200	391400	235400
ANNUAL RUNOFF (CFSM)	3.14	3.57	2.15
ANNUAL RUNOFF (INCHES)	42.63	48.61	29.24
10 PERCENT EXCEEDS	1010	962	768
50 PERCENT EXCEEDS	400	425	185
90 PERCENT EXCEEDS	116	123	89

e Estimated



## 14113000 KICKITAT RIVER NEAR PITT, WA

LOCATION.--Lat 45°45'24", long 121°12'32", in SW 1/4 sec.8, T.3 N., R.13 E., Klickitat County, Hydrologic Unit 17070106, on left bank 2.8 mi south of Pitt, 4.8 mi southwest of Klickitat, 5.3 mi upstream from Silvias Creek, and at mile 7.0.

DRAINAGE AREA.--1,297 mi<sup>2</sup>.

PERIOD OF RECORD.--July 1909 to January 1912, October 1928 to current year. Published as "at Klickitat" 1909-12 and as "at Pitt" 1928-35.

REVISED RECORDS.--WSP 1348: 1910(M), 1929-33(M), 1934, 1935-38(M), 1940(M), 1942-43(M), 1946(M), 1948(M).  
WSP 1935: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 288.9 ft above sea level (river-profile survey). July 3, 1909, to Jan. 31, 1912, nonrecording gage at site 7 mi upstream at different datum. Oct. 1, 1928, to Sept. 30, 1935, nonrecording gage at site 3.5 mi upstream at different datum.

REMARKS.--Records good except for estimated daily discharges, which are poor. Several small diversions upstream from station for irrigation of about 7,500 acres, mostly in vicinity of Glenwood. The largest of these is Hellroaring Irrigation Canal which at times diverts the entire flow of Hellroaring Creek (tributary to Big Muddy Creek). No regulation. Water temperatures October 1950 to September 1970. Chemical analyses October 1950 to September 1970, October 1975 to September 1986. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--70 years (water years 1910-11, 1929-96), 1,571 ft<sup>3</sup>/s, 1,138,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 51,000 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 17.90 ft from high-water mark in well, from rating curve extended above 16,000 ft<sup>3</sup>/s on basis of slope-area measurement at gage height 14.34 ft; minimum discharge, 412 ft<sup>3</sup>/s Jan. 16, 1979, gage height, 3.81 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 30	0530	7,470	8.60	Feb. 8	unknown	*51,000	*17.90
Dec. 13	0700	7,420	8.58	Feb. 19	unknown	unknown	unknown
Dec. 31	0730	4,070	6.96	Mar. 14	unknown	unknown	unknown
Jan. 8	0400	4,130	6.99	Apr. 24	0730	5,980	7.94
Jan. 18	2300	4,330	7.10				

Minimum discharge, 708 ft<sup>3</sup>/s Nov. 2.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	759	752	5620	3050	e1200	e3700	2850	3240	2230	1490	1180	961
2	733	739	4130	2830	e950	e3500	2810	3110	2260	1530	1160	946
3	788	734	3220	3150	e850	e3300	2590	3000	2360	1650	1160	930
4	841	745	2910	3080	e900	e3200	2500	2860	2550	1670	1130	923
5	780	748	2490	2870	e2000	e3000	2450	2760	2550	1570	1120	915
6	792	749	2210	2710	e5000	e3100	2460	2680	2420	1480	1090	896
7	776	800	2050	3010	24900	e3000	2610	2600	2400	1450	1080	894
8	768	1020	1870	3920	e40000	e2900	2810	2520	2450	1450	1080	891
9	761	1590	1750	3670	e25000	e3200	3020	2430	2380	1460	1090	886
10	761	1230	1740	3470	e15000	e3700	3240	2370	2230	1440	1110	889
11	872	1920	2140	3200	e11000	e4300	3220	2340	2120	1420	1130	892
12	950	2390	4220	2970	e9000	e4700	3130	2450	2090	1410	1130	908
13	889	2040	6750	2790	e8000	e5000	2940	2630	2060	1430	1090	919
14	846	2200	5640	2680	e7000	e5200	2770	2800	2020	1450	1080	918
15	836	1800	4700	3990	e6000	e4800	2700	2910	1960	1460	1090	1010
16	838	1610	3800	6910	e5400	e4500	2820	2930	1890	1450	1060	973
17	875	1440	3290	5560	e5400	e4100	2840	3030	1840	1390	1050	933
18	1050	1440	2940	4520	e6500	e3900	2720	3190	1780	1360	1030	919
19	932	1380	2690	4020	e8800	e3700	2610	3110	1680	1320	1010	905
20	872	1260	2480	3860	8010	e3500	2550	2940	1640	1280	1000	890
21	848	1260	2320	3960	7120	e3400	2470	2780	1600	1230	1000	867
22	828	1150	2170	3520	6330	e3300	2470	2740	1650	1230	980	864
23	812	1170	2030	3300	6070	e3200	3490	2600	1620	1250	968	860
24	798	1490	1900	3260	5550	e3100	5680	2470	1650	1250	969	856
25	792	2010	1790	3010	5150	e3000	5110	2430	1610	1260	983	852
26	873	1990	1710	2750	e4800	2790	4600	2500	1570	1250	990	850
27	879	1770	1680	2640	e4500	2700	4120	2590	1550	1250	988	848
28	828	3260	1660	2480	e4200	2610	3730	2570	1530	1240	975	855
29	810	4710	1680	2350	e3900	2550	3530	2470	1510	1260	978	855
30	790	6900	2020	e1900	--	2470	3390	2360	1490	1270	994	891
31	774	--	3660	e1600	--	2540	--	2270	--	1220	996	--
TOTAL	25751	52297	89260	103030	238530	107960	94230	83680	58690	42870	32691	26996
MEAN	831	1743	2879	3324	8225	3483	3141	2699	1956	1383	1055	900
MAX	1050	6900	6750	6910	40000	5200	5680	3240	2550	1670	1180	1010
MIN	733	734	1660	1600	850	2470	2450	2270	1490	1220	968	848
AC-FT	51080	103700	177000	204400	473100	214100	186900	166000	116400	85030	64840	53550

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1909 - 1996, BY WATER YEAR (WY)

	MEAN	751	970	1468	1810	2227	2250	2323	2467	1927	1147	822	736
MAX	1201	2763	6160	7325	8225	6111	4942	5235	4161	2250	1341	1060	
(WY)	1948	1910	1934	1974	1996	1910	1943	1956	1974	1974	1974	1974	
MIN	501	501	521	524	610	742	866	900	784	603	473	448	
(WY)	1945	1994	1931	1979	1994	1977	1977	1977	1992	1994	1994	1994	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1909 - 1996
ANNUAL TOTAL	816808	955985	
ANNUAL MEAN	2238	2612	1571
HIGHEST ANNUAL MEAN			2876
LOWEST ANNUAL MEAN			751
HIGHEST DAILY MEAN	13600	40000	40000
LOWEST DAILY MEAN	696	733	360
ANNUAL SEVEN-DAY MINIMUM	704	749	395
ANNUAL RUNOFF (AC-FT)	1620000	1896000	1138000
10 PERCENT EXCEEDS	3950	4540	3000
50 PERCENT EXCEEDS	1870	2040	1130
90 PERCENT EXCEEDS	752	859	636

e Estimated

14123500 WHITE SALMON RIVER NEAR UNDERWOOD, WA

LOCATION.--Lat 45°45'08", long 121°31'33", in NW 1/4 NW 1/4 sec.14, T.3 N., R.10 E., Skamania County, Hydrologic Unit 17070105, on right bank 300 ft downstream from bridge, 1,000 ft downstream from Pacific Power & Light Co.'s Condit powerplant, 1.7 mi north of Underwood, and at mile 1.9.

DRAINAGE AREA.--386 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1912 to February 1913 (published as "at Condit Dam, near Underwood"), March 1915 to September 1930, September 1935 to current year.

REVISED RECORDS.--WSP 484: 1915-17. WSP: 1348 1936-41(M). WSP 1638: Drainage area.

GAGE.--Water-stage recorder. Datum of gage is 112.96 ft above sea level. Prior to March 1913, reference point at dam 1 mi upstream at different datum. March 1915, to July 16, 1918, water-stage recorder at site 200 ft upstream at datum 3.24 ft higher, and July 17, 1918, to Sept. 30, 1930, at datum 2.24 ft higher than present datum.

REMARKS.--Records good except for the period Feb. 11 to Sept. 30, which is fair. Diversions for irrigation of about 4,000 acres in Trout Lake area. Low and medium flows regulated by powerplant of Pacific Power & Light Co. Chemical analyses August 1960 to August 1961, water years 1964-1968 (miscellaneous), October 1967 to September 1970 (monthly), November 1975 to June 1980. Water temperatures July 1968 to August 1970.

AVERAGE DISCHARGE.--76 years (water years 1916-30, 1936-96), 1,106 ft<sup>3</sup>/s, 801,300 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 45,200 ft<sup>3</sup>/s Feb. 8, 1996, result of flashboard failure on Condit Dam, gage height, 19.16 ft, from rating curve extended above 8,030 ft<sup>3</sup>/s, on basis of theoretical weir computation of peak flow; minimum discharge, practically no flow at times when powerplant is shut down; minimum daily discharge, 158 ft<sup>3</sup>/s Jan. 17, 1950.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 45,200 ft<sup>3</sup>/s Feb. 8, result of flashboard failure on Condit Dam, from rating curve extended above 8,030 ft<sup>3</sup>/s, on basis of theoretical weir computation of peak flow, gage height, 19.16 ft; minimum discharge, 266 ft<sup>3</sup>/s July 29.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	605	553	3990	2300	1440	2110	1870	2140	1470	1090	886	786
2	549	533	3180	2080	1410	2120	1920	2060	1460	1090	890	761
3	632	515	2450	2470	1350	2180	1820	1880	1470	1080	901	770
4	655	518	2250	2500	1380	2590	1750	1880	1470	1090	890	763
5	607	551	1910	2220	1510	2790	1740	1810	1460	1070	895	758
6	604	548	1620	2070	3220	2590	1750	1770	1420	1080	893	771
7	568	623	1510	2580	8370	2530	1810	1740	1410	1060	886	762
8	568	971	1360	3040	13100	2580	1900	1690	1410	1040	866	753
9	567	1410	1280	2740	15400	2560	1990	1650	1380	1000	873	766
10	565	1060	1270	2460	7880	2550	2050	1620	1330	998	862	762
11	660	2050	1520	2310	e6000	2620	2050	1600	1320	968	873	759
12	713	2130	2410	2170	e5000	2750	2080	1630	1300	988	853	762
13	714	1760	3690	2030	e4200	2650	2010	1700	1270	983	851	765
14	587	1620	3380	1920	e3400	2540	1930	1720	1290	988	849	772
15	633	1360	2990	2650	e3200	2460	1890	1750	1260	990	839	856
16	571	1110	2470	3890	e2800	2380	2090	1780	1280	984	815	865
17	637	1090	2160	3260	e2800	2300	2080	1870	1230	983	825	828
18	743	1060	1940	2810	3770	2250	1970	2070	1240	984	813	810
19	625	1100	1810	2550	4400	2220	1890	2280	1220	1020	816	800
20	641	965	1650	2400	4060	2160	1820	2130	1190	1010	800	798
21	580	939	1570	2400	3640	2110	1770	1960	1170	990	810	791
22	571	888	1490	2190	3240	2090	1820	1900	1150	981	801	797
23	604	913	1460	2120	3130	2020	2830	1840	1150	959	815	826
24	536	1210	1350	2040	2840	1970	4150	1750	1240	971	812	787
25	570	1570	1280	1910	2600	1890	3590	1690	1160	953	808	778
26	624	1560	1310	1790	2420	1860	3160	1680	1130	933	792	768
27	647	1450	1260	1790	2280	1820	2790	1680	1120	929	801	765
28	615	2770	1220	1730	2190	1780	2510	1650	1120	913	801	755
29	522	3500	1270	1610	2150	1760	2340	1620	1100	918	795	752
30	571	4310	1610	1450	---	1710	2230	1570	1080	936	788	749
31	560	---	2400	1430	---	1750	---	1520	---	901	793	---
TOTAL	18844	40637	61060	70910	119180	69690	65600	55630	38300	30880	25992	23435
MEAN	608	1355	1970	2287	4110	2248	2187	1795	1277	996	838	781
MAX	743	4310	3990	3890	15400	2790	4150	2280	1470	1090	901	865
MIN	522	515	1220	1430	1350	1710	1740	1520	1080	901	788	749
AC-FT	37380	80600	121100	140600	236400	138200	130100	110300	75970	61250	51560	46480

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1916 - 1996, BY WATER YEAR (WY)

	MEAN	621	795	1137	1304	1516	1493	1503	1497	1247	877	689	623
MAX	1003	1607	2984	3362	4110	3417	2518	2565	2506	1911	1225	1003	
(WY)	1951	1956	1918	1974	1996	1972	1943	1956	1956	1916	1916	1916	
MIN	429	396	452	430	508	558	651	659	587	456	424	391	
(WY)	1993	1930	1945	1979	1929	1977	1977	1977	1992	1977	1994	1994	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1916 - 1996
ANNUAL TOTAL	495909	620158	
ANNUAL MEAN	1359	1694	1106
HIGHEST ANNUAL MEAN			1765
LOWEST ANNUAL MEAN			554
HIGHEST DAILY MEAN	5900	Feb 1	15400
LOWEST DAILY MEAN	464	Sep 23	515
ANNUAL SEVEN-DAY MINIMUM	512	Sep 19	539
ANNUAL RUNOFF (AC-FT)	983600		1230000
10 PERCENT EXCEEDS	2420		2780
50 PERCENT EXCEEDS	1220		1450
90 PERCENT EXCEEDS	560		714

e Estimated

## WIND RIVER BASIN

439

14127300 TROUT CREEK NEAR STABLER WA

LOCATION.--Lat 45°49'21", long 122°00'55", in NE 1/4 NW 1/4 sec.12, T.4 N., R.6 E., Skamania County, Hydrologic Unit 17070105, on left bank 0.8 mi upstream side of bridge, 4.4 mi west of Wind River Ranger Station, and at mile 6.4.

DRAINAGE AREA.--21.0 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1995 to September 1996.

GAGE.--Water-stage recorder. Elevation of gage is 1,820 ft above sea level, from topographic map.

REMARKS.--Records good..

AVERAGE DISCHARGE.--1 years (water year 1996), 257 ft<sup>3</sup>/s, 166.35 in/yr, 186,300 acre-ft/yr.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1600	1,260	5.06	Dec. 14	1430	1,240	5.03
Nov. 11	0830	2,350	6.39	Feb. 8	1600	*5,660	*8.86
Nov. 28	0400	2,010	6.01	Feb. 18	1030	1,620	5.53
Dec. 1	0300	1,510	5.40	Apr. 23	1930	1,930	5.92

Minimum daily discharge, 6.0 ft<sup>3</sup>/s Sept. 11

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	53	72	1270	466	e70	91	337	198	77	34	14	e7.0
2	42	66	892	364	e65	86	382	166	69	33	16	e6.5
3	83	60	608	556	e60	120	289	146	63	31	16	e6.5
4	74	57	543	490	e55	290	227	123	58	31	15	e7.0
5	60	73	394	373	172	370	201	104	53	29	16	e9.0
6	51	109	306	312	1270	359	212	92	49	29	e15	e8.5
7	46	246	244	801	2640	356	252	90	46	27	14	7.4
8	43	826	197	783	4130	391	288	82	43	27	13	e7.0
9	41	633	171	537	2310	346	280	73	42	26	13	e6.5
10	66	498	156	444	1310	340	259	66	39	25	12	e6.5
11	245	1640	453	356	798	481	327	63	37	24	12	e6.0
12	271	802	744	289	537	518	584	68	35	23	e12	e6.5
13	179	774	1030	239	396	427	593	85	34	22	11	6.5
14	124	526	950	235	316	349	431	84	32	22	11	13
15	96	403	750	671	274	323	361	97	31	21	e11	e120
16	133	314	485	790	252	297	486	91	29	20	10	e40
17	230	273	359	484	384	261	506	136	34	21	e10	e22
18	247	277	285	360	1460	232	451	280	62	31	10	e18
19	173	230	237	301	1330	229	394	432	37	31	e10	e16
20	136	196	198	274	1060	213	341	323	32	25	10	e15
21	127	174	170	276	788	191	287	263	29	22	e10	e14
22	104	221	147	211	571	214	474	456	28	21	e9.5	e13
23	89	257	129	177	431	183	1560	441	39	19	e9.0	e13
24	79	608	115	153	339	160	1400	326	56	19	8.9	e12
25	112	728	103	131	244	133	953	255	49	17	8.7	e11
26	245	598	94	116	189	114	704	204	43	17	e9.0	e11
27	168	729	88	107	153	100	510	164	40	16	e8.5	e10
28	130	1480	83	98	119	89	375	140	42	16	e8.0	e10
29	107	1380	125	88	102	90	291	123	37	16	e7.5	e9.5
30	91	1240	371	e80	---	82	237	100	36	15	7.0	e9.0
31	81	---	764	e75	---	167	---	87	---	15	6.9	---
TOTAL	3726	15490	12461	10637	21825	7602	13992	5358	1301	725	344.0	447.4
MEAN	120	516	402	343	753	245	466	173	43.4	23.4	11.1	14.9
MAX	271	1640	1270	801	4130	518	1560	456	77	34	16	120
MIN	41	57	83	75	55	82	201	63	28	15	6.9	6.0
AC-FT	7390	30720	24720	21100	43290	15080	27750	10630	2580	1440	682	887
CFSM	5.72	24.6	19.1	16.3	35.8	11.7	22.2	8.23	2.07	1.11	.53	.71
IN.	6.60	27.44	22.07	18.84	38.66	13.47	24.79	9.49	2.30	1.28	.61	.79

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

MEAN	120	516	402	343	753	245	466	173	43.4	23.4	11.1	14.9
MAX	120	516	402	343	753	245	466	173	43.4	23.4	11.1	14.9
(WY)	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996
MIN	120	516	402	343	753	245	466	173	43.4	23.4	11.1	14.9
(WY)	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996	1996

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

ANNUAL TOTAL	93908.4
ANNUAL MEAN	257
HIGHEST DAILY MEAN	4130
LOWEST DAILY MEAN	6.0
ANNUAL SEVEN-DAY MINIMUM	6.6
ANNUAL RUNOFF (AC-FT)	186300
ANNUAL RUNOFF (CFSM)	12.2
ANNUAL RUNOFF (INCHES)	166.35
10 PERCENT EXCEEDS	608
50 PERCENT EXCEEDS	119
90 PERCENT EXCEEDS	11

e Estimated

## WIND RIVER BASIN

14128500 WIND RIVER NEAR CARSON, WA

LOCATION.--Lat 45°44'10", long 121°48'12", in SW 1/4 NE 1/4 sec.21, T.3 N., R.8 E., Skamania County, Hydrologic Unit 17070105, on right bank 0.8 mi upstream from Little Wind River, 1.0 mi northeast of Carson, and 1.9 mi upstream from mouth. Records include flow of Little Wind River.

DRAINAGE AREA.--225 mi<sup>2</sup>, includes that of Little Wind River.

PERIOD OF RECORD.--October 1934 to September 1977, October 1995 to September 1996. Monthly discharge only for October and November 1934 published in WSP 1318.

REVISED RECORDS.--WSP 964: Drainage area. WSP 1348: 1935-37, 1938(M), 1942-43(M), 1945-46(M).

GAGE.--Water-stage recorder. Datum of gage is 112.6 ft above sea level, from river-profile survey.

REMARKS.--Records good. Low flow occasionally affected by pondage at Forest Service powerplant on Trout Creek. No diversion above station.

AVERAGE DISCHARGE.--44 years (water years 1935-1977, 1996), 1,209 ft<sup>3</sup>/s, 72.99 in/yr, 875,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 53,600 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 23.04 ft, from rating curve extended above 14,000 ft<sup>3</sup>/s on the basis of slope area measurement of 45,700 ft<sup>3</sup>/s; minimum discharge, 123 ft<sup>3</sup>/s Nov. 30, 1952; minimum gage height, 1.72 ft, Aug. 23, 1977.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	1200	13,200	14.63	Feb. 8	unknown	*b53,600	*a23.04
Nov. 29	2200	12,000	14.17	Feb. 18	1200	6,810	11.70
Dec. 14	1930	8,250	12.49	Apr. 23	2300	9,290	13.00
Jan. 7	2230	7,040	11.83				

Minimum daily discharge, 160 ft<sup>3</sup>/s Oct. 9 .

a From inside high-water mark.

b From rating curve extended above 14,000 ft<sup>3</sup>/s on basis of slope-area measurement.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	e220	341	9160	2830	755	1160	1360	1490	716	354	225	180
2	e190	319	6610	2180	e700	1100	1530	1320	684	346	226	180
3	e460	302	4650	2840	e650	1210	1350	1210	666	339	234	179
4	e340	288	4440	2810	e600	1270	1200	1090	621	334	229	180
5	e240	307	3240	2300	e2000	2540	1110	1010	601	327	230	181
6	e200	395	2510	1970	e9500	2140	1090	941	577	320	227	185
7	e180	737	2040	4640	e18000	2010	1120	899	561	314	221	182
8	e170	2970	1670	5620	e28000	2110	1190	845	541	309	217	178
9	e160	3190	1470	3700	e16000	2060	1180	786	521	303	213	177
10	e260	1920	1320	2950	e10000	2020	1130	740	502	297	210	175
11	e1100	8760	2720	2410	e6000	2280	1150	715	483	293	207	173
12	e1500	4590	4680	2010	e3800	2530	1610	729	472	287	206	172
13	e800	4080	7200	1700	e2800	2260	1900	796	460	282	205	173
14	e500	3080	6850	1550	e2200	1970	1670	810	446	276	202	183
15	e380	2230	6060	3420	e2000	1810	1530	838	434	272	201	330
16	e550	1740	3980	5340	2070	1660	1960	832	425	267	199	288
17	e1000	1390	2970	3330	2290	1520	2090	912	425	268	197	231
18	e1400	1570	2400	2510	5960	1410	1980	1350	500	288	196	210
19	e800	1340	2000	2130	5990	1360	1850	2210	442	315	196	204
20	e550	1160	1690	2170	4760	1290	1710	1810	409	289	195	199
21	e500	1040	1460	2600	3820	1210	1540	1470	394	275	195	193
22	e420	1120	1280	2050	3070	1230	1780	1650	383	266	193	191
23	e360	1160	1150	1750	2870	1140	6370	1740	401	256	190	187
24	e320	2540	1040	1600	2370	1070	7460	1490	478	251	187	184
25	e500	4300	962	1370	2020	984	4860	1290	450	246	186	181
26	e1300	3620	896	1210	1760	934	3740	1150	409	242	186	181
27	e750	3630	847	1130	1550	888	2920	1040	413	238	187	172
28	493	8830	810	1040	1390	839	2350	950	402	236	186	176
29	436	8820	871	948	1250	834	1960	895	382	236	186	175
30	397	9010	1810	843	--	794	1690	825	366	231	183	173
31	365	--	3910	780	--	910	--	763	--	227	181	--
TOTAL	16841	84779	92696	73731	144175	47543	64380	34596	14564	8784	6296	5779
MEAN	543	2826	2990	2378	4972	1534	2146	1116	485	283	203	193
MAX	1500	9010	9160	5620	28000	2540	7460	2210	716	354	234	330
MIN	160	288	810	780	600	794	1090	715	366	227	181	172
AC-FT	33400	168200	183900	146200	286000	94300	127700	68620	28890	17420	12490	11460
CFSM	2.41	12.6	13.3	10.6	22.1	6.82	9.54	4.96	2.16	1.26	.90	.86
IN.	2.78	14.02	15.33	12.19	23.84	7.86	10.64	5.72	2.41	1.45	1.04	.96

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1935 - 1996, BY WATER YEAR (WY)

MEAN	477	1421	2138	2144	2041	1746	1712	1295	735	370	241	234
MAX	1662	2895	4147	5840	4972	3812	3056	2336	1660	723	355	503
(WY)	1948	1956	1965	1953	1996	1972	1937	1971	1955	1955	1956	1959
MIN	147	149	276	309	425	793	550	557	323	214	167	157
(WY)	1953	1937	1977	1977	1977	1941	1941	1947	1940	1940	1944	1939

## SUMMARY STATISTICS

## FOR 1996 WATER YEAR

## WATER YEARS 1935 - 1996

ANNUAL TOTAL	594164	
ANNUAL MEAN	1623	1209
HIGHEST ANNUAL MEAN		1864
LOWEST ANNUAL MEAN		477
HIGHEST DAILY MEAN	28000	30000
LOWEST DAILY MEAN	160	126
ANNUAL SEVEN-DAY MINIMUM	176	129
ANNUAL RUNOFF (AC-FT)	1179000	875600
ANNUAL RUNOFF (CFSM)	7.22	5.37
ANNUAL RUNOFF (INCHES)	98.24	72.99
10 PERCENT EXCEEDS	3650	2620
50 PERCENT EXCEEDS	911	800
90 PERCENT EXCEEDS	192	202

e Estimated

## COLUMBIA RIVER MAIN STEM

441

14128600 COLUMBIA RIVER AT STEVENSON, WA

LOCATION.--Lat 45°41'58", long 121°52'02", in NW 1/4 SE 1/4 sec.36, T.3 N., R.7-1/2 E., Skamania County,  
Hydrologic Unit 17070105, on right bank 0.9 mi east of Stevenson, and at mile 151.3.

DRAINAGE AREA.--239,800 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--October 1973 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is sea level.

REMARKS.--Flow regulated by many reservoirs upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 79.79 ft June 20, 1974; minimum, 70.39 ft Oct. 25, 1981.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 79.63 ft Feb. 8; minimum, 73.00 ft Dec. 19.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	75.76	74.96	75.27	75.85	74.80	75.24	77.06	76.53	76.85	75.28	73.94	74.40
2	75.42	74.49	74.93	75.96	75.08	75.62	76.80	76.13	76.56	73.94	73.33	73.59
3	75.32	73.98	74.38	75.84	75.28	75.49	77.01	76.68	76.92	74.20	73.30	73.74
4	75.43	74.40	74.70	75.40	74.74	75.02	77.53	76.61	77.02	74.31	73.90	74.13
5	75.37	74.14	74.68	75.44	74.38	74.72	77.17	76.29	76.64	74.42	74.24	74.34
6	75.56	74.96	75.23	75.69	73.70	74.60	76.63	76.11	76.43	74.24	73.32	73.78
7	75.90	75.39	75.63	76.50	74.61	75.64	76.34	75.85	76.06	73.67	73.44	73.56
8	75.78	74.93	75.22	76.79	76.20	76.51	76.94	76.28	76.78	74.47	73.39	73.67
9	75.81	74.84	75.22	76.46	75.92	76.10	77.02	76.29	76.65	74.47	73.42	73.75
10	76.03	75.10	75.42	76.58	75.40	76.02	77.02	76.23	76.45	76.32	73.72	75.00
11	75.95	75.19	75.51	76.37	75.37	76.01	76.65	74.88	75.72	77.26	76.27	76.83
12	76.74	74.20	75.16	76.00	74.40	74.85	76.80	75.99	76.40	77.29	76.90	77.01
13	76.60	74.74	75.50	75.25	74.15	74.62	77.44	76.54	77.15	77.20	75.40	76.13
14	76.37	75.63	76.05	75.54	74.18	74.94	77.95	77.08	77.49	75.70	75.30	75.53
15	76.43	75.44	76.02	76.31	74.72	75.34	77.52	76.28	76.72	75.46	74.26	74.77
16	76.24	74.51	75.18	76.20	74.76	75.08	77.00	76.32	76.61	76.35	74.51	75.25
17	75.76	74.34	74.94	75.44	74.69	75.14	76.92	76.09	76.33	77.33	76.11	76.62
18	75.66	75.25	75.41	76.52	74.88	75.52	76.17	73.62	74.61	77.55	76.63	77.09
19	76.08	75.35	75.69	76.47	74.52	75.37	74.94	73.00	73.77	76.63	76.18	76.38
20	76.43	75.90	76.09	75.02	73.06	74.31	75.93	74.82	75.37	77.55	76.44	76.89
21	75.91	74.78	75.15	74.73	73.43	74.04	76.22	75.64	75.99	77.68	77.12	77.40
22	75.76	75.38	75.60	76.09	73.58	74.59	77.17	75.60	76.36	77.26	77.16	77.22
23	75.65	75.01	75.26	75.91	74.55	75.25	77.30	76.68	76.97	77.29	75.67	76.62
24	76.02	74.89	75.36	74.93	73.27	73.90	77.01	75.77	76.31	75.83	75.57	75.72
25	76.30	75.23	75.79	75.92	73.30	74.55	76.40	75.00	75.72	75.84	74.62	75.27
26	76.27	75.22	75.60	75.89	73.60	74.67	76.20	74.77	75.39	75.41	74.53	74.88
27	75.85	74.81	75.33	77.16	75.49	76.27	76.90	75.17	76.20	75.17	73.79	74.38
28	75.84	74.76	75.18	76.55	75.09	75.86	76.72	75.89	76.43	75.79	74.35	75.22
29	76.09	75.05	75.53	77.53	76.51	77.09	76.33	74.59	75.49	74.88	74.24	74.66
30	75.80	74.34	74.86	77.18	76.04	76.51	76.85	74.78	75.89	75.07	74.17	74.71
31	75.36	74.39	74.87	---	---	---	76.77	75.28	75.80	74.47	73.73	73.98
MONTH	76.74	73.98	75.31	77.53	73.06	75.30	77.95	73.00	76.23	77.68	73.30	75.24



GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	75.27	73.64	74.24	77.35	76.32	76.78	76.31	74.00	74.78	77.36	76.79	77.12
2	75.36	74.05	74.73	76.84	75.62	76.12	76.32	74.80	75.63	78.17	76.51	77.21
3	75.56	74.03	74.72	76.62	75.35	75.99	77.12	75.23	75.85	77.06	75.23	77.21
4	75.73	75.22	75.50	76.66	75.90	76.20	77.30	76.49	76.98	77.22	75.44	76.09
5	76.00	74.92	75.42	76.14	75.58	75.89	77.05	76.02	76.64	77.36	76.78	77.13
6	78.16	75.86	76.73	77.13	75.43	76.45	77.49	75.89	76.67	76.94	75.81	76.23
7	78.18	77.54	77.86	76.71	75.91	76.32	77.28	76.09	76.54	77.15	75.50	76.42
8	79.63	77.88	78.89	76.78	75.56	76.05	76.90	74.43	75.41	76.94	76.58	76.75
9	79.11	76.93	78.26	76.14	74.85	75.55	76.40	74.65	75.50	77.57	76.60	77.17
10	78.78	77.63	78.16	75.87	74.80	75.32	76.66	75.38	76.10	77.25	75.75	76.67
11	78.06	77.26	77.76	75.95	75.18	75.58	77.92	76.43	77.37	76.68	75.92	76.22
12	77.97	76.64	77.22	77.11	75.37	76.07	78.23	77.17	77.66	76.61	75.80	76.08
13	77.11	76.06	76.72	77.27	76.02	76.67	77.71	76.80	77.28	76.52	74.42	74.89
14	77.87	75.78	76.55	76.16	75.16	75.68	77.65	77.06	77.35	76.01	74.38	75.27
15	77.67	76.71	77.06	77.01	75.12	75.79	77.74	77.22	77.53	76.55	75.54	76.06
16	77.21	76.20	76.75	78.13	75.39	76.88	77.84	76.52	77.35	75.80	74.87	75.34
17	77.67	76.75	77.23	77.10	75.99	76.65	76.99	75.69	76.09	75.88	75.15	75.52
18	77.80	76.76	77.21	77.61	75.75	76.85	77.85	76.99	77.67	76.08	75.51	75.83
19	78.13	77.31	77.86	77.24	76.08	76.67	77.58	76.36	76.96	76.65	75.73	76.07
20	78.51	76.80	77.34	76.86	75.20	76.00	77.42	76.35	77.04	76.79	76.41	76.60
21	78.80	77.19	78.05	77.31	75.08	76.16	77.81	77.32	77.48	76.96	76.59	76.87
22	77.60	75.96	76.78	76.99	74.79	76.10	77.35	75.71	76.50	76.84	75.81	76.48
23	77.53	76.79	77.08	78.00	75.91	77.09	77.11	76.51	76.78	77.93	76.60	77.03
24	76.92	76.15	76.59	78.06	75.68	76.85	77.60	76.28	76.76	78.03	77.51	77.74
25	77.19	75.88	76.40	77.95	75.84	76.91	77.69	76.90	77.29	78.46	77.99	78.20
26	77.77	76.96	77.36	77.95	76.03	77.21	78.14	77.58	77.82	78.13	76.74	77.23
27	77.25	76.11	76.60	76.47	74.73	75.37	78.14	76.42	77.12	77.22	76.84	77.05
28	77.22	76.55	76.94	76.91	75.75	76.23	78.12	76.96	77.58	77.02	76.31	76.68
29	77.26	75.50	76.48	78.13	75.95	76.92	78.25	77.03	77.47	76.50	75.52	75.95
30	---	---	---	78.13	76.07	76.97	77.04	76.38	76.88	78.66	76.50	77.59
31	---	---	---	76.07	74.54	75.35	---	---	---	78.61	77.55	78.26
MONTH	79.63	73.64	76.84	78.13	74.54	76.28	78.25	74.00	76.80	78.66	74.38	76.58

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	77.85	77.46	77.63	75.94	73.76	74.57	77.19	75.95	76.46	76.61	75.11	75.70
2	77.94	76.53	77.42	75.34	73.65	74.37	76.40	75.73	76.06	75.60	74.02	74.52
3	76.53	75.84	76.15	76.92	75.04	75.89	76.39	75.91	76.11	74.60	73.52	74.02
4	76.24	75.83	76.07	76.74	76.36	76.53	76.13	74.92	75.75	74.76	73.16	73.92
5	76.95	76.19	76.72	76.79	76.14	76.50	76.12	74.70	75.47	75.50	74.50	75.00
6	76.92	76.53	76.77	76.82	76.06	76.48	76.83	75.88	76.25	76.13	73.90	74.95
7	77.00	76.03	76.53	76.71	75.66	76.09	76.98	76.44	76.64	76.01	75.23	75.67
8	77.24	75.76	76.40	77.25	76.10	76.54	77.20	76.15	76.74	75.92	74.72	75.20
9	77.62	77.10	77.43	77.55	76.06	76.77	77.13	75.92	76.26	75.61	74.25	74.77
10	78.37	77.08	77.96	77.56	76.33	76.96	76.53	76.13	76.30	74.80	73.80	74.26
11	78.22	77.78	78.05	76.33	75.86	76.12	76.25	74.34	75.40	75.93	74.07	74.95
12	78.22	77.53	77.89	76.15	75.05	75.59	75.38	73.65	74.51	76.46	75.10	75.80
13	77.64	77.10	77.38	76.52	75.55	76.09	75.65	74.27	74.91	76.28	75.40	75.93
14	77.23	76.51	76.94	76.41	75.86	76.06	75.93	74.18	75.31	76.53	75.52	75.97
15	77.09	75.72	76.29	76.64	76.25	76.46	75.35	73.24	74.04	76.53	75.72	75.99
16	77.30	76.62	76.93	76.89	75.68	76.20	76.32	73.92	74.79	76.18	75.51	75.88
17	77.41	76.95	77.19	76.69	76.08	76.41	76.51	75.66	76.17	76.09	75.24	75.71
18	77.54	76.94	77.19	76.46	75.38	75.82	75.68	75.52	75.61	76.47	75.15	75.73
19	77.60	76.23	77.09	76.48	75.03	75.75	75.92	75.32	75.70	76.44	75.09	75.44
20	78.46	77.31	77.82	76.13	75.09	75.62	76.23	75.27	75.69	75.22	74.08	74.43
21	77.60	76.97	77.20	76.83	75.30	75.89	76.50	75.86	76.23	75.12	74.01	74.37
22	77.84	77.16	77.50	77.01	75.47	76.04	77.11	76.25	76.53	76.58	74.69	75.44
23	77.38	76.86	77.21	77.01	75.21	75.70	77.06	74.35	75.63	76.65	75.54	76.03
24	77.03	76.41	76.66	77.47	75.80	76.64	74.35	73.68	73.97	75.99	75.38	75.65
25	76.94	75.76	76.08	77.51	75.30	75.96	73.92	73.58	73.76	76.33	75.87	76.06
26	77.19	75.52	76.47	76.37	76.05	76.25	74.62	73.64	74.04	76.40	75.49	75.77
27	76.95	76.32	76.50	76.64	75.60	76.10	74.67	73.93	74.38	75.73	75.19	75.41
28	76.50	75.68	76.07	76.43	74.80	75.29	74.73	73.42	74.23	75.73	74.93	75.17
29	76.91	76.22	76.69	75.88	74.94	75.39	75.39	74.04	74.68	76.05	74.79	75.30
30	76.94	75.52	76.16	75.84	74.41	75.04	76.48	75.39	76.03	75.94	75.24	75.57
31	---	---	---	77.09	75.01	75.83	76.45	75.74	76.07	---	---	---
MONTH	78.46	75.52	76.95	77.56	73.65	75.97	77.20	73.24	75.47	76.65	73.16	75.29

YEAR	79.63	73.00	76.02									
------	-------	-------	-------	--	--	--	--	--	--	--	--	--

## COLUMBIA RIVER MAIN STEM

443

14128870 COLUMBIA RIVER BELOW BONNEVILLE DAM, OR

LOCATION.--Lat 45°38'00", long 121°57'33", in sec.21, T.2 N., R.7 E., Multnomah County, Hydrologic Unit 17080001, on left bank 0.9 mi downstream from Bonneville Dam left bank powerhouse, 50 ft upstream from Tanner Creek, and at mile 144.5.

