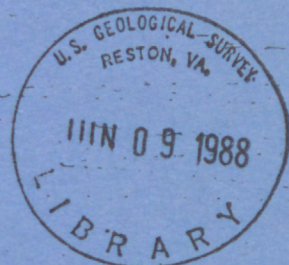
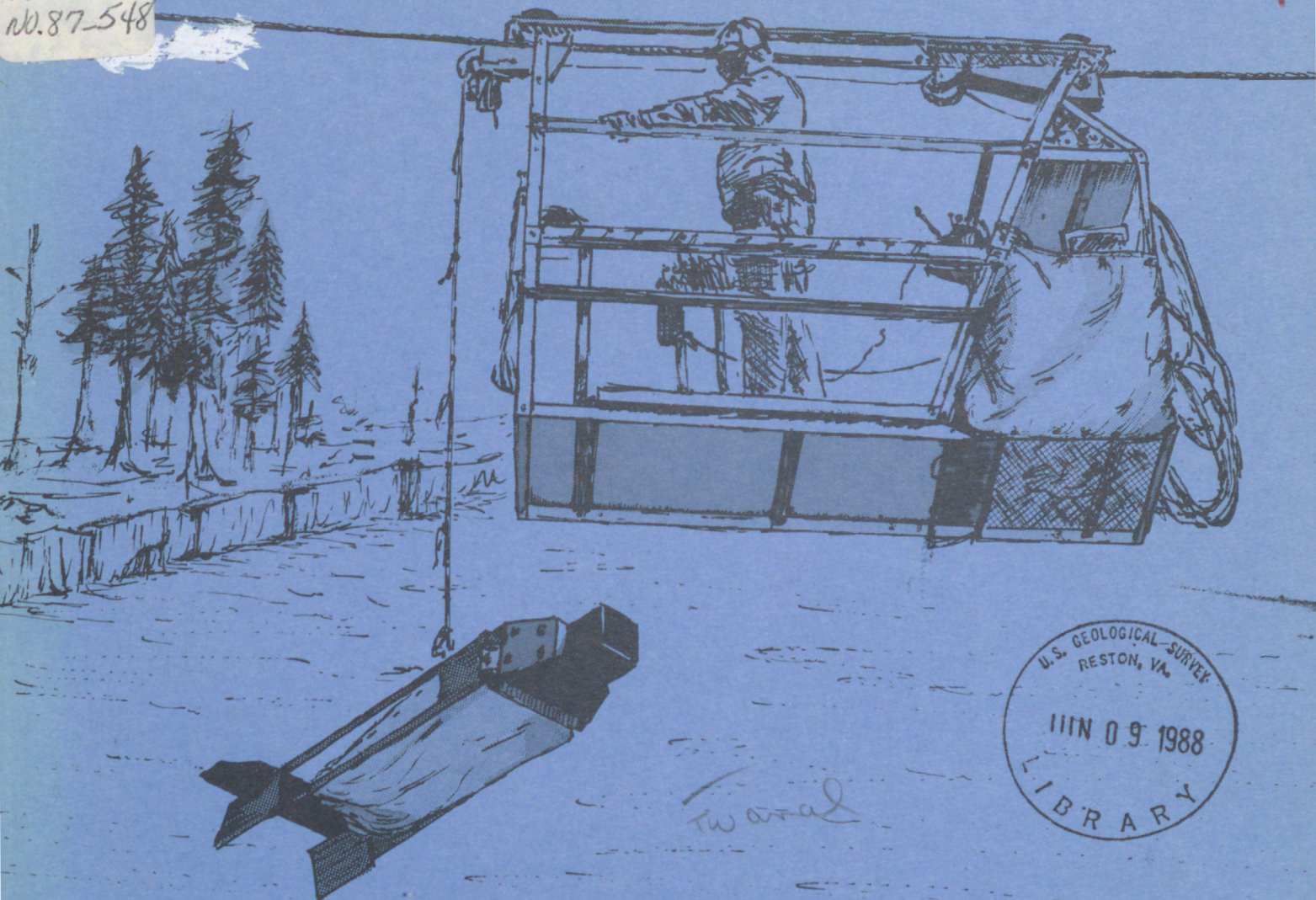


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HYDROLOGIC DATA FOR COMPUTATION OF SEDIMENT DISCHARGE

TOUTLE AND NORTH FORK TOUTLE RIVERS NEAR MOUNT ST. HELENS, WASHINGTON

WATER YEARS 1980-84

U. S. GEOLOGICAL SURVEY

Open-File Report 87-548





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TOUTLE AND NORTH FORK TOUTLE RIVERS
NEAR MOUNT ST. HELENS, WASHINGTON

WATER YEARS 1980-84

By Dallas Childers, Stephen E. Hammond, and William P. Johnson

U. S. GEOLOGICAL SURVEY

Open-File Report 87-548

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Vancouver, Washington
1988



UNITED STATES DEPARTMENT OF THE INTERIOR

DONALD PAUL HODEL, Secretary

GEOLOGICAL SURVEY

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CONVERSION FACTORS

The International System (SI) units used in this report can be converted to standard units by using the following factors:

MULTIPLY	BY	TO OBTAIN
gram per centimeter cubed (g/cm^3)	62.43	¹ pound per foot cubed (lb/ft^3)
kilogram (kg)	2.205	¹ pound (lb)
kilometer (km)	0.6214	mile (mi)
kilometer squared (km^2)	0.3861	mile squared (mi^2)
meter (m)	3.281	foot (ft)
meter squared (m^2)	10.76	foot squared (ft^2)
meter per second (m/s)	3.281	foot per second (ft/s)
meter cubed per sec (m^3/s)	35.31	foot cubed per second (ft^3/s)
millimeter (mm)	0.03937	inch (in)

Temperature in degrees Celsius can be converted to degrees Fahrenheit by using the following formula: $^{\circ}\text{F} = 1.8 \times ^{\circ}\text{C} + 32.0$.

¹This equivalence, from mass to weight, is based on a gravitational acceleration of 32.17 ft/sec^2 .

EXPLANATION OF TERMS

Altitude. - In this report, altitude refers to distance above or below the National Geodetic Vertical Datum of 1929 (NGVD of 1929), a geodetic datum derived from the general adjustment of the first order level nets of both the United States and Canada, formerly called "Mean Sea Level of 1929".

Armoring. - The formation of a resistant layer of relatively large particles resulting from removal of finer particles by erosion.

Bedload. - Material moving on or near the streambed by rolling, sliding, and sometimes making brief excursions into the flow a few grain diameters above the bed.

Bedload discharge. - The quantity of bedload passing a cross section in a unit of time.

Bed material. - The sediment mixture of which the bed is composed.

Bed-material discharge. - The discharge of sediment particles whose sizes are the same as those present in significant quantities in the bed.

Bulk density. - The ratio of the mass of a bulk sample to its in-situ volume, including the interstitial space.

Bulk sample. - An undisturbed sample of a sediment deposit, including the volume of the interstitial spaces.

Cross-section sample. - A sample of a definable property collected at one or more locations in a cross section in such a manner as to be representative of the property throughout the entire cross section.

Depth-integration. - A method of sampling at every point throughout the sampled depth whereby a water-sediment mixture is collected so that the contribution to the sample from each point is proportional to the stream velocity at the point. This yields a discharge-weighted sample. Ordinarily, depth integration is performed by traversing either a depth- or point-integrating sampler vertically at a selected, constant rate.

Depth-integrated sample. - A discharge-weighted (velocity-weighted) sample of water-sediment mixture collected in accordance with the technique of depth integration. The discharge of any property of the sample expressible as a concentration can be obtained as the product of a coefficient, the concentration, and the water discharge represented by the sample.

Equal-discharge increment (EDI) method. - A procedure for obtaining the discharge-weighted suspended-sediment concentration at a cross section by collecting a depth-integrated sample at each equal-flow segment centroid across the cross section.

Gaging station. - A site where streamflow and other hydrologic data are systematically collected.

Hydraulic radius. - The ratio of the area of a flow cross section to its wetted perimeter.

Manning's "n" roughness coefficient. - A flow resistance coefficient.

Particle density. - The ratio of the mass of a sediment particle to its volume.

Particle-size distribution. - The frequency distribution of the relative amounts of particles in a sample that are within specified size ranges, or a cumulative frequency distribution of the relative amounts of particles coarser or finer than specified sizes. Relative amounts may be expressed as percentages by mass or by numbers of particles in each size class.

Reach. - A segment along a stream channel between two specified cross sections.

Sediment discharge. - The mass or volume of sediment (usually mass) passing a stream transect in a unit of time. The term may be qualified, for example, as suspended-sediment discharge, bedload discharge, or total-sediment discharge.

Sediment load. - A general term for sediment in transport. It is not synonymous with either discharge or concentration (see bedload and suspended-sediment load).

Slope. - The difference in elevation between two points divided by the horizontal distance between the points. Water-surface and streambed slopes pertain to distance along the channel.

Suspended sediment. - Sediment that is suspended by the upward components of turbulent currents.