DRAINAGE AREA.--239,900 mi<sup>2</sup>, approximately.

PERIOD OF RECORD.--May 1981 to current year (gage heights only).

GAGE.--Water-stage recorder. Datum of gage is sea level. Prior to August 15, 1990, at a site 0.5 mi upstream at the same datum.

REMARKS.--Flow regulated by many reservoirs upstream.

EXTREMES FOR PERIOD OF RECORD.--Maximum gage height, 35.11 ft Feb. 9, 1996; minimum, 6.22 ft Sept. 26, 1993.

EXTREMES FOR CURRENT YEAR.--Maximum gage height, 35.11 ft Feb. 9; minimum, 8.26 ft Oct. 1, 2.

## GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

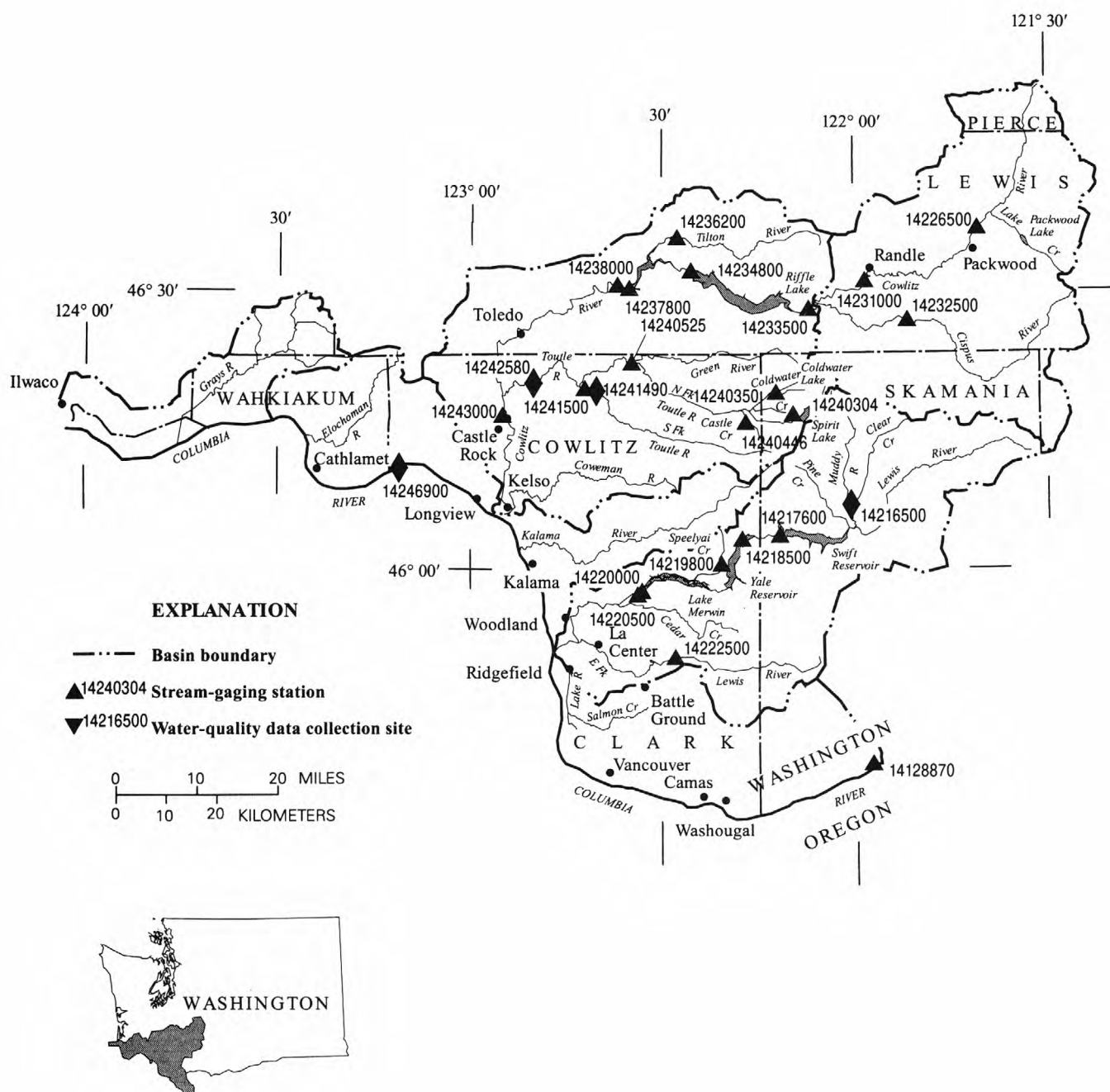
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	12.72	8.26	10.26	16.21	10.71	13.24	27.66	26.69	27.11	19.57	18.53	19.07
2	12.54	8.26	10.50	14.67	10.61	13.19	27.42	26.30	26.76	19.83	15.84	18.22
3	12.55	9.73	11.45	14.23	9.92	12.00	27.58	27.14	27.34	20.14	16.82	19.15
4	13.73	8.99	11.76	12.13	10.47	10.85	27.51	24.71	26.78	19.99	19.73	19.88
5	12.57	9.03	11.12	11.11	9.15	10.11	24.72	22.41	23.50	19.95	19.40	19.61
6	11.66	9.56	10.96	12.63	8.89	10.35	22.65	21.76	22.20	19.93	19.00	19.56
7	12.25	10.22	11.29	13.51	9.22	11.36	21.90	20.97	21.58	20.63	18.95	19.88
8	11.89	10.88	11.27	15.80	8.96	12.65	21.26	20.81	20.96	20.94	19.01	20.58
9	12.55	10.52	11.41	14.01	10.02	12.62	21.22	20.59	20.90	21.14	19.70	20.66
10	13.87	10.73	12.48	15.42	10.88	13.76	21.09	20.12	20.57	19.71	18.64	19.05
11	14.29	12.10	13.21	17.89	12.54	15.43	22.01	19.96	20.66	22.48	18.66	21.26
12	14.00	10.32	12.51	18.05	15.32	17.14	24.62	21.48	22.95	22.84	22.48	22.67
13	15.84	12.10	14.13	17.87	14.27	16.44	26.23	24.01	25.43	22.90	21.31	22.23
14	15.25	13.80	14.33	17.35	13.42	15.44	26.16	25.17	25.79	22.13	21.10	21.54
15	14.66	10.61	12.30	17.31	15.03	16.19	25.40	24.90	25.13	22.45	20.73	22.06
16	11.50	8.40	10.08	16.67	14.61	15.67	25.00	23.95	24.69	22.56	20.85	22.19
17	11.24	8.32	9.72	15.74	14.23	14.88	24.40	23.41	23.79	22.72	22.14	22.49
18	13.81	8.42	11.55	16.57	12.96	15.24	23.67	20.98	22.99	23.27	22.25	22.74
19	13.35	9.26	11.92	17.28	16.09	16.60	21.72	19.52	20.70	23.41	23.12	23.25
20	14.51	10.92	13.27	18.07	14.88	16.66	21.80	20.38	20.82	23.67	23.21	23.45
21	13.53	11.37	12.12	18.05	14.93	16.20	21.95	20.46	21.24	24.59	23.29	23.83
22	12.55	10.32	11.63	16.91	13.92	15.75	21.64	20.40	20.80	24.90	24.53	24.74
23	12.69	10.52	11.80	17.09	16.29	16.53	22.01	19.81	21.40	24.91	23.87	24.61
24	12.02	9.74	11.25	16.96	14.41	16.12	21.80	19.62	20.73	24.84	24.12	24.29
25	14.35	11.59	12.85	16.97	13.96	15.78	21.22	19.90	20.31	24.26	22.40	23.61
26	14.28	11.79	12.77	17.34	16.83	17.06	20.04	16.14	17.46	23.58	22.21	23.11
27	14.06	12.90	13.38	21.79	15.73	18.30	19.61	18.53	19.25	22.21	20.15	21.15
28	14.23	12.04	13.12	26.10	19.87	22.27	19.50	17.68	18.58	20.62	19.78	20.33
29	12.53	9.84	11.27	26.93	25.35	26.03	18.91	16.93	17.79	21.75	19.50	20.65
30	12.77	10.56	11.37	27.01	25.53	26.07	17.97	15.33	16.98	21.77	20.08	20.76
31	11.97	10.30	11.24	---	---	---	19.33	17.54	18.64	21.03	19.96	20.65
MONTH	15.84	8.26	11.88	27.01	8.89	15.66	27.66	15.33	22.06	24.91	15.84	21.52

GAGE HEIGHT, FEET, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

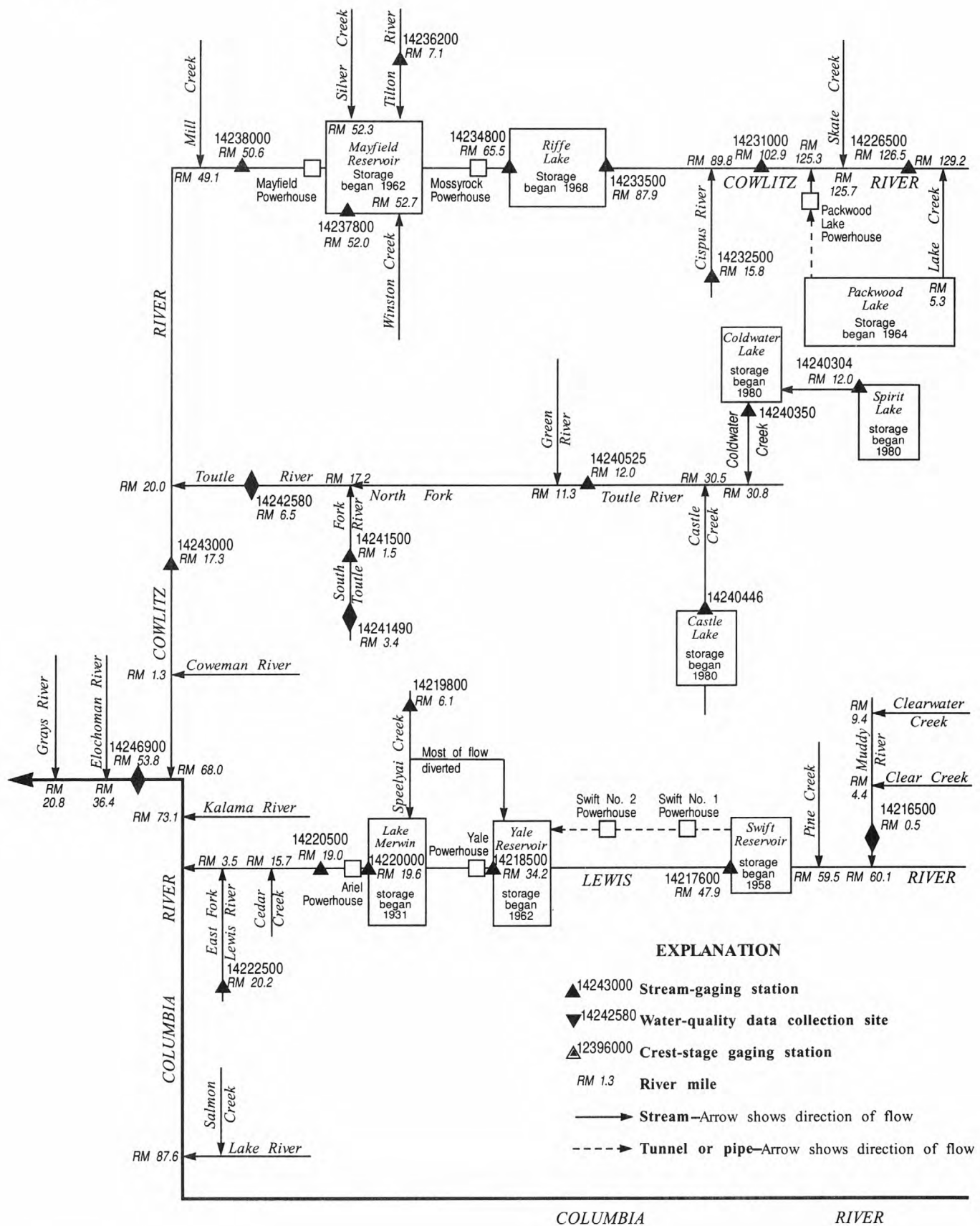
DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY				MARCH			APRIL			MAY		
1	20.37	19.49	20.01	27.95	26.12	26.93	19.99	18.11	18.82	26.82	25.33	25.88
2	21.27	20.04	20.75	26.34	24.56	25.51	21.57	18.69	20.07	27.87	24.40	26.38
3	21.23	18.84	19.31	24.56	21.97	22.96	21.25	19.28	19.90	25.42	23.87	24.57
4	20.98	17.06	19.37	24.53	21.88	23.16	22.25	19.89	21.23	25.68	23.56	24.79
5	20.43	17.06	18.39	27.43	24.40	26.60	22.35	20.80	21.33	24.83	24.06	24.49
6	26.35	19.45	21.81	27.36	23.46	25.04	22.71	21.33	21.87	25.31	23.64	24.53
7	30.88	26.31	28.34	25.12	24.17	24.46	23.22	20.81	21.74	23.66	22.52	23.01
8	34.64	30.79	33.16	26.30	23.96	25.01	22.72	19.38	20.43	23.35	21.95	22.82
9	35.11	33.53	34.28	26.15	23.24	24.51	20.23	18.38	19.60	24.53	21.94	23.29
10	34.09	33.10	33.74	24.75	21.34	23.28	23.80	19.87	22.37	24.19	21.27	22.25
11	33.64	31.21	32.69	25.52	22.95	24.32	25.61	23.80	24.41	22.34	20.02	20.88
12	31.40	29.46	30.48	25.88	24.49	25.06	26.46	25.25	25.62	21.58	20.49	21.12
13	29.64	28.27	29.02	26.61	24.62	25.74	26.10	24.99	25.35	22.18	20.16	20.75
14	29.46	26.79	28.63	27.06	25.75	26.40	25.31	24.90	25.06	24.32	20.03	21.71
15	28.05	25.88	27.09	27.90	23.72	26.04	25.38	24.44	25.08	25.54	23.53	24.46
16	28.15	26.21	27.37	27.47	23.38	25.25	25.49	24.64	25.11	25.18	23.64	24.49
17	29.32	26.99	28.00	26.75	23.77	25.15	25.05	24.67	24.83	25.82	24.70	25.16
18	29.24	26.90	28.29	26.86	23.17	24.40	26.79	24.88	25.87	28.29	24.96	27.03
19	29.83	28.75	29.14	25.17	22.77	23.80	26.87	26.45	26.59	28.97	27.89	28.50
20	30.64	29.63	30.04	26.16	22.84	24.01	26.59	24.28	25.18	29.45	28.21	28.98
21	30.00	29.35	29.68	25.34	21.58	23.86	26.12	24.40	25.10	29.12	28.57	28.94
22	29.69	27.52	28.96	25.02	22.18	23.01	25.76	24.19	24.65	29.15	27.50	28.12
23	29.62	28.68	28.97	24.64	21.71	23.09	27.93	25.22	26.44	28.70	27.48	28.16
24	29.46	28.37	28.99	24.85	21.70	22.87	29.22	27.54	28.33	29.29	27.48	28.20
25	29.23	28.58	28.98	24.51	20.59	22.20	29.48	28.38	28.68	28.11	27.56	27.80
26	29.07	28.07	28.60	24.83	21.66	23.41	29.47	29.07	29.25	28.26	26.47	27.30
27	28.23	27.70	27.90	24.83	21.44	22.52	29.65	29.17	29.36	26.88	25.80	26.56
28	27.82	26.91	27.34	21.93	20.95	21.62	29.66	28.65	29.34	27.80	26.30	26.83
29	28.16	26.95	27.51	22.04	20.75	21.68	28.85	26.03	27.05	28.50	26.67	27.78
30	---	---	---	21.92	19.49	20.98	26.82	24.96	25.83	28.95	27.94	28.51
31	---	---	---	19.57	18.25	19.00	---	---	---	28.76	26.57	27.80
MONTH	35.11	17.06	27.48	27.95	18.25	23.93	29.66	18.11	24.48	29.45	20.02	25.52

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
JUNE				JULY			AUGUST			SEPTEMBER		
1	28.63	26.31	27.62	23.03	20.16	21.21	18.22	17.18	17.67	16.28	13.07	13.80
2	28.69	27.80	28.19	21.08	18.76	20.46	18.30	16.97	17.48	13.51	10.34	11.66
3	28.12	26.39	27.18	21.31	17.71	19.97	18.08	15.43	16.36	14.08	10.20	12.13
4	27.87	26.78	27.52	22.64	20.12	21.22	16.02	13.13	14.09	12.82	10.30	11.60
5	28.87	27.49	28.25	22.60	20.80	21.41	16.79	13.39	15.25	12.11	10.29	11.42
6	29.11	28.14	28.69	21.72	19.07	20.45	19.38	16.52	17.79	12.26	11.41	11.82
7	28.83	27.69	28.25	22.36	20.91	21.72	19.31	15.57	17.26	12.01	9.69	11.41
8	29.26	27.44	28.34	21.71	20.28	20.77	19.49	16.47	17.28	12.87	9.00	10.97
9	29.54	28.74	29.22	22.25	20.24	20.92	19.84	16.24	17.97	14.24	11.83	12.97
10	30.04	28.82	29.42	22.49	20.12	21.89	16.41	15.12	15.70	13.45	11.82	12.34
11	30.36	29.77	30.11	22.48	20.13	20.97	16.48	14.32	15.34	11.82	10.43	11.03
12	30.30	29.85	30.12	21.91	20.84	21.26	17.71	14.69	16.10	12.94	9.01	11.03
13	30.25	29.42	29.77	22.11	20.60	21.24	17.80	16.67	17.09	15.00	11.09	13.44
14	29.71	28.25	28.90	21.79	19.85	20.97	20.27	17.02	18.60	14.85	12.82	13.91
15	28.47	27.69	28.10	21.20	20.40	20.75	18.97	15.96	17.51	13.93	10.00	11.24
16	28.95	27.98	28.47	21.05	18.59	20.00	17.57	14.33	15.85	13.50	10.17	11.72
17	29.42	27.62	28.51	21.51	20.46	20.95	15.51	14.04	14.90	12.99	9.99	11.66
18	29.21	27.66	28.73	20.66	18.19	18.81	15.07	14.36	14.57	11.93	10.08	11.07
19	29.18	27.37	28.40	20.22	18.30	19.14	17.26	14.59	16.11	14.18	10.35	12.43
20	27.45	26.06	26.72	19.83	18.19	18.93	16.96	15.06	16.03	14.40	12.54	13.74
21	26.36	24.50	25.30	19.70	17.00	17.70	17.00	15.20	16.08	12.55	11.30	12.02
22	25.80	21.76	23.59	20.37	16.14	18.57	17.93	15.45	16.77	13.45	10.43	11.61
23	22.40	20.73	21.96	20.30	16.70	18.53	16.80	15.49	16.26	14.09	11.56	12.65
24	22.79	22.24	22.47	20.99	17.46	19.03	16.33	14.30	14.98	13.89	10.98	12.23
25	23.24	22.37	22.58	20.51	17.88	19.28	14.63	13.99	14.33	13.75	12.01	12.55
26	25.36	22.43	23.40	20.54	18.38	19.58	14.67	11.82	13.80	13.87	12.88	13.34
27	25.34	23.06	23.62	19.77	16.62	17.58	14.66	12.59	13.67	14.51	12.07	13.28
28	24.98	22.65	23.69	18.02	14.29	15.85	16.10	13.58	14.70	13.59	10.17	11.38
29	24.09	23.23	23.73	17.79	14.80	16.17	16.10	13.26	14.63	11.04	8.84	10.01
30	24.18	23.01	23.70	17.90	14.84	16.29	15.21	13.39	14.27	11.64	10.71	11.23
31	---	---	---	17.88	14.06	15.46	16.28	13.78	14.90	---	---	---
MONTH	30.36	20.73	26.82	23.03	14.06	19.58	20.27	11.82	15.91	16.28	8.84	12.06

YEAR	35.11	8.26	20.55									
------	-------	------	-------	--	--	--	--	--	--	--	--	--



**Figure 63.** Location of surface-water and water-quality stations in the Lewis and Cowlitz River Basins and downstream to mouth of Columbia River.



**Figure 64.** Schematic diagram showing surface-water and water-quality stations in the Lewis and Cowlitz River Basins and downstream to mouth of Columbia River.



## 14216500 MUDDY RIVER BELOW CLEAR CREEK, NEAR COUGAR, WA

LOCATION.-- Lat 46°04'33", long 121°59'51", in NE 1/4 SE 1/4 sec.24, T.7 N., R.6 E., Skamania County, Hydrologic Unit 17080002, Gifford Pinchot National Forest, on left bank 3.9 mi downstream from Clear Creek, approximately 14 mi northeast of Cougar, and 0.5 mi upstream from mouth.

DRAINAGE AREA.--135 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--August 1927 to September 1934, October 1954 to December 1973 (destroyed by flood of January 1974), October 1983 to current year. Monthly discharge only for October, December 1933 and January 1934 published in WSP 1318. Published as "near Cougar" 1927-34. Records for August to October 1909, published in WSP 272 and 492, have been found to be unreliable and should not be used. Records for August 1980 to September 1981 (discharge measurements only), October 1981 to September 1983 at site 4.5 mi upstream published as "above Clear Creek" (station 14216350) is not equivalent due to inflow between sites.

GAGE.--Water-stage recorder and crest-stage gage. Datum of gage is 1,032.90 ft above sea level.

REMARKS.--Records good. No regulation or diversion upstream from station. U.S. Geological Survey telemeter at station.

AVERAGE DISCHARGE.--39 years (water years 1928-34, 1955-73, 1984-96), 856 ft<sup>3</sup>/s, 86.11 in/yr, 620,200 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 30,600 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 33.26 ft from high-water marks, from rating curve extended above 8,000 ft<sup>3</sup>/s; minimum, 64 ft<sup>3</sup>/s Dec. 29, 1990.

EXTREMES OUTSIDE PERIOD OF RECORD.--A flood occurred about 0900 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 3,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	0800	5,410	22.06	Jan. 8	0200	4,360	21.35
Nov. 28	0500	8,250	23.63	Feb. 6	2300	8,310	23.66
Nov. 29	1300	12,100	25.57	Feb. 8	unknown	*30,600	*33.26
Dec. 1	0200	7,650	23.33	Feb. 18	2215	4,270	20.13
Dec. 12	2345	8,450	23.73	Apr. 23	2130	8,050	23.15

Minimum discharge, 120 ft<sup>3</sup>/s Sept. 2, 3.

a From high-water mark.

b From rating curve extended above 8,000 ft<sup>3</sup>/s.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	219	441	5440	1300	527	1120	1030	1570	761	293	189	e130
2	218	420	3860	1340	511	1080	1060	1480	730	286	198	e120
3	356	405	3110	1690	503	1140	982	1370	720	282	196	e120
4	270	394	2570	1610	515	1270	952	1260	717	275	192	e130
5	230	406	2030	1530	1260	1220	932	1180	686	267	193	e150
6	215	421	1700	1680	4180	1190	932	1100	639	259	190	e200
7	212	776	1450	3420	6600	1200	966	1040	608	253	186	e190
8	207	1810	1190	3620	e21000	1300	1030	971	595	248	183	e170
9	205	1810	1130	2820	e12000	1360	1090	925	576	244	181	e160
10	322	1590	1430	2230	e4500	1470	1120	869	541	240	179	e150
11	652	3780	3800	1900	e3200	1650	1200	843	531	236	177	e140
12	600	3100	5310	1690	e2300	1710	1240	876	e500	233	174	147
13	509	2830	6030	1450	2020	1640	1110	961	e480	230	171	148
14	463	2340	4610	1430	1860	1540	1050	1050	e450	225	169	179
15	427	2110	3640	2220	1800	1450	1050	1210	e410	222	168	349
16	476	1800	2730	2510	1770	1350	1310	1150	e420	219	166	247
17	643	1600	2140	2260	2040	1260	1390	1340	e440	221	164	209
18	674	1710	1730	1980	3570	1200	1400	1740	e500	263	164	192
19	594	1440	1430	1790	3880	1150	1310	2070	e400	312	163	192
20	562	1280	1170	1640	3390	1100	1190	1960	359	258	165	178
21	538	1160	1000	1440	2830	1050	1100	1740	345	240	162	170
22	497	1230	885	1220	2340	1030	1260	1640	336	231	160	170
23	460	1410	786	1120	2040	971	4210	1480	367	e200	159	161
24	433	2310	710	1020	1790	929	5410	1340	394	e190	157	157
25	536	3060	652	906	1650	872	3710	1300	366	e180	156	154
26	729	3130	605	832	1520	842	2940	1270	344	e180	156	153
27	562	3170	585	789	1370	806	2510	1190	343	e180	156	152
28	537	6380	580	727	1270	763	2230	1100	335	e170	155	150
29	515	8920	732	672	1190	746	2000	1000	317	e200	e140	149
30	491	7350	1080	576	---	745	1800	914	304	194	e140	148
31	466	---	1410	549	---	780	---	828	---	191	e130	---
TOTAL	13818	68583	65525	49961	93426	35904	49514	38767	14514	7222	5239	5065
MEAN	446	2286	2114	1612	3222	1158	1650	1251	484	233	169	169
MAX	729	8920	6030	3620	21000	1710	5410	2070	761	312	198	349
MIN	205	394	580	549	503	715	932	828	304	170	130	120
AC-FT	27410	136000	130000	99100	185300	71220	98210	76890	28790	14320	10390	10050
CFSM	3.30	16.9	15.7	11.9	23.9	8.58	12.2	9.26	3.58	1.73	1.25	1.25
IN.	3.81	18.90	18.06	13.77	25.74	9.89	13.64	10.68	4.00	1.99	1.44	1.40

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1928 - 1996, BY WATER YEAR (WY)

	MEAN	324	1073	1189	1174	1217	1156	1272	1249	832	367	202	183
MAX	958	2609	2828	2263	3222	2841	1903	2467	2341	1163	438	385	
(WY)	1956	1984	1974	1959	1996	1972	1993	1956	1933	1971	1933	1968	
MIN	107	102	313	365	254	386	620	425	194	143	116	122	
(WY)	1988	1930	1931	1985	1929	1955	1973	1934	1992	1992	1992	1934	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1928 - 1996
ANNUAL TOTAL	420284	447538	
ANNUAL MEAN	1151	1223	851
HIGHEST ANNUAL MEAN			1297
LOWEST ANNUAL MEAN			566
HIGHEST DAILY MEAN	9470	Jan 31	21000
LOWEST DAILY MEAN	125	Sep 24	120
ANNUAL SEVEN-DAY MINIMUM	127	Sep 19	130
ANNUAL RUNOFF (AC-FT)	833600	887700	616500
ANNUAL RUNOFF (CFSM)	8.53	9.06	6.30
ANNUAL RUNOFF (INCHES)	115.81	123.32	85.64
10 PERCENT EXCEEDS	2610	2530	1800
50 PERCENT EXCEEDS	816	837	608
90 PERCENT EXCEEDS	161	170	154

e Estimated

WATER-QUALITY RECORDS

SUSPENDED SEDIMENT DISCHARGE: October 1983 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.

EXTREMES FOR PERIOD OF DAILY RECORD. - -

SEDIMENT DISCHARGE: Maximum daily, 1,400,000 tons (estimated) Feb. 8, 1996; minimum, 0.37 tons Nov. 20, 1993. U.S. Geological Survey Open-File Report 91-219. Beginning October 1994, daily sediment discharge values for period October to March, monthly sediment discharge values only for the period April to September each year. Additional data for period April to September on file at the Cascade Volcano Observatory in Vancouver, WA.

SEDIMENT DISCHARGE: Maximum daily for period October to March, 1,400,000 tons (estimated) Feb. 8; minimum, 5.1 tons Oct. 9.

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST CUBIC FEET PER SECOND (00061)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	SED. SUSP. SIEVE DIAM. % FINER THAN .125 MM (70332)	SED. SUSP. SIEVE DIAM. % FINER THAN .250 MM (70333)	SED. SUSP. SIEVE DIAM. % FINER THAN .500 MM (70334)	SED. SUSP. SIEVE DIAM. % FINER THAN 1.00 MM (70335)	SED. SUSP. SIEVE DIAM. % FINER THAN 2.00 MM (70336)
DEC 1993											
10...	1310	--	3280	1950	17300	47	60	80	92	98	100
MAR 1994											
01...	1738	6.0	1830	420	2080	--	--	--	--	--	--
OCT											
31...	1430	6.5	2860	5300	40900	39	59	83	96	99	100
DEC											
01...	1515	5.5	3280	4380	38800	27	40	70	91	98	100
19...	1500	4.5	4480	2170	26200	26	41	66	86	96	100
21...	1530	4.5	4640	1580	19800	21	34	60	86	98	100
JAN 1995											
11...	1450	--	1570	608	2580	23	30	46	72	87	93
NOV											
09...	1320	7.5	1780	675	3240	22	34	60	85	98	100
11...	1220	9.5	4250	3760	43100	31	47	74	91	99	100
APR 1996											
24...	1440	8.5	4560	3700	45600	26	42	74	93	98	100

[illegible]

14216500 MUDDY RIVER BELOW CLEAR CREEK, NEAR COUGAR, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	219	31	18	441	---	22	5440	2030	31000
2	218	26	15	420	---	19	3860	1710	17700
3	356	634	653	405	---	16	3110	1240	10500
4	270	38	29	394	---	14	2570	852	59900
5	230	16	9.7	406	17	18	2030	567	3370
6	215	13	7.5	421	19	21	1700	---	1500
7	212	11	6.2	776	246	593	1450	---	700
8	207	10	5.8	1810	11000	64000	1190	---	260
9	205	9	5.1	1810	2750	14200	1130	---	220
10	322	172	228	1590	486	2230	1430	---	640
11	652	496	875	3780	3400	36300	3800	---	17000
12	600	126	212	3100	577	4830	5310	---	30000
13	509	35	48	2830	569	4390	6030	---	35000
14	463	31	39	2340	372	2380	4610	---	19000
15	427	21	24	2110	221	1260	3640	---	11000
16	476	23	30	1800	158	768	2730	---	5200
17	643	396	988	1600	140	629	2140	---	2200
18	674	196	383	1710	765	3740	1730	---	750
19	594	38	61	1440	131	509	1430	---	250
20	562	35	53	1280	116	404	1170	---	120
21	538	30	44	1160	80	250	1000	---	76
22	497	22	30	1230	97	323	885	---	52
23	460	16	20	1410	202	861	786	---	40
24	433	15	18	2310	689	4450	710	---	35
25	536	186	499	3060	767	6260	652	---	27
26	729	381	881	3130	356	3020	605	---	23
27	562	41	62	3170	429	4020	585	---	21
28	537	26	38	6380	---	53000	580	---	21
29	515	25	35	8920	---	200000	732	---	35
30	491	24	32	7350	2750	56400	1080	---	95
31	466	---	27	---	---	---	1410	---	240
TOTAL	13818	---	5376.3	68583	---	464927	65525	---	246975
DAY	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCENTRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	1300	---	170	527	---	18	1120	---	1400
2	1340	---	190	511	---	17	1080	---	1300
3	1690	---	600	503	---	17	1140	---	1500
4	1610	---	480	515	---	17	1270	---	2100
5	1530	---	350	1260	---	150	1220	---	1900
6	1680	---	600	4180	---	10000	1190	---	1700
7	3420	---	9800	6600	---	33000	1200	---	1800
8	3620	---	7200	e21000	---	1400000	1300	---	2000
9	2820	---	4000	e12000	---	41000	1360	---	2600
10	2230	---	2000	e4500	---	58000	1470	---	3300
11	1900	---	1100	e3200	---	27000	1650	---	4600
12	1690	151	689	e2300	2030	13000	1710	---	5200
13	1450	---	250	2020	---	8500	1640	---	4600
14	1430	---	240	1860	---	6800	1540	---	3900
15	2220	---	2000	1800	---	6200	1450	---	3200
16	2510	---	3000	1770	---	5800	1350	---	2600
17	2260	---	2100	2040	---	8600	1260	---	2000
18	1980	---	1200	3570	---	33000	1200	---	1800
19	1790	---	850	3880	---	41000	1150	---	1500
20	1640	---	500	3390	---	31000	1100	---	1300
21	1440	---	250	2830	---	20000	1050	---	1100
22	1220	---	140	2340	---	12000	1030	---	1100
23	1120	---	100	2040	---	9000	971	---	860
24	1020	---	78	1790	---	6000	929	---	750
25	906	---	58	1650	---	4800	872	---	590
26	832	---	46	1520	---	3700	842	---	500
27	789	---	41	1370	---	2700	806	---	440
28	727	---	33	1270	---	2100	763	---	360
29	672	---	29	1190	---	1700	746	---	330
30	576	---	21	---	---	---	715	---	270
31	549	---	20	---	---	---	780	---	390
TOTAL	49961	---	38135	93426	---	1785119	35904	---	56990
MONTH			TOTAL MEAN DISCHARGE (CFS)	TOTAL SEDIMENT DISCHARGE (TONS/DAY)					
APRIL			49514	190000					
MAY			38767	38000					
JUNE			14514	2500					
JULY			7222	190					
AUGUST			5239	65					
SEPTEMBER			5065	580					

e Estimated

## LEWIS RIVER BASIN

14219800 SPEELYAI CREEK NEAR COUGAR, WA

LOCATION.--Lat 46°00'28", long 122°20'46", in NW 1/4 NW 1/4 sec.17, T.6 N., R.4 E., Cowlitz County, Hydrologic Unit 17080002, on right bank 3.8 mi southwest of Cougar, and at mile 6.1.

DRAINAGE AREA.--12.6 mi<sup>2</sup>.

PERIOD OF RECORD.--May 1959 to May 1978, October 1978 to current year.

REVISED RECORDS.--WSP 1718: 1959. WDR WA-81-1: 1978-80(P). WDR WA-84-1: 1983.

GAGE.--Water-stage recorder. Elevation of gage is 500 ft above sea level, from topographic map. Prior to Nov. 21, 1959, at site 250 ft downstream at different datum.