Suspended-sediment discharge. - The quantity of suspended sediment passing a cross section in a unit of time.

Suspended-sediment load. - That part of the sediment load which is in suspension.

Total-sediment load. - All of the sediment in transport; the sum of the bedload and suspended-sediment load.

Wetted perimeter. - The length of the contact between the flow and the containing channel at a cross section oriented normal to the flow.



North Fork Toutle River near Kid Valley, Washington; looking downstream toward the cableway, March 1985. Note the river bend downstream of the cable.

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TOUTLE AND NORTH FORK TOUTLE RIVERS
NEAR MOUNT ST. HELENS, WASHINGTON
1980-84

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ABSTRACT

Immediately after the devastating May 18 1980 eruption of Mount St. Helens, a program was initiated by the U.S. Geological Survey to study the streamflow and sediment characteristics of streams impacted by the eruption. Some of the data gathered in that program are presented in this report. Data are presented for two key sites in the Toutle River basin: North Fork Toutle River near Kid Valley, and Toutle River at Tower Road, near Silver Lake. The types of data presented are appropriate for use with sediment transport formulas; however, the data are also intended for use in a wide variety of additional applications.

The data presented in this report are unique because they delineate flow conditions possessing great potential for sediment transport. The data define a wide range of conditions including high stream velocity and turbulence and unusually high suspended-sediment concentration. Data defining hydraulic, peak discharge, suspended-sediment, and bed-material characteristics are presented.

INTRODUCTION

The 1980 eruptions of Mount St. Helens greatly altered the streamflow and sediment yield characteristics of most river basins adjacent to the mountain. Streamflow and sediment discharge data were needed immediately for evaluation of hazards and management of problems caused by altered rainfall-runoff relations and sediment delivery to lower basins. Immediately following the devastation caused by the eruption and associated mudflows of May 18 1980 the U.S. Geological Survey began a program to define hydraulic and sedimentologic characteristics of impacted streams, and to monitor changes in those characteristics over time. This program produced data unique in their wide ranging values, including rarely documented high sediment concentrations and greatly altered channel hydraulic characteristics.

Purpose and Scope

This report presents data collected at two sites in the Toutle River basin, North Fork Toutle River near Kid Valley and Toutle River at Tower Road, near Silver Lake. The data are presented in a format designed to facilitate their use in the computation of sediment discharge (bedload discharge, bed-material discharge, or total-sediment discharge) by a variety of formulas. Only sets of quality data containing all or most of the hydraulic and sediment characteristics required are included. Detailed descriptions of the data-collection sites are presented as an aid to use of the data. The following categories of data are presented:

Hydraulic characteristics: detailed data from streamflow measurements;

Peak water-discharge characteristics: selected peak water discharges and associated peak suspended-sediment concentrations;

Suspended-sediment characteristics: concentrations and particle-size distributions of suspended sediment;

Bed-material characteristics: particle-size distributions; density, shape, lithology, and axial dimension of selected particles; and bulk densities of bed deposits.

Acknowledgements

During the first year following the eruption of Mount St. Helens, May 1980 to April 1981, hydrologic data presented in this report were collected by the staff of the Tacoma Field Office of the Water Resources Division (WRD), U.S. Geological Survey (USGS). In spring 1981, responsibility for collection of hydrologic data was assigned to the newly formed Data Surveillance Section at the Cascades Volcano Observatory (CVO) in Vancouver, Washington. Laboratory analyses of sediment samples were made by USGS sediment laboratories in Tacoma, Washington and Sacramento, California until December 1981; after that time they were made by the laboratory at CVO.

Thanks are owed to the technicians and professionals from the Tacoma, Washington field office and CVO who contributed their expertise, brawn, and persistence, to gather data under difficult field conditions. A particular debt is owed to: T. D. Arhart, A. D. Bequette, D. M. Bice, S. R. Brantley, J. S. Brown, K. A. Cameron, C. Collins, S. E. Cox, J. K. Culbertson, R. L. Dinehart, J. E. Dodge, M. P. Doukas, G. L. Gallino, J. D. Graham, S. A. Gustafson, T. W. Hale, K. L. Hein, E. Y. Iwatsubo, R. J. Janda, R. L. Jesser, T. G. Kane, R. L. Kittelson, J. W. Langerack, G. Lansky, W. W. Larson, K. K. Lee, T. A. Leighley, K. W. Lewis, R. J. McLean, D. F. Meyer, M. B. Miles, C. A. Onions, B. S. Peck, T. C. Pierson, R. E. Quistorff, L. L. Reed, K. R. Spicer, M. A. Uhrich, and R. L. Wunderman.

DESCRIPTION OF THE AREA

The North Fork and South Fork Toutle Rivers lie in adjacent basins which trend generally west-northwest and originate on the north and west slopes of Mount St. Helens. Downstream from the confluence of the two forks, the Toutle River flows generally westward to its confluence with the Cowlitz River near Castle Rock, Washington, about 87 river km (by way of the North Fork) from the crater of Mount St. Helens (fig. 1). Altitudes in the basin range from about 10 m at the mouth of the Toutle River to 2,549 m on the south rim of the volcano crater. The drainage area of the North Fork Toutle River basin is 781 km², the South Fork Toutle River basin is 328 km², and the entire Toutle River basin is 1,326 km².

HYDROLOGIC CONDITIONS

The hydrologic characteristics of most basins near Mount St. Helens were profoundly altered by the eruptions of 1980. Huge volumes of readily erodible sediment were created, channel transport capacities were increased, and rainfall-runoff relations were greatly altered.

On May 18 1980, the lateral blast felled trees and deposited non-cohesive sediment on steep mountainous terrane in the Toutle River basin (Janda and others, 1984). The debris avalanche, which traveled down the North Fork Toutle River valley floor, created a massive sediment deposit and blocked the outflow from Spirit Lake. Many downstream tributaries to the North Fork Toutle River were also blocked, creating several new lakes (Childers and Carpenter, 1985). Several of the new lakes have breached and released the impounded waters. The resulting flows eroded the avalanche deposit and transported large quantities of sediment downstream. Pyroclastic flows and ashfall from the May 18 and ensuing 1980 eruptions deposited fresh sediment to depths of tens of meters in the upper basin. Mudflows in the basin on May 18 overwhelmed the original pool and riffle geometries, leaving steep-sloped, sand-dominated channels with the potential for higher velocities and greater sediment discharges.

Examination of post eruption meteorologically-induced flows shows increased runoff and shorter accumulation times for given amounts of rainfall than were observed prior to May 18 1980. (Orwig and Matheson, 1981). Annual precipitation varies from 1,200 mm near the mouth of the Toutle River (Orwig, C.E., National Weather Service, oral communication, 1986), to more than 3,200 mm on the upper slopes of the volcano (Phillips, 1974). Most of the precipitation takes place between October and March, frequently occurring as snow at higher altitudes. The largest meteorologically-induced flow of record in the Toutle River basin was caused by rain falling on snowpack, a combination that typically has caused many high flows.

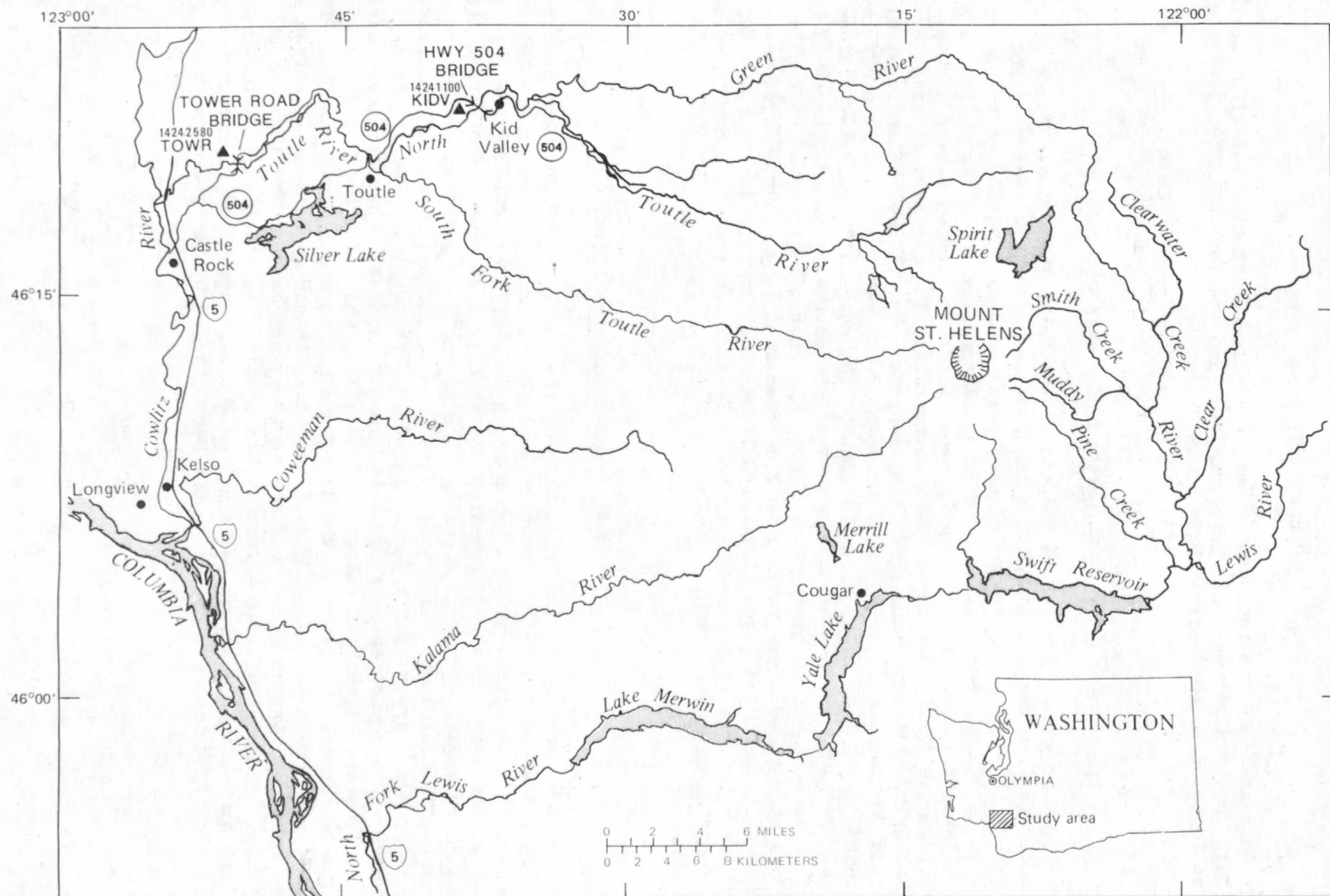


Figure 1.-- Locations of gaging-station sampling sites in the Toutle River basin, Mount St. Helens, Washington.

DESCRIPTION OF SITES

Data presented in this report were collected at station 14241100, North Fork Toutle River near Kid Valley (KIDV), and station 14242580, Toutle River at Tower Road, near Silver Lake (TOWR) (fig. 1).

North Fork Toutle River near Kid Valley

The KIDV gaging station is located on the North Fork Toutle River 11.1 km upstream from the mouth and 48.4 km downstream from the crater of Mount St. Helens (fig. 2). Collection of data began on June 10 1980. Altitude at the gage is 175 m. Drainage area upstream of the gage is 736 km². The data-collection reach extends from the gage, which is located at the Highway 504 bridge, to a cableway about 290 m downstream. The cableway is used for measuring streamflow and collecting samples. The channel reach is straight from 500 m upstream to 100 m downstream of the cableway, but it bends sharply to the right downstream from the reach. The channel is normally braided when the discharge is low (below about 15 m³/s); however, when discharge is high, flow is confined to a single channel. The unstable streambed typically consists of sediments ranging in size from sand to cobbles. Stream banks generally are stable and lined with large tree stumps and saplings. At the bridge, bedrock is exposed along the left bank and the right bank has eroded significantly since 1980.

Toutle River at Tower Road, near Silver Lake

The TOWR gaging station is located on the Toutle River 10.5 km upstream from the mouth and 76.7 km downstream from the crater of Mount St. Helens (fig. 3). Collection of data began March 24 1981. Altitude at the gage is 49 m. Drainage area upstream from the gage is 1,285 km². The data-collection reach extends from the gage, which is adjacent to Tower Road bridge, to a cableway located about 330 m downstream. The channel bends to the left at the bridge, curves gently to the right near the cableway and is straight for about 500 m downstream. Flow is confined to a single channel except during intermediate discharges (about 75- 150 m³/s), when it usually divides into a main channel, normally on the left, and a lesser secondary channel. The unstable streambed typically consists of sediments ranging in size from sand to cobbles. Stream banks near the cableway are bordered by large trees, stumps, and saplings and generally are stable. Substantial erosion on the left bank near the bridge has required the emplacement of riprap, but erosion of the right bank at the bridge has been limited by the presence of bedrock.



Figure 2.-- North Fork Toutle River near Kid Valley, Washington, December 1980. Aerial view looking downstream toward gage and Highway 504 bridge.

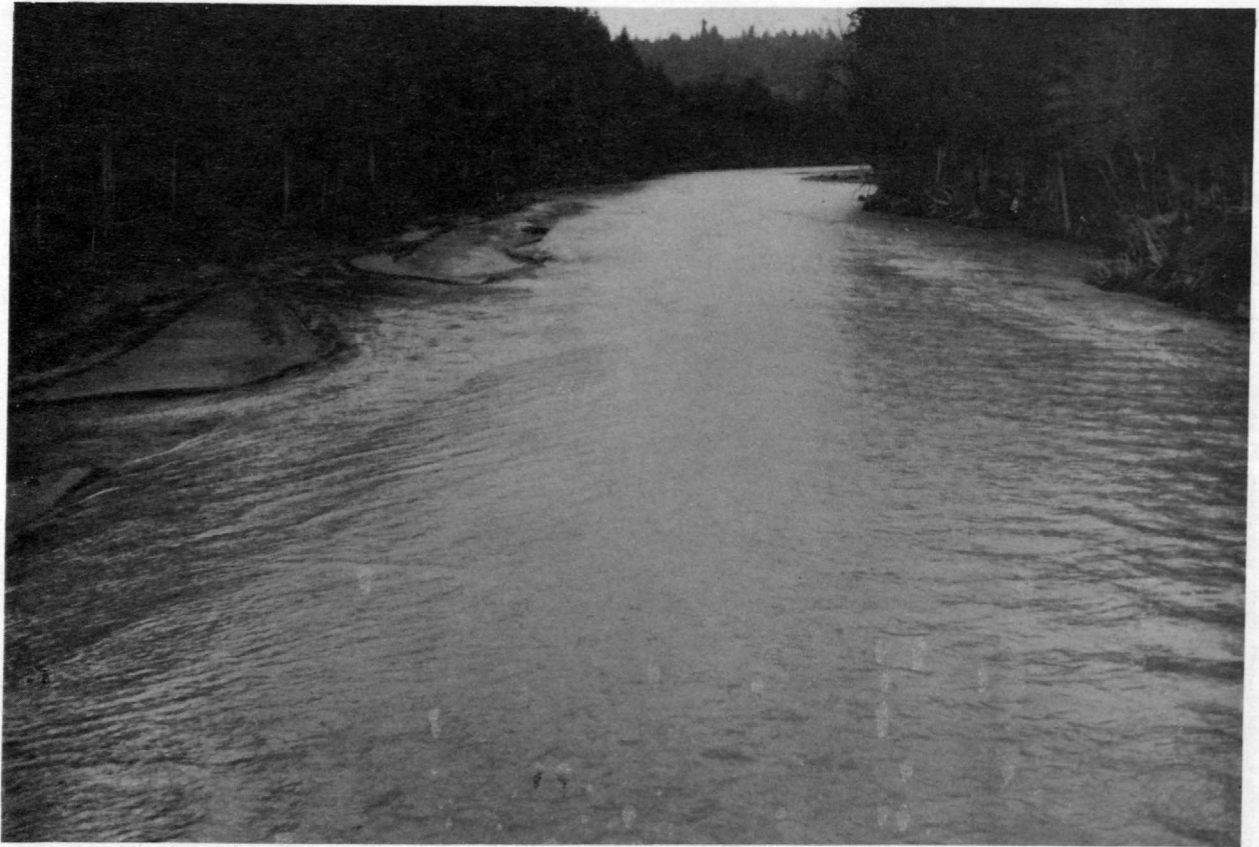


Figure 3.-- Toutle River at Tower Road, near Silver Lake, Washington, looking downstream from the bridge, January 1981. Note mudlines on the tree trunks from the mudflows of May 18 1980. Photo taken prior to construction of gage and cableway.

EXPLANATION OF THE DATA

Data presented for KIDV were collected at two locations within the channel reach. Prior to March 1981, data were collected at or near the bridge. After that date, data were collected from the cableway, or by wading at the cableway, using common cross-section stationing. Data presented for TOWR were collected from the cableway, or by wading at the cableway using common cross-section stationing. Grids for particle counts and bulk samples for each of the two sites were established immediately upstream from each cableway.

Data collected during water-discharge measurements were obtained in standard units and converted to SI units for the discharge computations presented in this report. To facilitate the association of data presented in the various tables, common measurement numbers were assigned to data sets consisting of associated hydraulic and sediment data.

Sets of data are intended to provide information required to determine sediment discharge from a variety of transport equations and theoretical procedures. A complete data set consists of hydraulic data, suspended-sediment concentration and particle-size distribution, and bed material particle-size distribution. Each data set was gathered over a short time span and is representative of uniform field conditions. Representative bed-material samples usually could not be collected during high flows because of heavy debris and high velocities and turbulence, and the lack of equipment capable of satisfactorily sampling large particles. Therefore, some data sets consist only of hydraulic data and suspended-sediment data. A few early data sets do not include suspended-sediment particle-size distributions because the samples were not analyzed for size distribution in the lab. Supplementary data include peak discharge characteristics, and size distributions and other characteristics from particle counts and bulk samples of bed material.