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

AVERAGE DISCHARGE.--36 years (water years 1960-77, 1979-96), 102 ft<sup>3</sup>/s, 110.03 in/yr, 73,920 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 3,600 ft<sup>3</sup>/s probably Nov. 20, 1962 (by slope-area measurement, gage height not determined); maximum gage height, 8.12 ft Feb. 8, 1996; minimum discharge, 0.76 ft<sup>3</sup>/s Aug. 28 to Sept. 4, 1992.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 700 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1415	958	4.47	Dec. 14	1515	738	4.07
Nov. 11	0700	1,490	5.40	Jan. 7	1745	1,300	5.08
Nov. 24	0800	744	4.08	Feb. 8	1145	*3,300	*8.12
Nov. 29	1400	2,130	6.37	Apr. 23	1630	868	5.59

Minimum discharge, 1.6 ft<sup>3</sup>/s Aug. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	64	48	835	211	50	75	106	59	37	20	3.5	1.7
2	46	43	567	167	50	72	131	53	35	17	17	1.8
3	62	39	366	271	50	84	90	49	33	15	6.8	2.0
4	55	36	329	233	47	155	71	46	31	14	5.8	2.3
5	44	43	235	193	135	207	63	42	29	13	6.5	6.2
6	36	51	174	239	866	279	58	40	27	11	5.1	4.9
7	31	282	134	1040	1540	263	53	38	24	9.8	4.4	2.7
8	29	649	108	723	2410	271	50	35	22	8.5	3.9	2.3
9	26	452	102	347	907	258	45	33	20	8.0	3.5	2.2
10	44	297	143	228	413	236	43	31	19	7.0	3.4	2.1
11	219	1050	492	170	255	253	70	29	16	6.2	3.2	1.9
12	224	464	461	137	180	222	233	29	14	5.5	3.3	1.8
13	142	328	493	113	146	171	284	30	13	5.1	3.1	2.5
14	99	254	612	122	134	131	218	29	12	4.5	2.9	2.5
15	74	202	488	394	133	109	178	34	9.8	4.1	2.8	6.5
16	74	164	287	476	131	94	192	32	8.4	4.0	2.7	4.7
17	131	135	203	270	167	85	174	45	10	4.7	2.6	2.9
18	169	133	167	192	380	79	178	89	13	19	2.6	1.8
19	124	115	141	168	406	76	183	161	7.0	22	2.5	3.0
20	95	99	121	235	327	69	172	120	5.0	9.1	3.1	2.0
21	80	85	104	301	256	66	164	81	4.8	7.2	2.8	1.6
22	67	124	87	210	200	64	273	92	4.6	6.1	2.3	1.4
23	58	180	76	162	169	59	764	91	18	5.2	2.2	1.2
24	51	661	67	132	130	56	582	74	30	4.8	2.0	1.0
25	73	527	59	105	107	52	368	61	41	4.4	1.9	8.9
26	169	353	53	88	93	49	264	57	32	4.3	1.8	7.8
27	123	503	48	78	86	46	190	51	28	4.4	1.9	7.4
28	97	1230	48	70	82	41	135	48	26	4.3	1.9	6.7
29	78	1620	104	60	78	40	94	47	23	4.2	1.7	6.3
30	66	952	192	54	--	35	69	44	22	3.8	1.8	6.0
31	56	--	263	50	--	43	--	41	--	3.6	1.8	--
TOTAL	2706	11119	7559	7239	9928	3740	5495	1711	614.6	259.8	110.8	363.5
MEAN	87.3	371	244	234	342	121	183	55.2	20.5	8.38	3.57	12.1
MAX	224	1620	835	1040	2410	279	764	161	41	22	17	65
MIN	26	36	48	50	47	35	43	29	4.6	3.6	1.7	1.7
AC-FT	5370	22050	14990	14360	19690	7420	10900	3390	1220	515	220	721
CFSM	6.93	29.4	19.4	18.5	27.2	9.58	14.5	4.38	1.63	.67	.28	.96
IN.	7.99	32.83	22.32	21.37	29.31	11.04	16.22	5.05	1.81	.77	.33	1.07

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1960 - 1996, BY WATER YEAR (WY)

MEAN	50.1	172	196	196	184	149	129	77.5	39.4	15.6	9.36	14.4
MAX	158	371	393	350	374	357	238	151	106	71.2	49.0	55.9
(WY)	1960	1996	1976	1974	1972	1972	1993	1960	1981	1983	1968	1977
MIN	1.34	6.79	39.9	37.1	57.2	25.9	51.5	20.0	6.93	3.26	1.40	2.37
(WY)	1988	1994	1977	1977	1973	1992	1987	1994	1992	1992	1992	1987

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1960 - 1996
ANNUAL TOTAL	42567.8	50845.7	
ANNUAL MEAN	117	139	102
HIGHEST ANNUAL MEAN			155
LOWEST ANNUAL MEAN			54.0
HIGHEST DAILY MEAN	1620	Nov 29	2410
LOWEST DAILY MEAN	2.4	Sep 22	1.7
ANNUAL SEVEN-DAY MINIMUM	2.7	Sep 18	1.8
ANNUAL RUNOFF (AC-FT)	84430	100900	73920
ANNUAL RUNOFF (CFSM)	9.26	11.0	8.10
ANNUAL RUNOFF (INCHES)	125.68	150.12	110.03
10 PERCENT EXCEEDS	297	327	242
50 PERCENT EXCEEDS	59	59	56
90 PERCENT EXCEEDS	4.5	3.7	5.0

## LEWIS RIVER BASIN

451

## RESERVOIRS IN LEWIS RIVER BASIN, WA

## 14217600 SWIFT RESERVOIR

LOCATION.--Lat 46°03'38", long 122°11'44", in NE 1/4 SW 1/4 sec.28, T.7 N., R.5 E., Skamania County, Hydrologic Unit 17080002, at the intake structure near left bank on Swift Dam on Lewis River, 5.0 mi east of Cougar, and at mile 47.9.

DRAINAGE AREA.--481 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1958 to current year.

GAGE.--Water-stage recorder and long distance indicator in powerhouse. Datum of gage is sea level (levels by PacifiCorp).

REMARKS.--Hourly elevations for the year were furnished by PacifiCorp. Reservoir is formed by rock and earthfill dam; storage began Sept. 29, 1958; dam completed in December 1958. Usable capacity, 446,600 acre-ft between elevations 878 ft, lower limit for economic operation, and 1,000.5 ft, maximum operating limit. Dead storage unknown. Figures given herein represent total contents. Water is used by PacifiCorp for power development. Capacity table furnished by PacifiCorp.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 759,100 acre-ft Nov. 15, 1973, elevation, 1,000.77 ft; minimum contents since reservoir was first filled, 325,100 acre-ft May 1, 1967, elevation, 883.60 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 755,300 acre-ft May 30, elevation, 999.93 ft; minimum contents, 606,100 acre-ft Nov. 7, elevation, 965.32 ft.

## 14218500 YALE RESERVOIR

LOCATION.--Lat 45°57'50", long 122°19'53", in SE 1/4 NE 1/4 sec.32, T.6 N., R.4 E., Clark County, Hydrologic Unit 17080002, at left bank on Yale Dam on Lewis River just upstream from intake, 500 ft upstream from powerhouse, 1.0 mi upstream from Canyon Creek, 3.2 mi southeast of Yale, and at mile 34.2.

DRAINAGE AREA.--596 mi<sup>2</sup>.

PERIOD OF RECORD.--August 1952 to current year.

GAGE.--Water-stage recorder and long distance indicator in powerhouse. Datum of gage is sea level (levels by PacifiCorp). Prior to Feb. 1, 1954, nonrecording indicator gage at same site and datum.

REMARKS.--Hourly elevations for the year were furnished by PacifiCorp. Reservoir is formed by rock and earthfill dam; storage began July 31, 1952, dam completed in 1952. Usable capacity, 189,500 acre-ft between elevations 430 ft, lower limit for economic operation, and 490 ft, top of spillway gates. Dead storage below elevation 417 ft, 178,000 acre-ft. Figures given herein represent total contents. Water is used by PacifiCorp for power development. Capacity table furnished by PacifiCorp.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents, 402,500 acre-ft May 13, 1961, elevation, 490.15 ft; minimum contents observed since reservoir was first filled, 227,600 acre-ft Feb. 22, 1957, elevation, 435.65 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 401,700 acre-ft Feb. 9, elevation, 489.98 ft; minimum contents, 327,900 acre-ft Mar. 23, elevation, 469.12 ft.

## 14220000 LAKE MERWIN

LOCATION.--Lat 45°57'23", long 122°33'13", in SW 1/4 SW 1/4 sec.34, T.6 N., R.2 E., Clark County, Hydrologic Unit 17080002, on left bank on dam on Lewis River at Ariel, and at mile 19.6.

DRAINAGE AREA.--730 mi<sup>2</sup>.

PERIOD OF RECORD.--March 1931 to current year.

GAGE.--Water-stage recorder and long distance indicator in powerhouse. Datum of gage is sea level (levels by PacifiCorp).

REMARKS.--Hourly elevations for the year were furnished by PacifiCorp. Reservoir is formed by combination gravity-concrete-arch dam; some storage began March 1931; completed May 13, 1931. Usable capacity, 245,600 acre-ft between elevations 165 ft, lower limit of regulation set by Federal Energy Regulatory Commission, and 235 ft, top of spillway gates. Additional storage of 18,200 acre-ft is provided by flashboards to elevation 239.6 ft. Unused storage below elevation 165 ft, 159,000 acre-ft. Figures given herein represent total contents. Water is used by PacifiCorp for power development. Capacity table furnished by PacifiCorp.

EXTREMES FOR PERIOD OF RECORD.--Maximum contents during the period 1931-52 not determined; maximum since 1953, 424,000 acre-ft Jan. 24, 1959, elevation, 239.86 ft; minimum contents observed since reservoir was first filled, 164,200 acre-ft Dec. 5, 1936, elevation, 166.7 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 422,300 acre-ft Feb. 9, elevation, 239.48 ft; minimum contents, 363,000 acre-ft Feb. 3, elevation, 224.15 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
14217600 SWIFT RESERVOIR				14218500 YALE RESERVOIR			14220000 LAKE MERWIN		
Sept. 30.....	983.60	682,400	-	479.33	362,700	-	236.40	410,100	-
Oct. 31.....	972.85	636,900	-45,500	481.96	372,100	+9,400	235.74	407,500	-2,600
Nov. 30.....	995.59	735,600	+98,700	484.01	379,500	+7,400	235.22	405,500	-2,000
Dec. 31.....	987.96	701,500	-34,100	472.89	340,400	-39,100	234.75	403,600	-1,900
CAL YR 1995	-	-	-31,500	-	-	-44,200	-	-	+12,400
Jan. 31.....	976.64	652,800	-48,700	482.81	375,100	+34,700	226.61	372,300	-31,300
Feb. 29.....	991.12	715,500	+62,700	478.59	360,100	-15,000	226.68	372,600	+300
Mar. 31.....	979.53	665,000	-50,500	469.86	330,300	-29,800	234.62	403,100	+30,500
Apr. 30.....	998.96	750,800	+85,800	489.42	399,600	+69,300	235.87	408,000	+4,900
May 31.....	999.17	751,800	+1,000	489.33	399,300	-300	234.67	403,300	-4,700
June 30.....	995.58	735,500	-16,300	489.05	398,200	-1,100	237.79	415,600	+12,300
July 31.....	997.26	743,100	+7,600	485.83	386,200	-12,000	235.29	405,700	-9,900
Aug. 31.....	995.83	736,700	-6,400	484.72	382,100	-4,100	235.35	406,000	+300
Sept. 30.....	990.43	712,400	-24,300	475.99	351,000	-31,100	236.47	410,400	+4,400
WTR YR 1996	-	-	+30,000	-	-	-11,700	-	-	+300



## LEWIS RIVER BASIN

14220500 LEWIS RIVER AT ARIEL, WA

LOCATION.--Lat 45°57'07", long 122°33'46", in NW 1/4 NE 1/4 sec.4, T.5 N., R.2 E., Cowlitz County, Hydrologic Unit 17080002, on right bank 0.4 mi southeast of Ariel, 0.5 mi downstream from Ariel Dam and powerplant, 3.3 mi upstream from Cedar Creek, and at mile 19.0.

DRAINAGE AREA.--731 mi<sup>2</sup>.

PERIOD OF RECORD.--July to October 1909, November 1909 (gage heights only), July to October 1922, July 1923 to current year. Published as "near Ariel" water years 1922-29. Prior to October 1952, discharge measurements made at site 0.5 mi downstream; low discharges not equivalent due to local inflow.

REVISED RECORDS.--WSP 984: 1938. WSP 984: 1936-37, 1940-42. WSP 1318: 1924-30 (M).

GAGE.--Water-stage recorder. Datum of gage is 44.0 ft above sea level (levels by Pacific Power and Light Co.). July to November 1909, nonrecording gage at site 4 mi upstream at different datum. July 27 to Oct. 29, 1922 and July 31, 1923, to Apr. 20, 1930, nonrecording gages at site 0.5 mi downstream at datums 3.90 ft and 0.90 ft higher respectively, than present datum.

REMARKS.--Records good. No diversion upstream from station. Flow regulated by Swift and Yale Reservoirs, and Lake Merwin (stations 14217600, 14218500, 14220000). Chemical analyses July 1959 to June 1960, April 1979 to September 1986. Additional data from April to August 1980 are published in U.S. Geological Survey Open File Report 81-1007. Water temperatures October 1950 to September 1963.

AVERAGE DISCHARGE.--73 years (water years 1924-96), 4,789 ft<sup>3</sup>/s, 88.97 in/yr, 3,470,000 acre-ft/yr, adjusted for storage in Lake Merwin Reservoir since March 1931, Yale Reservoir since August 1952, and Swift Reservoir since October 1958.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 129,000 ft<sup>3</sup>/s Dec. 22, 1933, gage height, 35.0 ft, from floodmarks, from rating curve extended above 56,000 ft<sup>3</sup>/s on basis of computation of peak flow over dam; no flow at times June 30, July 1-3, 6-9, 1931 (caused by regulation during construction of Ariel Dam); minimum daily discharge, 1 ft<sup>3</sup>/s July 6, 1931.

EXTREMES FOR CURRENT YEAR.--Maximum discharge, 86,400 ft<sup>3</sup>/s Feb. 8, gage height, 27.38 ft, from high-water mark; minimum discharge, 579 ft<sup>3</sup>/s Aug. 13.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3010	e5350	42300	7930	9940	9980	2820	9160	4820	2180	1250	1230
2	3020	e3500	25700	7900	9470	9980	2350	9220	4260	2140	1200	1240
3	3030	e5450	16800	7810	9330	9980	2060	9240	2980	2110	1190	1250
4	3030	e5390	13600	7900	5660	10500	2060	8380	2980	2110	1190	1920
5	3030	e4440	11200	9010	5500	10100	2050	8250	2990	2110	1190	1220
6	4890	e5520	11100	9430	8750	9830	2040	8310	2970	2120	1190	1220
7	3000	5660	8230	11600	14600	9720	2060	5790	2830	2110	1190	1190
8	2620	7920	10900	14700	e53700	9780	2070	5220	2500	2120	1200	1210
9	2580	4610	10800	10900	e54800	9810	2070	5200	2510	2110	1200	2230
10	4900	8850	10800	10900	36300	9810	2090	4560	2480	2130	1200	1240
11	4640	17300	10900	10800	22900	9570	2120	2930	2530	2120	1190	1230
12	4370	17600	12500	9340	18000	8880	2480	2940	2500	2130	1180	1240
13	4510	11300	21400	10900	13100	8930	2880	2950	2520	2140	854	1210
14	4900	11200	26300	10800	11400	9030	2860	2790	2530	2130	1210	1210
15	3050	11200	17600	9460	11400	9210	4200	2710	2520	2130	1920	1210
16	4930	11200	11200	10700	10900	7840	5660	2870	2510	1710	2020	2340
17	5940	11100	11300	10700	10300	4420	5910	3280	2500	1560	1210	2990
18	5810	9320	11200	10700	10600	5990	5930	3930	2490	1480	1210	3020
19	2570	9120	11200	10700	13600	6010	5900	4010	2470	1460	1230	3200
20	e5080	9120	10900	10800	17100	6010	5880	5180	2490	1460	1250	4760
21	e4790	9220	8680	10900	11700	6020	5890	5920	2500	1470	1240	2240
22	e5020	5860	8080	11000	11600	6070	8270	5990	2490	1480	1240	2290
23	e5060	10700	8030	10400	11500	5310	14500	6260	2500	1480	2110	3870
24	e4970	11400	8020	10100	11400	5260	16000	6810	2520	1480	1220	2430
25	e6350	12500	7940	10100	11400	5680	12900	6380	2520	1480	1240	2500
26	e2520	11500	7970	10000	11400	5920	14900	5970	2540	1480	1250	1810
27	e4800	17800	2960	10000	11400	5970	12500	5540	2560	1470	1250	2250
28	e2990	33700	7050	10000	11400	4740	11600	5100	2650	1480	1760	4080
29	e3120	41100	7890	10300	11400	3000	9220	5200	2800	1470	1250	1400
30	e4860	43200	7880	9770	- - -	2940	9160	5020	2780	1480	1230	2370
31	e5050	- - -	7910	9590	- - -	2950	- - -	4850	- - -	1480	1220	- - -
TOTAL	128440	372130	388340	315140	450550	229240	180430	169960	82240	55810	40284	61600
MEAN	4143	12400	12530	10170	15540	7395	6014	5483	2741	1800	1299	2053
MAX	6350	43200	42300	14700	54800	10500	16000	9240	4820	2180	2110	4760
MIN	2520	3500	2960	7810	5500	2940	2040	2710	2470	1460	854	1190
AC-FT	254800	738100	770300	625100	893700	454700	357900	337100	163100	110700	79900	122200
MEAN†	3514	14153	11306	9429	16371	6585	8703	5417	2655	1568	1134	1197
CFSM†	4.81	19.36	15.47	12.90	22.40	9.01	11.91	7.41	3.63	2.14	1.55	1.64
IN.†	5.54	21.61	17.84	14.88	24.16	10.39	13.29	8.55	4.05	2.47	1.79	1.83
AC-FT†	216100	842200	695200	579800	941700	404900	517900	333100	158000	96400	69700	71200
CAL YR 1995 TOTAL	2161690	MEAN 5922	MAX 43200	MIN 1100	AC-FT 4288000	MEAN† 5836	CFSM† 7.98	IN.† 108.40	AC-FT† 4225000			
WTR YR 1996 TOTAL	2474164	MEAN 6760	MAX 54800	MIN 854	AC-FT 4908000	MEAN† 6787	CFSM† 9.28	IN.† 126.41	AC-FT† 4927000			

e Estimated

† Adjusted for change in contents in Lake Merwin, Swift Reservoir and Yale Reservoir.

14222500 EAST FORK LEWIS RIVER NEAR HEISSON, WA

LOCATION.--Lat 45°50'13", long 122°27'54", in NE 1/4 NW 1/4 sec.17, T.4 N., R.3 E., Clark County, Hydrologic Unit 17080002, on right bank 60 ft downstream from Basket Creek, 1.5 mi northeast of Heisson, 3.4 mi southwest of Yacolt, and at mile 20.2.

DRAINAGE AREA.--125 mi<sup>2</sup>.

PERIOD OF RECORD.--September 1929 to current year.

GAGE.--Water-stage recorder. Datum of gage is 356.8 ft above sea level (from river-profile survey). Prior to Oct. 1, 1987, at datum 10.00 ft higher.

REMARKS.--Records good except for estimated daily discharges, which are fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--67 years (water years 1930-96), 738 ft<sup>3</sup>/s, 80.26 in/yr, 534,900 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 28,600 ft<sup>3</sup>/s Feb. 8, 1996, from indirect measurement, gage height, 25.26 ft; minimum discharge, 29 ft<sup>3</sup>/s Nov. 3, 1935, Sept. 27, 28, 1967.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,100 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	1030	12,100	20.52	Nov. 29	1645	10,100	19.74
Nov. 28	0515	11,700	20.35	Feb. 8	Unknown	a*28,600	b*25.26

Minimum discharge, 43 ft<sup>3</sup>/s Sept. 12.  
a Peak discharge from indirect measurement.  
b From high-water mark.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	321	364	5940	1690	545	e380	e540	747	455	223	84	51
2	254	328	4150	1210	522	e360	e1500	658	417	211	107	49
3	520	301	3040	1800	488	e430	e800	596	388	206	113	51
4	460	285	2500	1740	453	e800	e650	542	361	200	96	56
5	329	308	1950	1430	1130	e1050	e500	484	338	186	107	66
6	257	414	1510	1350	8050	e1400	428	445	314	174	99	71
7	219	1020	1220	3610	13400	e1350	427	436	298	165	88	55
8	207	2980	992	3590	e21000	e1400	423	402	282	157	80	51
9	199	2800	964	2410	e8000	e1300	416	370	269	153	75	49
10	312	1960	1050	1930	e2100	e1200	429	347	258	149	72	48
11	1580	8120	2120	1570	e1300	e1250	507	334	243	142	68	46
12	1530	3900	2580	1280	e900	e1100	1080	350	231	134	70	45
13	951	3040	3290	1060	e700	e850	1470	462	221	131	67	52
14	632	2360	3530	990	e660	e660	1130	476	213	125	63	110
15	474	1810	3230	2210	e660	e550	963	574	203	123	62	578
16	463	1410	2220	3180	e650	e470	1120	576	195	118	61	241
17	763	1150	1680	2110	e800	e440	1080	745	223	130	61	160
18	1090	1080	1360	1590	e1900	e400	1000	1080	294	196	62	120
19	731	919	1120	1860	e2000	e380	961	1570	217	225	63	145
20	581	794	945	2580	e2100	e350	944	1210	191	162	63	123
21	527	704	813	3180	e1700	e330	908	966	180	140	63	105
22	460	960	714	2340	e1300	e320	1320	2000	175	128	58	110
23	406	1160	631	1990	e850	e300	3470	2040	270	118	54	94
24	369	3290	564	1800	e650	e280	3250	1520	484	111	52	84
25	453	3380	509	1480	e540	e260	2300	1160	473	106	51	79
26	1340	2690	467	1240	e470	e240	1880	926	360	102	51	76
27	927	3580	439	e1100	e440	e230	1520	770	305	99	56	74
28	704	9230	425	929	e400	e210	1210	681	303	98	57	72
29	564	8240	628	787	e390	e200	1000	644	265	103	53	70
30	474	6470	1340	e725	---	e180	851	572	242	93	51	68
31	414	---	2280	e650	---	e220	---	502	---	85	53	---
TOTAL	18511	75047	54201	55411	74098	18890	34077	24185	8668	4493	2160	2999
MEAN	597	2502	1748	1787	2555	609	1136	780	289	145	69.7	100
MAX	1580	9230	5940	3610	21000	1400	3470	2040	484	225	113	578
MIN	199	285	425	650	390	180	416	334	175	85	51	45
AC-FT	36720	148900	107500	109900	147000	37470	67590	47970	17190	8910	4280	5950
CFSM	4.78	20.0	14.0	14.3	20.4	4.87	9.09	6.24	2.31	1.16	.56	.80
IN.	5.51	22.33	16.13	16.49	22.05	5.62	10.14	7.20	2.58	1.34	.64	.89

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1996, BY WATER YEAR (WY)

	344	1079	1464	1403	1291	1108	929	589	345	145	83.0	114
MEAN	344	1079	1464	1403	1291	1108	929	589	345	145	83.0	114
MAX	1318	2502	3957	3460	2636	2432	1818	1254	914	561	278	555
(WY)	1952	1996	1934	1953	1961	1932	1937	1933	1933	1983	1968	1941
MIN	36.7	53.7	288	303	394	352	312	198	88.2	59.4	42.7	42.3
(WY)	1988	1937	1977	1979	1977	1992	1941	1931	1992	1992	1992	1967

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1930 - 1996
ANNUAL TOTAL	315391	372740	
ANNUAL MEAN	864	1018	738
HIGHEST ANNUAL MEAN			1117
LOWEST ANNUAL MEAN			417
HIGHEST DAILY MEAN	9230	Nov 28	21000
LOWEST DAILY MEAN	43	Sep 22	45
ANNUAL SEVEN-DAY MINIMUM	47	Sep 18	49
ANNUAL RUNOFF (AC-FT)	625600		739300
ANNUAL RUNOFF (CFSM)	6.91		8.15
ANNUAL RUNOFF (INCHES)	93.86		110.93
10 PERCENT EXCEEDS	2110		2240
50 PERCENT EXCEEDS	506		475
90 PERCENT EXCEEDS	62		72

e Estimated

## 14226500 COWLITZ RIVER AT PACKWOOD, WA

LOCATION.--Lat 46°36'47", long 121°40'41", in SE 1/4 SE 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 mi<sup>2</sup>.

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 sea level (Bureau of Public Roads bench mark). 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.--Records fair except for estimated daily discharges, which are poor. 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 this station. Monthly mean diversion in cubic feet per second for the current water year, as furnished by the Washington Power Supply System, is as follows:

October.....	e0	January.....	e150	April.....	e79.2	July.....	123
November.....	e196	February.....	e164	May.....	115	August.....	56.6
December.....	e187	March.....	71.4	June.....	131	September.....	85.2

e Estimated.

AVERAGE DISCHARGE.--75 years (water years 1912-19, 1930-96), 1,593 ft<sup>3</sup>/s, 1,154,000 acre-ft/yr, unadjusted. 67 years (water years 1930-96), 1,591 ft<sup>3</sup>/s, 1,152,000 acre-ft/yr, unadjusted.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 36,600 ft<sup>3</sup>/s Dec. 21, 1933, gage height, 13.0 ft; maximum gage height, 13.73 ft Dec. 2, 1977; minimum discharge, 130 ft<sup>3</sup>/s Nov. 29, 1952.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 7,500 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1500	17,000	9.70	Dec. 13	0215	7,820	6.24
Nov. 11	0915	15,200	9.21	Jan. 7	1915	8,910	6.64
Nov. 13	1700	8,970	7.26	Feb. 7	0600	16,200	8.87
Nov. 25	0130	7,900	6.87	Feb. 8	1745	*32,900	*10.86
Nov. 29	1115	32,100	10.72	Apr. 23	2400	8,110	6.95
Dec. 11	0830	8,410	6.46				

Minimum daily discharge, 310 ft<sup>3</sup>/s Sept. 29, 30.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	519	828	12600	3150	1530	1030	637	1880	1790	1580	836	496
2	763	752	8830	2840	1510	990	787	1740	2250	1790	765	473
3	1650	703	6010	4500	1510	1030	679	1640	3340	1850	754	463
4	1320	669	4460	3600	1500	1170	634	1510	3510	1860	700	459
5	843	666	3130	2790	1730	1140	643	1430	2700	1690	676	454
6	656	664	2290	2590	5380	1140	779	1360	2590	1550	661	e455
7	595	1730	1980	6950	13700	1140	1310	1340	3060	1500	633	e445
8	538	10900	1810	6970	26800	1260	1940	1260	3030	1490	633	e425
9	508	5290	1840	4700	19800	1560	2360	1180	2470	1610	637	e400
10	2500	2690	2960	3610	10500	2000	2280	1130	2040	1540	643	e385
11	3780	9780	7500	2960	6450	2150	1920	1150	2000	1420	664	e375
12	2640	4780	6340	2580	4420	2070	1660	1550	1980	1380	683	e380
13	1910	6370	6830	2320	3260	1870	1440	2260	2010	1440	678	e400
14	1580	5430	5040	2700	2540	1690	1340	2940	2080	1530	672	447
15	1470	3750	3920	4370	2400	1660	1340	2980	2040	1580	670	559
16	1960	2980	3060	4990	2390	1530	1730	2800	1920	1500	659	544
17	3280	2180	2540	3770	2670	1390	1690	2700	1690	1270	617	e475
18	3170	2930	2230	3010	4970	1280	1500	2870	1500	1190	578	e435
19	2060	2070	2020	2650	4280	1210	1320	2880	1320	1150	551	e410
20	1650	1600	1880	2430	3300	1120	1170	2490	1270	e1000	535	e380
21	1460	1260	1760	2260	2720	1020	1050	2210	1420	e960	519	e370
22	1240	1390	1660	2090	2290	964	1010	2120	1550	e920	498	e360
23	1090	2580	1590	2000	2030	880	3750	2020	1540	e940	491	e350
24	988	4900	1530	1910	1800	817	6030	1940	1690	e960	483	e340
25	1040	5990	1480	1830	1590	726	4060	2190	1660	e980	491	e330
26	2360	3950	1440	1760	1420	694	3290	2760	1620	e950	e480	e325
27	1750	3250	1410	1710	1280	644	2690	2790	1560	979	e470	e320
28	1450	15400	1390	1660	1150	594	2310	2270	1530	969	e470	e315
29	1220	27400	1500	1620	1080	575	2090	2040	1430	948	e490	e310
30	1060	17800	2100	1580	---	540	1990	1900	1380	931	508	e310
31	927	---	3740	1560	---	528	---	1750	---	905	521	---
TOTAL	47977	150682	106870	93460	136000	36412	55429	63080	59970	40362	18666	12190
MEAN	1548	5023	3447	3015	4690	1175	1848	2035	1999	1302	602	406
MAX	3780	27400	12600	6970	26800	2150	6030	2980	3510	1860	836	559
MIN	508	664	1390	1560	1080	528	634	1130	1270	905	470	310
AC-FT	95160	298900	212000	185400	269800	72220	109900	125100	119000	80060	37020	24180

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1930 - 1996, BY WATER YEAR (WY)

MEAN	812	1598	1778	1508	1437	1211	1716	2814	3041	1775	819	581
MAX	2683	5023	6025	4104	4690	3478	2833	5209	6085	4265	1688	1527
(WY)	1956	1996	1934	1974	1996	1972	1991	1949	1974	1933	1933	1959
MIN	237	196	319	364	396	495	668	1548	842	527	445	344
(WY)	1988	1953	1953	1937	1933	1955	1975	1977	1992	1992	1987	1987

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1930 - 1996
ANNUAL TOTAL	767687	821098	1591
ANNUAL MEAN	2103	2243	2411
HIGHEST ANNUAL MEAN			923
LOWEST ANNUAL MEAN			27700
HIGHEST DAILY MEAN	27400	Nov 29	Dec 2 1977
LOWEST DAILY MEAN	326	Sep 26	Nov 29 1952
ANNUAL SEVEN-DAY MINIMUM	365	Sep 20	156
ANNUAL RUNOFF (AC-FT)	1523000	1629000	1152000
10 PERCENT EXCEEDS	3720	3980	3360
50 PERCENT EXCEEDS	1490	1560	1090
90 PERCENT EXCEEDS	524	505	452

e Estimated

## 14231000 COWLITZ RIVER AT RANDLE, WA

LOCATION.--Lat 46°31'57", long 121°57'20", in NW 1/4 NE 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 mi<sup>2</sup>.

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

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

REMARKS.--Records fair except for estimated daily discharges, which are poor. Small diversions for domestic use and irrigation upstream from station. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--3 years (water years 1994-96), 2,960 ft<sup>3</sup>/s, 74.33 in/yr, 2,144,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined Feb. 9, 1996, gage height, 24.24 ft; maximum gage height, 24.90 ft Feb. 9, 1996, from outside high-water mark; minimum discharge, 292 ft<sup>3</sup>/s Nov. 26, 1993.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 10,800 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 9	0115	20,700	18.38	Dec. 13	0815	13,500	14.15
Nov. 11	1915	21,800	19.03	Jan. 8	0345	14,800	14.98
Nov. 14	0045	16,600	15.83	Feb. 9	0430	unknown	24.24
Nov. 25	0915	12,500	13.13	Feb. 9	0430	---	*a24.90
Nov. 30	0630	unknown	23.58	Apr. 24	0730	12,000	13.19

Minimum discharge, 507 ft<sup>3</sup>/s Sept. 30.

a From outside high-water mark.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	996	1550	e26000	6150	1890	2770	1950	3430	2610	2070	1210	769
2	923	1450	16800	5200	1830	2660	2350	3140	2870	2240	1170	723
3	2140	1340	10800	7620	1760	2680	2180	2890	3800	2340	1230	703
4	2310	1260	8630	7350	1710	3000	2090	2670	4370	2380	1110	695
5	1680	1260	6900	5670	1970	2970	2050	2510	3650	2060	1130	676
6	1360	1300	5750	4930	5910	2990	2130	2370	3470	1880	1090	739
7	1210	2140	4980	9740	e22000	2940	2560	2290	3790	1800	1060	711
8	1090	11100	4390	13300	e32000	3060	3340	2190	3920	1960	1070	696
9	1020	15700	4140	9070	e35000	3480	3940	2020	3450	2050	1100	636
10	2100	7900	4890	6930	e20000	4130	4080	1920	2990	1880	1110	617
11	6070	15800	11400	5650	11900	4450	3750	1880	2840	1810	1110	615
12	5170	16400	11500	4870	7970	4370	3460	2190	2740	1790	1060	628
13	3920	12800	12800	4320	6420	4040	3250	2980	2730	1990	1040	701
14	3170	14100	10400	4260	5810	3700	3080	4160	2780	2060	1030	717
15	2930	9420	8330	5710	5530	3560	3070	4350	2750	2030	1040	974
16	3180	7800	6580	7840	5400	3380	3680	4320	2630	1860	1010	1030
17	4040	6310	5490	6270	5430	3180	3840	4040	2390	1640	957	915
18	5860	6650	4760	5020	8900	3020	3560	4260	2210	1590	884	827
19	3890	5860	4190	4450	9470	2910	3270	4690	1980	1650	877	789
20	3110	5090	3770	4050	7540	2800	3030	4350	1880	1500	875	727
21	2830	4520	3420	3770	6220	2670	2840	3820	1970	1350	857	702
22	2500	4260	3120	3420	5340	2590	2720	3650	2080	1330	857	705
23	2180	4840	2850	3200	4840	2470	4770	3530	2110	1380	801	679
24	1940	8230	2650	2980	4310	2380	10900	3330	2270	1400	790	647
25	1790	11400	2470	2760	3910	2240	8160	3410	2250	1520	810	627
26	3500	9920	2330	2590	3580	2180	6750	3870	2140	1420	810	609
27	3180	8580	2210	2420	3300	2100	5520	3960	2070	1390	795	601
28	2710	e24000	2110	2300	3070	2010	4620	3450	2030	1380	792	543
29	2320	e30000	2310	2190	2920	1920	4020	3140	1950	1330	859	534
30	2000	e33000	3330	e2080	---	1860	3690	2930	1950	1370	892	521
31	1700	---	6280	e1980	---	1810	---	2670	---	1310	886	---
TOTAL	82819	283980	205580	158090	235930	90320	114650	100410	80670	53760	30312	21056
MEAN	2672	9466	6632	5100	8136	2914	3822	3239	2689	1734	978	702
MAX	6070	33000	26000	13300	35000	4450	10900	4690	4370	2380	1230	1030
MIN	923	1260	2110	1980	1710	1810	1950	1880	1880	1310	790	521
AC-FT	164300	563300	407800	313600	468000	179100	227400	199200	160000	106600	60120	41760
CFSM	4.94	17.5	12.3	9.43	15.0	5.39	7.06	5.99	4.97	3.21	1.81	1.30
IN.	5.69	19.53	14.14	10.87	16.22	6.21	7.88	6.90	5.55	3.70	2.08	1.45

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1994 - 1996, BY WATER YEAR (WY)

	1994	1995	1996	1994	1995	1996	1994	1995	1996
MEAN	1472	4063	4545	3771	5539	3217	3241	3743	2813
MAX	2672	9466	6632	5100	8136	3578	3822	4388	3087
(WY)	1996	1996	1996	1996	1996	1996	1996	1996	1996
MIN	417	365	1772	2925	1323	2914	2308	3239	2662
(WY)	1994	1994	1994	1995	1995	1996	1995	1996	1994

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1994 - 1996

ANNUAL TOTAL	1369772	1457577	2960
ANNUAL MEAN	3753	3982	3982
HIGHEST ANNUAL MEAN			1996
LOWEST ANNUAL MEAN			1958
HIGHEST DAILY MEAN	33000	Nov 30	35000
LOWEST DAILY MEAN	576	Sep 26	295
ANNUAL SEVEN-DAY MINIMUM	646	Sep 21	583
ANNUAL RUNOFF (AC-FT)	2717000	2891000	2144000
ANNUAL RUNOFF (CFSM)	6.94	7.36	5.47
ANNUAL RUNOFF (INCHES)	94.19	100.23	74.33
10 PERCENT EXCEEDS	6730	7920	5420
50 PERCENT EXCEEDS	2680	2740	2290
90 PERCENT EXCEEDS	856	870	625

e Estimated



## COWLITZ RIVER BASIN

14232500 CISPUS RIVER NEAR RANDLE, WA

LOCATION.--Lat 46°26'50", long 121°51'46", in NW 1/4 sec.18, T.11 N., R.8 E., (unsurveyed), Lewis County, Hydrologic Unit 17080004, Gifford Pinchot National Forest, on left bank 60 ft upstream from bridge to Tower Rock ranger station, 4.1 mi downstream from North Fork, 8.0 mi southeast of Randle, and at mile 15.8.

DRAINAGE AREA.--321 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1910 to February 1912, September 1929 to February 1996 (discontinued).

REVISED RECORDS.--WSP 794: 1934. WSP 1288: Drainage area. WSP 1935: 1950-53, 1954(M), 1955-56, 1957(M), 1960. WDR WA-86-1: 1985.

GAGE.--Water-stage recorder. Datum of gage is 1,221.60 ft above sea level. Prior to Mar. 1, 1912, nonrecording gage at site 1.0 mi upstream at different datum. Sept. 28, 1929, to Nov. 26, 1949, Oct. 1-24, 1950, water-stage recorder at site 450 ft upstream at datum 0.26 ft higher.

REMARKS.--Records fair except for estimated daily discharges, which are poor. No regulation or diversion upstream from station. U.S. Geological Survey satellite telemeter at station. Water temperatures May 1950 to September 1972.

AVERAGE DISCHARGE.--66 years (water years 1930-95), 1,305 ft<sup>3</sup>/s, 55.25 in/yr, 945,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 31,600 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 11.50 ft, on basis of slope-area measurement of peak flow; maximum gage height, 12.58 ft Jan. 15, 1974; minimum discharge, 177 ft<sup>3</sup>/s Nov. 24, 1993.