Hydraulic Characteristics

Hydraulic data pertaining to KIDV and TOWR are presented in tables 1 and 10, respectively. The tables include data derived from streamflow measurements and suspended-sediment concentration curves. Water-surface slopes were derived by obtaining the elevations of the water surface at the gage and at a reference mark at the cableway at each of the two sites. These slopes were used to derive Manning's roughness coefficients.

Peak Discharge Characteristics

At each station, the peak discharges for all significant flow events were determined from the station's discharge rating curves (relation between discharge and gage height) and the recorded peak adjusted gage heights. Similarly, the peak suspended-sediment concentrations during selected flow events were obtained by constructing graphs displaying variation in concentration through time as defined from discharge variations, suspended-sediment samples, and concentration versus discharge transport curves. The selected peak discharges and concentrations at KIDV and TOWR are presented in tables 2 and 11.

Suspended-Sediment Characteristics

Depth-integrated cross-section samples were collected at KIDV and TOWR to define suspended-sediment concentrations and particle-size distributions. Samples were collected as close in time as possible to associated streamflow measurements. All particle-size distributions for portions of suspended sediment greater than 0.062 mm in diameter were determined by wet-sieve analysis, which is dependent on physical diameter, or by visual-accumulation tube analysis, which is dependent on settling velocity. The type of analysis is noted in each table. All particle-size distributions of the portions less than 0.062 mm in diameter were determined by pipet analysis. Duplicate sample sets always were obtained. One set was composited and analyzed to determine particle-size distribution. The second set was analyzed to obtain the mean concentration. Particle-size distributions from the first sample set and concentrations from the second are presented for the two stations in tables 3 and 12. Some of the samples from the second set, collected by the EDI method, were analyzed individually for particle-size distribution. These data are presented in tables 4 and 13, and illustrate the spatial variation in suspended-sediment concentration and particle-size distribution.

Bed-material characteristics

Samples were obtained to define particle-size distributions and other physical characteristics of the bed material by three different methods. Mechanical samples were obtained by sampling at the bed surface with U.S. BM-54 type samplers. Particle counts were conducted by selecting individual particles on the bed surface in accordance with the particle count method described by Wolman (1954). Bulk samples were obtained by excavating to a depth of about 0.3 meter.

Mechanical samples

When the streambed was dominated by sand-sized sediment (often during high and intermediate flows), bed-material samples were obtained with a U.S. BM-54 type sampler in association with hydraulic and suspended-sediment data. Size distributions were determined by dry-sieve analysis of the oven-dried samples. The sampler often was not capable of obtaining representative samples of bed material at every point because some sampling points had surficial sediment too coarse for the sampler to trap and retain.

Often, when the streambed was armored and a thin layer of sand covered the armored layer, a small sample of sand could be obtained. At times, a greater volume of sediment was obtained by combining samples from multiple attempts at a sampling point. Samples obtained in this manner are not truly representative of the bed, other than the thin layer of sand-sized sediment at the bed surface. At other times, no sample could be obtained even after multiple attempts. Particle-size distributions of these bed-material samples are presented for KIDV in table 5 and for TOWR in table 14. Only those data judged to be reasonably representative of the cross section or of selected points in the cross section are presented. Appropriate footnotes are included for those data for which conditions are thought to have existed as described above.

Particle Counts

To define bed-material characteristics when the streambed was dominated by gravel- and cobble-sized sediment, the particle-count method was used. During low-flow periods, when large areas of the bed were above the waterline and most or all of the remaining flow was shallow and could be waded, particle counts of surface bed material were conducted. This method was used at KIDV, in September 1981 and March 1985, and at TOWR in September 1984. Each particle count was conducted in a rectangular sampling grid which created more than 300 sampling nodes. The downstream side of the grid was defined by the cableway at each site. At each sampling node, the length of the intermediate diameter was recorded for every particle greater than 2.0 mm. Field data from particle counts are presented for KIDV in tables 6, 7, and 8, and for TOWR in tables 15 and 16.

During the 1984 and 1985 particle counts, several lines of sampling nodes were selected as reasonably representative of the whole grid. Along those lines, particles found at sampling nodes were removed to the laboratory for further analysis. Larger particles (greater than 2.0 mm) were analyzed to determine their shape, lithology, and particle density. Lengths of short, intermediate, and long diameters of these particles were measured. Results of the analyses are presented in tables 8 and 16. At nodes having particles smaller than 2.0 mm in diameter, subsamples approximately 2 cm³ in volume were obtained and composited for later analysis. Each of these composited subsamples was oven-dried and mechanically dry-sieved to determine size distribution by mass. These size distributions are shown in tables 9 and 17.

The method selected for determining the size distribution from a particle count is as follows: For particles larger in diameter than 2.0 mm, the number of particles in each size class was divided by the total number of sampling nodes on the grid to obtain the percentage of particles by number in each class. In 1981, subsamples of sediment less than 2.0 mm in diameter were not obtained, and size distribution is not delineated for those particles. In 1984 and 1985, the size distributions, by mass in each class, of sediment smaller than 2.0 mm in diameter derived from the mechanical sieve analyses, were converted to size distributions by numbers of particles in each class using the technique described by Kellerhalls and Bray (1977). These size distributions of fine sediment were prorated to blend with those for coarse sediment from the particle counts. Particle-size distributions for whole-grid particle counts, derived in this manner, are presented in figures 4, 5, and 6.

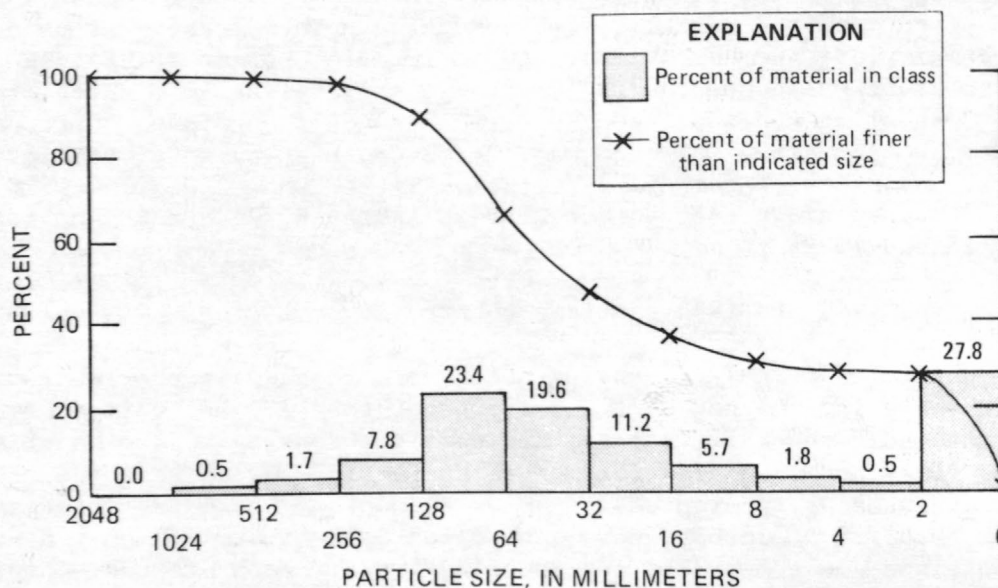


Figure 4.--Particle-size distribution by number of particles in each class from particle count at the Kid Valley gaging station September 1981.

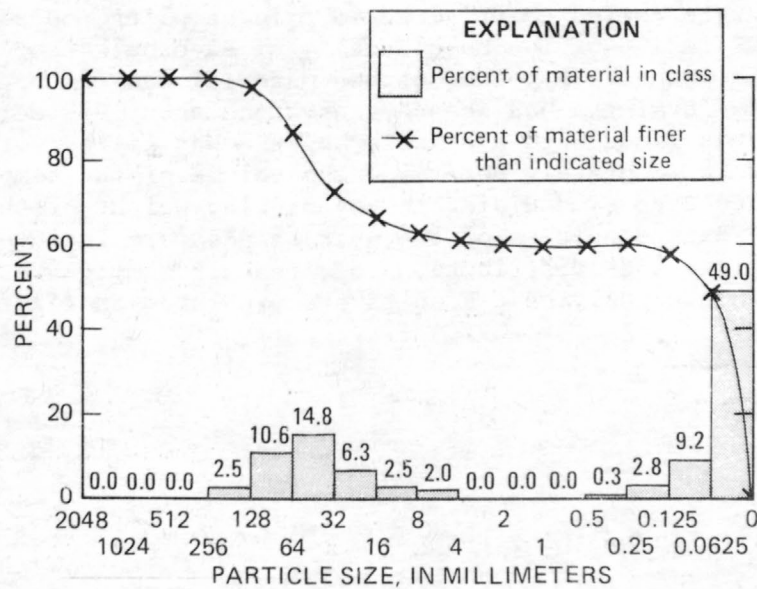


Figure 5.--Particle-size distribution by number of particles in each class from particle count at the Kid Valley gaging station, March 1985.

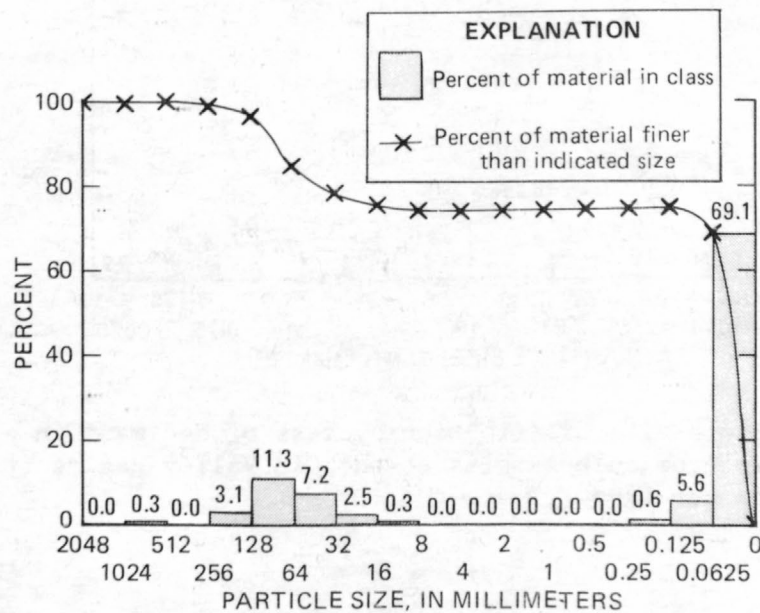


Figure 6.--Particle-size distribution by number of particles in each class from particle count at the Tower Road gaging station September 1984.

Bulk Samples

Bulk samples were collected at selected grid sampling nodes at KIDV in 1985 and at TOWR in 1984. The bulk density of each bulk sample was obtained by the following method: A volume of bed material was removed and retained using hand tools forming a box-shaped excavation about 0.3 meter deep. The excavated hole was lined with a plastic bag and was filled with a measured volume of water to accurately determine the volume of the sample. Bulk density was calculated by dividing the oven-dried weight of the bulk sample by its volume. Bulk densities of the bulk samples are included in tables 7 and 15. Particle-size distributions of the bulk samples were defined by mechanical dry-sieve analyses. Results are presented in figures 7 and 8.

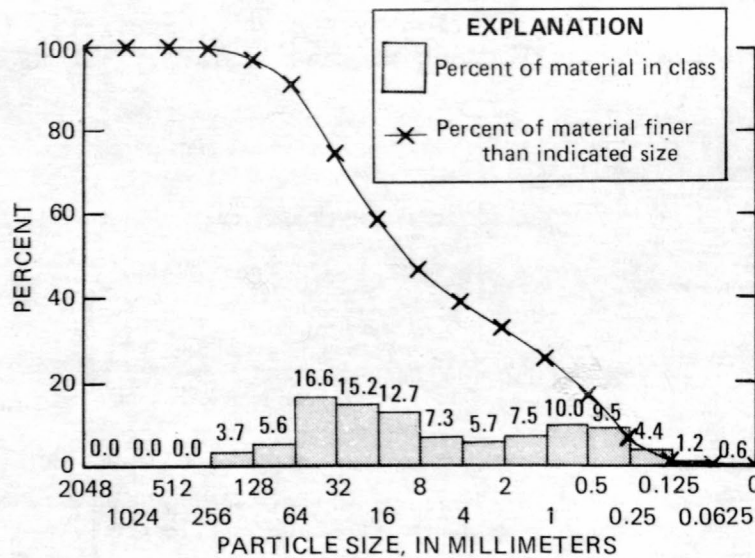


Figure 7.--Particle-size distribution by mass of sediment in each class from bulk samples at the Kid Valley gaging station September 1985.

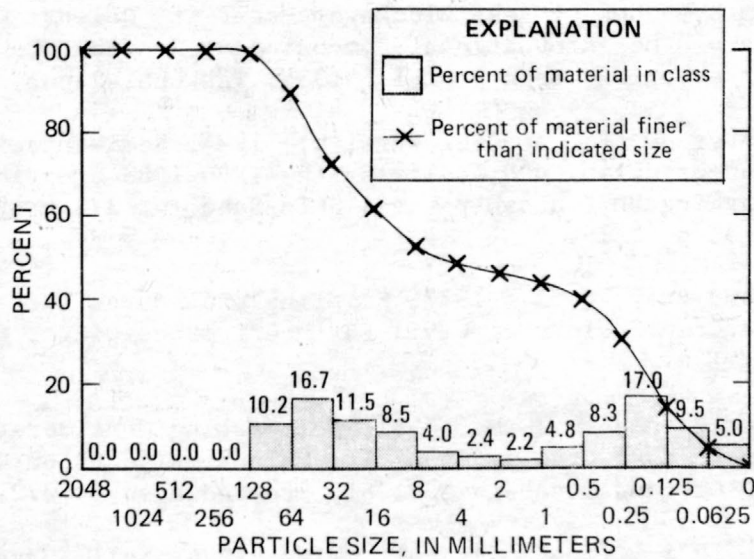


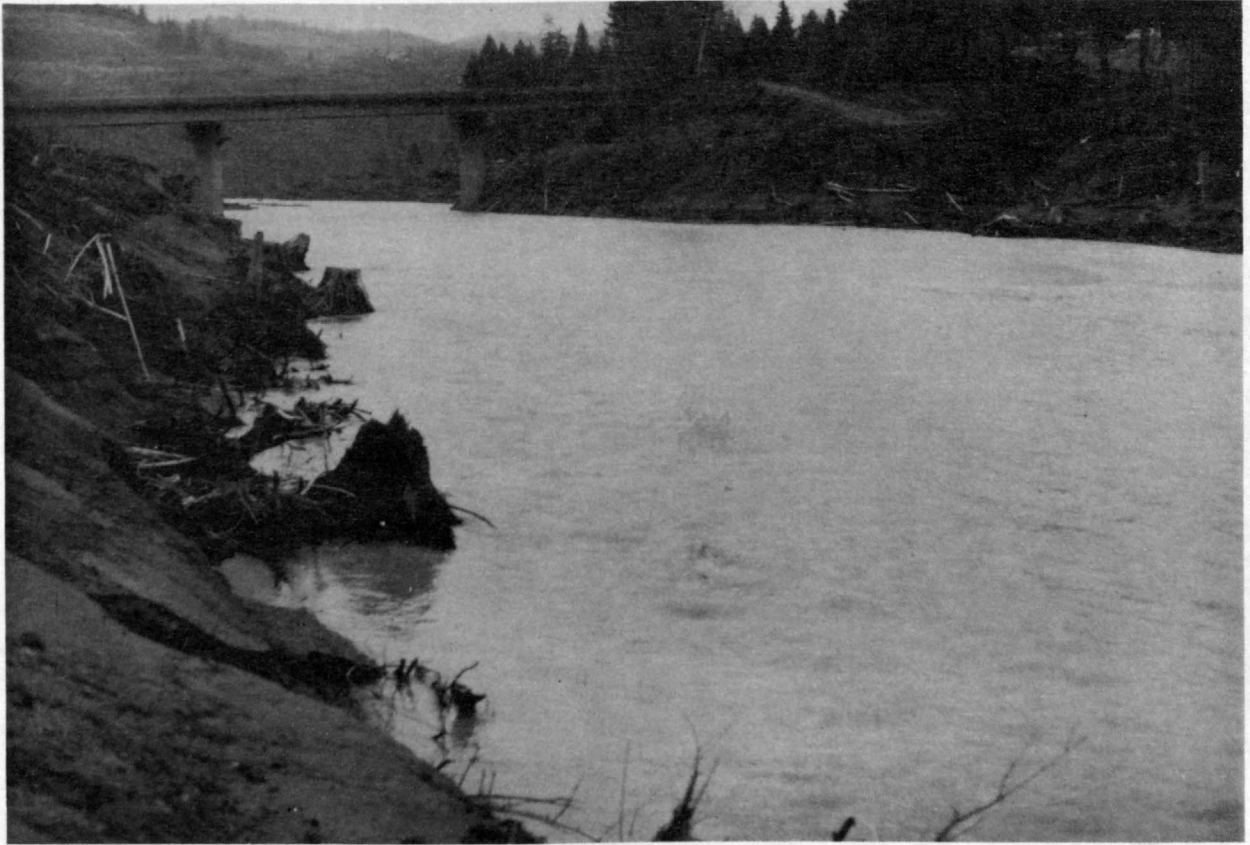
Figure 8.--Particle-size distribution by mass of sediment in each class from bulk samples at the Tower Road gaging station September 1984.