EXTREMES FOR OCTOBER 1995 TO FEBRUARY 1996--Peak discharges greater than base discharge of 4,000 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1900	4,710	8.17	Nov. 28	1445	22,000	11.16
Nov. 11	1800	11,500	9.67	Nov. 29	1530	25,700	*11.96
Nov. 14	0300	5,950	8.52	Dec. 13	0300	9,180	9.91
Nov. 25	0930	5,050	8.27	Feb. 8	unknown	*31,600	11.50

Minimum discharge, 396 ft<sup>3</sup>/s Oct. 2.

DISCHARGE, CUBIC FEET PER SECOND, OCTOBER 1995 TO FEBRUARY 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	447	658	7820	e2300	e1100	---	---	---	---	---	---	---
2	426	616	4290	e2200	e1050	---	---	---	---	---	---	---
3	805	590	e3000	e2900	e1000	---	---	---	---	---	---	---
4	680	588	e2500	e2700	e1100	---	---	---	---	---	---	---
5	548	592	e2100	e2500	e2500	---	---	---	---	---	---	---
6	494	613	e1900	e2300	e3500	---	---	---	---	---	---	---
7	471	787	e1700	e4000	e13700	---	---	---	---	---	---	---
8	451	2720	e1500	e5000	e24000	---	---	---	---	---	---	---
9	443	3440	e1450	e3700	---	---	---	---	---	---	---	---
10	501	2390	e2000	e3000	---	---	---	---	---	---	---	---
11	1190	7830	4800	e2500	---	---	---	---	---	---	---	---
12	1190	5940	5970	e2000	---	---	---	---	---	---	---	---
13	1030	5050	7140	e1900	---	---	---	---	---	---	---	---
14	879	4720	4780	e2300	---	---	---	---	---	---	---	---
15	833	3490	3510	e3000	---	---	---	---	---	---	---	---
16	867	3150	e2400	e3500	---	---	---	---	---	---	---	---
17	1020	2630	e2200	e2800	---	---	---	---	---	---	---	---
18	1340	3090	e2000	e2300	---	---	---	---	---	---	---	---
19	1100	2540	e1800	e2000	---	---	---	---	---	---	---	---
20	952	2200	e1700	e1800	---	---	---	---	---	---	---	---
21	885	1900	e1600	e1700	---	---	---	---	---	---	---	---
22	827	1760	e1500	e1600	---	---	---	---	---	---	---	---
23	766	1900	e1400	e1550	---	---	---	---	---	---	---	---
24	701	2670	e1350	e1500	---	---	---	---	---	---	---	---
25	696	4530	e1300	e1450	---	---	---	---	---	---	---	---
26	1120	4100	e1250	e1400	---	---	---	---	---	---	---	---
27	1020	3740	e1200	e1350	---	---	---	---	---	---	---	---
28	899	16900	e1150	e1300	---	---	---	---	---	---	---	---
29	818	18300	e1300	e1250	---	---	---	---	---	---	---	---
30	759	13000	e1900	e1200	---	---	---	---	---	---	---	---
31	695	---	e2500	e1150	---	---	---	---	---	---	---	---
TOTAL	24853	122434	81010	70150	---	---	---	---	---	---	---	---
MEAN	802	4081	2613	2263	---	---	---	---	---	---	---	---
MAX	1340	18300	7820	5000	---	---	---	---	---	---	---	---
MIN	426	588	1150	1150	---	---	---	---	---	---	---	---
AC-FT	49300	242800	160700	139100	---	---	---	---	---	---	---	---
CFSM	2.50	12.7	8.14	7.05	---	---	---	---	---	---	---	---
IN.	2.88	14.19	9.39	8.13	---	---	---	---	---	---	---	---

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1911 - 1996, BY WATER YEAR (WY)

MEAN	560	1230	1608	1438	1426	1300	1724	2429	2045	1007	546	435
MAX	1579	4081	5567	3759	3773	4021	3252	4292	5111	2520	1075	718
(WY)	1948	1996	1934	1934	1982	1972	1943	1949	1974	1974	1974	1972
MIN	266	251	350	396	328	586	794	918	567	419	336	306
(WY)	1936	1953	1953	1937	1937	1977	1975	1992	1992	1992	1992	1934

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## WATER YEARS 1911 1996

ANNUAL TOTAL	578960		
ANNUAL MEAN	1586		
HIGHEST ANNUAL MEAN		1305	
LOWEST ANNUAL MEAN		2102	1974
HIGHEST DAILY MEAN	18300	720	1977
LOWEST DAILY MEAN	291	24000	Feb 8 1996
ANNUAL SEVEN-DAY MINIMUM	306	205	Nov 2 1935
ANNUAL RUNOFF (AC-FT)	1148000	212	Oct 31 1935
ANNUAL RUNOFF (CFSM)	4.94	945700	
ANNUAL RUNOFF (INCHES)	67.09	4.07	
10 PERCENT EXCEEDS	2680	55.25	
50 PERCENT EXCEEDS	1150	2640	
90 PERCENT EXCEEDS	424	973	
		387	

e Estimated



## COWLITZ RIVER BASIN

457

14233500 COWLITZ RIVER NEAR KOSMOS, WA

LOCATION.--Lat 46°27'59", long 122°06'28", in NE 1/4 SW 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 1/2 mi southeast of Kosmos.

DRAINAGE AREA.--1,040 mi<sup>2</sup>.

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

GAGE.--Daily discharge determined from flow through turbines and outlet structures of Cowlitz Falls dam. Prior to December 1948, non-recording gage at site 0.3 mi downstream. December 1948 to September 1967, water-stage recorder at site 0.8 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 sea level.

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 P.U.D since Mar. 8, 1994.

AVERAGE DISCHARGE.--49 years (water years 1948-96), 4,827 ft<sup>3</sup>/s, 63.06 in/yr, 3,497,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 103,000 ft<sup>3</sup>/s Feb. 9, 1996; no flow part or all of many days 1994-96 water years.

EXTREMES FOR PERIOD.--Maximum discharge, 103,000 ft<sup>3</sup>/s Feb. 9; no flow part of many days.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	1390	2650	43700	10400	3260	4330	3070	6590	4850	3140	1860	1240
2	1300	2520	28100	9040	3260	4060	3780	6070	5360	3470	1820	1020
3	2880	2340	17900	12100	2940	3670	3570	5590	6970	3630	2030	1210
4	2930	2200	13900	12300	2780	5180	3350	5040	7590	3720	1870	1170
5	2160	2230	11100	10100	4150	4550	3210	4770	6520	3300	1780	1060
6	1790	2360	10200	8980	12700	4560	3290	4500	5630	2910	1710	1180
7	1630	3380	8480	15800	39700	4280	3790	4700	6600	2790	1270	1200
8	1480	15200	7570	19300	60000	4850	4920	4130	6730	2950	2150	1120
9	1390	19200	7180	13000	84300	5440	5960	2630	5990	3120	1610	1170
10	2650	11700	8100	11600	40800	6420	6910	3660	5330	2950	1740	690
11	7110	23200	20900	9700	21600	7100	5680	3400	4950	2800	1770	890
12	6300	23700	21400	7760	14400	7590	6100	3820	4770	2750	1700	1300
13	3700	18900	23300	7390	12100	7160	5800	5050	4650	3030	1560	1030
14	4840	18200	18000	7110	10000	6520	5360	7140	4800	3070	1610	1470
15	3970	14300	16300	10200	9620	6210	4860	7680	4650	3110	1570	1390
16	3950	12100	13000	13600	9610	5830	6910	8140	4510	2880	1610	2130
17	4920	9630	10800	11600	9380	5440	6090	7340	3870	2610	1470	1360
18	7330	10700	9540	9560	15200	5560	6280	8560	3280	2500	1450	1410
19	5130	9110	7430	8420	16600	4420	5630	10400	3800	2640	1390	1360
20	4200	8110	7260	7640	13900	4510	5220	9400	4960	2420	1210	1200
21	3750	7100	6080	7390	11500	4190	4790	7020	1820	2220	1330	1260
22	2710	6050	5620	6190	9800	3900	4510	6800	3070	2160	1480	1320
23	1370	7130	5170	5900	9040	3900	10100	7520	3330	2100	1350	1290
24	1950	11800	4760	5430	7760	3730	21000	7000	3650	2680	1180	1090
25	2470	16700	4310	5100	6880	3470	15400	6870	3570	2330	1190	1080
26	3980	15400	4140	4740	6440	3390	12900	7480	3320	2190	1370	1080
27	4770	14500	3950	4350	5020	3360	11000	7660	3270	2140	1340	1070
28	4250	34200	3760	4320	5590	3140	8990	6880	3210	2220	1290	975
29	3730	51500	4060	3850	4320	3120	7750	6280	3140	2120	1300	848
30	3260	63300	5740	3580	---	2740	7120	5760	3090	2110	1430	1190
31	2920	---	10200	3360	---	2900	---	5210	---	2190	1450	---
TOTAL	106210	439410	361950	269810	452650	145520	203340	193090	137280	84250	47890	35803
MEAN	3426	14650	11680	8704	15610	4694	6778	6229	4576	2718	1545	1193
MAX	7330	63300	43700	19300	84300	7590	21000	10400	7590	3720	2150	2130
MIN	1300	2200	3760	3360	2780	2740	3070	2630	1820	2100	1180	690
AC-FT	210700	871600	717900	535200	897800	288600	403300	383000	272300	167100	94990	71020
CFSM	3.29	14.1	11.2	8.37	15.0	4.51	6.52	5.99	4.40	2.61	1.49	1.15
IN.	3.80	15.72	12.95	9.65	16.19	5.21	7.27	6.91	4.91	3.01	1.71	1.28

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1948 - 1996, BY WATER YEAR (WY)

	MEAN	2127	4983	6287	5738	5884	4683	5754	7957	7279	3916	1927	1487
MAX	6302	14650	16520	13820	15610	14510	9738	13760	16130	8580	3705	2881	
(WY)	1960	1996	1978	1974	1996	1972	1990	1949	1974	1974	1974	1959	
MIN	675	648	1100	1640	1815	2270	2656	4017	2176	1336	1042	954	
(WY)	1988	1953	1953	1979	1977	1955	1975	1992	1992	1992	1992	1987	

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1948 - 1996
ANNUAL TOTAL	2229952.00	2477203	
ANNUAL MEAN	6109	6768	4827
HIGHEST ANNUAL MEAN			7236
LOWEST ANNUAL MEAN			2580
HIGHEST DAILY MEAN	63300	Nov 30	84300
LOWEST DAILY MEAN	---	Sep 9	---
ANNUAL SEVEN-DAY MINIMUM	840	Sep 20	549
ANNUAL RUNOFF (AC-FT)	4423000	4914000	3497000
ANNUAL RUNOFF (CFSM)	5.87	6.51	4.64
ANNUAL RUNOFF (INCHES)	79.76	88.61	63.06
10 PERCENT EXCEEDS	11300	13200	9430
50 PERCENT EXCEEDS	4230	4510	3750
90 PERCENT EXCEEDS	1390	1370	1290

## COWLITZ RIVER BASIN

14234800 RIFFE LAKE NEAR MOSSYROCK, WA

LOCATION.--Lat 46°32'07", long 122°25'25", in SE 1/4 SW 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 mi<sup>2</sup>.

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 sea level (levels by city of Tacoma).

REMARKS.--Reservoir is formed by concrete arch dam, completed in April 1968; storage began Apr. 3, 1968. Usable 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 development. Elevation records collected in cooperation with city of Tacoma. 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, 658,503 acre-ft Mar. 17, 1977, elevation, 666.88 ft.

EXTREMES FOR CURRENT YEAR.--Maximum contents, 1,670,374 acre-ft June 10, elevation, 777.28 ft; minimum contents, 1,236,367 acre-ft Feb. 5, elevation 736.29 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	762.19	1,499,886	--
Oct. 31.....	762.84	1,506,938	+7,052
Nov. 30.....	772.63	1,616,306	+109,368
Dec. 31.....	745.39	1,325,456	-290,850
CAL YR 1995.....	--	--	-120,628
Jan. 31.....	739.87	1,271,002	-54,454
Feb. 29.....	755.71	1,430,908	+159,906
Mar. 31.....	755.11	1,424,637	-6,271
Apr. 30.....	767.58	1,559,118	+134,481
May 31.....	774.94	1,643,013	+83,895
June 30.....	774.30	1,635,583	-7,430
July 31.....	767.38	1,556,889	-78,694
Aug. 31.....	760.29	1,479,412	-77,477
Sept. 30.....	751.81	1,390,473	-88,939
WTR YR 1996.....	--	--	-109,413

LOCATION.--Lat 46°35'44", long 122°27'30", in NE 1/4 SW 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.

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 sea level, from topographic map.

REMARKS.--Records good except for estimated daily discharges, which are fair. 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.--40 years (water years 1957-96), 824 ft<sup>3</sup>/s, 79.36 in/yr, 596,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 27,100 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 17.90 ft, from rating curve extended above 10,500 ft<sup>3</sup>/s on basis of slope-area measurement at gage height of 14.79 ft; minimum discharge, 49 ft<sup>3</sup>/s Oct. 22-26, 28-30, 1987, gage height, 1.93 ft.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 6,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1615	7,430	9.50	Jan. 7	1030	7,940	9.80
Nov. 11	0830	8,160	9.93	Feb. 7	0015	19,800	15.28
Nov. 29	1815	16,700	14.05	Feb. 8	unknown	*a27,100	*17.90

Minimum discharge, 76 ft<sup>3</sup>/s Sept. 11-13,  
a From rating extended above 10,500 ft<sup>3</sup>/s.

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	282	445	7290	2110	532	585	962	919	488	191	106	80
2	225	401	4920	1660	521	571	1320	809	453	184	144	79
3	410	366	3400	3500	515	758	946	753	424	179	166	79
4	349	342	2900	3130	514	1340	758	713	400	175	134	87
5	266	398	2190	2300	1280	1290	652	630	377	169	161	89
6	223	564	1710	2350	8370	1400	599	576	357	162	158	111
7	202	3360	1390	6600	13400	1270	559	585	339	156	135	94
8	193	5730	1160	4630	e21000	1350	518	565	323	151	122	86
9	189	3620	1300	2900	9190	1440	488	517	309	146	115	83
10	710	2180	1690	2090	4430	1410	505	483	299	144	109	80
11	2280	6110	2840	1620	2860	1340	599	462	286	139	106	77
12	1660	3490	2230	1330	2120	1180	1060	455	273	134	105	76
13	1070	3450	3420	1120	1720	1010	1430	651	263	130	102	78
14	739	3060	4100	1160	1500	866	1230	705	255	126	99	101
15	555	2240	3380	2300	1330	772	1150	718	245	122	96	237
16	685	1790	2340	3050	1210	694	1480	717	236	119	94	323
17	1320	1420	1780	2020	1220	631	1430	793	243	121	93	210
18	1710	1440	1530	1530	1880	582	1240	970	291	141	93	164
19	1080	1350	1310	1340	2640	566	1120	1580	248	297	93	175
20	812	1160	1130	1460	2210	541	1010	1410	228	220	93	162
21	770	1000	978	1620	1730	501	893	1150	217	178	92	147
22	653	948	853	1340	1420	503	932	1320	211	156	89	142
23	563	1240	755	1190	1330	473	2780	1510	239	143	87	130
24	498	2500	674	1070	e1100	446	3000	1290	284	134	85	119
25	532	2960	604	933	e1020	419	2520	1080	266	127	83	112
26	1370	3030	565	827	e885	403	2280	912	230	121	83	107
27	1040	3260	537	743	e765	387	1890	787	216	117	83	103
28	831	8880	524	686	e650	368	1510	716	235	114	83	100
29	681	14400	932	614	614	381	1250	662	215	113	83	97
30	578	9300	1880	572	--	382	1050	587	201	110	80	94
31	504	--	2740	545	--	390	--	534	--	109	80	--
TOTAL	22980	90434	63052	58340	87956	24249	37161	25559	8651	4628	3252	3622
MEAN	741	3014	2034	1882	3033	782	1239	824	288	149	105	121
MAX	2280	14400	7290	6600	21000	1440	3000	1580	488	297	166	323
MIN	189	342	524	545	514	368	488	455	201	109	80	76
AC-FT	45580	179400	125100	115700	174500	48100	73710	50700	17160	9180	6450	7180
CFSM	5.26	21.4</										

MEAN	397	1267	1553	1551	1416	1104	1046	696	410	191	120	171
MAX	1240	3014	3418	2869	3039	2940	1616	1283	1082	620	294	667
(WY)	1960	1996	1976	1971	1982	1972	1991	1974	1981	1983	1968	1959
MIN	52.0	185	401	415	377	374	573	304	134	93.4	64.3	60.5
(WY)	1988	1994	1977	1977	1977	1992	1973	1980	1992	1970	1970	1967

ANNUAL TOTAL	337666		429884			
ANNUAL MEAN	925		1175		824	
HIGHEST ANNUAL MEAN					1228	1972
LOWEST ANNUAL MEAN					467	1977
HIGHEST DAILY MEAN	14400	Nov 29	21000	Feb 8	21000	Feb 8 1996
LOWEST DAILY MEAN	76	Sep 16	76	Sep 12	49	Oct 23 1987
ANNUAL SEVEN-DAY MINIMUM	77	Sep 15	81	Aug 28	50	Oct 23 1987
ANNUAL RUNOFF (AC-FT)	669800		852700		596600	
ANNUAL RUNOFF (CFSM)	6.56		8.33		5.84	
ANNUAL RUNOFF (INCHES)	89.09		113.42		79.36	
10 PERCENT EXCEEDS	2060		2670		1770	
50 PERCENT EXCEEDS	555		601		530	
90 PERCENT EXCEEDS	98		104		95	

e Estimated

## COWLITZ RIVER BASIN

14237800 MAYFIELD RESERVOIR NEAR SILVER CREEK, WA

LOCATION.--Lat 46°30'13", long 122°35'11", in SE 1/4 SW 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 mi<sup>2</sup>.

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

GAGE.--Water-stage recorder. Datum of gage is sea level. 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 development. 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, 133,830 acre-ft May 26, elevation, 425.05 ft; minimum contents, 123,610 acre-ft Dec. 5, 19, elevation, 420.40 ft.

## MONTHEND ELEVATION AND CONTENTS AT 2400, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Elevation (feet)	Contents (acre-feet)	Change in contents (acre-feet)
Sept. 30.....	423.15	129,595	--
Oct. 31.....	422.99	129,239	-356
Nov. 30.....	424.50	132,600	+3,361
Dec. 31.....	422.33	127,796	-4,804
CAL YR 1995.....	--	--	-791
Jan. 31.....	422.93	129,113	+1,317
Feb. 29.....	422.77	128,764	-349
Mar. 31.....	423.35	130,040	+1,276
Apr. 30.....	424.33	132,219	+2,179
May 31.....	424.14	131,792	-427
June 30.....	424.23	131,996	+204
July 31.....	423.88	131,216	-780
Aug. 31.....	423.93	131,326	+110
Sept. 30.....	423.08	129,436	-1,890
WTR YR 1996.....	--	--	-159

## COWLITZ RIVER BASIN

461

## 14238000 COWLITZ RIVER BELOW MAYFIELD DAM, WA

LOCATION.--Lat 46°30'38", long 122°36'54", in SE 1/4 NE 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 mi<sup>2</sup>.

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 sea level. 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.--62 years (water years 1935-96), 6,232 ft<sup>3</sup>/s, 60.45 in/yr, 4,515,100 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 ft<sup>3</sup>/s Nov. 28, 1995; gage height, 26.19 ft; minimum discharge, 37 ft<sup>3</sup>/s Apr. 16, 1962, gage height, 6.42 ft; minimum daily discharge, 451 ft<sup>3</sup>/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, 68,400 ft<sup>3</sup>/s Nov. 28, gage height, 26.19 ft; minimum discharge, 2,190 ft<sup>3</sup>/s Oct. 1.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2570	7800	58300	10200	9120	7420	4940	9700	5270	4950	2950	2890
2	2550	7980	53500	11800	9090	7430	4930	9710	5260	4970	2950	2900
3	2540	7970	47700	14900	9100	7420	4930	9770	5070	4970	2880	2880
4	2520	7990	33400	14800	9110	7230	4930	9790	5160	4960	2880	2890
5	2520	8010	21400	15700	8430	5070	4910	9790	5380	4960	2890	2890
6	2590	8290	16700	17500	12500	5010	4970	9640	5760	4960	2970	2890
7	3160	11000	19400	17500	24200	4970	4970	5590	6000	4960	2920	2900
8	3170	18200	22300	17500	28700	4960	4980	5000	6000	4960	2890	2900
9	3340	19000	22400	17500	39300	5000	4940	4990	6000	4960	2900	2900
10	3550	16300	22400	17400	42700	5000	4930	4920	6000	4950	2890	2900
11	3570	20800	22300	17400	39200	5230	4950	4900	5450	4940	2890	2900
12	3770	18400	22100	17500	35400	6940	4970	4920	5400	4940	2900	2900
13	3950	16600	22000	17600	30600	8050	4980	4940	4980	4960	2880	2910
14	3960	16700	22200	17500	29900	8960	4970	4950	4940	4950	2970	2910
15	3960	16600	22500	19100	29900	8960	4980	4950	4950	4970	2920	2910
16	4210	15900	22300	21500	28100	8940	4990	4960	4960	4970	2870	2910
17	5000	14800	22100	20200	25100	8960	4980	4940	4970	4960	2880	2990
18	6300	14800	21900	20200	25000	8980	4990	4940	4960	5010	2870	2910
19	5310	14600	21900	19100	25200	8980	4990	4930	4950	4360	2870	2910
20	6360	13900	21900	17400	25300	7510	5000	4940	4960	4050	2870	2920
21	6470	13900	22000	17400	22200	6520	5000	4950	4980	4070	2870	2930
22	6440	14100	18300	14700	16500	6250	5960	4940	4940	3770	2870	2910
23	6460	15300	15900	11900	13400	6080	7810	6240	4940	2790	2880	2920
24	6460	16700	16300	9470	13400	6060	9760	8050	4940	2920	2870	2910
25	6460	17500	16400	9040	13500	5940	11300	8040	4950	2940	2870	2910
26	6460	18100	16100	9070	13100	5040	12800	8060	4970	2900	2880	2910
27	6480	20700	15900	9060	9110	4930	14000	8040	4940	2900	2880	2920
28	6480	54300	15100	9120	8980	4920	14100	8060	4950	2900	2880	2910
29	6500	65000	10400	9100	7540	4940	14000	8040	4950	2890	2870	2910
30	6740	59000	10300	9060	---	4930	10900	6460	4950	2890	2880	2920
31	7560	---	10300	9120	---	4930	---	6350	---	2900	2880	---
TOTAL	147410	570240	705700	459340	603680	201560	204860	205500	155930	131580	89670	87260
MEAN	4755	19010	22760	14820	20820	6502	6829	6629	5198	4245	2893	2909
MAX	7560	65000	58300	21500	42700	8980	14100	9790	6000	5010	2970	2990
MIN	2520	7800	10300	9040	7540	4920	4910	4900	4940	2790	2870	2880
AC-FT	292400	1131000	1400000	911100	1197000	399800	406300	407600	309300	261000	177900	173100
MEAN†	4863	20912	22585	13951	23585	6419	9128	7985	5078	2951	1634	1383
CFSM†	3.47	14.94	16.13	9.97	16.85	4.59	6.52	5.70	3.63	2.11	1.17	0.99
IN.†	4.01	16.66	18.60	11.49	18.17	5.29	7.27	6.58	4.05	2.43	1.35	1.10
AC-FT†	299100	1244000	1389000	858000	1357000	394800	543000	491100	302100	181500	100500	82270

CAL YR 1995 TOTAL 3059170 MEAN 8381 MAX 65000 MIN 2350 AC-FT 6068000 MEAN† 8238 CFSM† 5.88 IN.† 79.89 AC-FT† 5965000  
WTR YR 1996 TOTAL 3562730 MEAN 9734 MAX 65000 MIN 2520 AC-FT 7067000 MEAN† 9587 CFSM† 6.85 IN.† 93.17 AC-FT† 6957000

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



## COWLITZ RIVER BASIN

## 14240304 SPIRIT LAKE AT TUNNEL, AT SPIRIT LAKE, WA

LOCATION.--Lat 46°16'35", long 122°09'41", in NE 1/4 NE 1/4 sec.10, T.9 N., 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 mi<sup>2</sup> at entrance to Spirit Lake Outlet Tunnel. Prior to the volcanic eruption on May 18, 1980, 14.9 mi<sup>2</sup>.

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. Elevation of gage is 3,470 ft above sea level, from topographic map.

REMARKS.--As a result of the May 18, 1980 eruption, a gravitational landslide ensued, transporting an estimated 0.6 mi<sup>3</sup> 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. Records of contents published in WDR-WA-94-1 are unreliable and should not be used.

EXTREMES FOR PERIOD OF RECORD.--Maximum recorded elevation, 3,459.23 ft Feb. 11, 1996; minimum recorded elevation, 3,437.00 ft Oct. 28, 1987.

EXTREMES FOR CURRENT YEAR.--Maximum recorded elevation, 3,459.23 ft Feb. 11; minimum recorded elevation, 3,438.47 ft Oct. 1, 2.

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3438.48	3440.24	3448.51	3451.37	3454.25	3455.66	3450.05	---	---	3442.15	3440.14	3439.00
2	3438.59	3440.26	3448.80	3451.32	3454.28	3455.42	3449.86	---	---	3442.09	3440.16	3438.98
3	3438.79	3440.31	3449.02	3451.34	3454.34	3455.31	3449.67	---	---	3442.00	3440.10	3438.96
4	3438.79	3440.39	---	3451.26	3454.43	3455.16	3449.47	---	---	3441.92	3440.09	3438.96
5	3438.79	3440.52	---	3451.15	3454.78	3454.94	3449.28	---	---	3441.83	3440.06	3439.06
6	3438.83	3440.60	---	3451.06	3455.56	3454.73	3449.11	---	---	3441.74	3440.02	3439.09
7	3438.85	3440.78	---	3451.10	3456.61	3454.54	3448.97	---	---	3441.66	3439.98	3439.10
8	3438.87	3441.26	---	3451.14	3458.35	3454.34	3448.84	---	---	3441.59	3439.93	3439.13
9	3438.85	3441.45	3449.75	3451.34	3458.84	3454.19	3448.73	---	---	3441.49	3439.90	3439.15
10	3439.02	3441.69	---	3451.45	3459.09	3454.02	3448.62	---	---	3441.42	3439.85	3439.17
11	3439.28	3442.27	3450.76	3451.58	3459.14	3453.87	3448.53	---	3443.92	3441.34	3439.80	3439.17
12	3439.35	3442.53	3451.60	3451.68	3458.89	3453.72	3448.45	---	3443.82	3441.27	3439.76	3439.22
13	3439.38	3442.85	3452.00	3451.80	3458.66	3453.53	3448.31	---	3443.72	3441.20	3439.71	3439.24
14	3439.40	3443.06	---	3451.94	3458.45	3453.35	3448.15	---	3443.60	3441.13	3439.66	3439.35
15	3439.41	3443.24	---	3452.29	3458.25	3453.16	3448.07	---	3443.49	3441.05	3439.62	3439.49
16	3439.48	3443.34	---	3452.45	3458.05	3452.97	3448.02	---	3443.39	3440.98	3439.57	3439.55
17	3439.65	3443.62	---	3452.56	3457.95	3452.78	3447.93	---	3443.34	3440.92	3439.51	3439.58
18	3439.67	3443.79	3452.99	3452.81	3457.95	3452.58	3447.81	---	3443.28	3440.96	3439.48	3439.65
19	3439.68	3443.89	3453.09	3452.97	3457.86	3452.39	3447.69	---	3443.17	3440.89	3439.44	3439.67
20	3439.71	3443.99	3453.17	3453.20	3457.79	3452.19	3447.56	---	3443.05	3440.83	3439.40	3439.70
21	3439.76	3444.09	3453.05	3453.35	3457.62	3452.00	3447.42	---	3442.95	3440.78	3439.37	3439.77
22	3439.76	3444.19	3452.83	3453.43	3457.49	3451.80	3447.38	---	3442.86	3440.72	3439.34	3439.80
23	3439.75	3444.46	3452.61	3453.57	3457.32	3451.61	---	---	3442.83	3440.67	3439.30	3439.82
24	3439.76	3444.81	3452.37	3453.68	3457.09	3451.41	---	---	3442.76	3440.61	3439.26	3439.84
25	3439.94	3445.04	3452.15	3453.77	3456.88	3451.21	---	---	3442.66	3440.55	3439.24	3439.87
26	3440.01	3445.31	3451.95	3453.84	3456.64	3451.01	---	---	3442.58	3440.49	3439.21	3439.89
27	3440.07	3445.90	3451.71	3453.94	3456.38	3450.80	---	---	3442.51	3440.43	3439.17	3439.92
28	3440.11	3446.70	3451.55	3454.05	3456.13	3450.59	---	---	3442.41	3440.39	3439.15	3439.94
29	3440.14	3447.48	3451.47	3454.11	3455.89	3450.44	---	---	3442.33	3440.33	3439.11	3439.97
30	3440.16	3448.09	3451.55	3454.15	---	3450.23	---	---	3442.24	3440.26	3439.07	3439.99
31	3440.20	---	3451.50	3454.20	---	3450.11	---	---	---	3440.20	3439.04	---
MAX	3440.20	3448.09	---	3454.20	3459.14	3455.66	---	---	---	3442.15	3440.16	3439.99
MIN	3438.48	3440.24	---	3451.06	3454.25	3450.11	---	---	---	3440.20	3439.04	3438.96

## 14240350 COLDWATER LAKE NEAR SPIRIT LAKE, WA

LOCATION.--Lat 46°17'35", long 122°15'35", in NW 1/4 SE 1/4 sec.2, T.9 N., R.4 E., Cowlitz County, Hydrologic Unit 17080005, Mount St. Helens National Volcanic Monument, on right bank, at outflow of Coldwater Lake.

DRAINAGE AREA.--36.2 mi<sup>2</sup>, at spillway entrance. Prior to the volcanic eruption drainage area is unknown.

PERIOD OF RECORD.--October 1993 to current year.

GAGE.--Water-stage recorder with radio telemetry. Datum of gage is 2,457.84 ft above sea level, (U.S. Army Corps of Engineers bench marks).

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 Coldwater Creek forming Coldwater Lake. Coldwater 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 Coldwater Lake. As a result, the level of Coldwater 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, 164p., 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, 2,493.46 ft Feb. 8, 1996; minimum elevation, 2,489.34 ft Jan. 31, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 2,493.46 ft Feb. 8; minimum elevation, 2,489.34 ft Jan. 31.

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2489.89	2490.18	2491.86	2491.57	2489.48	2491.45	2491.45	2491.35	2490.97	2490.33	2489.99	2489.74
2	2490.02	2490.15	2491.47	2491.53	2489.46	2491.43	2491.39	2491.25	2490.97	2490.31	2490.00	2489.74
3	2490.25	2490.08	2491.21	2491.67	2489.48	2491.56	2491.29	2491.24	2490.99	2490.29	2489.93	2489.78
4	2490.26	2490.09	2490.97	2491.54	2489.52	2491.68	2491.25	2491.21	2490.95	2490.26	2489.95	2489.80
5	2490.21	2490.14	2490.74	2491.47	2490.02	2491.79	2491.24	2491.16	2490.91	2490.25	2489.96	2489.83
6	2490.24	2490.15	2490.57	2491.56	2491.29	2491.62	2491.31	2491.14	2490.87	2490.23	2489.96	2489.84
7	2490.20	2490.31	2490.44	2491.95	2492.49	2491.62	2491.23	2491.12	2490.86	2490.20	2489.96	2489.83
8	2490.20	2490.94	2490.32	2491.70	2493.43	2491.69	2491.23	2491.10	2490.84	2490.23	2489.96	2489.81
9	2490.20	2491.05	2490.39	2491.28	2492.31	2491.87	2491.26	2491.04	2490.77	2490.14	2489.94	2489.77
10	2490.34	2491.09	2490.62	2490.93	2491.34	2491.95	2491.26	2491.00	2490.71	2490.14	2489.92	2489.73
11	2490.67	2491.62	2491.17	2490.69	2490.99	2491.97	2491.29	2490.97	2490.67	2490.11	2489.92	2489.71
12	2490.76	2491.50	2491.64	2490.52	2491.53	2491.79	2491.34	2491.04	2490.63	2490.10	2489.90	2489.71
13	2490.74	2491.48	2491.63	2490.39	2492.14	2491.58	2491.29	2491.20	2490.60	2490.10	2489.88	2489.72
14	2490.69	2491.34	2491.46	2490.38	2491.96	2491.49	2491.25	2491.30	2490.58	2490.10	2489.88	2489.78
15	2490.62	2491.22	2491.16	2490.62	2491.85	2491.51	2491.26	2491.37	2490.56	2490.07	2489.86	2489.87
16	2490.59	2491.05	2490.90	2490.64	2491.89	2491.57	2491.35	2491.31	2490.54	2490.04	2489.85	2489.89
17	2490.78	2490.94	2490.69	2490.52	2492.05	2491.55	2491.33	2491.40	2490.53	2490.04	2489.84	2489.87
18	2490.81	2490.97	2490.54	2490.39	2492.26	2491.44	2491.28	2491.55	2490.53	2490.08	2489.82	2489.90
19	2490.71	2490.90	2490.40	2490.37	2492.11	2491.32	2491.20	2491.62	2490.48	2490.11	2489.82	2489.87
20	2490.64	2490.78	2490.28	2490.35	2491.87	2491.28	2491.14	2491.52	2490.44	2490.08	2489.81	2489.86
21	2490.60	2490.70	2490.43	2490.27	2491.65	2491.29	2491.06	2491.46	2490.42	2490.10	2489.85	2489.89
22	2490.50	2490.64	2490.80	2490.15	2491.69	2491.35	2491.17	2491.47	2490.41	2490.07	2489.88	2489.89
23	2490.44	2490.74	2491.28	2490.09	2491.61	2491.37	2491.88	2491.42	2490.47	2490.05	2489.85	2489.75
24	2490.36	2490.93	2491.44	2490.03	2491.56	2491.37	2492.11	2491.36	2490.47	2490.08	2489.85	2489.77
25	2490.44	2491.11	2491.48	2489.97	2491.44	2491.45	2492.01	2491.38	2490.46	2490.03	2489.75	2489.78
26	2490.53	2491.17	2491.35	2489.86	2491.36	2491.41	2491.87	2491.36	2490.42	2490.02	2489.82	2489.79
27	2490.51	2491.52	2491.32	2489.83	2491.30	2491.33	2491.74	2491.33	2490.42	2490.00	2489.78	2489.74
28	2490.46	2492.37	2491.33	2489.81	--	2491.29	2491.60	2491.31	2490.41	2490.00	2489.78	2489.73
29	2490.42	2492.48	2491.44	2489.77	2491.47	2491.27	2491.50	2491.25	2490.39	2490.00	2489.76	2489.72
30	2490.32	2492.23	2491.59	2489.57	--	2491.28	2491.44	2491.15	2490.36	2490.00	2489.78	2489.71
31	2490.25	--	2491.75	2489.47	--	2491.34	--	2491.08	--	2489.99	2489.72	--
MEAN	2490.44	2491.00	2491.05	2490.61	--	2491.51	2491.40	2491.27	2490.62	2490.11	2489.87	2489.79
MAX	2490.81	2492.48	2491.86	2491.95	--	2491.97	2492.11	2491.62	2490.99	2490.33	2490.00	2489.90
MIN	2489.89	2490.08	2490.28	2489.47	--	2491.27	2491.06	2490.97	2490.36	2489.99	2489.72	2489.71

## COWLITZ RIVER BASIN

## 14240446 CASTLE LAKE NEAR MOUNT ST. HELENS, WA

LOCATION.--Lat 46°15'36", long 122°16'27", in SE 1/4 SW 1/4 sec.14, T.9 N., R.4 E., 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 mi<sup>2</sup>, 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 (revised) above sea level, (U.S. Army Corps of Engineers bench marks).

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, 164p., 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, 2,578.54 ft Aug. 29, Sept. 3, 1996.

EXTREMES FOR CURRENT YEAR.--Maximum elevation, 2,582.76 ft Feb. 8; minimum elevation, 2,578.54 ft Aug. 29, Sept. 3.