SUMMARY

The data presented in this report represent hydraulic and sediment transport characteristics of two streams in the process of recovery from devastating impacts of the 1980 eruptions of Mount St. Helens. Quality data have been carefully selected for presentation in this report.

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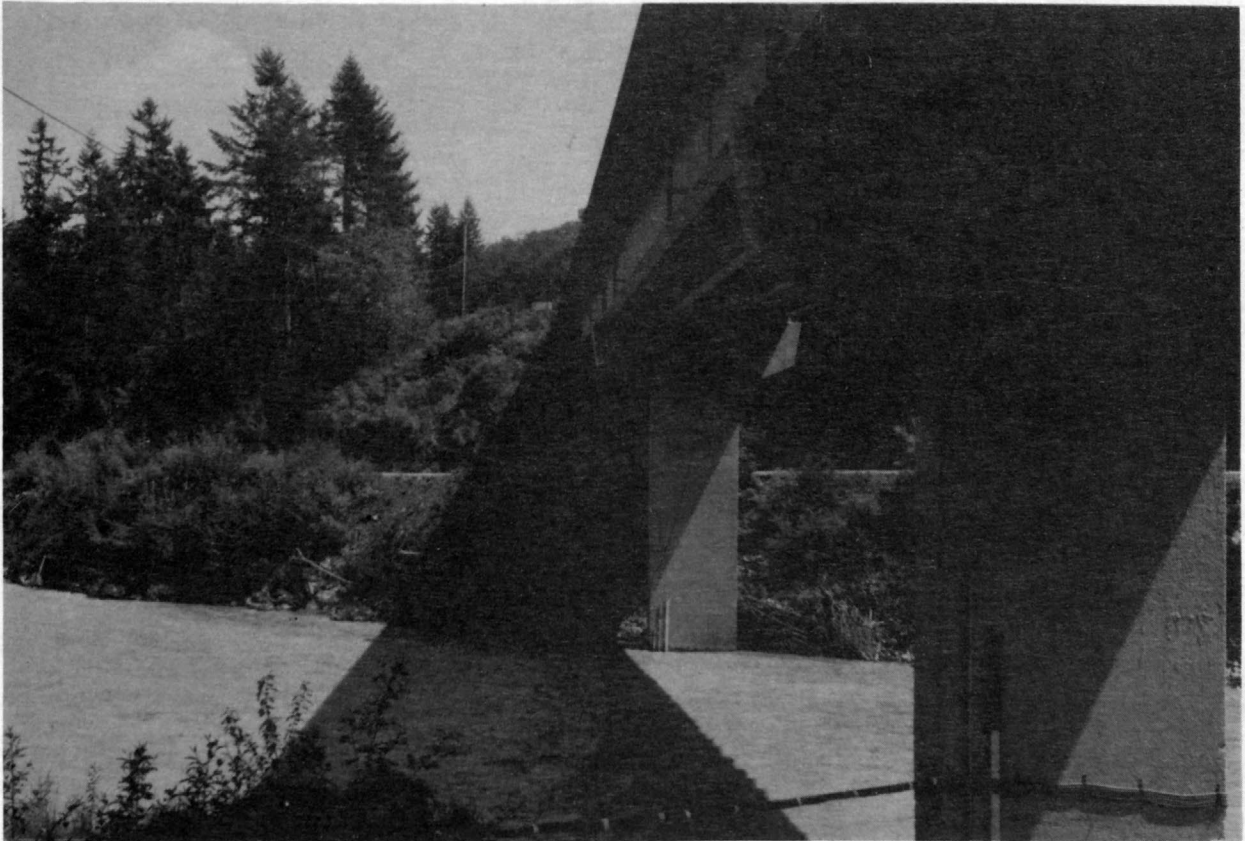
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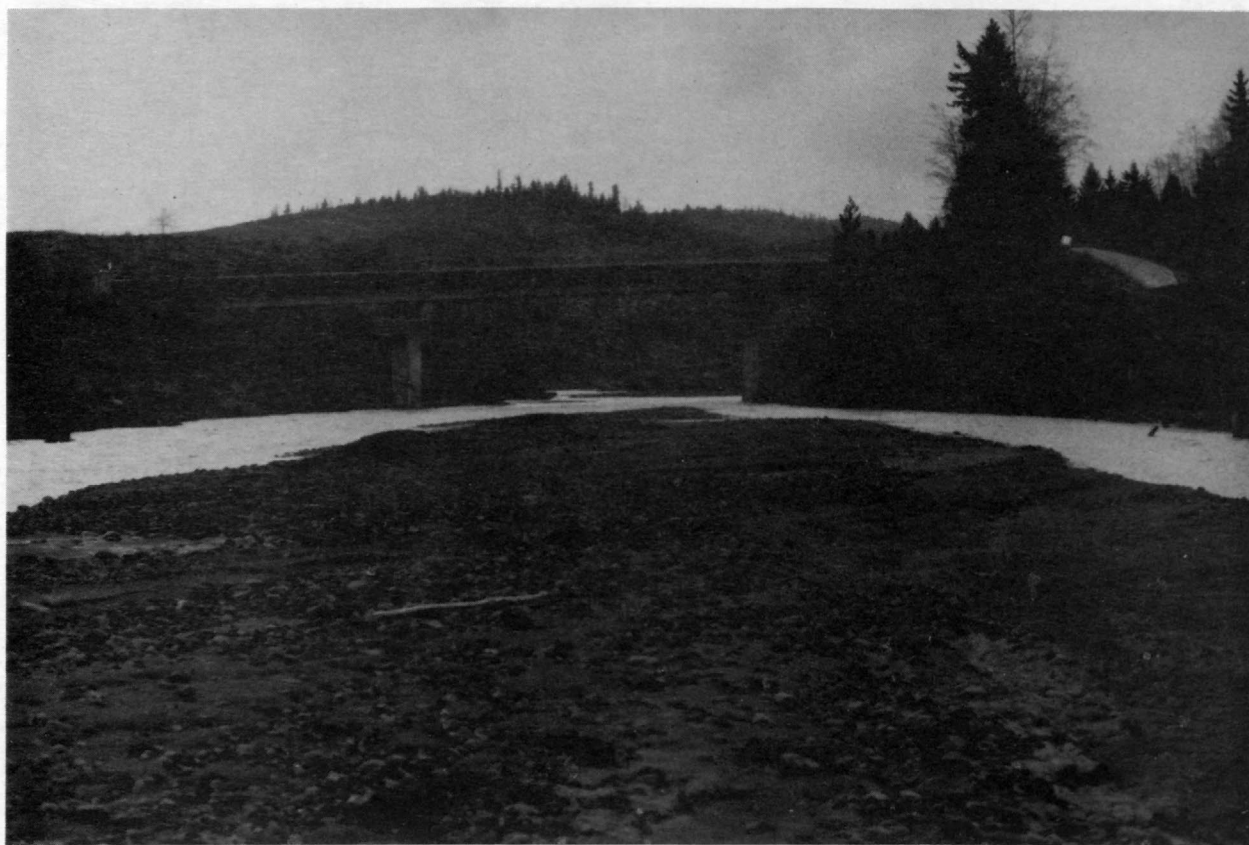
North Fork Toutle River near Kid Valley, Washington, looking upstream toward the bridge from the right bank near the cableway, April, 1981.



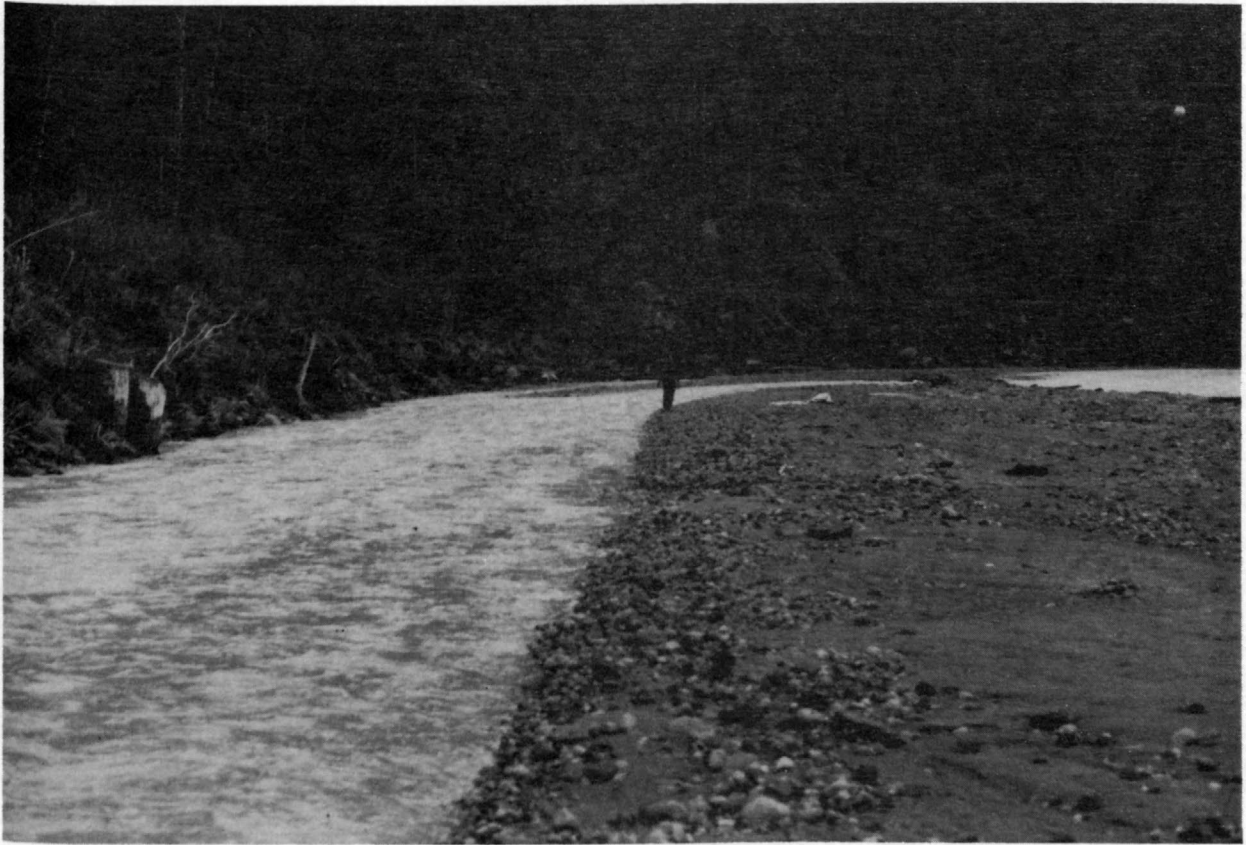
North Fork Toutle River near Kid Valley, Washington, looking downstream from the bridge, March, 1982.



North Fork Toutle River at Kid Valley, Washington, looking toward left bank along upstream side of bridge, June, 1984. Note splash lines on bridge piers from mudflow of May 18, 1980. Also note intake hoses for pumping sampler on bridge pier.



North Fork Toutle River near Kid Valley, Washington, looking upstream toward the bridge, March, 1985. Photo taken during particle count.



North Fork Toutle River near Kid Valley, Washington, looking downstream along the left bank toward the cableway and left channel, March, 1985.

Table 1.--Hydraulic data for station 14241100, North

[Location: B, data collected on upstream side of

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature ($^{\circ}\text{C}$)	Gage height (m)	Discharge (m^3/sec)	Area (m^2)
5	B	Aug 27, 1980	1715	--	--	37.4	20.0
6	B	Sep 2, 1980	1425	--	1.06	22.4	17.5
11	B	Nov 3, 1980	2045	--	3.99	22.2	17.7
13	B	Nov 6, 1980	2236	--	4.32	¹ 57.2	34.0
19	B	Nov 21, 1980	1632	--	5.04	¹ 148	70.9
21	B	Nov 22, 1980	0755	6.2	4.48	79.8	42.7
22	B	Nov 22, 1980	0835	6.2	4.48	78.7	39.2
23	B	Dec 1, 1980	1440	--	4.27	62.4	29.7
29	B	Dec 18, 1980	0945	5.5	4.24	36.8	23.8
43	C	Apr 1, 1981	1150	8.4	6.34	43.3	22.8
44	C	Apr 7, 1981	1527	7.0	6.41	39.0	24.5
47	C	May 6, 1981	1200	8.3	6.48	25.5	14.5
48	C	May 11, 1981	1310	11.6	6.49	34.6	20.5
50	C	Jun 8, 1981	1410	11.5	6.30	90.2	63.9
53	C	Jun 22, 1981	1425	12.5	5.64	53.7	26.0
70	C	Oct 6, 1981	1240	--	5.99	129	52.8
71	C	Oct 6, 1981	1610	--	5.94	119	49.2
72	C	Oct 7, 1981	1225	12.5	5.59	65.9	32.9
74	C	Oct 26, 1981	1423	12.0	5.11	9.6	10.1
75	C	Oct 28, 1981	1019	9.4	5.43	¹ 40.0	23.6
76	C	Nov 2, 1981	0954	9.0	5.17	18.2	15.9
77	C	Nov 9, 1981	1045	7.6	5.11	13.1	12.1
78	C	Nov 12, 1981	1048	9.6	5.34	34.9	21.5
79	C	Nov 14, 1981	1453	7.8	5.89	114	46.8
81	C	Nov 16, 1981	1124	7.0	5.55	54.9	28.2
82	C	Nov 23, 1981	1028	6.6	5.66	62.0	29.8
84	C	Dec 2, 1981	1130	6.2	6.00	138	57.1
85	C	Dec 3, 1981	1031	5.0	5.64	68.9	33.1
86	C	Dec 5, 1981	1312	8.0	6.62	¹ 314	91.0
88	C	Dec 5, 1981	2241	7.0	6.34	194	65.3
93	C	Dec 14, 1981	1038	5.3	5.79	47.2	23.5
94	C	Dec 17, 1981	1215	5.6	6.00	65.2	32.7
96	C	Dec 21, 1981	1215	5.1	5.83	53.8	28.2
99	C	Jan 12, 1982	1025	3.6	5.69	28.8	19.3
100	C	Jan 17, 1982	1014	4.8	6.36	156	62.4

¹ Extreme change in stage during the streamflow measurement.

Fork Toutle River near Kid Valley, Washington

bridge; C, data collected at cableway]

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
5	39.7	0.51	1.87	0.50	---	---	384,000
6	45.4	0.38	1.28	0.38	---	---	20,800
11	44.5	0.40	1.25	0.40	---	---	19,300
13	46.4	0.73	1.68	0.73	---	---	18,000
19	48.2	1.47	2.08	1.45	---	---	225,000
21	46.4	0.92	1.87	0.92	---	---	19,000
22	46.4	0.85	2.01	0.84	---	---	16,000
23	45.8	0.65	2.10	0.65	---	---	6,000
29	46.1	0.52	1.55	0.51	---	---	2,200
43	50.0	0.46	1.90	0.45	---	---	2,400
44	52.8	0.46	1.59	0.46	---	---	2,600
47	51.2	0.28	1.76	0.38	---	---	1,000
48	53.7	0.38	1.69	0.38	---	---	1,300
50	54.9	1.16	2.97	1.16	---	---	26,800
53	47.9	0.54	2.06	0.54	---	---	1,100
70	51.2	1.03	2.43	1.02	0.00422	0.027	48,000
71	51.5	0.95	2.42	0.95	0.00249	0.020	52,000
72	46.1	0.71	2.01	0.71	---	---	15,000
74	35.4	0.29	0.95	0.29	0.00356	0.027	200
75	45.1	0.52	1.69	0.52	0.00390	0.024	20,300
76	37.2	0.43	1.15	0.43	0.00331	0.028	5,000
77	35.7	0.34	1.08	0.34	0.00342	0.026	2,300
78	44.2	0.49	1.62	0.49	0.00350	0.023	12,000
79	50.9	0.92	2.44	0.92	0.00350	0.023	106,000
81	44.5	0.63	1.95	0.63	0.00400	0.024	28,000
82	45.1	0.66	2.08	0.66	0.00404	0.023	15,000
84	51.9	1.10	2.41	1.10	0.00430	0.029	34,000
85	48.8	0.68	2.08	0.68	0.00371	0.023	12,800
86	58.9	1.55	3.45	1.53	---	---	101,000
88	51.5	1.27	2.97	1.25	---	---	41,500
93	47.6	0.49	2.01	0.49	0.00441	0.020	7,000
94	50.9	0.64	2.00	0.64	---	---	10,300
96	47.9	0.59	1.91	0.59	0.00422	0.024	8,700
99	44.5	0.43	1.49	0.43	0.00461	0.026	3,400
100	54.3	1.15	2.50	1.14	0.00405	0.028	11,600