ELEVATION (FEET NGVD), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY OBSERVATION AT 24:00 VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2579.92	2579.93	2581.17	2580.27	2579.86	2579.09	2579.18	2579.23	2579.00	2578.76	2578.62	2578.56
2	2579.98	2579.92	2580.85	2580.31	2579.86	2579.06	2579.19	2579.20	2578.97	2578.75	2578.68	2578.56
3	2580.04	2579.90	2580.68	2580.38	2579.86	2579.16	2579.16	2579.16	2578.94	2578.75	2578.67	2578.59
4	2580.02	2579.91	2580.46	2580.35	2579.76	2579.20	2579.13	2579.12	2578.93	2578.75	2578.69	2578.61
5	2579.99	2579.99	2580.30	2580.33	2580.42	2579.21	2579.10	2579.08	2578.90	2578.73	2578.70	2578.67
6	2579.98	2580.04	2580.19	2580.38	2581.50	2579.19	2579.09	2579.04	2578.89	2578.72	2578.69	2578.66
7	2579.95	2580.12	2580.11	2580.70	2582.20	2579.25	2579.09	2579.03	2578.87	2578.72	2578.68	2578.65
8	2579.96	2580.51	2580.08	2580.63	2582.13	2579.29	2579.08	2579.00	2578.85	2578.71	2578.67	2578.65
9	2579.91	2580.55	2580.09	2580.53	2580.70	2579.36	2579.12	2578.98	2578.84	2578.69	2578.67	2578.65
10	2580.07	2580.60	2580.48	2580.37	2580.12	2579.43	2579.13	2578.96	2578.83	2578.68	2578.66	2578.65
11	2580.26	2580.85	2581.08	2580.26	2579.87	2579.50	2579.26	2578.94	2578.82	2578.68	2578.64	2578.64
12	2580.28	2580.77	2581.29	2580.17	2579.69	2579.48	2579.33	2578.99	2578.81	2578.68	2578.64	2578.65
13	2580.24	2580.68	2581.35	2580.12	2579.58	2579.41	2579.28	2579.05	2578.80	2578.67	2578.63	2578.65
14	2580.18	2580.53	2581.31	2580.18	2579.50	2579.35	2579.24	2579.05	2578.78	2578.67	2578.63	2578.75
15	2580.09	2580.43	2580.97	2580.48	2579.44	2579.30	2579.34	2579.09	2578.78	2578.66	2578.62	2578.85
16	2580.14	2580.33	2580.64	2580.50	2579.40	2579.23	2579.48	2579.07	2578.77	2578.65	2578.61	2578.85
17	2580.20	2580.37	2580.44	2580.43	2579.48	2579.18	2579.51	2579.17	2578.83	2578.67	2578.61	2578.83
18	2580.15	2580.33	2580.28	2580.36	2579.74	2579.14	2579.50	2579.45	2578.85	2578.75	2578.60	2578.85
19	2580.09	2580.25	2580.19	2580.31	2579.78	2579.12	2579.44	2579.56	2578.83	2578.76	2578.59	2578.82
20	2580.09	2580.19	2580.12	2580.34	2579.83	2579.10	2579.37	2579.50	2578.82	2578.75	2578.59	2578.81
21	2580.10	2580.16	2580.09	2580.24	2579.72	2579.08	2579.29	2579.47	2578.79	2578.74	2578.59	2578.81
22	2580.07	2580.15	2579.99	2580.13	2579.72	2579.06	2579.41	2579.50	2578.78	2578.73	2578.58	2578.80
23	2580.03	2580.29	2579.98	2580.11	2579.60	2579.06	2580.50	2579.42	2578.84	2578.72	2578.58	2578.79
24	2580.01	2580.48	2579.95	2580.07	2579.48	2579.01	2580.27	2579.35	2578.85	2578.71	2578.59	2578.76
25	2580.10	2580.56	2579.92	2580.02	2579.41	2578.99	2579.99	2579.28	2578.83	2578.70	2578.59	2578.75
26	2580.09	2580.62	2579.91	2579.96	2579.34	2578.97	2579.75	2579.22	2578.81	2578.69	2578.59	2578.74
27	2580.07	2580.95	2579.90	2579.96	2579.29	2578.96	2579.58	2579.17	2578.82	2578.68	2578.58	2578.73
28	2580.04	2581.43	2579.96	2579.96	2579.12	2578.95	2579.44	2579.15	2578.80	2578.67	2578.58	2578.73
29	2580.03	2581.60	2580.02	2579.92	2579.12	2578.98	2579.35	2579.11	2578.78	2578.66	2578.58	2578.72
30	2579.98	2581.46	2580.20	2579.84	--	2578.95	2579.28	2579.07	2578.77	2578.65	2578.58	2578.72
31	2579.95	--	2580.29	2579.85	--	2579.02	--	2579.03	--	2578.64	2578.57	--
MEAN	2580.06	2580.46	2580.40	2580.24	2579.91	2579.16	2579.40	2579.18	2578.84	2578.70	2578.62	2578.72
MAX	2580.28	2581.60	2581.35	2580.70	2582.20	2579.50	2580.50	2579.56	2579.00	2578.76	2578.70	2578.85
MIN	2579.91	2579.90	2579.90	2579.84	2579.12	2578.95	2579.08	2578.94	2578.77	2578.64	2578.57	2578.56

WTR YR 1996 MEAN 2579.47 MAX 2582.20 MIN 2578.56

14240525 NORTH FORK TOUTLE RIVER BELOW SEDIMENT RETENTION STRUCTURE, NEAR KID VALLEY, WA

LOCATION.--Lat 46°22'19", long 122°34'40", in NE 1/4 NE 1/4 sec.8, T.10 N., R.2 E., Cowlitz County, Hydrologic Unit 17080005, 1.3 mi downstream from Sediment Retention Structure, on left bank, 0.7 mi upstream from the mouth of the Green River, 1.8 mi east of Kid Valley, and at mile 12.0.

DRAINAGE AREA.--175 mi<sup>2</sup>.

PERIOD OF RECORD.--October 1989 to current year.

GAGE.--Water-stage recorder. Datum of gage is 700.00 ft above sea level (levels by U.S. Army Corps of Engineers).

REMARKS.--Records fair. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--7 years (water years 1990-96), 740 ft<sup>3</sup>/s, 57.49 in/yr, 536,400 acre-ft/yr.EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 13,100 ft<sup>3</sup>/s Feb. 8, 1996, gage height, 62.13 ft; minimum discharge, 147 ft<sup>3</sup>/s Aug. 15, 1990.

EXTREMES OUTSIDE PERIOD OF RECORD.--An outstanding flood occurred 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 1,600 ft<sup>3</sup>/s and maximum (\*):

Date	Discharge Time	Gage height (ft <sup>3</sup> /s)	(ft)	Date	Discharge Time	Gage height (ft <sup>3</sup> /s)	(ft)
Nov. 13	1015	1,960	56.83	Feb. 8	1615	*13,100	*62.13
Nov. 29	2400	6,450	59.54	Feb. 21	0115	2,060	56.91
Dec. 3	0545	2,580	57.32	Apr. 24	1645	3,030	57.64
Dec. 13	2000	3,940	58.22	May 23	0830	1,760	56.65
Jan. 8	1530	2,230	57.05				

Minimum discharge, 178 ft<sup>3</sup>/s Sept. 8, 11-13.DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	384	582	4700	1270	680	1170	1030	1350	1010	542	299	248
2	359	533	3450	1290	665	1130	1220	1280	948	517	313	243
3	414	472	2420	1360	639	1170	1210	1220	890	497	326	253
4	504	416	2170	1440	651	1310	1140	1150	833	494	323	266
5	492	397	1880	1470	859	1370	1070	1050	795	486	325	266
6	474	436	1640	1490	1910	1370	1010	961	785	465	328	253
7	452	493	1520	1770	6860	1350	968	939	752	451	328	218
8	430	680	1390	2170	11000	1390	928	933	736	434	324	184
9	412	1140	1290	2070	7720	1440	908	872	711	434	318	187
10	414	1240	1280	1850	3820	1470	938	833	702	428	309	186
11	566	1560	1660	1620	2410	1500	991	809	693	422	300	180
12	793	1920	2140	1470	2060	1510	1140	836	679	417	299	178
13	830	1950	3640	1320	1820	1500	1240	915	663	414	300	182
14	786	1830	3540	1170	1680	1440	1230	1020	646	404	296	192
15	725	1690	2880	1210	1620	1370	1190	1050	639	392	288	237
16	707	1580	2160	1400	1530	e1300	1240	1080	626	387	283	278
17	724	1480	1860	1400	1490	e1200	1290	1180	617	377	282	293
18	801	1440	1650	1340	1640	e1100	1300	1380	653	391	280	291
19	792	1370	1480	1320	1890	e1050	1290	1610	651	420	279	287
20	764	1250	1350	1350	1970	e1050	1260	1670	620	427	279	283
21	748	1050	1290	1430	2020	e950	1210	1580	595	423	283	282
22	728	904	1210	1370	1900	e940	1180	1640	571	403	277	281
23	699	862	1100	1280	1840	e930	1190	1750	569	388	267	263
24	673	1030	1000	1150	1720	e880	2880	1680	603	e380	265	251
25	649	1280	999	992	1570	862	2660	1510	615	e370	263	243
26	681	1440	1010	870	1480	864	2410	1370	605	355	261	237
27	691	1630	1000	786	1400	873	2090	1260	592	341	255	227
28	675	4310	997	732	1310	863	1860	1170	586	327	255	220
29	654	5100	1040	670	1220	866	1630	1140	577	323	253	208
30	637	5630	1120	613	---	862	1470	1100	560	317	247	203
31	615	---	1240	664	---	860	---	1060	---	303	243	---
TOTAL	19273	45695	56106	40337	67374	35940	41573	37398	20522	12729	8948	7120
MEAN	622	1523	1810	1301	2323	1159	1386	1206	684	411	289	237
MAX	830	5630	4700	2170	11000	1510	2880	1750	1010	542	328	293
MIN	359	397	997	613	639	860	908	809	560	303	243	178
AC-FT	38230	90640	111300	80010	133600	71290	82460	74180	40710	25250	17750	14120
CFSM	3.55	8.70	10.3	7.44	13.3	6.62	7.92	6.89	3.91	2.35	1.65	1.36
IN.	4.10	9.71	11.93	8.57	14.32	7.64	8.84	7.95	4.36	2.71	1.90	1.51

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1990 - 1996, BY WATER YEAR (WY)

	1990	1991	1992	1993	1994	1995	1996
MEAN	345	861	1158	1031	1237	963	1052
MAX	622	1523	1810	1508	2323	1181	1461
(WY)	1996	1996	1996	1990	1996	1990	1996
MIN	206	211	664	566	402	539	658
(WY)	1994	1994	1993	1993	1993	1992	1992

## SUMMARY STATISTICS FOR 1995 CALENDAR YEAR FOR 1996 WATER YEAR WATER YEARS 1990 - 1996

	1995 CALENDAR YEAR	1996 WATER YEAR	1990 - 1996
ANNUAL TOTAL	322829	393015	
ANNUAL MEAN	884	1074	740
HIGHEST ANNUAL MEAN			1074
LOWEST ANNUAL MEAN			541
HIGHEST DAILY MEAN	5630	Nov 30	11000
LOWEST DAILY MEAN	210	Sep 22	178
ANNUAL SEVEN-DAY MINIMUM	218	Sep 19	184
ANNUAL RUNOFF (AC-FT)	640300	779500	536400
ANNUAL RUNOFF (CFSM)	5.05	6.14	4.23
ANNUAL RUNOFF (INCHES)	68.62	83.54	57.49
10 PERCENT EXCEEDS	1520	1830	1380
50 PERCENT EXCEEDS	757	897	622
90 PERCENT EXCEEDS	275	280	210

e Estimated

## COWLITZ RIVER BASIN

14241490 SOUTH FORK TOUTLE RIVER AT CAMP 12, NEAR TOUTLE, WA

LOCATION.--Lat 46°19'05", long 122°40'01", in NE 1/4 SW 1/4 sec.35, T.10 N., R.1 E., Cowlitz County, Hydrologic Unit 17080005, on right bank 0.9 mi downstream from Johnson Creek, 1.2 mi southeast of Toutle, and at mile 3.4.

DRAINAGE AREA.--117 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--February 1981 to February 1996 (destroyed by flood of February 1996).

GAGE.--Water-stage recorder. Elevation of gage is 510 ft above sea level, from topographic map. Prior to Dec. 22, 1982, gage located 1.6 mi upstream at different datum.

REMARKS.--Records fair. No regulation or diversion upstream from station. Quality of water data on file in Washington office. U.S. Geological Survey satellite telemeter at station.

AVERAGE DISCHARGE.--14 years (water years 1982-95), 559 ft<sup>3</sup>/s, 64.86 in/yr, 404,600 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, occurred February 9, 1996, stage and discharge not determined, gage destroyed by floodwaters that date; minimum daily discharge, 49 ft<sup>3</sup>/s Nov. 7, 8, 1987, Aug. 21, 1992.

EXTREMES OUTSIDE PERIOD OF RECORD.--A flood occurred at about 1000 hours on May 18, 1980, from a mudflow caused by the eruption of Mount St. Helens. Another flood, on Dec. 26, 1980, reached a stage of 17.50 ft, discharge not determined.

EXTREMES FOR PERIOD OCTOBER 1995 TO FEBRUARY 1996.--Peak discharges greater than base discharge of 3,100 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 8	1530	3,190	15.77	Dec. 14	1445	5,040	17.37
Nov. 11	1000	7,260	18.16	Jan. 7	0930	4,920	17.01
Nov. 25	0015	3,120	16.09	Jan. 16	0045	4,090	16.59
Nov. 28	unknown	unknown	unknown	Jan. 20	1300	3,330	16.20
Nov. 29	1500	7,650	18.36	Feb. 6	2200	8,950	19.02
Dec. 11	0700	4,580	17.19	Feb. 8	unknown	a*unknown	a*unknown
Dec. 12	2215	5,430	17.52				

Minimum discharge, 154 ft<sup>3</sup>/s Nov. 4.

a Gage destroyed, peak discharge and peak stage not determined.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	267	197	4410	818	414	---	---	---	---	---	---	---
2	239	180	e3100	657	373	---	---	---	---	---	---	---
3	536	167	e2200	1010	358	---	---	---	---	---	---	---
4	405	160	e1700	936	415	---	---	---	---	---	---	---
5	300	181	1190	804	1940	---	---	---	---	---	---	---
6	244	227	863	1040	5900	---	---	---	---	---	---	---
7	218	692	652	4210	7570	---	---	---	---	---	---	---
8	199	1750	500	3650	e17000	---	---	---	---	---	---	---
9	186	1830	608	2700	---	---	---	---	---	---	---	---
10	289	1300	978	2000	---	---	---	---	---	---	---	---
11	917	4120	3510	1520	---	---	---	---	---	---	---	---
12	800	3250	3060	1230	---	---	---	---	---	---	---	---
13	515	2710	4370	1030	---	---	---	---	---	---	---	---
14	372	1990	4300	1030	---	---	---	---	---	---	---	---
15	290	1540	3370	3000	---	---	---	---	---	---	---	---
16	319	1120	2270	3400	---	---	---	---	---	---	---	---
17	511	843	1620	2340	---	---	---	---	---	---	---	---
18	621	1080	1300	1780	---	---	---	---	---	---	---	---
19	442	898	984	1910	---	---	---	---	---	---	---	---
20	386	751	789	2620	---	---	---	---	---	---	---	---
21	348	638	642	2660	---	---	---	---	---	---	---	---
22	309	643	528	1940	---	---	---	---	---	---	---	---
23	267	785	441	1550	---	---	---	---	---	---	---	---
24	243	1670	377	1340	---	---	---	---	---	---	---	---
25	249	2630	331	1110	---	---	---	---	---	---	---	---
26	474	2260	297	938	---	---	---	---	---	---	---	---
27	361	2590	275	822	---	---	---	---	---	---	---	---
28	314	e6600	263	706	---	---	---	---	---	---	---	---
29	274	6610	462	598	---	---	---	---	---	---	---	---
30	242	5640	646	499	---	---	---	---	---	---	---	---
31	217	---	1050	456	---	---	---	---	---	---	---	---
TOTAL	11354	55052	47086	50304	---	---	---	---	---	---	---	---
MEAN	366	1835	1519	1623	---	---	---	---	---	---	---	---
MAX	917	6610	4410	4210	---	---	---	---	---	---	---	---
MIN	186	160	263	456	---	---	---	---	---	---	---	---
AC-FT	22520	109200	93400	99780	---	---	---	---	---	---	---	---
CFSM	3.13	15.7	13.0	13.9	---	---	---	---	---	---	---	---
IN.	3.61	17.50	14.97	15.99	---	---	---	---	---	---	---	---

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1982 - 1996, BY WATER YEAR (WY)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	251	900	903	995	961	884	799	487	328	171	107	112	112	112	112
MAX	544	1872	1597	1745	1858	1323	1585	795	600	504	182	226	226	226	226
(WY)	1983	1984	1983	1990	1982	1987	1991	1984	1990	1983	1983	1983	1983	1983	1983
MIN	58.5	97.7	500	374	394	295	448	248	116	83.4	66.9	68.9	68.9	68.9	68.9
(WY)	1988	1994	1986	1985	1993	1992	1987	1992	1992	1992	1992	1992	1992	1992	1992

## SUMMARY STATISTICS

## FOR 1995 CALENDAR YEAR

## WATER YEARS 1982 - 1996

ANNUAL TOTAL	262908		
ANNUAL MEAN	720		
HIGHEST ANNUAL MEAN		559	
LOWEST ANNUAL MEAN		786	1983
HIGHEST DAILY MEAN	6610	Nov 29	17000
LOWEST DAILY MEAN	73	Sep 22	49
ANNUAL SEVEN-DAY MINIMUM	76	Sep 18	53
ANNUAL RUNOFF (AC-FT)	521500		404600
ANNUAL RUNOFF (CFSM)	6.16		4.77
ANNUAL RUNOFF (INCHES)	83.59		64.86
10 PERCENT EXCEEDS	1680		1240
50 PERCENT EXCEEDS	419		391
90 PERCENT EXCEEDS	96		85

e Estimated



## COWLITZ RIVER BASIN

467

14241490 SOUTH FORK TOUTLE RIVER AT CAMP 12, NEAR TOUTLE, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--May 1981 to Feb. 1996 (discontinued). Station was destroyed by flood event of February 8, 1996. Records prior to October 1985 are published in U.S. Geological Survey Open-File Report 85-632; records for water years 1984-87 are published in U.S. Geological Survey Open-File Report 91-219.

INSTRUMENTATION.--Automatic pumping sediment sampler since May 1981.

## EXTREMES FOR PERIOD OF DAILY RECORD.--

SEDIMENT CONCENTRATION: Maximum daily, 34,100 mg/L Dec. 3, 1982; minimum, 1 mg/L on many days each year.  
SEDIMENT DISCHARGE: Maximum daily, 800,000 tons Feb. 8, 1996; minimum, 0.10 tons Oct. 3, 4, 1994. Beginning October 1994, daily sediment discharge values for period October to March, monthly sediment discharge values only for the period April to September each year. Additional data for period April to September on file at the Cascade Volcano Observatory in Vancouver, WA.

## EXTREMES FOR CURRENT YEAR.--

SEDIMENT CONCENTRATION: Maximum daily for period October to February 8, 17,400 mg/L (estimated) Feb. 8; minimum for period October to February 8, 2 mg/L Nov. 2.  
SEDIMENT DISCHARGE.--Maximum daily for period October to February 8, 800,000 tons (estimated) Feb. 8; minimum for period October to February 8, 1.1 tons Nov. 2.

## WATER-QUALITY DATA

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)	SED. SUSP. SIEVE DIAM. % FINER THAN .125 MM (70332)	SED. SUSP. SIEVE DIAM. % FINER THAN .250 MM (70333)	SED. SUSP. SIEVE DIAM. % FINER THAN .500 MM (70334)	SED. SUSP. SIEVE DIAM. % FINER THAN 1.00 MM (70335)	SED. SUSP. SIEVE DIAM. % FINER THAN 2.00 MM (70336)
MAR 1993											
04...	1400	--	1080	323	942	--	--	--	--	--	--
24...	1305	--	2040	1080	5570	24	37	66	94	100	100
DEC											
10...	1105	8.0	2340	990	6250	--	--	--	--	--	--
MAR 1994											
03...	1415	8.5	2370	626	4010	--	--	--	--	--	--
NOV											
30...	1610	6.5	7040	5480	104000	34	54	81	96	99	100
DEC											
21...	1415	7.0	2750	1000	7430	20	32	63	94	99	100
27...	1400	8.0	4880	3360	44300	31	48	75	95	100	--
NOV 1995											
11...	1130	8.5	5390	6190	90100	41	59	83	97	100	--
28...	1315	--	6090	3510	57700	21	42	76	95	100	--
DEC											
01...	1325	--	4170	2610	29400	23	36	66	94	100	--
FEB 1996											
06...	1640	--	7920	4800	103000	36	55	81	95	99	100

DATE	SED. SUSP. FALL DIAM. % FINER THAN .002 MM (70337)	SED. SUSP. FALL DIAM. % FINER THAN .004 MM (70338)	SED. SUSP. FALL DIAM. % FINER THAN .008 MM (70339)	SED. SUSP. FALL DIAM. % FINER THAN .016 MM (70340)	SED. SUSP. FALL DIAM. % FINER THAN .031 MM (70341)	SED. SUSP. FALL DIAM. % FINER THAN .062 MM (70342)	SED. SUSP. FALL DIAM. % FINER THAN .125 MM (70343)	SED. SUSP. FALL DIAM. % FINER THAN .250 MM (70344)	SED. SUSP. FALL DIAM. % FINER THAN .500 MM (70345)	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM (70346)
MAR 1993										
04...	--	--	--	--	--	39	65	87	99	100
24...	--	--	--	--	--	--	--	--	--	--
DEC										
10...	--	--	--	--	--	31	57	86	99	100
MAR 1994										
03...	--	--	--	--	--	28	42	69	95	100
NOV										
30...	3	6	10	14	21	--	--	--	--	--
DEC										
21...	--	--	--	--	--	--	--	--	--	--
27...	--	--	--	--	--	--	--	--	--	--
NOV 1995										
11...	4	7	12	18	27	--	--	--	--	--
28...	3	6	10	14	17	--	--	--	--	--
DEC										
01...	4	6	8	12	16	--	--	--	--	--
FEB 1996										
06...	6	8	12	17	24	--	--	--	--	--

## 14241490 SOUTH FORK TOUTLE RIVER AT CAMP 12, NEAR TOUTLE, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	267	---	3.6	197	---	1.3	4410	2490	30800
2	239	5	3.2	180	2	1.1	e3100	1110	10300
3	536	---	37	167	4	1.8	e2200	520	3090
4	405	---	12	160	4	1.9	e1700	350	1610
5	300	---	4.9	181	12	6.6	1190	146	473
6	244	---	4.0	227	16	9.9	863	82	193
7	218	---	3.5	692	384	763	652	51	90
8	199	---	3.2	1750	6160	38100	500	29	39
9	186	---	3.0	1830	5230	28000	608	47	82
10	289	---	7.9	1300	1920	7130	978	154	650
11	917	---	60	4120	5400	62400	3510	1830	17900
12	800	---	21	3250	1850	16800	3060	1440	12900
13	515	---	9.7	2710	915	6760	4370	1780	21100
14	372	---	7.0	1990	482	2640	4300	1490	17100
15	290	---	5.5	1540	342	1430	3370	710	6690
16	319	---	6.0	1120	242	762	2270	212	1340
17	511	---	39	843	172	403	1620	78	347
18	621	---	39	1080	775	2330	1300	45	157
19	442	---	12	898	259	633	984	45	120
20	386	---	7.3	751	146	299	789	24	52
21	348	---	6.6	638	93	160	642	---	32
22	309	---	5.8	643	111	195	528	15	22
23	267	---	5.0	785	323	889	441	---	18
24	243	---	4.6	1670	1190	5720	377	---	15
25	249	---	5.3	2630	1560	11400	331	---	13
26	474	---	12	2260	748	4570	297	---	12
27	361	---	6.2	2590	1150	10500	275	---	11
28	314	---	4.5	e6600	4370	72000	263	---	11
29	274	---	3.2	6610	4560	84100	462	---	19
30	242	---	2.3	5640	5360	83100	646	---	26
31	217	---	1.7	---	---	---	1050	---	42
TOTAL	11354	---	346.0	55052	---	441106.6	47086	---	125254

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	818	---	33	414	---	7.5	---	---	---
2	657	---	27	373	7	7.0	---	---	---
3	1010	85	238	358	7	6.8	---	---	---
4	936	50	127	415	---	7.9	---	---	---
5	804	24	51	1940	---	2300	---	---	---
6	1040	48	154	5900	2800	56800	---	---	---
7	4210	1150	14100	7570	4230	88600	---	---	---
8	3650	633	6530	e17000	---	800000	---	---	---
9	2700	126	937	---	---	---	---	---	---
10	2000	41	223	---	---	---	---	---	---
11	1520	23	94	---	---	---	---	---	---
12	1230	17	56	---	---	---	---	---	---
13	1030	9	26	---	---	---	---	---	---
14	1030	14	41	---	---	---	---	---	---
15	3000	258	2480	---	---	---	---	---	---
16	3400	346	3270	---	---	---	---	---	---
17	2340	90	582	---	---	---	---	---	---
18	1780	---	210	---	---	---	---	---	---
19	1910	21	110	---	---	---	---	---	---
20	2620	155	1260	---	---	---	---	---	---
21	2660	49	365	---	---	---	---	---	---
22	1940	22	115	---	---	---	---	---	---
23	1550	15	65	---	---	---	---	---	---
24	1340	18	64	---	---	---	---	---	---
25	1110	17	50	---	---	---	---	---	---
26	938	17	43	---	---	---	---	---	---
27	822	40	89	---	---	---	---	---	---
28	706	13	25	---	---	---	---	---	---
29	598	7	11	---	---	---	---	---	---
30	499	6	8.3	---	---	---	---	---	---
31	456	---	7.9	---	---	---	---	---	---
TOTAL	50304	---	31392.2	---	---	---	---	---	---

e Estimated

## 14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA

LOCATION.--Lat 46°19'26", long 122°42'28", in SE 1/4 NW 1/4 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 mi<sup>2</sup>.

## WATER-DISCHARGE RECORDS

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

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

REMARKS.--Records fair except for estimated daily discharges, which are poor. No regulation or diversion upstream from station.

AVERAGE DISCHARGE.--18 years (water years 1940-57), 615 ft<sup>3</sup>/s, 69.66 in/yr, 445,700 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, not determined Feb. 8, 1996, gage height, 28.81 ft, from highwater mark; maximum daily discharge, 17,400 ft<sup>3</sup>/s Feb. 8, 1996; minimum discharge, 62 ft<sup>3</sup>/s Nov. 29, 1952.

EXTREMES OUTSIDE PERIOD OF RECORD.--Flood of Jan. 9, 1990 produced discharge of 19,200 ft<sup>3</sup>/s as recorded at station 14241490, 2.2 mi upstream. A flood believed to be in excess of 100,000 ft<sup>3</sup>/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 PERIOD FEBRUARY TO SEPTEMBER 1996.--Peak discharges greater than base discharge of 4,200 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Feb. 8	unknown	*unknown	*a28.81	Apr. 23	2045	5,240	24.47

Minimum discharge, 87 ft<sup>3</sup>/s Sept. 1-3, 10.  
a From high-water mark.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	---	---	---	---	e425	e520	e907	1060	546	179	108	e87
2	---	---	---	---	e383	e480	e1140	962	e510	169	128	e87
3	---	---	---	---	e367	e666	e859	1000	480	165	129	91
4	---	---	---	---	e426	934	684	e993	439	e122	99	99
5	---	---	---	---	e1990	985	581	e937	405	e164	130	114
6	---	---	---	---	e6050	852	537	892	e376	e156	124	124
7	---	---	---	---	e7760	796	e516	888	350	e152	115	e105
8	---	---	---	---	e17400	972	492	835	333	146	108	e95
9	---	---	---	---	7690	995	464	773	e315	139	105	90
10	---	---	---	---	e4320	972	476	711	296	138	105	88
11	---	---	---	---	e3100	1020	579	673	279	137	e103	89
12	---	---	---	---	2320	927	1060	e678	252	131	101	90
13	---	---	---	---	e1690	772	1140	913	238	130	97	93
14	---	---	---	---	1210	688	e774	951	230	e127	96	e104
15	---	---	---	---	1030	654	542	1010	217	125	94	e220
16	---	---	---	---	e960	571	1080	1030	e210	123	94	193
17	---	---	---	---	e969	e498	1200	1110	211	139	95	155
18	---	---	---	---	e1560	468	962	1490	307	152	e94	133
19	---	---	---	---	e1920	490	818	e1530	221	227	96	144
20	---	---	---	---	e1620	483	787	1240	200	168	96	136
21	---	---	---	---	e1380	468	e667	1150	199	e148	95	e126
22	---	---	---	---	e1160	493	841	1360	185	139	91	e125
23	---	---	---	---	e1080	473	3650	1330	e198	130	91	114
24	---	---	---	---	968	e420	3720	1120	303	126	e90	107
25	---	---	---	---	e820	388	2410	998	265	120	e90	102
26	---	---	---	---	e687	367	e2080	e929	223	116	91	95
27	---	---	---	---	628	347	e1700	e872	213	114	94	94
28	---	---	---	---	e591	327	1380	814	231	e113	93	93
29	---	---	---	---	570	333	1180	755	203	112	e91	e93
30	---	---	---	---	---	e349	1020	679	e189	107	e89	91
31	---	---	---	---	---	e400	---	624	---	102	e89	---
TOTAL	---	---	---	---	71074	19108	34246	30307	8624	4350	3144	3377
MEAN	---	---	---	---	2451	616	1142	978	287	140	101	113
MAX	---	---	---	---	17400	1020	3720	1530	546	227	130	220
MIN	---	---	---	---	367	327	464	624	185	102	89	87
AC-FT	---	---	---	---	141000	37900	67930	60110	17110	8630	6240	6700
CFSM	---	---	---	---	20.4	5.14	9.51	8.15	2.40	1.17	.85	.94
IN.	---	---	---	---	22.03	5.92	10.62	9.40	2.67	1.35	.97	1.05

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1940 - 1996, BY WATER YEAR (WY)

	380	846	1134	937	1115	785	760	662	421	202	120	138
MEAN	380	846	1134	937	1115	785	760	662	421	202	120	138
MAX	924	1655	2021	2488	2451	1647	1142	1097	772	414	172	409
(WY)	1948	1956	1947	1953	1996	1950	1996	1948	1955	1955	1954	1941
MIN	75.3	106	389	340	381	297	257	211	132	97.2	78.8	82.1
(WY)	1953	1953	1945	1949	1941	1941	1941	1947	1940	1940	1940	1957

## SUMMARY STATISTICS

## WATER YEARS 1940 - 1996

ANNUAL MEAN	615
HIGHEST ANNUAL MEAN	900
LOWEST ANNUAL MEAN	366
HIGHEST DAILY MEAN	17400
LOWEST DAILY MEAN	64
ANNUAL SEVEN-DAY MINIMUM	68
ANNUAL RUNOFF (AC-FT)	445700
ANNUAL RUNOFF (CFSM)	5.13
ANNUAL RUNOFF (INCHES)	69.66
10 PERCENT EXCEEDS	1300
50 PERCENT EXCEEDS	423
90 PERCENT EXCEEDS	101

e Estimated

## COWLITZ RIVER BASIN

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA--Continued

## WATER-QUALITY RECORDS

PERIOD OF DAILY RECORD.--February to September 1996.

INSTRUMENTATION.--Samples obtained by observer.

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

EXTREMES FOR FEBRUARY 9 TO SEPTEMBER 30, 1996.--

SEDIMENT CONCENTRATION: Maximum daily, 13,000 mg/L Feb. 9; minimum, 1 mg/L Sept. 24, 30.

SEDIMENT DISCHARGE.--Maximum daily, 240,000 tons Feb. 9; minimum, 0.29 tons Sept. 30.

## WATER-QUALITY DATA

DATE	TIME	TEMPER- ATURE WATER (DEG C) (00010)	DIS- CHARGE, INST. CUBIC FEET PER SECOND (00061)	SEDI- MENT, SUS- PENDE (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDE (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN (70331)	SED. SUSP. SIEVE DIAM. % FINER THAN (70332)	SED. SUSP. SIEVE DIAM. % FINER THAN (70333)
FEB 1996								
09...	1625	--	6350	14700	252000	30	56	91
APR								
24...	1540	9.0	3180	7340	63000	18	31	68

DATE	SED. SUSP. SIEVE DIAM. % FINER THAN (70334)	SED. SUSP. SIEVE DIAM. % FINER THAN (70335)	SED. SUSP. FALL DIAM. % FINER THAN (70337)	SED. SUSP. FALL DIAM. % FINER THAN (70338)	SED. SUSP. FALL DIAM. % FINER THAN (70339)	SED. SUSP. FALL DIAM. % FINER THAN (70340)	SED. SUSP. FALL DIAM. % FINER THAN (70341)
FEB 1996							
09...	99	100	2	4	7	12	18
APR							
24...	95	99	3	4	6	9	13

## COWLITZ RIVER BASIN

471

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	---	---	---	---	---	---	---	---	---
2	---	---	---	---	---	---	---	---	---
3	---	---	---	---	---	---	---	---	---
4	---	---	---	---	---	---	---	---	---
5	---	---	---	---	---	---	---	---	---
6	---	---	---	---	---	---	---	---	---
7	---	---	---	---	---	---	---	---	---
8	---	---	---	---	---	---	---	---	---
9	---	---	---	---	---	---	---	---	---
10	---	---	---	---	---	---	---	---	---
11	---	---	---	---	---	---	---	---	---
12	---	---	---	---	---	---	---	---	---
13	---	---	---	---	---	---	---	---	---
14	---	---	---	---	---	---	---	---	---
15	---	---	---	---	---	---	---	---	---
16	---	---	---	---	---	---	---	---	---
17	---	---	---	---	---	---	---	---	---
18	---	---	---	---	---	---	---	---	---
19	---	---	---	---	---	---	---	---	---
20	---	---	---	---	---	---	---	---	---
21	---	---	---	---	---	---	---	---	---
22	---	---	---	---	---	---	---	---	---
23	---	---	---	---	---	---	---	---	---
24	---	---	---	---	---	---	---	---	---
25	---	---	---	---	---	---	---	---	---
26	---	---	---	---	---	---	---	---	---
27	---	---	---	---	---	---	---	---	---
28	---	---	---	---	---	---	---	---	---
29	---	---	---	---	---	---	---	---	---
30	---	---	---	---	---	---	---	---	---
31	---	---	---	---	---	---	---	---	---
TOTAL	---	---	---	---	---	---	---	---	---

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	---	---	---	e425	---	---	e520	---	1200
2	---	---	---	e383	---	---	e480	---	870
3	---	---	---	e367	---	---	e666	---	1600
4	---	---	---	e426	---	---	934	799	2070
5	---	---	---	e1990	---	---	985	762	2070
6	---	---	---	e6050	---	---	852	572	1310
7	---	---	---	e7760	---	---	796	821	1770
8	---	---	---	e17400	---	---	972	888	2320
9	---	---	---	7690	13000	240000	995	569	1530
10	---	---	---	e4320	---	96000	972	663	1740
11	---	---	---	e3100	---	53000	1020	650	1790
12	---	---	---	2320	---	32000	927	676	1690
13	---	---	---	e1690	---	19000	772	649	1350
14	---	---	---	1210	---	11000	688	536	997
15	---	---	---	1030	---	8000	654	381	673
16	---	---	---	e960	---	6900	571	323	499
17	---	---	---	e969	---	6500	e498	---	320
18	---	---	---	e1560	---	88000	468	175	222
19	---	---	---	e1920	---	100000	490	191	252
20	---	---	---	e1620	---	28000	483	210	274
21	---	---	---	e1380	---	13000	468	198	250
22	---	---	---	e1160	---	8800	493	191	254
23	---	---	---	e1080	---	7100	473	178	227
24	---	---	---	968	---	5500	e420	---	140
25	---	---	---	e820	---	4000	388	88	92
26	---	---	---	e687	---	2900	367	102	101
27	---	---	---	628	1360	2310	347	51	48
28	---	---	---	e591	---	1900	327	56	49
29	---	---	---	570	1020	1570	333	42	38
30	---	---	---	---	---	---	e349	---	37
31	---	---	---	---	---	---	e400	---	100
TOTAL	---	---	---	71074	---	---	19108	---	25883

e Estimated



## COWLITZ RIVER BASIN

14241500 SOUTH FORK TOUTLE RIVER AT TOUTLE, WA--Continued

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
APRIL			MAY			JUNE			
1	e907	---	1700	1060	3190	9180	546	110	163
2	e1140	---	2400	962	2730	7120	e510	---	100
3	e859	---	920	1000	1110	2980	480	81	105
4	684	244	454	e993	---	2300	439	129	152
5	581	161	254	e937	---	2300	405	501	544
6	537	97	141	892	910	2190	e376	---	250
7	e516	---	97	888	689	1650	350	58	55
8	492	56	75	835	516	1170	333	26	24
9	464	104	130	773	374	781	e315	---	23
10	476	116	149	711	245	471	296	31	25
11	579	134	215	673	259	471	279	17	13
12	1060	876	2860	e678	---	500	252	12	8.4
13	1140	636	2040	913	560	1500	238	14	9.1
14	e774	---	670	951	844	2200	230	21	13
15	542	244	359	1010	635	1790	217	25	15
16	1080	654	1960	1030	800	2220	e210	18	10
17	1200	460	1490	1110	796	2420	211	---	10
18	962	409	1070	1490	1470	6040	307	60	52
19	818	277	612	e1530	---	6400	221	16	9.7
20	787	133	287	1240	1140	3830	200	17	9.0
21	e667	---	200	1150	1140	3540	199	7	3.9
22	841	176	500	1360	1060	3870	185	6	3.0
23	3650	---	130000	1330	720	2590	e198	---	7.0
24	3720	10600	113000	1120	495	1500	303	70	58
25	2410	8180	53100	998	---	1300	265	37	27
26	e2080	---	34000	e929	---	1300	223	26	16
27	e1700	---	17000	e872	---	1300	213	15	8.4
28	1380	2470	9220	814	552	1210	231	19	12
29	1180	2220	7040	755	423	865	203	18	10
30	1020	2510	6890	679	436	798	e189	---	6.8
31	---	---	---	624	415	702	---	---	---
TOTAL	34246	---	388833	30307	---	76488	8624	---	1742.3

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JULY			AUGUST			SEPTEMBER			
1	179	10	4.8	108	5	1.5	e87	---	3.0
2	169	8	3.7	128	10	3.6	e87	---	2.7
3	165	5	2.4	129	14	4.9	91	10	2.5
4	e169	---	2.9	e122	---	3.3	99	9	2.3
5	e164	---	3.5	130	---	2.6	114	12	3.7
6	e156	---	4.1	124	---	1.8	124	16	5.3
7	e152	---	4.9	115	4	1.3	e105	---	3.8
8	146	14	5.5	108	4	1.2	e95	---	2.5
9	139	12	4.4	105	4	1.1	90	7	1.8
10	138	6	2.2	105	4	1.2	88	5	1.3
11	137	4	1.6	e103	---	1.4	89	6	1.4
12	131	5	1.8	101	6	1.6	90	4	1.0
13	130	5	1.8	97	6	1.4	93	3	.80
14	e127	---	2.1	96	4	.92	e104	---	1.1
15	125	7	2.3	94	2	.62	e220	---	31
16	123	6	1.9	94	3	.84	193	30	16
17	126	5	1.8	95	2	.53	155	14	5.9
18	152	13	6.0	e94	2	.53	133	8	3.0
19	227	48	30	96	---	.66	144	11	4.4
20	168	13	6.1	96	3	.71	136	5	2.0
21	e148	---	3.0	95	2	.53	e126	---	1.1
22	139	5	2.0	91	2	.58	e125	---	.88
23	130	6	2.1	91	5	1.2	114	2	.63
24	126	6	1.9	e90	---	2.9	107	1	.36
25	120	4	1.4	e90	---	7.4	102	2	.65
26	116	5	1.6	91	48	12	95	2	.56
27	114	6	2.0	94	23	5.8	94	2	.53
28	e113	7	2.3	93	19	4.9	93	3	.84
29	112	---	1.8	e91	---	4.3	e93	---	.58
30	107	4	1.2	e89	---	3.8	91	1	.29
31	102	3	.73	e89	---	3.4	---	---	---
TOTAL	4350	---	113.83	3144	---	78.52	3377	---	101.92

e Estimated

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

LOCATION---Lat 46°20'02", long 122°50'20", in NW 1/4 SW 1/4 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 mi<sup>2</sup>, of which approximately 21 mi<sup>2</sup> is noncontributing. Prior to July 7, 1981, the noncontributing portion was approximately 40 mi<sup>2</sup>.

## 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 sea level, 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---15 years (water years 1982-96), 2,020 ft<sup>3</sup>/s, 55.34 in/yr, 1,463,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD---Maximum discharge, 61,800 ft<sup>3</sup>/s, Feb. 8, 1996, gage height, 24.91 ft; maximum gage height, 28.03 ft Dec. 3, 1982; minimum daily, 243 ft<sup>3</sup>/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 ft<sup>3</sup>/s and maximum (\*):

Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)	Date	Time	Discharge (ft <sup>3</sup> /s)	Gage height (ft)
Nov. 11	1315	12,900	13.47	Feb. 7	0900	30,200	18.47
Nov. 28	1215	20,600	16.18	Feb. 8	1615	*61,800	*24.91
Nov. 30	0045	22,700	16.51	Apr. 23	2315	11,800	11.25
Dec. 13	2100	14,300	13.20				

Minimum discharge, 324 ft<sup>3</sup>/s Sept. 11, 12.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	951	1220	16200	3880	1570	2470	2430	3510	2140	1010	555	400
2	853	1120	11900	3550	1460	2360	3620	3200	2020	981	610	e380
3	1400	1030	8520	4230	1370	2530	2910	3020	1960	957	707	e390
4	1510	951	7640	4230	1440	3290	2520	2820	1870	973	639	e480
5	1180	951	6010	3910	2990	3410	2280	2560	1720	935	659	498
6	1020	1110	4890	4170	11300	3310	2140	2350	1640	886	671	509
7	978	2010	4110	7680	24900	3190	2080	2260	1580	852	622	434
8	894	4370	3550	7800	48300	3430	2040	2220	1530	817	595	372
9	867	5710	3600	6420	30700	3680	2020	2070	1460	792	574	350
10	920	4310	3980	5280	14500	3790	2120	1960	1420	776	558	340
11	2610	9620	7780	4330	8420	3910	2270	1880	1350	760	544	333
12	2910	8100	7910	3740	6230	3850	3370	1910	1310	742	536	325
13	2360	6550	11900	3280	5040	3580	3970	2240	1270	726	520	342
14	1950	5410	12500	3020	4270	3270	3370	2790	1230	710	505	384
15	1660	4560	10000	4660	3780	3050	3100	2920	1200	688	495	726
16	1670	3970	7370	6030	3440	2800	3640	2940	1170	674	485	757
17	1900	3410	5820	4800	3550	2570	3570	3200	1160	672	483	689
18	2620	3770	5060	4070	4770	2370	3350	3980	1360	738	484	607
19	2150	3430	4330	4340	6050	2310	3250	4940	1230	956	482	619
20	1930	3040	3830	5240	5520	2230	3200	4570	1130	856	478	601
21	1820	2690	3360	5900	5310	2090	2920	4060	1080	791	478	563
22	1730	2530	2970	4840	4720	2090	2990	4600	1060	738	465	575
23	1550	2610	2640	4260	4940	1980	7570	4810	1120	704	451	548
24	1460	4170	2340	3890	4390	1900	10800	4400	1370	673	444	504
25	1380	6050	2170	3330	3800	1760	8630	3830	1290	654	437	476
26	2050	5920	2050	2900	3460	1690	7670	3410	1190	639	439	456
27	1910	6390	2000	2630	3150	1680	6250	3050	1140	620	443	439
28	1660	17000	1970	2400	2860	1650	5160	2800	1170	602	443	424
29	e1500	18300	2300	2140	2650	1630	4390	2720	1110	598	435	408
30	e1400	18400	2880	1870	---	1630	3840	2530	1050	576	422	393
31	e1300	---	4030	1670	---	1650	---	2310	---	562	421	---
TOTAL	50093	158702	175610	130490	224880	81150	117470	95860	41330	23658	16080	14322
MEAN	1616	5290	5665	4209	7754	2618	3916	3092	1378	763	519	477
MAX	2910	18400	16200	7800	48300	3910	10800	4940	2140	1010	707	757
MIN	853	951	1970	1670	1370	1630	2020	1880	1050	562	421	325
AC-FT	99360	314800	348300	258800	446000	161000	233000	190100	81980	46930	31890	28410
CFSM	3.26	10.7	11.4	8.49	15.6	5.28	7.89	6.23	2.78	1.54	1.05	.96
IN.	3.76	11.90	13.17	9.79	16.87	6.09	8.81	7.19	3.10	1.77	1.21	1.07

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1981 - 1996, BY WATER YEAR (WY)

MEAN	869	2827	3113	3225	3543	2824	2744	2024	1512	782	461	439
MAX	1616	5290	5665	5085	7754	3813	4697	3092	2643	1653	740	708
(WY)	1996	1996	1996	1983	1996	1987	1991	1996	1990	1983	1993	1983
MIN	310	418	1705	1454	1185	1315	1729	1226	539	412	306	277
(WY)	1988	1994	1986	1985	1993	1992	1986	1992	1992	1992	1992	1989

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1981 - 1996
ANNUAL TOTAL	923661	1129645	
ANNUAL MEAN	2531	3086	2020
HIGHEST ANNUAL MEAN			3086
LOWEST ANNUAL MEAN			1387
HIGHEST DAILY MEAN	18400	Nov 30	48300
LOWEST DAILY MEAN	385	Sep 24	243
ANNUAL SEVEN-DAY MINIMUM	408	Sep 20	349
ANNUAL RUNOFF (AC-FT)	1832000	2241000	1463000
ANNUAL RUNOFF (CFSM)	5.10	6.22	4.07
ANNUAL RUNOFF (INCHES)	69.27	84.72	55.34
10 PERCENT EXCEEDS	4560	5950	3960
50 PERCENT EXCEEDS	1950	2140	1570
90 PERCENT EXCEEDS	505	502	381

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, 13,000 mg/L Feb. 8; minimum, 31 mg/l (estimated) Aug. 31, Sept. 1.

SEDIMENT DISCHARGE: Maximum daily, 1,790,000 tons Feb. 8; minimum, 31 (estimated) tons Sept. 2.

## WATER-QUALITY DATA

DATE	TIME	TEMPER- ATURE WATER (DEG C)	DIS- CHARGE, INST. CUBIC FEET PER SECOND	SEDI- MENT, DIS- CHARGE, SUS- PENDED (MG/L)	SEDI- MENT, DIS- CHARGE, SUS- PENDED (T/DAY)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM	SED. SUSP. SIEVE DIAM. % FINER THAN .125 MM	SED. SUSP. SIEVE DIAM. % FINER THAN .250 MM	SED. SUSP. SIEVE DIAM. % FINER THAN .500 MM	SED. SUSP. SIEVE DIAM. % FINER THAN 1.00 MM	SED. SUSP. SIEVE DIAM. % FINER THAN 2.00 MM
OCT 1993											
10...	1440	--	5300	965	13809	--	--	--	--	--	--
MAR 1994											
04...	1425	--	6440	426	7407	--	--	--	--	--	--
OCT											
27...	1650	10	4520	1600	19526	82	89	95	100	--	--
DEC											
01...	1048	--	12000	3330	107892	40	52	72	90	96	98
27...	1444	8	13800	2360	87934	36	52	74	93	100	--
OCT 1995											
11...	1330	12	3160	2010	17149	89	95	97	99	100	--
NOV											
11...	0845	10	9530	3560	91602	46	68	88	98	100	--
DEC											
01...	1145	9.5	16600	2820	126392	53	66	88	99	--	--
FEB 1996											
07...	1315	--	24700	7320	488171	36	48	69	90	98	100
08...	1400	--	57100	12200	1880874	63	80	94	99	--	--
11...	1000	5	8600	4070	94505	46	55	77	96	100	--

DATE	SED. SUSP. FALL DIAM. % FINER THAN .002 MM	SED. SUSP. FALL DIAM. % FINER THAN .004 MM	SED. SUSP. FALL DIAM. % FINER THAN .008 MM	SED. SUSP. FALL DIAM. % FINER THAN .016 MM	SED. SUSP. FALL DIAM. % FINER THAN .031 MM	SED. SUSP. FALL DIAM. % FINER THAN .062 MM	SED. SUSP. FALL DIAM. % FINER THAN .125 MM	SED. SUSP. FALL DIAM. % FINER THAN .250 MM	SED. SUSP. FALL DIAM. % FINER THAN .500 MM	SED. SUSP. FALL DIAM. % FINER THAN 1.00 MM
OCT 1993										
10...	<1	<1	<1	<1	<1	59	75	93	100	100
MAR 1994										
04...	<1	<1	<1	<1	<1	61	71	86	97	100
OCT										
27...	19	29	42	56	69	--	--	--	--	--
DEC										
01...	--	--	--	--	--	--	--	--	--	--
27...	8	11	17	22	29	--	--	--	--	--
OCT 1995										
11...	--	--	--	--	--	--	--	--	--	--
NOV										
11...	--	--	--	--	--	--	--	--	--	--
DEC										
01...	--	--	--	--	--	--	--	--	--	--
FEB 1996										
07...	9	14	20	24	29	--	--	--	--	--
08...	11	18	28	39	51	--	--	--	--	--
11...	17	26	34	38	42	--	--	--	--	--

## COWLITZ RIVER BASIN

475

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

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
OCTOBER			NOVEMBER			DECEMBER			
1	951	73	187	1220	41	135	16200	2970	130000
2	853	41	95	1120	51	156	11900	2480	80100
3	1400	657	2860	1030	---	110	8520	1800	41500
4	1510	488	2030	951	---	100	7640	1610	33500
5	1180	---	620	951	---	100	6010	1320	21400
6	1020	96	266	1110	---	110	4890	871	11500
7	978	71	188	2010	---	2300	4110	577	6410
8	894	64	155	4370	2750	46000	3550	485	4660
9	867	68	159	5710	3770	63100	3600	483	4750
10	920	77	210	4310	707	8160	3980	---	5400
11	2610	1500	11500	9620	2400	68500	7780	---	24000
12	2910	535	4300	8100	1770	39400	7910	---	26000
13	2360	218	1400	6550	1570	27700	11900	---	84000
14	1950	172	910	5410	---	20000	12500	---	85000
15	1660	99	447	4560	---	13000	10000	1780	48300
16	1670	96	435	3970	---	9500	7370	1660	33500
17	1900	120	683	3410	---	6600	5820	1140	18100
18	2620	221	1600	3770	---	5900	5060	759	10400
19	2150	109	635	3430	---	4300	4330	541	6370
20	1930	80	417	3040	---	3100	3830	427	4410
21	1820	72	356	2690	---	2200	3360	374	3390
22	1730	52	242	2530	---	1700	2970	413	3310
23	1550	---	210	2610	---	1800	2640	458	3260
24	1460	---	190	4170	---	5900	2340	404	2560
25	1380	---	170	6050	---	29000	2170	---	2000
26	2050	---	790	5920	---	24000	2050	---	1600
27	1910	---	520	6390	1520	27500	2000	---	1400
28	1660	---	300	17000	4140	196000	1970	---	1200
29	e1500	---	220	18300	2960	148000	2300	---	1800
30	e1400	---	160	18400	3080	154000	2880	---	4400
31	e1300	38	133	---	---	---	4030	---	10000
TOTAL	50093	---	32388	158702	---	908371	175610	---	714220

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JANUARY			FEBRUARY			MARCH			
1	3880	---	9300	1570	---	510	2470	574	3830
2	3550	---	7600	1460	---	480	2360	553	3520
3	4230	744	8500	1370	---	450	2530	632	4340
4	4230	681	7770	1440	---	470	3290	643	5710
5	3910	---	5200	2990	---	12000	3410	520	4780
6	4170	---	5700	11300	---	88000	3310	422	3770
7	7680	---	100000	24900	5620	441000	3190	393	3380
8	7800	3070	61000	48300	12300	1790000	3430	413	3820
9	6420	1020	17800	30700	11000	975000	3680	488	4840
10	5280	683	9750	14500	5200	208000	3790	478	4900
11	4330	---	7000	8420	3760	86500	3910	490	5180
12	3740	---	5400	6230	2340	39700	3850	502	5220
13	3280	---	4200	5040	---	24000	3580	479	4630
14	3020	---	3400	4270	---	16000	3270	421	3730
15	4660	---	19000	3780	---	11000	3050	---	3400
16	6030	---	39000	3440	842	7840	2800	---	3400
17	4800	---	18000	3550	766	7360	2570	---	3400
18	4070	---	9100	4770	1420	18800	2370	---	3300
19	4340	586	6850	6050	1700	27800	2310	609	3810
20	5240	294	4520	5520	1390	20700	2230	552	3330
21	5900	494	7940	5310	1270	18200	2090	726	4100
22	4840	---	3400	4720	1050	13400	2090	761	4290
23	4260	---	2500	4940	885	11800	1980	829	4420
24	3890	---	2000	4390	704	8340	1900	837	4300
25	3330	164	1480	3800	615	6320	1760	947	4480
26	2900	---	1200	3460	556	5200	1690	1100	4990
27	2630	148	1050	3150	619	5270	1680	800	3630
28	2400	130	841	2860	508	3920	1650	559	2490
29	2140	---	710	2650	529	3770	1630	591	2600
30	1870	---	620	---	---	---	1630	601	2640
31	1670	---	550	---	---	---	1650	---	2400
TOTAL	130490	---	371381	224880	---	3851830	81150	---	122630

e Estimated

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

SEDIMENT DISCHARGE, SUSPENDED (TONS/DAY), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
APRIL			MAY			JUNE			
1	2430	---	3800	3510	---	6500	2140	---	2600
2	3620	---	8100	3200	---	5300	2020	---	2400
3	2910	---	4000	3020	---	4500	1960	---	2300
4	2520	---	2200	2820	---	3800	1870	---	2200
5	2280	---	1700	2560	---	3100	1720	---	2000
6	2140	---	1400	2350	---	2500	1640	---	1900
7	2080	---	1200	2260	---	2200	1580	---	1800
8	2040	---	1200	2220	---	1900	1530	---	1800
9	2020	---	1900	2070	---	1600	1460	---	1700
10	2120	578	3310	1960	---	1400	1420	---	1600
11	2270	544	3360	1880	---	1200	1350	---	1500
12	3370	661	6080	1910	---	1100	1310	---	1500
13	3970	463	5020	2240	---	2800	1270	---	1400
14	3370	284	2590	2790	---	6800	1230	---	1400
15	3100	275	2300	2920	---	8800	1200	---	1300
16	3640	348	3440	2940	758	6040	1170	---	1300
17	3570	357	3440	3200	732	6430	1160	---	1300
18	3350	---	2900	3980	1200	13400	1360	---	1700
19	3250	---	2500	4940	1450	19400	1230	---	1300
20	3200	---	2200	4570	993	12300	1130	---	1000
21	2920	---	1800	4060	849	9330	1080	---	810
22	2990	---	1900	4600	839	10500	1060	---	660
23	7570	---	56000	4810	825	10700	1120	---	690
24	10800	4200	12300	4400	727	8660	1370	---	1100
25	8630	2660	62300	3830	732	7560	1290	---	1000
26	7670	1880	39300	3410	---	6500	1190	---	930
27	6250	1250	21200	3050	---	5300	1140	---	880
28	5160	1000	14000	2800	---	4500	1170	---	890
29	4390	796	9430	2720	---	4000	1110	---	830
30	3840	826	8540	2530	---	3500	1050	---	770
31	---	---	---	2310	---	2900	---	---	---
TOTAL	117470	---	289410	95860	---	184520	41330	---	42560

DAY	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)	MEAN DISCHARGE (CFS)	MEAN CONCEN- TRATION (MG/L)	SEDIMENT DISCHARGE (TONS/DAY)
JULY			AUGUST			SEPTEMBER			
1	1010	---	730	555	133	200	400	---	33
2	981	---	700	610	129	215	e380	---	31
3	957	---	670	707	131	252	e390	---	33
4	973	---	670	639	45	77	e480	54	70
5	935	---	640	659	53	94	498	55	75
6	886	---	590	671	42	77	509	54	74
7	852	---	560	622	38	63	434	40	47
8	817	---	530	595	32	51	372	84	84
9	792	---	510	574	---	57	350	93	88
10	776	---	490	558	---	65	340	59	54
11	760	---	470	544	---	74	333	49	44
12	742	---	450	536	---	85	325	49	43
13	726	---	440	520	---	97	342	44	41
14	710	---	420	505	---	110	384	56	58
15	688	194	361	495	90	120	726	337	717
16	674	163	297	485	79	103	757	373	763
17	672	233	425	483	88	115	689	195	365
18	738	215	425	484	95	124	607	112	184
19	956	231	597	482	92	120	619	---	170
20	856	109	253	478	102	132	601	---	160
21	791	68	145	478	97	126	563	---	140
22	738	61	122	465	61	76	575	---	140
23	704	65	124	451	54	66	548	---	120
24	673	62	112	444	70	84	504	---	110
25	654	57	101	437	84	99	476	---	100
26	639	75	129	439	72	86	456	---	91
27	620	77	129	443	56	67	439	---	83
28	602	108	175	443	52	62	424	---	77
29	598	93	149	435	34	40	408	---	71
30	576	93	145	422	---	36	393	---	65
31	562	124	188	421	---	35	---	---	---
TOTAL	23658	---	11747	16080	---	3008	14322	---	4131
YEAR	1129645		6536196						

e Estimated



## COWLITZ RIVER BASIN

477

14243000 COWLITZ RIVER AT CASTLE ROCK, WA

LOCATION.--Lat 46°16'28", long 122°54'45", in SW 1/4 SE 1/4 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 mi<sup>2</sup>, of which approximately 21 mi<sup>2</sup> is noncontributing. Prior to July 7, 1981, the noncontributing portion was approximately 40 mi<sup>2</sup>.

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

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

GAGE.--Water-stage recorder. Datum of gage is 20.20 ft above sea level. Prior to Dec. 18, 1933, nonrecording gage at site 2 mi upstream at datum 14.93 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 5.0 ft higher. Oct. 1, 1934, to May 21, 1980, water-stage recorder, on right bank at present datum. May 23, 1980 water-stage recorder at present site and datum.

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.--58 years (water years 1927-85), 9,263 ft<sup>3</sup>/s, 56.21 in/yr, 6,711,000 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 ft<sup>3</sup>/s Dec. 23, 1933, gage height, 31.6 ft present datum, from rating curve extended above 80,000 ft<sup>3</sup>/s; maximum gage height, 32.11 ft Feb. 8, 1996; minimum discharge, 998 ft<sup>3</sup>/s Nov. 7, 8, 1935.

EXTREMES FOR PERIOD NOVEMBER TO APRIL.--Maximum discharge, 112,000 ft<sup>3</sup>/s Feb. 8, gage height, 32.11 ft; minimum discharge, 6,760 ft<sup>3</sup>/s Mar. 31.

DISCHARGE, CUBIC FEET PER SECOND, NOVEMBER 1995 TO APRIL 1996  
DAILY MEAN VALUES

DAY	NOV	DEC	JAN	FEB	MAR	APR
1	9890	80700	15900	10400	11400	8690
2	10100	73100	15500	10100	11100	10400
3	10100	60700	20200	9870	11300	9340
4	10100	48400	20300	9960	12300	8680
5	10200	33000	20000	11400	11000	8210
6	10700	24100	23300	25800	10000	7960
7	12800	23900	28700	56700	9620	7840
8	23300	26700	30000	93900	9740	7750
9	27100	26700	27000	85300	9990	7630
10	22900	27200	25200	63500	10100	7740
11	32700	31800	23600	51100	10400	8060
12	32000	32300	22600	45700	11800	11100
13	26400	38800	21800	38600	12600	13200
14	24700	41400	21300	35400	13600	11400
15	23300	37300	24100	34000	13400	10400
16	22200	32500	30100	32900	13100	11200
17	20200	29700	26800	30400	12900	11300
18	20400	28800	25700	32000	12700	10800
19	20000	27500	26100	35000	12800	11000
20	18800	26300	25600	34600	11500	11100
21	18200	25500	28500	33100	10000	10500
22	17900	23200	24200	28200	9630	11000
23	18700	19200	19100	26200	9190	26000
24	22300	18900	17600	24300	8870	29900
25	25600	18800	15200	22100	8510	26100
26	26900	18400	13800	20800	7540	25500
27	27600	18100	12900	16200	7060	24500
28	59600	17900	12400	14300	6980	22800
29	92300	14700	11800	12500	6940	21400
30	95800	14700	11100	---	6920	18400
31	---	16400	10600	---	6970	---
TOTAL	792790	956700	651000	944330	319960	409900
MEAN	26430	30860	21000	32560	10320	13660
MAX	95800	80700	30100	93900	13600	29900
MIN	9890	14700	10600	9870	6920	7630
AC-FT	1572000	1898000	1291000	1873000	634600	813000
MEAN†	28350	26020	20130	35340	10240	15960
CFSM†	12.7	11.6	8.99	15.8	4.58	7.13
IN.†	14.14	13.41	10.37	17.04	5.28	7.96
AC-FT†	687000	1600000	1238000	2033000	629600	949700

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

## COLUMBIA RIVER MAIN STEM

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

LOCATION.--Lat 46°10'55", long 123°10'50", in NE 1/4 sec.16, T.8 N., R.4 W., Columbia County, Hydrologic Unit 17080003, on left bank, 0.7 mi downstream from Crims Island, 3.0 mi northwest of Quincy, and at mile 53.8.

DRAINAGE AREA.--256,900 mi<sup>2</sup>, approximately.

## WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--May 1968 to June 1970, June 1991 to current year.

GAGE.--Acoustic velocity meter with water-stage and velocity index recorder. Datum of gage is 0.52 ft above sea level. May 1968 to June 1970 water-stage recorder with auxillary water-stage recorder 5.6 miles downstream, at datum 10.00 ft lower.

REMARKS.--Records good except for estimated daily discharges, which are fair. Flow regulated by many reservoirs on Columbia River and in tributary basins. Flows affected by tide which can cause reverse direction during tidal cycle when mean daily flows are less than 250,000 ft<sup>3</sup>/s. Mean discharge values are based on a 24 hour day, not a tidal cycle.

AVERAGE DISCHARGE.--6 years (water years 1969, 1992-96), 232,700 ft<sup>3</sup>/s, 168,600,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum daily discharge, 864,000 ft<sup>3</sup>/s Feb. 10, 1996; minimum daily discharge, 73,700 ft<sup>3</sup>/s Sept. 7, 1994.

EXTREMES FOR CURRENT YEAR.--Maximum daily discharge, 864,000 ft<sup>3</sup>/s Feb. 10; maximum elevation, 13.33 ft Feb. 9; minimum daily discharge, 111,000 ft<sup>3</sup>/s Sept. 3.

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996  
DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	158000	169000	e560000	e295000	e373000	e482000	e242000	e424000	e420000	e321000	e203000	e176000
2	132000	186000	e574000	e314000	e356000	e441000	e272000	e428000	e444000	e264000	e208000	e146000
3	151000	181000	e559000	e326000	e337000	e397000	e280000	e420000	e432000	e271000	e217000	e111000
4	167000	162000	e576000	e335000	e320000	e343000	e293000	e379000	e411000	e278000	e189000	e150000
5	158000	141000	e523000	e338000	e289000	e371000	e308000	e390000	e430000	e289000	e150000	e135000
6	148000	140000	e427000	e342000	e312000	e451000	e285000	e376000	e452000	e281000	e197000	e140000
7	145000	139000	e402000	e344000	e429000	e410000	e332000	e373000	e455000	e275000	e238000	e150000
8	140000	173000	e405000	e352000	e671000	e398000	e295000	e329000	e435000	e288000	e215000	e130000
9	137000	223000	e413000	e365000	e834000	e408000	e261000	e333000	e452000	e291000	e221000	e137000
10	139000	235000	e416000	e363000	e864000	e389000	e271000	e343000	e462000	e280000	e213000	e146000
11	176000	e233000	e402000	e365000	e854000	e352000	e348000	e310000	e484000	e289000	e184000	e151000
12	204000	e275000	e412000	e412000	e758000	e395000	e386000	e280000	e485000	e274000	e163000	e140000
13	192000	e273000	e478000	e415000	e650000	e414000	e395000	e294000	e479000	e282000	e214000	e132000
14	205000	e289000	e544000	e371000	e588000	e416000	e389000	e275000	e465000	e291000	e220000	e162000
15	188000	e288000	e535000	e377000	e578000	e427000	e394000	e326000	e443000	e276000	e231000	e171000
16	155000	e299000	e505000	e369000	e523000	e426000	e401000	e364000	e425000	e276000	e222000	e118000
17	138000	e269000	e512000	e389000	e525000	e400000	e376000	e370000	e449000	e259000	e198000	e142000
18	163000	e257000	e500000	e409000	e537000	e392000	e390000	e400000	e442000	e275000	e170000	e146000
19	180000	e266000	e442000	e425000	e552000	e380000	e419000	e461000	e450000	e227000	e170000	e140000
20	179000	e260000	e416000	e421000	e566000	e347000	e416000	e494000	e430000	e252000	e200000	e151000
21	184000	e257000	e410000	e444000	e600000	e361000	e397000	e511000	e390000	e242000	e203000	e162000
22	168000	e236000	e413000	e452000	e554000	e346000	e400000	e502000	e357000	e209000	e195000	e157000
23	152000	e262000	e390000	e487000	e545000	e345000	e416000	e473000	e316000	e260000	e215000	e159000
24	149000	e238000	e387000	e466000	e539000	e344000	e466000	e501000	e300000	e227000	e172000	e154000
25	145000	e241000	e361000	e462000	e545000	e330000	e528000	e485000	e312000	e264000	e171000	e154000
26	171000	e250000	e339000	e436000	e559000	e330000	e556000	e484000	e307000	e229000	e170000	e155000
27	180000	e276000	e290000	e424000	e522000	e330000	e572000	e443000	e353000	e254000	e170000	e155000
28	190000	e377000	e326000	e399000	e497000	e323000	e566000	e435000	e326000	e211000	e159000	e165000
29	172000	e526000	e297000	e354000	e483000	e328000	e553000	e432000	e337000	e174000	e173000	e123000
30	167000	e574000	e267000	e399000	---	e320000	e455000	e464000	e344000	e202000	e179000	e123000
31	160000	---	e274000	e387000	---	e268000	---	e482000	---	e188000	e172000	---
TOTAL	5093000	7695000	13355000	12037000	15760000	11664000	11662000	12581000	12287000	7999000	6002000	4381000
MEAN	164300	256500	430800	388300	543400	376300	388700	405800	409600	258000	193600	146000
MAX	205000	574000	576000	487000	864000	482000	572000	511000	485000	321000	238000	176000
MIN	132000	139000	267000	295000	289000	268000	242000	275000	300000	174000	150000	111000
AC-FT10100000	15260000	26490000	23880000	31260000	23140000	23130000	24950000	24370000	15870000	11900000	8690000	

## STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1969 - 1996, BY WATER YEAR (WY)

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MEAN	139800	192000	255100	273300	284300	244200	269600	335600	314500	211400	149600	122700																
MAX	166700	256500	430800	388300	543400	376300	406500	469600	409600	265000	193600	146100																
(WY)	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
MIN	114500	136100	175400	199100	191100	196700	196200	234800	203900	139500	107100	92400																
(WY)	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996

SUMMARY STATISTICS	FOR 1995 CALENDAR YEAR	FOR 1996 WATER YEAR	WATER YEARS 1969 - 1996
ANNUAL TOTAL	91490900	120516000	
ANNUAL MEAN	250700	329300	
HIGHEST ANNUAL MEAN			232700
LOWEST ANNUAL MEAN			329300
HIGHEST DAILY MEAN	576000	Dec 4	864000
LOWEST DAILY MEAN	79900	Sep 10	111000
ANNUAL SEVEN-DAY MINIMUM	107000	Sep 7	136000
ANNUAL RUNOFF (AC-FT)	181500000		239000000
10 PERCENT EXCEEDS	360000		507000
50 PERCENT EXCEEDS	241000		327000
90 PERCENT EXCEEDS	140000		155000

e Estimated

14246900 COLUMBIA RIVER AT BEAVER ARMY TERMINAL, NEAR QUINCY, OR--Continued  
(National stream quality accounting network station)

## WATER-QUALITY DATA

PERIOD OF RECORD.--August 1967 to September 1970, October 1990 to current year.

PERIOD OF DAILY RECORD.--

SPECIFIC CONDUCTANCE: October 1993 to current year.

WATER TEMPERATURE: August 1967 to September 1970. October 1993 to current year.

INSTRUMENTATION.--Temperature recorder August 1967 to September 1970. Temperature and specific conductance recorders from October 1992 to current year.

REMARKS.--Since February, 1994, specific conductance and temperature sensors located on right bank. Prior to that time sensors were located on left bank. It was determined that daily record collected prior to February 1994 is not representative of the cross section due to a seasonal influence from several upstream sloughs. Additional specific conductance and temperature data for the period October 1992 to September 1993 available in the files of the Portland field office.

EXTREMES FOR PERIOD OF RECORD.--

SPECIFIC CONDUCTANCE: Maximum recorded, 188 microsiemens Feb. 5, 1994, but may have been higher during periods of missing record; minimum recorded, 73 microsiemens Feb. 9, 1996, but may have been lower during periods of missing record.

WATER TEMPERATURE: Maximum, 23.5°C Aug. 21, 22, 1967; minimum, 0.0°C Jan. 31, Feb. 1, 1969.

EXTREMES FOR CURRENT YEAR.--

SPECIFIC CONDUCTANCE: Maximum recorded, 169 microsiemens Nov. 6, but may have been higher during period of missing record; minimum recorded, 73 microsiemens Feb. 9, but may have been lower during period of missing record.

WATER TEMPERATURE: Maximum, 21.5°C several days in July and August; minimum, 1.5°C Feb. 3-5.

## WATER-QUALITY DATA

DATE	TIME	DIS- CHARGE, IN CUBIC FEET PER SECOND (00060)	SPE- CIFIC CON- DUCT- ANCE (US/CM) (00095)	PH, WATER WHOLE FIELD (STAND- ARD UNITS) (00400)	TEMPER- ATURE WATER (DEG C) (00010)	TUR- BID- ITY (NTU) (00076)	OXYGEN, DIS- SOLVED (MG/L) (00300)	BARO- METRIC PRES- SURE (MM OF HG) (00025)	OXYGEN, DIS- SOLVED (PER- CENT SATUR- ATION) (00301)	HARD- NESS, TOTAL (MG/L AS CAO3) (00900)	CALCIUM, DIS- SOLVED (MG/L AS CA) (00915)	MAGNE- SIUM, DIS- SOLVED (MG/L AS MG) (00925)
OCT 1995												
24...	1130	149000	139	7.8	14.0	2.2	9.6	762	94	52	14	4.2
NOV												
28...	1150	E377000	119	7.5	10.5	--	11.3	758	102	--	--	--
DEC												
01...	1250	E560000	102	7.6	10.5	41	11.1	752	100	37	10	2.9
JAN 1996												
10...	1220	E363000	105	7.5	6.5	15	12.5	770	101	41	11	3.3
FEB												
12...	1310	E758000	--	--	--	--	--	--	--	--	--	--
14...	1420	E588000	90	7.2	5.0	63	14.3	764	112	41	11	3.2
22...	1220	E554000	113	7.7	5.0	73	15.0	758	118	44	12	3.4
MAR												
12...	1220	E395000	126	7.8	5.5	15	13.7	760	109	49	13	4.1
APR												
25...	1130	E528000	115	7.8	9.5	25	11.9	765	105	50	14	3.7
MAY												
14...	1210	E275000	137	8.1	12.0	5.5	13.7	758	127	57	16	4.0
JUN												
06...	1215	E452000	134	8.1	14.5	6.0	11.0	766	108	53	15	3.8
18...	1150	E442000	107	7.8	15.5	4.5	11.3	767	112	46	13	3.3
JUL												
09...	1030	E291000	123	7.8	18.5	--	10.1	765	108	--	--	--
22...	1140	E209000	122	7.8	19.5	2.7	9.4	767	102	50	14	3.7
AUG												
27...	1230	E170000	136	7.6	20.5	2.1	9.7	758	108	54	15	3.9

DATE	SODIUM, DIS- SOLVED (MG/L AS NA) (00930)	SODIUM PERCENT RATIO (00932)	SODIUM AD- SORP- TION RATIO (00931)	POTAS- SIUM, DIS- SOLVED (MG/L AS K) (00935)	ALKA- LINITY, DIS IT FIELD (MG/L AS CAO3) (39086)	BICAR- BONATE, DIS IT FIELD (MG/L AS HCO3) (00453)	CAR- BONATE, DIS IT FIELD (MG/L AS CO3) (00452)	SULFATE, DIS- SOLVED (MG/L AS SO4) (00945)	CHLO- RIDE, DIS- SOLVED (MG/L AS CL) (00940)	FLUO- RIDE, DIS- SOLVED (MG/L AS F) (00950)	SILICA, DIS- SOLVED (MG/L AS SiO2) (00955)	SOLIDS, RESIDUE AT 180 DEG. C DIS- SOLVED (MG/L) (70300)
OCT 1995												
24...	7.0	22	0.4	1.1	53	65	0	9.1	5.1	0.2	9.6	83
NOV												
28...	--	--	--	--	40	48	0	--	--	--	--	--
DEC												
01...	5.4	24	0.4	1.0	34	41	0	6.7	3.3	0.1	11	68
JAN 1996												
10...	4.6	19	0.3	0.9	38	46	0	5.6	2.7	0.2	13	77
FEB												
12...	--	--	--	--	--	--	--	--	--	--	--	--
14...	4.3	18	0.3	1.1	37	45	0	6.0	2.6	<0.1	13	68
22...	4.9	19	0.3	1.3	37	45	0	6.6	3.1	0.1	14	83
MAR												
12...	5.3	19	0.3	1.1	46	56	0	9.3	3.2	0.1	13	83
APR												
25...	5.1	18	0.3	1.0	48	59	0	8.5	2.8	0.1	12	82
MAY												
14...	5.3	17	0.3	1.0	56	68	0	9.4	4.1	0.1	11	83
JUN												
06...	4.3	15	0.3	1.0	49	60	0	7.6	2.0	0.2	10	83
18...	4.2	16	0.3	1.0	44	53	0	6.7	2.1	0.1	10	70
JUL												
09...	--	--	--	--	48	58	0	--	--	--	--	--
22...	4.0	14	0.2	1.0	50	61	0	7.8	2.1	0.1	7.6	69
AUG												
27...	5.2	17	0.3	1.0	53	64	0	9.6	3.6	0.1	7.1	74

E - Estimated.

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

## WATER-QUALITY DATA

DATE	SOLIDS, SUM OF CONSTITUENTS, DIS- SOLVED (MG/L) (70301)	SOLIDS, DIS- SOLVED (TONS PER AC-FT) (70303)	NITRO- GEN, AMMONIA DIS- SOLVED (MG/L) AS N) (00608)	NITRO- GEN, NITRITE DIS- SOLVED (MG/L) AS N) (00613)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L) AS N) (00623)	NITRO- GEN,AM- MONIA + ORGANIC DIS- SOLVED (MG/L) AS N) (00625)	NITRO- GEN, NO2+NO3 DIS- SOLVED (MG/L) AS N) (00631)	PHOS- PHORUS, TOTAL (MG/L) AS P) (00665)	PHOS- PHORUS, DIS- SOLVED (MG/L) AS P) (00666)	PHOS- PHORUS, ORTHO, DIS- SOLVED (MG/L) AS P) (00671)	CARBON, ORGANIC DIS- SOLVED (MG/L) AS C) (00681)
OCT 1995											
24...	83	0.11	0.02	<0.01	<0.2	<0.2	0.17	0.02	<0.01	0.020	1.5
NOV											
28...	--	--	0.02	<0.01	<0.2	0.3	0.43	0.10	0.03	0.020	1.6
DEC											
01...	63	0.09	<0.01	<0.01	0.2	0.3	0.41	0.18	0.03	0.021	1.9
JAN 1996											
10...	66	0.10	<0.01	<0.01	<0.2	<0.2	0.40	0.06	0.02	0.020	1.8
FEB											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	65	0.09	0.02	<0.01	<0.2	0.3	0.41	0.08	<0.01	0.016	1.7
22...	70	0.11	0.03	0.01	<0.2	0.4	0.54	0.10	0.02	0.027	2.1
MAR											
12...	79	0.11	0.02	<0.01	<0.2	0.2	0.46	0.08	0.02	0.022	1.6
APR											
25...	78	0.11	<0.01	<0.01	<0.2	<0.2	0.26	0.05	<0.01	0.011	1.7
MAY											
14...	85	0.11	0.06	<0.01	<0.2	0.3	0.15	0.05	<0.01	0.003	2.0
JUN											
06...	74	0.11	0.02	<0.01	<0.2	0.3	0.08	0.05	<0.01	0.003	--
18...	67	0.09	--	--	--	--	--	--	--	--	--
JUL											
09...	--	--	0.02	<0.01	<0.2	<0.2	0.09	<0.01	<0.01	0.003	1.8
22...	71	0.09	0.03	0.01	<0.2	<0.2	0.10	0.02	<0.01	0.001	1.8
AUG											
27...	78	0.10	<0.01	0.01	<0.2	<0.2	0.12	0.07	<0.01	0.008	1.6

DATE	CARBON, ORGANIC SUS- PENDED TOTAL (MG/L) AS C) (00689)	ALUM- INUM, DIS- SOLVED (UG/L) AS AL) (01106)	ANTI- MONY, DIS- SOLVED (UG/L) AS SB) (01095)	ARSENIC, DIS- SOLVED (UG/L) AS AS) (01000)	BARIIUM, DIS- SOLVED (UG/L) AS BA) (01005)	BERYL- LIUM, DIS- SOLVED (UG/L) AS BE) (01010)	CADMIUM, DIS- SOLVED (UG/L) AS CD) (01025)	CHRO- MIUM, DIS- SOLVED (UG/L) AS CR) (01030)	COBALT, DIS- SOLVED (UG/L) AS CO) (01035)	COPPER, DIS- SOLVED (UG/L) AS CU) (01040)	IRON, DIS- SOLVED (UG/L) AS FE) (01046)
OCT 1995											
24...	0.5	20	--	<1	21	<1	<1	<5	<3	<1	22
NOV											
28...	1.2	77	<1	--	14	<1	<1	<1	<1	2	--
DEC											
01...	2.0	161	<1	<1	13	<1	<1	<1	<1	2	120
JAN 1996											
10...	0.6	82	<1	<1	15	<1	<1	<1	<1	1	85
FEB											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	2.3	42	<1	<1	12	<1	<1	<1	<1	1	48
22...	2.8	13	<1	<1	15	<1	<1	<1	<1	2	24
MAR											
12...	0.6	6	<1	<1	17	<1	<1	<1	<1	2	12
APR											
25...	1.1	13	<1	<1	15	<1	<1	<1	<1	2	18
MAY											
14...	1.1	6	<1	<1	21	<1	<1	1	<1	2	13
JUN											
06...	--	7	<1	<1	17	<1	<1	<1	<1	<1	10
18...	--	13	<1	1	18	<1	<1	<1	<1	1	17
JUL											
09...	0.6	--	--	--	--	--	--	--	--	--	--
22...	0.7	5	<1	<1	21	<1	<1	<1	<1	2	8
AUG											
27...	0.4	4	<1	<1	23	<1	<1	<1	<1	2	6

DATE	LEAD, DIS- SOLVED (UG/L) AS PB) (01049)	LITHIUM, DIS- SOLVED (UG/L) AS LI) (01130)	MANGA- NESE, DIS- SOLVED (UG/L) AS MN) (01056)	MOLYB- DENUM, DIS- SOLVED (UG/L) AS MO) (01060)	NICKEL, DIS- SOLVED (UG/L) AS NI) (01065)	SELE- NIUM, DIS- SOLVED (UG/L) AS SE) (01145)	SILVER, DIS- SOLVED (UG/L) AS AG) (01075)	STRON- TIUM, DIS- SOLVED (UG/L) AS SR) (01080)	URANIUM NATURAL DIS- SOLVED (UG/L) AS U) (22703)	VANA- DIUM, DIS- SOLVED (UG/L) AS V) (01085)	ZINC, DIS- SOLVED (UG/L) AS ZN) (01090)
OCT 1995											
24...	<1	<4	<1	<10	<1	<1	<1	91	--	<6	<3
NOV											
28...	<1	--	4	<1	<1	--	<1	--	<1	--	2
DEC											
01...	<1	<4	12	<1	<1	<1	<1	59	<1	<6	2
JAN 1996											
10...	<1	<4	3	<1	<1	<1	<1	60	<1	<6	2
FEB											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	1	<4	7	<1	<1	<1	<1	61	<1	<6	3
22...	<1	<4	3	<1	<1	<1	<1	63	<1	<6	1
MAR											
12...	<1	<4	4	<1	1	<1	<1	73	<1	<6	1
APR											
25...	<1	<4	3	<1	<1	<1	<1	74	<1	<6	3
MAY											
14...	<1	<4	<1	<1	<1	<1	<1	78	<1	<6	1
JUN											
06...	<1	<4	<1	<1	<1	<1	<1	71	<1	<6	<1
18...	<1	<4	<1	<1	<1	<1	<1	66	<1	<6	<1
JUL											
09...	--	--	--	--	--	--	--	--	--	--	--
22...	<1	<4	<1	<1	1	<1	<1	76	<1	<6	<1
AUG											
27...	<1	<4	<1	<1	1	<1	<1	88	<1	<6	2

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

## WATER-QUALITY DATA

DATE	DIAZ- INON, D10 SRG WAT FLT 0.7 U GF, REC PERCENT (91063)	TERBUTH YLAZINE, SURROGT WAT FLT 0.7 U GF, REC PERCENT (91064)	HCH ALPHA, D6 SRG WAT FLT 0.7 U GF, REC PERCENT (91065)	PROP- CHLOR, WATER, DISS, REC (UG/L) (04024)	BUTYL- ATE, WATER, DISS, REC (UG/L) (04028)	SI- MAZINE, WATER, DISS, REC (UG/L) (04035)	PRO- METON, WATER, DISS, REC (UG/L) (04037)	DEETHYL ATRA- ZINE, WATER, DISS, REC (UG/L) (04040)	CYANA- ZINE, WATER, DISS, REC (UG/L) (04041)	FONOFOS, WATER, DISS, REC (UG/L) (04095)	ALPHA, BHC DIS- SOLVED (UG/L) (34253)
OCT 1995											
24...	105	103	96	<0.007	<0.002	E0.005	<0.018	E0.002	<0.004	<0.003	<0.002
NOV											
28...	102	103	95	<0.007	<0.002	0.013	<0.018	<0.002	<0.004	<0.003	<0.002
DEC											
01...	101	99	89	<0.007	<0.002	0.006	E0.003	<0.002	<0.004	<0.003	<0.002
JAN 1996											
10...	94	120	93	<0.007	<0.002	0.007	<0.018	E0.008	<0.004	<0.003	<0.002
FEB											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	76	86	90	<0.007	<0.002	0.007	<0.018	E0.004	<0.004	<0.003	<0.002
22...	91	89	99	<0.007	<0.002	0.005	E0.004	E0.004	<0.004	<0.003	<0.002
MAR											
12...	82	101	84	<0.007	<0.002	E0.003	<0.018	<0.002	<0.004	<0.003	<0.002
APR											
25...	101	108	96	<0.007	<0.002	0.019	<0.018	E0.004	<0.004	<0.003	<0.002
MAY											
14...	96	104	106	<0.007	<0.002	E0.003	<0.018	E0.001	<0.004	<0.003	<0.002
JUN											
06...	88	102	103	<0.007	<0.002	E0.003	<0.018	<0.002	<0.004	<0.003	<0.002
18...	93	109	60	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004	<0.003	<0.002
JUL											
09...	79	111	111	<0.007	<0.002	<0.005	<0.018	E0.003	<0.004	<0.003	<0.002
22...	90	108	92	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004	<0.003	<0.002
AUG											
27...	89	108	87	<0.007	<0.002	<0.005	<0.018	<0.002	<0.004	<0.003	<0.002
DATE	P, P' DDE, DISSOLV (UG/L) (34653)	CHLOR- PYRIFOS, DIS- SOLVED (UG/L) (38933)	LINDANE, DIS- SOLVED (UG/L) (39341)	DI- ELDRIN, DIS- SOLVED (UG/L) (39381)	METO- LACHLOR, WATER, DISSOLV (UG/L) (39415)	MALA- THION, DIS- SOLVED (UG/L) (39532)	PARA- THION, DIS- SOLVED (UG/L) (39542)	DI- AZINON, DIS- SOLVED (UG/L) (39572)	ATRA- ZINE, WATER, DISS, REC (UG/L) (39632)	ALA- CHLOR, WATER, DISS, REC (UG/L) (46342)	ACETO- CHLOR, WATER, FLTRD REC (UG/L) (49260)
OCT 1995											
24...	<0.006	<0.004	<0.004	<0.001	0.008	<0.005	<0.004	<0.002	0.006	<0.002	<0.002
NOV											
28...	E0.001	<0.004	<0.004	<0.001	0.006	<0.005	<0.004	<0.002	0.012	<0.002	<0.002
DEC											
01...	<0.006	<0.004	<0.004	<0.001	0.007	<0.005	<0.004	<0.002	0.022	<0.002	<0.002
JAN 1996											
10...	<0.006	<0.004	<0.004	<0.001	0.006	<0.005	<0.004	<0.002	0.019	<0.002	<0.002
FEB											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	<0.006	0.005	<0.004	<0.001	0.011	<0.005	<0.004	<0.002	0.024	<0.002	<0.002
22...	<0.006	<0.004	<0.004	<0.001	0.006	<0.005	<0.004	<0.002	0.014	<0.002	<0.002
MAR											
12...	<0.006	<0.004	<0.004	<0.001	E0.003	<0.005	<0.004	<0.002	0.007	<0.002	<0.002
APR											
25...	<0.006	<0.004	<0.004	<0.001	0.005	<0.005	<0.004	<0.002	0.023	<0.002	<0.002
MAY											
14...	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	0.006	<0.002	<0.002
JUN											
06...	<0.006	<0.004	<0.004	<0.001	E0.002	<0.005	<0.004	<0.002	0.005	<0.002	<0.002
18...	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	E0.004	<0.002	<0.002
JUL											
09...	<0.006	<0.004	<0.004	<0.001	0.005	<0.005	<0.004	<0.002	E0.004	<0.002	<0.002
22...	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001	<0.002	<0.002
AUG											
27...	<0.006	<0.004	<0.004	<0.001	<0.002	<0.005	<0.004	<0.002	<0.001	<0.002	<0.002
DATE	METRI- BUZIN, SENCOR WATER DISSOLV (UG/L) (82630)	2,6-DI- ETHYL ANILINE, WAT FLT 0.7 U GF, REC (UG/L) (82660)	TRI- FLUR- ALIN, WAT FLT 0.7 U GF, REC (UG/L) (82661)	ETHAL- FLUR- ALIN, WAT FLT 0.7 U GF, REC (UG/L) (82663)	PHORATE, WATER FLTRD 0.7 U GF, REC (UG/L) (82664)	TER- BACIL, WATER FLTRD 0.7 U GF, REC (UG/L) (82665)	LIN- URON, WATER FLTRD 0.7 U GF, REC (UG/L) (82666)	METHYL PARA- THION, WAT FLT 0.7 U GF, REC (UG/L) (82667)	EPTC, WATER FLTRD 0.7 U GF, REC (UG/L) (82668)	PEB- ULATE, WATER FLTRD 0.7 U GF, REC (UG/L) (82669)	TEBU- THIURON, WATER FLTRD 0.7 U GF, REC (UG/L) (82670)
OCT 1995											
24...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.013	<0.002	<0.006	<0.002	<0.004	<0.010
NOV											
28...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	0.003	<0.004	<0.010
DEC											
01...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	<0.010
JAN 1996											
10...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	<0.010
FEB											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	0.009	<0.003	0.006	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	<0.010
22...	0.009	<0.003	0.007	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	<0.010
MAR											
12...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	<0.010
APR											
25...	<0.004	<0.003	<0.002	<0.004	<0.002	E0.008	<0.002	<0.006	E0.002	<0.004	<0.010
MAY											
14...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	0.004	<0.004	<0.010
JUN											
06...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	0.005	<0.004	<0.010
18...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	0.004	<0.004	<0.010
JUL											
09...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	E0.003	<0.004	<0.010
22...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	<0.010
AUG											
27...	<0.004	<0.003	<0.002	<0.004	<0.002	<0.007	<0.002	<0.006	<0.002	<0.004	<0.010

E- Estimated.



## COLUMBIA RIVER MAIN STEM

14246900 COLUMBIA RIVER AT BEAVER ARMY TERMINAL, NEAR QUNICY, OR--Continued

## WATER-QUALITY DATA

DATE	MOL- INATE, WATER FLTRD 0.7 U GF, REC (UG/L) (82671)	ETHO- PROP, WATER FLTRD 0.7 U GF, REC (UG/L) (82672)	BEN- FLUR- ALIN, WAT FLD 0.7 U GF, REC (UG/L) (82673)	CARBO- FURAN, WATER FLTRD 0.7 U GF, REC (UG/L) (82674)	TER- BUFOS, WATER FLTRD 0.7 U GF, REC (UG/L) (82675)	PRON- AMIDE, WATER FLTRD 0.7 U GF, REC (UG/L) (82676)	DISUL- FOTON, WATER FLTRD 0.7 U GF, REC (UG/L) (82677)	TRIAL- LATE, WATER FLTRD 0.7 U GF, REC (UG/L) (82678)	PRO- PANIL, WATER FLTRD 0.7 U GF, REC (UG/L) (82679)	CAR- BARYL, WATER FLTRD 0.7 U GF, REC (UG/L) (82680)	THIO- BENCARB, WATER FLTRD 0.7 U GF, REC (UG/L) (82681)
OCT 1995											
24...	<0.004	<0.003	<0.002	E0.013	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
NOV											
28...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	E0.004	<0.002
DEC											
01...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
JAN 1996											
10...	<0.004	<0.003	<0.002	<0.003	<0.013	0.005	<0.017	0.004	<0.004	<0.003	<0.002
FEB											
12...	--	--	--	--	--	--	--	--	--	--	--
14...	<0.004	<0.003	<0.002	<0.003	<0.013	0.013	<0.017	0.004	<0.004	<0.003	<0.002
22...	<0.004	<0.003	<0.002	<0.003	<0.013	0.015	<0.017	0.009	<0.004	<0.003	<0.002
MAR											
12...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
APR											
25...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	0.005	<0.004	<0.003	<0.002
MAY											
14...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
JUN											
06...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
18...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
JUL											
09...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
22...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002
AUG											
27...	<0.004	<0.003	<0.002	<0.003	<0.013	<0.003	<0.017	<0.001	<0.004	<0.003	<0.002

DATE	DCPA, WATER FLTRD 0.7 U GF, REC (UG/L) (82682)	PENDI- METH- ALIN, WAT FLT 0.7 U GF, REC (UG/L) (82683)	NAPROP- AMIDE, WATER FLTRD 0.7 U GF, REC (UG/L) (82684)	PRO- PARGITE, WATER FLTRD 0.7 U GF, REC (UG/L) (82685)	METHYL AZIN- PHOS, WAT FLT 0.7 U GF, REC (UG/L) (82686)	PER- METHRIN, CIS WAT FLT 0.7 U GF, REC (UG/L) (82687)	AN- TIMONY, SED. SUSP. (UG/G) (29816)	ARSENIC, SED. SUSP. (UG/G) (29818)	BARIIUM, SED. SUSP. (UG/G) (29820)	BERYL- LIUM, SED. SUSP. (UG/G) (29822)	CADMIUM, SED. SUSP. (UG/G) (29826)
OCT 1995											
24...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	1.1	8.4	490	1.4	0.8
NOV											
28...	E0.000	<0.004	E0.002	<0.013	<0.001	<0.005	0.6	6.4	460	1.4	0.6
DEC											
01...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	0.5	4.1	440	1.4	<0.1
JAN 1996											
10...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	0.7	5.8	510	1.5	0.5
FEB											
12...	--	--	--	--	--	--	0.6	6.1	530	1.3	0.1
14...	E0.001	<0.004	<0.003	<0.013	<0.001	<0.005	0.6	6.5	560	1.4	0.2
22...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	0.7	6.0	580	1.4	0.4
MAR											
12...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	1.0	7.1	580	1.5	0.5
APR											
25...	E0.002	<0.004	<0.003	<0.013	<0.001	<0.005	0.6	4.7	540	1.3	0.4
MAY											
14...	E0.002	<0.004	<0.003	<0.013	<0.001	<0.005	0.9	7.2	510	1.5	1.0
JUN											
06...	E0.001	<0.004	<0.003	<0.013	<0.001	<0.005	1.0	6.5	600	1.6	1.0
18...	<0.003	<0.004	<0.003	<0.013	<0.001	<0.005	1.0	7.9	640	1.6	1.0
JUL											
09...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	1.2	9.4	560	1.4	1.1
22...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	0.9	8.2	550	1.6	1.1
AUG											
27...	<0.002	<0.004	<0.003	<0.013	<0.001	<0.005	1.6	6.3	520	1.5	1.0

E- Estimated.

## COLUMBIA RIVER MAIN STEM

483

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

## WATER-QUALITY DATA

DATE	CHROMIUM, SED. SUSP. (UG/G) (29829)	COPPER, SED. SUSP. (UG/G) (29832)	LEAD, SED. SUSP. (UG/G) (29836)	MANGANESE, SED. SUSP. (UG/G) (29839)	MERCURY, SED. SUSP. (UG/G) (29841)	MOLYBDENUM, SED. SUSP. (UG/G) (29843)	NICKEL, SED. SUSP. (UG/G) (29845)	SELENIUM, SED. SUSP. (UG/G) (29847)	SILVER, SED. SUSP. (UG/G) (29850)	VANADIUM, SED. SUSP. (UG/G) (29853)	ZINC, SED. SUSP. (UG/G) (29855)
OCT 1995											
24...	--	42	60	1400	0.09	--	--	0.4	<0.5	98	190
NOV											
28...	--	61	26	1200	0.07	--	--	0.4	<0.5	130	140
DEC											
01...	--	44	18	840	0.06	--	--	0.2	<0.5	96	96
JAN 1996											
10...	--	48	25	1000	0.07	--	--	0.3	<0.5	110	130
FEB											
12...	45	52	16	910	0.06	<5	29	0.2	0.5	120	140
14...	50	54	18	970	0.10	<5	34	0.2	1.4	130	130
22...	48	43	16	860	0.04	<5	34	0.1	<0.5	120	120
MAR											
12...	57	55	34	1100	0.10	<5	37	0.2	<0.5	120	180
APR											
25...	39	52	12	840	0.04	<5	28	0.1	<0.5	110	120
MAY											
14...	50	59	26	1200	0.06	<5	34	0.6	<0.5	99	180
JUN											
06...	50	40	21	1100	0.08	<5	29	0.4	<0.5	110	180
18...	61	41	25	1000	0.08	<5	36	0.3	<0.5	110	190
JUL											
09...	49	47	38	1200	0.10	<5	29	0.5	<0.5	100	190
22...	54	63	32	1400	0.12	<5	35	0.6	0.5	110	190
AUG											
27...	63	43	21	1500	0.10	<5	61	0.5	--	110	180

DATE	ALUMINUM, SED, SUSP PERCENT (30221)	IRON, SEDI- MENT, SUSP. PERCENT (30269)	PHOSPHORUS, SEDI- MENT, SUSP. PERCENT (30292)	TITANIUM, SEDI- MENT, SUSP. PERCENT (30317)	COBALT, SEDI- MENT, SUSP. (UG/G) (35031)	STRONTIUM, SEDI- MENT, SUSP. (UG/G) (35040)	URANIUM, SEDI- MENT, SUSP. (UG/G) (35046)	LITHIUM, SEDI- MENT, SUSP. (UG/G) (35050)	SEDI- MENT, SUS- PENDEDED (MG/L) (80154)	SEDI- MENT, DIS- CHARGE, SUS- PENDEDED (T/DAY) (80155)	SED. SUSP. SIEVE DIAM. % FINER THAN .062 MM (70331)
OCT 1995											
24...	7.3	4.0	0.16	0.46	17	290	<50	22	9	3620	E89
NOV											
28...	8.5	4.8	0.14	0.60	21	310	<50	25	88	E89600	46
DEC											
01...	8.9	3.9	0.12	0.48	16	430	<50	23	323	E488000	37
JAN 1996											
10...	8.6	4.5	0.14	0.50	19	340	<50	24	42	E41200	63
FEB											
12...	8.9	4.6	0.11	0.57	18	340	<50	29	360	E737000	74
14...	8.8	4.7	0.11	0.59	19	360	<50	31	180	E286000	63
22...	8.7	4.6	0.10	0.53	18	330	<50	31	190	E284000	70
MAR											
12...	8.6	4.6	0.11	0.54	18	320	<50	29	53	E56500	52
APR											
25...	8.4	3.9	0.11	0.50	17	400	<50	26	94	E134000	76
MAY											
14...	7.2	4.0	0.16	0.48	15	280	<50	28	23	E17100	97
JUN											
06...	7.4	4.1	0.12	0.50	18	350	<50	26	52	E63500	57
18...	7.3	4.1	0.13	0.50	18	350	<50	27	60	E71600	61
JUL											
09...	6.7	3.9	0.16	0.44	17	280	<50	27	17	E13400	95
22...	6.6	4.3	0.13	0.49	18	250	<50	24	13	E7340	91
AUG											
27...	6.2	4.3	0.17	0.48	19	280	<50	21	12	E5510	91

E - Estimated.

## COLUMBIA RIVER MAIN STEM

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

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
OCTOBER			NOVEMBER			DECEMBER			JANUARY			
1	149	137	141	153	141	147	---	---	---	---	---	---
2	144	135	141	150	142	147	---	---	---	---	---	---
3	143	136	138	155	146	151	---	---	---	---	---	---
4	144	135	139	156	150	153	---	---	---	---	---	---
5	145	138	142	165	149	159	---	---	---	---	---	---
6	145	139	143	169	158	161	---	---	---	---	---	---
7	146	136	140	164	151	160	---	---	---	---	---	---
8	142	135	138	159	139	149	---	---	---	---	---	---
9	143	136	139	144	131	139	---	---	---	---	---	---
10	---	133	---	148	125	137	---	---	---	---	---	---
11	---	133	---	127	114	120	---	---	---	120	108	111
12	---	---	---	121	104	115	---	---	---	128	118	123
13	---	---	---	110	102	104	---	---	---	136	127	131
14	---	---	---	119	110	116	---	---	---	136	131	134
15	---	---	---	124	114	117	---	---	---	137	128	133
16	---	---	---	128	121	125	---	---	---	132	120	127
17	---	---	---	134	126	130	---	---	---	126	119	123
18	---	---	---	137	128	134	---	---	---	121	118	119
19	---	---	---	135	130	133	---	---	---	124	119	121
20	---	---	---	148	131	143	---	---	---	125	120	122
21	---	---	---	152	145	148	---	---	---	120	113	117
22	---	---	---	153	142	147	---	---	---	123	113	119
23	---	---	---	155	142	148	---	---	---	127	121	124
24	151	---	---	151	137	145	---	---	---	131	126	129
25	151	141	146	143	128	137	---	---	---	133	129	130
26	149	140	145	137	124	130	---	---	---	134	130	132
27	---	142	---	138	121	129	---	---	---	135	130	133
28	---	145	---	125	112	119	---	---	---	135	130	132
29	151	141	147	---	---	---	---	---	---	134	131	132
30	149	142	146	---	---	---	---	---	---	140	133	136
31	151	141	147	---	---	---	---	---	---	141	136	139
MONTH	---	---	---	---	---	---	---	---	---	---	---	---

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
FEBRUARY			MARCH			APRIL			MAY			
1	142	136	140	135	127	131	150	145	148	134	129	131
2	145	141	143	136	132	134	148	143	146	140	133	136
3	146	144	145	135	132	134	151	144	147	144	138	140
4	150	144	147	135	128	132	151	145	148	142	136	139
5	153	144	150	130	126	128	156	148	151	140	136	139
6	144	122	136	131	127	128	155	148	151	141	137	139
7	123	102	112	131	126	128	152	146	149	146	140	142
8	102	76	86	135	129	130	153	146	149	145	141	143
9	78	73	76	141	134	137	153	146	149	143	141	142
10	79	74	77	136	132	133	153	148	150	144	141	143
11	91	79	84	135	131	132	154	149	151	142	139	141
12	100	91	95	133	131	132	156	148	151	143	140	141
13	109	99	104	132	128	130	149	146	148	142	139	141
14	119	109	113	131	128	129	150	146	148	145	139	141
15	123	119	120	135	129	131	160	149	156	145	138	140
16	136	123	130	139	134	136	158	153	155	144	139	141
17	146	135	141	141	135	137	157	153	155	143	139	141
18	145	137	141	148	140	143	159	156	157	139	134	136
19	139	129	135	147	139	141	159	156	158	139	134	136
20	132	123	127	142	139	140	162	157	160	137	130	133
21	124	118	121	142	139	140	161	156	159	131	127	129
22	119	116	117	143	139	140	157	150	154	128	123	125
23	117	113	115	140	138	140	151	126	137	123	118	120
24	117	111	113	143	138	140	126	120	122	119	115	117
25	114	111	112	143	140	141	125	118	121	116	112	114
26	117	112	113	148	140	145	120	118	119	113	108	110
27	118	115	116	144	142	143	125	118	120	108	106	107
28	122	118	120	151	143	148	126	122	124	108	105	106
29	130	122	126	146	142	144	129	125	126	107	104	105
30	---	---	---	153	146	150	131	125	128	110	106	108
31	---	---	---	152	148	150	---	---	---	112	107	109
MONTH	153	73	119	153	126	137	162	118	145	146	104	130

SPECIFIC CONDUCTANCE, US/CM @ 25 DEGREES CENTIGRADE, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	
	JUNE				JULY			AUGUST			SEPTEMBER		
1	114	111	112	109	108	108	125	121	123	145	139	141	
2	114	112	113	110	108	109	130	118	122	141	139	140	
3	115	110	113	113	109	110	124	119	121	143	139	141	
4	116	113	114	113	110	112	123	119	121	148	140	144	
5	116	114	115	114	110	112	124	121	123	147	141	144	
6	116	113	114	114	111	112	127	122	125	146	138	142	
7	117	115	116	114	111	113	127	122	124	142	139	140	
8	118	116	117	115	112	114	130	122	126	143	139	141	
9	119	117	118	117	112	114	130	123	126	146	140	142	
10	120	114	117	116	113	114	132	125	127	149	142	146	
11	117	114	115	119	114	116	130	124	127	154	146	149	
12	115	113	114	120	114	116	128	123	126	150	146	148	
13	115	112	114	119	115	116	132	127	129	152	145	148	
14	117	111	113	117	112	114	130	125	128	152	144	147	
15	115	107	110	118	113	115	134	127	131	148	144	146	
16	108	105	107	118	112	115	131	126	128	149	145	147	
17	107	103	104	115	111	113	135	127	130	151	147	149	
18	106	103	104	114	110	112	133	127	130	152	145	148	
19	109	103	104	116	113	114	131	126	129	150	143	146	
20	109	101	104	116	114	115	138	129	132	150	144	146	
21	107	101	103	116	113	115	140	130	133	151	145	149	
22	108	102	104	118	113	116	135	130	132	149	143	146	
23	106	102	104	118	115	117	138	131	134	148	142	146	
24	107	103	105	123	116	121	138	131	135	147	141	145	
25	108	104	106	126	116	120	139	130	133	151	142	146	
26	108	105	107	124	117	120	143	131	137	148	144	146	
27	111	107	109	121	117	120	140	135	138	154	143	148	
28	114	109	111	121	117	119	142	137	139	149	141	145	
29	112	108	110	122	116	119	142	138	140	150	142	146	
30	109	108	109	126	118	120	143	138	141	143	138	141	
31	---	---	---	126	120	122	142	139	140	---	---	---	
MONTH	120	101	110	126	108	115	143	118	130	154	138	145	

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	19.0	18.0	18.5	12.5	12.0	12.0				---	---	---
2	19.0	18.5	18.5	12.0	11.5	11.5				---	---	---
3	18.5	18.0	18.5	11.5	11.0	11.0				---	---	---
4	18.5	18.0	18.0	11.0	10.5	11.0				---	---	---
5	18.5	18.0	18.0	11.0	10.5	11.0				---	---	---
6	18.0	17.5	18.0	11.0	10.5	11.0				---	---	---
7	18.0	17.5	17.5	11.0	10.5	10.5				---	---	---
8	17.5	17.0	17.5	11.0	11.0	11.0				---	---	---
9	17.5	16.5	17.0	11.0	11.0	11.0				---	---	---
10	17.5	16.5	17.0	11.0	10.5	11.0				---	---	---
11	17.0	16.5	16.5	11.0	10.5	10.5				6.5	6.5	6.5
12	16.5	16.0	16.5	11.0	10.5	11.0				6.5	6.0	6.5
13	16.5	15.5	16.0	11.0	10.5	11.0				6.0	6.0	6.0
14	16.0	15.5	16.0	11.0	10.5	11.0				6.0	6.0	6.0
15	16.0	15.5	16.0	11.0	11.0	11.0				6.5	6.0	6.0
16	16.0	15.5	16.0	11.0	11.0	11.0				6.5	6.5	6.5
17	16.0	15.5	16.0	11.5	11.0	11.0				6.5	6.0	6.0
18	15.5	15.0	15.5	11.5	11.0	11.0				6.0	6.0	6.0
19	15.5	14.5	15.0	11.0	10.5	11.0				6.0	5.5	6.0
20	15.5	15.0	15.0	11.0	10.5	10.5				5.5	5.5	5.5
21	15.0	14.5	15.0	10.5	10.5	10.5				6.0	5.5	5.5
22	14.5	14.0	14.5	10.5	10.5	10.5				6.0	5.5	5.5
23	14.5	14.0	14.5	10.5	10.5	10.5				6.0	5.5	5.5
24	14.5	14.0	14.5	11.0	10.5	10.5				5.5	5.5	5.5
25	14.0	14.0	14.0	11.0	10.5	11.0				5.5	5.5	5.5
26	14.5	13.5	14.0	10.5	10.5	10.5				5.5	5.5	5.5
27	14.5	13.5	14.0	10.5	10.0	10.0				5.5	5.0	5.5
28	14.0	13.5	14.0	10.5	10.0	10.5				5.0	5.0	5.0
29	13.5	13.0	13.5	---	---	---				5.0	5.0	5.0
30	13.5	13.0	13.0	---	---	---				5.0	4.0	4.5
31	13.0	12.5	13.0	---	---	---				4.0	3.0	3.5
MONTH	19.0	12.5	16.0	---	---	---				---	---	---

## COLUMBIA RIVER MAIN STEM

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

TEMPERATURE, WATER (DEG. C), WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

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

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



## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

As the number of streams on which streamflow information is likely to be desired far exceeds the number of stream-gaging stations feasible to operate at one time, the Geological Survey collects limited streamflow data at sites other than stream-gaging stations. When limited streamflow data are collected on a systematic basis over a period of years for use in hydrologic analyses, the site at which the data are collected is called a partial-record station. Data collected at these partial-record stations are usable in low-flow or flood-flow analyses, depending on the type of data collected. In addition, discharge measurements are made at other sites not included in the partial-record program. These measurements are generally made in times of drought or flood to give better areal coverage to these events. Those measurements and others collected for some special reason are called measurements at miscellaneous sites.

Records collected at crest-stage partial-record stations are presented in the following table. Discharge measurements made at low-flow partial-record sites and peak flows at miscellaneous sites and for special studies are given in separate tables.

## Crest-stage partial-record stations

The following table contains annual maximum discharge for crest-stage stations. A crest-stage gage is a device which will register the peak stage occurring between inspections of the gage. A stage-discharge relation for each gage is developed from discharge measurements made by indirect measurements of peak flow or by current meter. The date of the maximum discharge is not always certain but is usually determined by comparison with nearby continuous-record stations, weather records, or local inquiry. Only the maximum discharge for each water year is given. Information on some lower floods may have been obtained but is not published herein. The years given in the period of record represent water years for which the annual maximum has been determined.

## Annual maximum discharge at crest-stage partial-record stations during water year 1996

Station	Location and drainage area	Period of record	Water year 1996 maximum			Period of record maximum		
			Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)	Date	Gage height (ft)	Dis- charge (ft <sup>3</sup> /s)
PUYALLUP RIVER BASIN								
Carbon River (12095690)	Lat. 47°07'00", long 122°13'08", in NE 1/4 SW 1/4 sec. 19, T.19 N., R.5 E., Pierce County, Hydrologic Unit 17110014, 1.5 mi northwest of Orting, and at mile 1.1.	1986-96	2- 8-96	130.88e	---	11-24-90	130.93e	---
Puyallup River (12096500)	Lat 47°11'07", long 122°13'42", on line between sec.25, T.20 1996 N.,R.4 E., and sec.30, T.20 N., R.5 E., Pierce County, at State Highway 162 road crossing, 1.0 mi north of Alderton, 1.0 mi south of Sumner, and at mile 12.2.	1914-27, 1996	2- 9-96	61.15e	41,500	2- 9-96	61.15e	41,500
PEND OREILLE RIVER BASIN								
Calispell Creek near Dalkena, (12396000)	Lat 48°14'40", long 117°20'26", in NE 1/4 SW 1/4 sec.26, T.32 N., R.43 E., Pend Oreille County, 2.4 mi upstream from Calispell Lake, and 4.8 mi west of Dalkena. Drainage area is 68.3 mi <sup>2</sup> .	1950-73†, 1974-96	4-23-96	9.21	1,190	1-15-74	14.38	3,190

† Operated as a continuous-record gaging station.

e Gage height shown is elevation above NGVD 1929.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1996

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured	Measurements	
				previously (water years)	Discharge Date	(ft <sup>3</sup> /s)
CHEHALIS RIVER BASIN						
12024000 South Fork Newaukum River	Newaukum River	Lat 46°34'34", long 122°40'58", on south line of SE 1/4 sec.28, T.13 N., R.1 E., Lewis County, Hydrologic Unit 17100103, on upstream side of county road bridge, 1.0 mi upstream from Lost Creek, 1.7 mi east of Onalaska, and at mile 22.8.	42.4	1945-48†, 1958-71†, 1972-76b, 1978-79b	2- 8-96	a4,200
12020565 Chehalis River	Grays Harbor	Lat 46°37'54", long 123°14'51", in NW 1/4 NE 1/4 sec.12, T.13 N., R.5 W., Lewis County, Hydrologic Unit 17100103, at 1.0 mi west of Rainbow Falls State Park Chandler Road bridge, 1.3 mi east of Doty, and at mile 97.8.	---	1978-95	5-21-96 7-17-96	1,010 84
Skookumchuck River	Chehalis River	Lat 46°43'51", long 122°57'10", in SE 1/4 NE 1/4 Sec.5, T.14 N., R.2 W., Lewis County, at the Pearl Street bridge in Centraillia, and at mile 2.4.	---	---	11- 3-95	123
HUMPTULIPS RIVER BASIN						
12039000 Humtulpis River	Grays Harbor	Lat 47°13'42", long 123°56'23", in NE 1/4 NE 1/4 sec.17, T.20 N., R.10 W., Grays Harbor County, on right bank, southeast of Humtulpis, 2.3 mi upstream from Stevensmile Creek, 3.3 mi downstream from confluence of East and West Forks, and at mile 24.8.	130	1933-35†, 1942, 1942-79†, 1980-82, 1985-95	8-19-96	130
DUNGENESS RIVER BASIN						
Dungeness River	Dungeness Bay	Lat 48°08'37", long 123°07'39", in SW 1/4 SW 1/4, sec.41, T.31 N., R.4 W., Clallam County, at School Road bridge, near Dungeness, and at mile 0.8	---	---	4-15-96 5- 3-96 9-10-96	314 355 98
Dungeness River	.....do.....	Lat 48°07'00", long 123°08'54", on north line of NE 1/4 NE 1/4, sec.11, T.30 N., R.4 W., Clallam County, at Woodcock Road bridge, near Dungeness, and at mile 3.2.	---	---	4-15-96 5- 3-96 9-10-96	315 351 84
Dungeness River	.....do.....	Lat 48°05'08", long 123°08'48", in NE 1/4 NE 1/4, sec.23, T.30 N., R.4 W., Clallam County, at railroad bridge, near Carlsburg, and at mile 5.7.	---	---	4-15-96 5- 3-96 9-10-96	274 308
NISQUALLY RIVER BASIN						
12090200 Muck Creek	Nisqually River	Lat 47°00'20", long 122°32'32", in SW 1/4 NW 1/4 sec.34, T.18 N., R.2 E., Pierce County, Hydrologic Unit 17110019, 0.3 mi downstream from Muck Lake, at north edge of Roy.	86.6	1949, 1956-72†, 1973-76b, 1977	2- 8-96	a1,670
PUYALLUP RIVER BASIN						
12095690 Carbon River	Puyallup River	Lat 47°07'00", long 122°13'08", in NE 1/4 SW 1/4 sec.19, T.19 N., R.5 E., Pierce County, Hydrologic Unit 17110014, 1.5 mi northwest of Orting, and at mile 1.1.	230	1988-95	10-23-95	579
12096500 Puyallup River	Commencement Bay	Lat 47°11'07", long 122°13'42", on line between sec.25, T.20 N., R.4 E., and sec.30, T.20 N., R.5 E., Pierce County, Hydrologic Unit 17110014, at State Highway 162, 1.0 mi north of Alderton, 1.0 mi south of Sumner, and at mile 12.2.	438	1914, 1915-27†, 1944-57, 1982-95	10-26-95 2- 7-96 2-12-96	2,610 18,300 3,540
STILLAGUAMISH RIVER BASIN						
12164510 South Fork Stillaguamish River	Stillaguamish River	Lat 48°12'03", long 122°07'04", in NE 1/4 SE 1/4 sec.2, T.31 N., R.5 E., Snohomish County, at State Highway 530 bridge near northeast corner of Arlington, 0.4 mi upstream from the confluence with the North Fork Stillaguamish River, and at mile 18.2.	255	1966, 1973-75, 1978-92, 1994-95	1-18-96 3-19-96 6-20-96 9-25-96	2,100 1,050 668 708
12165500 North Fork Stillaguamish River	.....do.....	Lat 48°16'48", long 121°42'04", in NW 1/4 NW 1/4 sec.7, T.32 N., R.9 E., Snohomish County, at county highway bridge, 1.0 mi north of Whitehorse, and at mile 30.0.	82.2	1950-57† 1974 1976 1994-95	1-18-96 3-19-96 6-20-96 9-24-96	770 403 162 143
12167700 Stillaguamish River	Port Susan	Lat 48°11'48", long 122°12'33", in SW 1/4 SE 1/4 sec.6, T.31 N., R.5 E., Snohomish County, at Interstate 5, 1.5 mi east of Silvana, 6.7 mi downstream from confluence of North and South Forks of Stillaguamish River, and at mile 11.1.	557	1975†, 1976-95	3-19-96 6-20-96 9-26-96	2,410 1,380 1,270
SKAGIT RIVER BASIN						
12177900 Ladder Creek	Skagit River	Lat 48°40'12", long 121°14'20", in NE 1/4 SE 1/4 sec.21, T.27 N., R.12 E., Whatcom County, Ross Lake National Recreation Area, at Gorge powerhouse, at east edge of Newhalem, and 250 ft upstream from mouth.	7.95	1934, 1960, 1988-95	10-19-95 12- 6-95 2-14-96 4-18-96 6-13-96 8- 6-96	56 50 55 48 61 52

† Operated as a continuous-record gaging station.

a Annual maximum discharge

b Operated as a crest-stage gage.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1996--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured	Measurements	
				previously (water years)	Discharge Date (ft <sup>3</sup> /s)	
SAMISH RIVER BASIN						
12201500 Samish River	Samish Bay	Lat 48°32'44", long 122°20'19" in SE 1/4 SE 1/4 sec. 6, T.35 N., R.4 E., Skagit County, 500 ft downstream from bridge, on old U.S. Highway 99, 0.5 mi downstream from Friday Creek, 5.0 mi north of Burlington, and at mile 10.3.	87.8	1944-71† a1972-79 1972-74 1976-95	10- 4-95 2-28-96 4-25-96 7- 9-96 9- 5-96	38 232 387 37 34
PEND OREILLE RIVER BASIN						
12396000 Calispell River	Pend Oreille River	Lat 48°14'40", long 117°20'26", in NE 1/4 SW 1/4 sec.26, T.32 N., R.43 E., Pend Oreille County, 2.4 mi upstream from Calispell Lake, and 4.8 mi west of Dalkena.	68.3	1950-73†, 1974, 1976-83, a1974-95	10- 3-95 4-10-96 6-18-96	19 286 59
12398600 Pend Oreille River at International Boundary	Columbia River	Lat 48°59'56", long 117°21'09", in SW 1/4 NE 1/4 sec.3 T.40 N., R.43 E., Pend Oreille County, Hydrologic Unit 17010216, on left bank 0.1 mi upstream from international boundary, 0.9 mi downstream from Boundary Dam, 6.0 mi downstream from Slate Creek, 9.7 mi north of Metaline Falls, and at mile 16.1.	25,200 approximately	1913-95	10- 5-95 12- 8-95 2-16-96 4-11-96 6-19-96 8- 6-96	29,600 50,600 54,200 49,600 96,000 32,500
Harvey Creek	Sullivan Lake	Lat 48°46'08", long 117°17'45", in NE, NW sec.30, T.38 N., R.44 E., Pend Oreille County, Hydrologic Unit 17010216, 6.5 mi southeast of Metaline Falls.	---	1967 1993-95	10- 3-95 5-31-96 8- 8-96	37 253 16
SPOKANE RIVER BASIN						
12422990 Hangman Creek at State Line Road, nr Tekoa	Spokane River	Lat 47°12'10", long 117°02'23", in sec.29, T.20 N., R.46 E., Whitman County, Hydrologic Unit 17010306, at county road bridge, 2 mi southeast of Tekoa.	---	1995	12- 1-95 2- 9-96 9-19-96	252 3,760 0.77
SANPOIL RIVER BASIN						
12433890 Sanpoil River upstream from Thirteenmile Creek, near Republic	Columbia River	Lat 48°28'38", long 118°43'41", in SE 1/4 NW 1/4, sec.1, T.34 N., R.32 E., Ferry County, Colville Indian Reservation, at bridge on State Highway 21, 25 ft upstream from Thirteenmile Creek, 2.1 mi upstream from West Fork Sanpoil River, 11.8 mi south of Republic, and at mile 45.5.	263	1972-74† 1975-79 1995	10- 2-95	14
OKANOGAN RIVER BASIN						
12443600 Similkameen River	Okanogan River	Lat 48°56'05", long 119°26'27", in NE 1/4 SW 1/4 sec.28, T.40 N., R.27 E., Okanogan County, at Twelfth Avenue bridge in Oroville.	3,590	1929-30, 1935, 1937, 1939-40, 1943-44, 1975-95	10- 3-95 7-10-96 7-30-96	436 4,760 2,010
CRAB CREEK BASIN						
12470500 Rocky Ford Creek	Moses Lake	Lat 47°18'46", long 119°26'40", in SW 1/4 SW 1/4 sec.16, T.21 N., R.27 E., Grant County, Hydrologic Unit 17020015, on right bank, 1.4 mi downstream from source at Rock Ford Springs, 5.0 mi east of Ephrata, and 6.3 mi upstream from mouth.	12	1909-11, 1942-91†, 1992-95	10-19-95 12-13-95 2-22-96 4- 6-96 6- 4-96	65 49 39 46 62
PALOUSE RIVER BASIN						
13348000 S.F. Palouse River	Palouse River	Lat 46°43'50", long 117°11'00", in NE 1/4 sec.6, T.14 N., R.45 E., Whitman County, Hydrologic Unit 17060108, State Street crossing in Pullman, 600 ft upstream from Missouri Flat Creek.	132	1934-42†, 1948, 1954, 1958 1959-81†, 1982-85, 1994-95	2- 8-96 6-25-96 8-20-96	3,960 19 3.5
13352500 Cow Creek at Hooper	.....do.....	Lat 46°45'56", long 118°08'46", in NW 1/4 NW 1/4 sec.26, T.15 N., R.37 E., Adams County, Hydrologic Unit 17060108, at county road bridge, 0.5 mi upstream from mouth, and 0.5 mi north of Hooper.	679	1951-53†, 1962-70†, 1972, 1974-76, a1971-79	2-12-96 4- 4-96 4-11-96 6- 5-96	31 104 149 49
WALLA WALLA RIVER BASIN						
Mill Creek	Walla Walla River	Lat 45°59'24", long 118°02'58", unsurveyed, T.6 N., R.38 E., Umatilla County, State of Oregon, Hydrologic Unit 17070102, 600 ft downstream from city of Walla Walla Intake, and at mile 25.3.	---	1988-89, 1994-95	7-29-96	19
WASHOUGAL RIVER BASIN						
14143500 Washougal River	Columbia River	Lat 45°37'23", long 122°17'35", in SW 1/4 SE 1/4 sec.27, T.2 N., R.4 E., Clark County, Hydrologic Unit 17080001, 0.6 mi upstream from Cougar Creek, 4.0 mi northeast of Washougal, and at mile 9.2.	108	1944-81†	2- 8-96	a27,100

† Operated as a continuous-record gaging station.

a Annual maximum discharge.

b Operated as a crest-stage gage.

## DISCHARGE AT PARTIAL-RECORD STATIONS AND MISCELLANEOUS SITES

Discharge measurements made at miscellaneous sites during water year 1996--Continued

Stream	Tributary to	Location	Drainage area (mi <sup>2</sup> )	Measured	Measurements	
				previously (water years)	Discharge Date	(ft <sup>3</sup> /s)
KALAMA RIVER BASIN						
14223500 Kalama River	Columbia River	Lat 46°02'42", long 112°48'51", in NE 1/4 SW 1/4 sec.33, T.7 N., R.1 W., Cowlitz County, 2.8 mi northeast of Kalama, 5.7 mi downstream from Italian Creek, at at mile 4.2.	198	1947-75†, 1976-79b 1976-77, 1979	2- 8-96	a24,000
COWLITZ RIVER BASIN						
14243500 Delameter Creek	Cowlitz River	Lat. 46°15'49", long 122°57'58", in NW 1/4 SW 1/4 sec. 17, T.9 N., R.2 W., Cowlitz County, 2.5 mi upstream from mouth and 2.8 mi west of Castle Rock.	19.6	1949-69†	2- 8-96	a3,500
14245000 Coweman	.....do.....	Lat 45°07'42", long 122°50'14", in SE 1/4 SW 1/4 sec.32, T.8 N.,R.1 W., Cowlitz County, Hydrologic Unit 17080005, 3.4 mi southeast of Kelso High School, 3.9 mi downstream from Goble Creek, and at mile 7.5.	119	1950-84†	2- 8-96	a11,700

† Operated as a continuous-record gaging station.

a Annual maximum discharge.

b Operated as a crest-stage gage.

## SPOKANE COUNTY

47401117072901. Local number, 25/45-16C1.

LOCATION.--Lat 47°40'11", long 117°07'29", Hydrologic Unit 17010305, near Greenacres.

Owner: Inland Empire Paper Company.

AQUIFER.--Glacial sand and gravel of Pleistocene Age.

WELL CHARACTERISTICS.--Dug unused irrigation water-table well, diameter 96 in, depth 129 ft, lined with gunite cement to 129 ft.

DATUM.--Elevation of land-surface datum is 2,060.4 ft above sea level.

PERIOD OF RECORD.--April 1929 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 84.56 ft below land-surface datum, June 17, 1953; lowest measured, 114.53 ft below land-surface datum, Dec. 8, 1931.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level
OCT 25	104.16	FEB 20	94.11	MAY 22	93.77	AUG 24	102.43
NOV 22	101.41	MAR 25	95.04	JUN 20	96.47	SEP 25	102.40
JAN 22	98.57	APR 30	94.07	JUL 22	100.39		

## STEVENS COUNTY

475529118052201. Local number, 28/37-13K1.

LOCATION.--Lat 47°55'29", long 118°05'23", Hydrologic Unit 17010307, Spokane Indian Reservation.

Owner: USGS No. 33

AQUIFER.--Holocene alluvium; Pre-Cambrian Granite contact.

WELL CHARACTERISTICS.--Drilled observation-test water table well, diameter 4 in, total depth 9 ft, PVC casing.

DATUM.--Elevation of land-surface datum is 2,140 ft.

REMARKS.--Water level measured in casing.

PERIOD OF RECORD.--May 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 0.24 ft below land-surface datum, Mar. 12, 1996; lowest measured, 3.09 ft below land-surface datum, Aug. 23, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level
OCT 2	0.86	JAN 8	1.03	APR 10	0.44	JUL 2	0.68
OCT 31	0.83	FEB 15	0.87	MAY 9	0.66	AUG 8	0.82
DEC 5	0.77	MAR 12	0.24	JUN 6	0.66	SEP 4	0.79

475530118052301. Local number, 28/37-13L1.

LOCATION.--Lat 47°55'30", long 118°05'23", Hydrologic Unit 17010307, Spokane Indian Reservation.

Owner: USGS No. 34

AQUIFER.--Holocene alluvium; Pre-Cambrian Granite contact.

WELL CHARACTERISTICS.--Drilled observation-test water table well, diameter 4 in, total depth 11 ft, PVC casing.

DATUM.--Elevation of land-surface datum is 2,171 ft.

REMARKS.--Water level measured in casing.

PERIOD OF RECORD.--May 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 2.87 ft below land-surface datum, Mar. 26, 1994; lowest measured, 4.15 ft below land-surface datum, Aug. 26, 1986.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level
OCT 2	3.11	JAN 8	3.35	APR 10	3.13	JUL 2	3.15
OCT 31	3.14	FEB 15	3.11	MAY 9	3.10	AUG 8	3.19
DEC 5	3.20	MAR 12	3.03	JUN 6	3.15	SEP 4	3.32

475529118052301. Local number, 28/37-13L3.

LOCATION.--Lat 47°55'29", long 118°05'23", Hydrologic Unit 17010307, Spokane Indian Reservation.

Owner: USGS No. 32

AQUIFER.--Holocene alluvium; Pre-Cambrian Granite contact.

WELL CHARACTERISTICS.--Drilled observation-test water table well, diameter 4 in, total depth 18 ft, PVC casing.

DATUM.--Elevation of land-surface datum is 2,142 ft.

REMARKS.--Water level measured in casing, temperature, conductance, and pH measurements made from samples pumped (peristaltic pump) from well.

PERIOD OF RECORD.--May 1984 to current year.

EXTREMES FOR PERIOD OF RECORD.--Highest water level measured, 3.26 ft below land-surface datum, Feb. 7, 1995; lowest measured, 5.34 ft below land-surface datum, Aug. 23, 1988.

## WATER LEVEL, IN FEET BELOW LAND-SURFACE DATUM, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

Date	Water Level	Date	Water Level	Date	Water Level	Date	Water Level
OCT 2	3.54	JAN 8	3.75	APR 10	3.28	JUL 2	3.44
OCT 31	3.49	FEB 15	3.57	MAY 9	3.44	AUG 8	3.55
DEC 5	3.46	MAR 12	3.29	JUN 6	3.56	SEP 4	3.64



## QUALITY OF GROUND WATER

## STEVENS COUNTY

LOCATION.--Lat 47°55'29", long 118°05'23", Hydrologic Unit 17010307, Spokane Indian Reservation.

Owner: USGS No. 32

AQUIFER.--Holocene alluvium; Pre-Cambrian Granite contact.

WELL CHARACTERISTICS.--Drilled observation-test water table well, diameter 4 in, total depth 18 ft, PVC casing.

DATUM.--Elevation of land-surface datum is 2,142 ft.

REMARKS.--Water level measured in casing, temperature, conductance, and pH measurements made from samples pumped (peristaltic pump) from well (see Ground-Water Levels section for water levels).

PERIOD OF RECORD.--May 1984 to current year.

## WATER-QUALITY DATA, OCTOBER 1995 TO SEPTEMBER 1996

LOCAL IDENT- I- FIER	STATION NUMBER	GEO- LOGIC UNIT	DATE OF SAMPLE	SPE- CIFIC CON- DUCT- ANCE (US/CM)	PH (UNITS)	TEMPER- ATURE (DEG C)
28/37-13L3	475529118052301	110ALVM	95-10- 2	2060	6.8	11.7
			95-10-31	2390	7.0	9.7
			95-12- 5	2580	6.7	6.6
			96- 1- 8	2630	6.9	5.2
			96- 2-15	2530	6.8	4.1
			96- 3-12	2510	6.6	4.8
			96- 4-10	2400	6.7	6.2
			96- 5- 9	2250	6.8	7.2
			96- 6- 6	2170	6.6	8.9
			96- 7- 2	2170	6.8	10.7
			96- 8- 8	2180	6.7	13.4
			96- 9- 4	2290	6.8	12.6

Page	Page
Access to WATSTORE data .....	43
Ahtanum Creek at Union Gap .....	403
Alder Reservoir at Alder .....	136
American River near Nile .....	401
Andrews Creek near Mazama .....	361,362
Asotin Creek at Asotin .....	416
below Kearney Gulch, near Asotin .....	415
Baker Lake, contents of .....	275,276
Baker River at Concrete .....	277
Bear Creek near Redmond .....	219
Big Beef Creek near Seabeck .....	120
Big Creek near Grisdale .....	80
Big Quilcene River below diversion dam, near Quilcene .....	105
Big Soos Creek above hatchery, near Auburn .....	183-185
Blue Creek, above Midnite Mine Drainage, near Wellpinit .....	325-330
below Midnite Mine Drainage, near Wellpinit .....	337-341
near Mouth, near Wellpinit .....	343-347
Boise Creek at Buckley .....	162
Boulder Creek near Cedar Falls .....	204
Boxley Creek near Cedar Falls .....	239
near Edgewick .....	241
Calawah River near Forks .....	89
Canyon Creek near Cedar Falls .....	207
Carbon River near Fairfax .....	154
Castle Lake near Mount St. Helens .....	464
Cedar Lake (Masonry Pool) near Cedar Falls .....	206
Cedar River, at Cedar Falls .....	208
at Renton .....	212-214
below Bear Creek, near Cedar Falls .....	201
below diversion, near Landsburg .....	211
near Cedar Falls .....	202
near Landsburg .....	210
Centralia Power Canal near McKenna .....	141
Chamokane Creek below Falls, near Long Lake .....	324
Chehalis River, at Porter .....	76
near Doty .....	70
near Grand Mound .....	75
Chehalis River Basin, discharge measurements at miscellaneous sites in .....	488
Chelan River at Chelan .....	373
Chester Morse Lake at Cedar Falls .....	205
Chewuch River at Winthrop .....	363
Chiwawa River near Plain .....	377
Cispus River near Randle .....	456
Clarks Creek at Tacoma Road, near Puyallup .....	168,169
Clear Creek at Pioneer Way, below fish hatchery, near Tacoma .....	170
Clover Creek near Tillicum .....	144
North Fork, near Parkland .....	143
Coldwater Lake near Spirit Lake .....	463
Columbia River, at Beaver Army Terminal .....	479-486
at Birchbank .....	298
at Bridgeport .....	353
at Grand Coulee Dam .....	352
at international boundary .....	305
at Northport .....	306-310
at Richland .....	399
at Rocky Reach Dam .....	376
at Stevenson .....	441,442
at The Dalles .....	435
at Vernita Bridge, near Priest Rapids Dam .....	397,398
below Bonneville Dam .....	443,444
below Priest Rapids Dam .....	396
below Rock Island Dam .....	382
below Wells Dam .....	368
on Clover Island, at Kennewick .....	408
Colville River at Kettle Falls .....	314
Cooperation .....	2
Cowlitz River, at Castle Rock .....	477
at Packwood .....	454
at Randle .....	455
below Mayfield Dam .....	461
near Kosmos .....	457
Cowlitz River Basin, discharge measurements at miscellaneous sites in .....	490
Crab Creek, at Irby .....	383
near Beverly .....	391-393
near Moses Lake .....	384
Crab Creek Basin, discharge measurements at miscellaneous sites in .....	489
Crab Creek Lateral above Royal Lake, near Othello .....	388-390
Crest-stage partial-record stations, discharge at .....	487
Definition of terms .....	44-54
Deschutes River at E Street Bridge, at Tumwater .....	132,133
near Rainier .....	131
Devils Hole Creek at Bangor Subbase, near Bangor .....	121
Diablo Reservoir, contents of .....	275,276
Discharge at partial-record stations and miscellaneous sites .....	488-490
Duckabush River near Brinnon .....	106
Dungeness River Basin, discharge measurements at miscellaneous sites in .....	488
Dungeness River near Sequim .....	87
Duwamish River at golf course, at Tukwila .....	197,198
Elwha River above Lake Mills, near Port Angeles .....	93-97
at McDonald Bridge, near Port Angeles .....	99-101
Entiat River near Ardenvoir .....	374
near Entiat .....	375
Esquatzel Coulee at Connell .....	407
Explanation of the records .....	30-54
Feeder Canal at Grand Coulee .....	350
Fish Trap Creek at Flynn Road, at Lynden .....	289-292
Flett Creek at Tacoma .....	147
Franklin D. Roosevelt Lake at Grand Coulee Dam .....	351
Gaging station records .....	62-486
Gamble Creek near Port Gamble .....	122
Gorge Reservoir, contents of .....	275,276
Grande Ronde River at Troy, Oregon .....	411
Green River (Duwamish River Basin) above Twin Camp Creek, near Lester .....	175-177
at purification plant, near Palmer .....	180
below Howard A. Hanson Reservoir .....	179
near Auburn .....	186
Greenwater River at Greenwater .....	157
Ground-water levels in: Spokane County .....	491
Stevens County .....	491
Hangman Creek at Spokane .....	320
Hoh River at U.S. Highway 101, near Forks .....	88
Hoko River near Sekiu .....	92
Howard A. Hanson Reservoir near Palmer .....	178
Huge Creek near Wauna .....	128
Humtulpis River Basin, discharge measurements at miscellaneous sites in .....	488
Hylebos Creek at Highway 99, at Fife .....	172
Icicle Creek above Snow Creek, near Leavenworth .....	379
Introduction .....	1
Issaquah Creek, near Hobart .....	216
near mouth, near Issaquah .....	217
Johnson Creek near Poulsbo .....	125
DNR site, near Poulsbo .....	123
North Fork, near Poulsbo .....	124
Kalama River Basin, discharge measurements at miscellaneous sites in .....	490
Kettle River, near Ferry .....	312
near Laurier .....	313
Klickitat River above West Fork, near Glenwood .....	436
near Pitt .....	437
La Grande Reservoir at La Grande .....	137
Lake Chelan at Chelan .....	372
Lake Merwin, contents of .....	451
Lake Mills at Glines Canyon, near Port Angeles .....	98
Lake Shannon, contents of .....	275,276
Lake Tapps Diversion at Dieringer .....	166
Lake Tapps near Sumner .....	165
Lakes and Reservoirs: Alder Reservoir at Alder .....	136
Baker Lake .....	247,276
Castle Lake, near Mount St. Helens .....	464
Cedar Lake (Masonry Pool) near Cedar Falls .....	206
Chelan, Lake, at Chelan .....	372
Chester Morse Lake at Cedar Falls .....	205
Coldwater Lake near Spirit Lake .....	463
Diablo Reservoir .....	275,276
Franklin D. Roosevelt Lake at Grand Coulee Dam .....	351
Gorge Reservoir .....	275,276
Howard A. Hanson Reservoir near Palmer .....	178
La Grande Reservoir at La Grande .....	137
Lenore Lake near Soap Lake .....	385
Long Lake at Long Lake .....	322
Mayfield Reservoir near Silver Creek .....	460
Merwin, Lake .....	451
Mills, Lake, at Glines Canyon, near Port Angeles .....	98
Moses Lake at Moses Lake .....	387
Mud Mountain Lake near Buckley .....	159
Osoyoos Lake near Oroville .....	355
Rattlesnake Lake at Cedar Falls .....	240
Riffe Lake near Mossyrock .....	458
Ross Reservoir near Newhalem .....	266
Sammamish Lake near Redmond .....	218
Shannon, Lake .....	275,276
Soap Lake near Soap Lake .....	386
South Fork Tolt Reservoir near Carnation .....	251
Spada Lake near Startup .....	230
Spirit Lake at Tunnel, at Spirit Lake .....	462
Sullivan Lake near Metaline Falls .....	302
Swift Reservoir .....	451
Tapps, Lake, near Sumner .....	165
Wynoochee Lake near Grisdale .....	78
Yale Reservoir .....	451

	Page
Leach Creek near Fircrest .....	148
near Steilacoom .....	149
Lenore Lake near Soap Lake .....	385
Lewis River at Ariel .....	452
East Fork, near Heisson .....	453
Little Spokane River at Dartford .....	321
Long Lake at Long Lake .....	322
Mashel River near La Grande .....	139
Mayfield Reservoir near Silver Creek .....	460
Mercer Creek near Bellevue .....	215
Methow River above Goat Creek, near Mazama .....	360
at Twisp .....	366
at Winthrop .....	364
near Pateros .....	367
Midnite Mine Drainage near Wellpinit .....	331-336
Mill Creek at Earthworks Park, at Kent (Duwamish River Basin .....	188
at Walla Walla (Walla Walla River Basin) .....	433
near mouth at Orillia (Duwamish River Basin) .....	189-193
near Walla Walla (Walla Walla River Basin) .....	432
Mineral Creek near Mineral .....	135
Moses Lake at Moses Lake .....	387
Muddy River below Clear Creek, near Cougar .....	447-449
Mud Mountain Lake near Buckley .....	159
Myers Creek near Chesaw .....	311
Naselle River near Naselle .....	65
Newaukum Creek near Black Diamond .....	181,182
Newaukum River near Chehalis .....	71
Newhalem Creek near Newhalem .....	269
Nisqually River at La Grande .....	138
at McKenna .....	142
near National .....	134
Nisqually River Basin, discharge measurements at miscellaneous sites in .....	488
Nooksack River, at Brennan .....	294,295
at Deming .....	285
at Ferndale .....	293
at North Cedarville .....	286-288
Middle Fork, near Deming .....	283
North Fork, below Cascade Creek, near Glacier .....	282
South Fork, near Wickersham .....	284
North River near Raymond .....	67
Ohop Creek near Eatonville .....	140
Okanagan River at Oroville .....	356
at Malott .....	359
near Oliver, British Columbia .....	354
near Tonasket .....	358
Okanogan River Basin, discharge measurements at miscellaneous sites in .....	489
Osoyoos Lake near Oroville .....	355
Outlet Creek near Metaline Falls .....	303
Palouse River at Hooper .....	418-422
Palouse River Basin, discharge measurements at miscellaneous sites in .....	489
Pend Oreille River at Newport .....	299
below Box Canyon, near Ione .....	300
Pend Oreille, crest-stage partial record stations in .....	487
discharge measurements at miscellaneous sites in .....	489
Pilchuck Creek near Bryant .....	263
Pilchuck River near Snohomish .....	261
Providence Coulee near Cunningham .....	406
Publications on Techniques of Water-Resources Investigations .....	55-58
Puyallup River at Puyallup .....	167
near Electron .....	152
near Orting .....	153
Puyallup River Basin, discharge measurements at miscellaneous sites in .....	488
Quality of ground water: Stevens County .....	492
Queets River near Clearwater .....	87
Quinault River at Quinault Lake .....	86
Raging River near Fall City .....	244
Rattlesnake Lake at Cedar Falls .....	240
Reservoirs, See Lakes and Reservoirs in Lewis River Basin .....	451
in Skagit River Basin .....	275,276
Rex River near Cedar Falls .....	203
Riffe Lake near Mossyrock .....	458
Ross Reservoir near Newhalem .....	266
Samish River Basin, discharge measurements at miscellaneous sites in .....	489
Sammamish Lake near Redmond .....	218
Sammamish River near Woodinville .....	220
Sanpoil River Basin, discharge measurements at miscellaneous sites in .....	489
Satsop River near Satsop .....	77
Sauk River above White Chuck River, near Darrington .....	273
near Sauk .....	274
Schafer Creek near Grisdale .....	82

	Page
Similkameen River near Nighthawk .....	357
Skagit River at Marblemount .....	270-272
at Newhalem .....	268
near Concrete .....	278
near Mount Vernon .....	279
Skagit River Basin, discharge measurements at miscellaneous sites in .....	488
Skokomish River, near Potlatch .....	118,119
North Fork, below Lower Cushman Dam, near Potlatch .....	113-115
North Fork, below Staircase Rapids, near Hoodsport .....	109-112
North Fork, near Potlatch .....	116
South Fork, near Union .....	117
Skookumchuck River near Bucoda .....	74
below Bloody Run Creek, near Centralia .....	73
near Vail .....	72
Skykomish River near Gold Bar .....	227
Snake River at Burbank .....	424-429
below Ice Harbor Dam .....	423
near Anatone .....	412-414
Snohomish River near Monroe .....	260
Snoqualmie River, near Carnation .....	259
near Snoqualmie .....	243
Middle Fork, near Tanner .....	235
North Fork, near Snoqualmie Falls .....	236
South Fork, above Alice Creek, near Garcia .....	237
South Fork, at Edgewick .....	238
South Fork, at North Bend .....	242
Soap Lake near Soap Lake .....	386
South Prairie Creek at South Prairie .....	155,156
Spada Lake near Startup .....	230
Special networks and programs .....	29,30
Speelyai Creek near Cougar .....	450
Spirit Lake at Tunnel, at Spirit Lake .....	462
Spokane River at Long Lake .....	323
at Spokane .....	319
near Post Falls, Idaho .....	317,318
Spokane River Basin, discharge measurements at miscellaneous sites in .....	489
Springbrook Creek at Tukwila .....	194-196
near Orillia .....	187
Stehekin River at Stehekin .....	371
Stillaguamish River, North Fork, near Arlington .....	262
Stillaguamish River Basin, discharge measurements at miscellaneous sites in .....	488
Sullivan Creek above Outlet Creek, near Metaline Falls .....	301
at Metaline Falls .....	304
Sullivan Lake near Metaline Falls .....	302
Sultan River below diversion dam, near Sultan .....	231
below powerplant, near Sultan .....	232-234
South Fork, near Sultan .....	229
Summary of hydrologic conditions .....	3-25
Swan Creek at 80th Street East, near Tacoma .....	171
Swift Reservoir, contents of .....	451
Taylor Creek near Selleck .....	209
Thornton Creek near Seattle .....	221-224
Thunder Creek (Skagit River basin) near Newhalem .....	267
Tilton River above Bear Canyon Creek, near Cinebar .....	459
Tolt River, near Carnation .....	258
North Fork, near Carnation .....	245-247
South Fork, below regulating basin, near Carnation .....	255-257
South Fork, near Carnation .....	252-254
South Fork, near Index .....	248-250
South Fork Tolt Reservoir near Carnation .....	251
Toutle River at Tower Road, near Silver Lake .....	473-476
North Fork, below Sediment Retention Structure, near Kid Valley .....	465
South Fork, at Camp 12, near Toutle .....	466-468
South Fork, at Toutle .....	469-472
Trout Creek near Stabler .....	439
Tucannon River near Starbuck .....	417
Twisp River near Twisp .....	365
Wallace River at Gold Bar .....	228
Walla Walla River near Touchet .....	434
Walla Walla River Basin, discharge measurements at miscellaneous sites in .....	489
Wenatchee River at Monitor .....	381
at Peshastin .....	380
at Plain .....	378
White River (Puyallup River basin) at Buckley .....	163
below Clearwater River, near Buckley .....	158
Canal at Buckley .....	161
near Auburn .....	164
near Buckley .....	160
White Salmon River near Underwood .....	438
Willapa River near Willapa .....	66
Wind River near Carson .....	440
Wynoochee Lake near Grisdale .....	78
Wynoochee River, above Black Creek, near Montesano .....	83
above Save Creek, near Aberdeen .....	81
near Grisdale .....	79
Yale Reservoir, contents .....	451
Yakima River, above Ahtanum Creek, at Union Gap .....	402
at Kiona .....	405
at Mabton .....	404
at Umtanum .....	400







## CONVERSION FACTORS AND VERTICAL DATUM

Multiply	By	To obtain
<i>Length</i>		
inch (in.)	$2.54 \times 10^1$	millimeter
	$2.54 \times 10^{-2}$	meter
foot (ft)	$3.048 \times 10^{-1}$	meter
mile (mi)	$1.609 \times 10^0$	kilometer
<i>Area</i>		
acre	$4.047 \times 10^3$	square meter
	$4.047 \times 10^{-1}$	square hectometer
	$4.047 \times 10^{-3}$	square kilometer
square mile (mi <sup>2</sup> )	$2.590 \times 10^0$	square kilometer
<i>Volume</i>		
gallon (gal)	$3.785 \times 10^0$	liter
	$3.785 \times 10^0$	cubic decimeter
	$3.785 \times 10^{-3}$	cubic meter
million gallons (Mgal)	$3.785 \times 10^3$	cubic meter
	$3.785 \times 10^{-3}$	cubic hectometer
cubic foot (ft <sup>3</sup> )	$2.832 \times 10^1$	cubic decimeter
	$2.832 \times 10^{-2}$	cubic meter
cubic-foot-per-second day [(ft <sup>3</sup> /s) d]	$2.447 \times 10^3$	cubic meter
	$2.447 \times 10^{-3}$	cubic hectometer
acre-foot (acre-ft)	$1.233 \times 10^3$	cubic meter
	$1.233 \times 10^{-3}$	cubic hectometer
	$1.233 \times 10^{-6}$	cubic kilometer
<i>Flow</i>		
cubic foot per second (ft <sup>3</sup> /s)	$2.832 \times 10^1$	liter per second
	$2.832 \times 10^1$	cubic decimeter per second
	$2.832 \times 10^{-2}$	cubic meter per second
gallon per minute (gal/min)	$6.309 \times 10^{-2}$	liter per second
	$6.309 \times 10^{-2}$	cubic decimeter per second
	$6.309 \times 10^{-5}$	cubic meter per second
million gallons per day (Mgal/d)	$4.381 \times 10^1$	cubic decimeter per second
	$4.381 \times 10^{-2}$	cubic meter per second
<i>Mass</i>		
ton (short)	$9.072 \times 10^{-1}$	megagram or metric ton

*Sea level:* In this report “sea level” refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment for the first-order level nets of both the United States and Canada, formerly called Sea Level Datum of 1929.

U.S. DEPARTMENT OF THE INTERIOR  
U.S. Geological Survey  
1201 Pacific Avenue, Suite 600  
Tacoma, WA 98402

---