Table 1.--Hydraulic data for station 14241100, North

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
101	C	Jan 23, 1982	1323	5.0	6.87	320	102
103	C	Jan 24, 1982	0940	--	6.91	¹ 379	111
105	C	Jan 25, 1982	1453	6.5	6.20	149	58.2
106	C	Jan 29, 1982	1127	5.6	5.99	69.6	33.2
107	C	Feb 2, 1982	1009	5.8	5.82	73.5	38.2
108	C	Feb 4, 1982	1133	3.2	5.70	56.3	33.4
109	C	Feb 8, 1982	1229	3.1	5.49	34.3	24.9
110	C	Feb 14, 1982	0827	6.5	6.26	203	65.9
111	C	Feb 15, 1982	0855	6.4	6.25	203	70.0
112	C	Feb 16, 1982	1014	7.2	6.69	301	97.5
113	C	Feb 17, 1982	1102	7.0	6.62	244	76.9
114	C	Feb 19, 1982	1021	7.2	6.48	163	63.7
115	C	Feb 20, 1982	1120	10.7	7.34	¹ 467	114
116	C	Feb 20, 1982	1450	10.0	7.21	¹ 412	107
117	C	Feb 22, 1982	1123	4.5	6.30	131	51.3
118	C	Mar 1, 1982	1115	6.9	6.42	78.2	36.3
120	C	Mar 4, 1982	1234	7.0	6.27	59.0	30.9
121	C	Mar 9, 1982	1023	8.4	6.21	61.7	31.9
122	C	Mar 15, 1982	1124	5.6	6.22	64.7	31.1
124	C	Mar 20, 1982	0310	9.5	6.31	¹ 44.6	19.1
125	C	Mar 20, 1982	0430	9.5	6.31	49.3	19.2
126	C	Mar 20, 1982	1605	8.5	6.32	38.7	19.7
127	C	Mar 23, 1982	1205	7.0	6.56	36.5	17.4
128	C	Mar 31, 1982	1033	5.5	6.75	27.3	15.8
129	C	Apr 5, 1982	0120	4.8	6.85	39.0	18.4
130	C	Apr 7, 1982	1240	11.0	6.84	37.2	19.0
131	C	Apr 14, 1982	1115	6.0	7.32	88.9	34.0
132	C	Apr 19, 1982	1016	6.6	7.18	43.3	22.3
133	C	Apr 29, 1982	1044	6.0	7.04	¹ 42.4	23.9
134	C	May 7, 1982	1158	11.0	6.84	37.5	19.7
135	C	May 12, 1982	1209	11.0	6.75	30.5	18.2
136	C	May 17, 1982	1040	9.6	6.73	47.1	23.7
137	C	May 24, 1982	1133	14.5	6.60	37.0	20.9
138	C	Jun 4, 1982	1023	11.0	6.49	23.1	14.7
139	C	Jun 7, 1982	1002	10.0	6.45	23.7	16.0

¹ Extreme change in stage during the streamflow measurement.

Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
101	55.2	1.85	3.13	1.82	---	---	36,000
103	55.8	1.99	3.42	1.95	0.00328	0.026	37,000
105	54.0	1.08	2.57	1.07	0.00362	0.024	24,000
106	52.8	0.63	2.10	0.63	0.00384	0.022	7,500
107	52.8	0.72	1.92	0.72	0.00337	0.024	5,300
108	52.5	0.64	1.68	0.63	0.00346	0.026	4,000
109	51.9	0.48	1.38	0.48	0.00307	0.025	3,200
110	54.3	1.21	3.08	1.20	0.00321	0.021	50,000
111	54.0	1.30	2.90	1.28	0.00305	0.023	36,000
112	55.8	1.75	3.08	1.72	0.00321	0.026	49,500
113	55.2	1.39	3.18	1.38	0.00353	0.023	49,800
114	54.0	1.18	2.56	1.17	0.00405	0.028	29,500
115	57.6	1.98	4.09	1.94	0.00476	0.026	176,000
116	57.0	1.87	3.86	1.84	0.00325	0.022	78,000
117	54.9	0.93	2.55	0.92	0.00239	0.018	22,000
118	54.9	0.66	2.16	0.66	0.00393	0.022	25,500
120	54.0	0.57	1.91	0.57	---	---	11,700
121	54.3	0.59	1.93	0.59	0.00375	0.022	14,100
122	54.3	0.57	2.08	0.57	0.00380	0.020	5,400
124	35.7	0.54	2.33	0.53	---	---	417,000
125	37.5	0.51	2.57	0.51	0.00404	0.016	250,000
126	54.0	0.36	1.96	0.36	---	---	58,000
127	54.3	0.32	2.10	0.32	---	---	23,500
128	54.6	0.29	1.73	0.29	---	---	17,800
129	55.2	0.33	2.12	0.33	0.00447	0.015	11,400
130	55.5	0.34	1.96	0.34	0.00564	0.019	7,600
131	56.7	0.60	2.61	0.59	---	---	23,000
132	56.1	0.40	1.94	0.40	0.00479	0.019	8,000
133	56.1	0.43	1.78	0.42	---	---	7,000
134	43.0	0.46	1.90	0.36	0.00521	0.019	5,700
135	42.1	0.43	1.67	0.33	0.00509	0.020	4,600
136	45.4	0.52	1.98	0.43	0.00451	0.019	6,500
137	42.7	0.49	1.77	0.39	0.00433	0.020	4,100
138	37.8	0.39	1.57	0.28	0.00483	0.019	3,800
139	37.2	0.43	1.48	0.30	0.00484	0.021	3,500

Table 1.--Hydraulic data for station 14241100, North

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
140	C	Jun 14, 1982	1152	12.0	6.49	27.5	16.0
141	C	Jun 23, 1982	1147	18.0	6.34	22.6	13.2
142	C	Jul 1, 1982	1158	15.0	6.13	15.1	9.8
151	C	Sep 13, 1982	1440	17.5	6.25	14.0	8.4
152	C	Sep 20, 1982	1028	--	6.35	23.2	14.2
153	C	Oct 12, 1982	1200	13.5	6.26	12.6	9.1
154	C	Oct 21, 1982	1128	10.0	6.23	11.0	8.3
155	C	Oct 23, 1982	1340	12.5	6.58	24.7	13.8
156	C	Oct 29, 1982	1140	10.0	7.02	¹ 103	44.1
157	C	Oct 30, 1982	1425	9.5	6.82	52.3	25.5
158	C	Nov 2, 1982	1240	--	6.82	34.3	17.0
159	C	Nov 16, 1982	1153	7.5	6.90	36.2	15.5
160	C	Nov 18, 1982	1148	8.0	6.90	54.5	23.7
161	C	Nov 24, 1982	1215	3.5	6.83	30.2	14.4
162	C	Nov 28, 1982	1605	3.5	7.00	65.1	28.8
163	C	Dec 3, 1982	1305	3.0	7.33	227	64.8
165	C	Dec 4, 1982	0928	3.0	7.41	250	75.3
166	C	Dec 4, 1982	1508	3.0	7.26	122	66.2
167	C	Dec 5, 1982	1300	3.5	7.15	122	43.8
169	C	Dec 16, 1982	1143	6.5	7.42	¹ 162	53.1
170	C	Dec 17, 1982	1253	6.5	7.33	146	48.8
171	C	Dec 21, 1982	1310	6.5	7.08	70.2	31.1
172	C	Dec 27, 1982	1245	3.0	6.69	36.4	18.8
173	C	Jan 4, 1983	1300	6.5	6.97	¹ 58.1	28.2
174	C	Jan 5, 1983	1943	6.5	7.41	215	69.5
175	C	Jan 6, 1983	1108	6.5	7.43	201	69.9
176	C	Jan 7, 1983	1115	7.0	7.54	221	68.8
177	C	Jan 10, 1983	1253	7.5	7.22	128	46.9
178	C	Jan 18, 1983	1145	7.0	6.57	43.8	21.7
179	C	Jan 25, 1983	1004	6.5	6.47	37.2	19.5
180	C	Jan 27, 1983	1215	7.5	7.00	¹ 94.1	35.4
181	C	Feb 3, 1983	1258	6.0	6.42	33.9	17.7
182	C	Feb 8, 1983	1042	5.0	6.33	29.5	16.7
184	C	Feb 22, 1983	1154	12.8	6.73	54.5	27.8
185	C	Mar 1, 1983	1117	6.8	6.74	49.7	25.5

¹ Extreme change in stage during the streamflow measurement.

Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
140	36.6	0.44	1.72	0.30	0.00460	0.018	4,100
141	33.2	0.40	1.71	0.25	---	---	4,400
142	27.1	0.36	1.55	0.19	0.00433	0.014	4,400
151	18.0	0.46	1.68	0.46	---	---	2,400
152	35.7	0.40	1.63	0.27	0.00428	0.017	8,600
153	19.5	0.47	1.39	0.46	0.00414	0.028	2,100
154	29.6	0.28	1.33	0.17	0.00386	0.014	1,600
155	47.9	0.29	1.79	0.26	---	---	27,900
156	55.8	0.79	2.34	0.78	---	---	25,000
157	55.5	0.46	2.03	0.46	0.00433	0.019	13,700
158	38.7	0.44	2.02	0.31	---	---	7,000
159	41.8	0.37	2.34	0.29	---	---	71,400
160	47.6	0.50	2.30	0.42	0.00422	0.016	46,500
161	42.1	0.34	2.10	0.26	0.00302	0.011	31,300
162	54.9	0.52	2.26	0.52	---	---	38,900
163	57.6	1.12	3.51	1.11	0.00587	0.023	103,000
165	56.4	1.33	3.32	1.31	---	---	41,000
166	56.4	1.17	3.13	1.16	---	---	38,000
167	56.1	0.78	2.79	0.77	0.00345	0.018	32,000
169	56.7	0.94	3.05	0.93	0.00418	0.020	76,000
170	56.7	0.86	3.00	0.86	0.00419	0.019	41,500
171	55.8	0.56	2.26	0.55	0.00401	0.019	20,600
172	50.3	0.37	1.94	0.34	---	---	25,700
173	55.2	0.51	2.06	0.51	---	---	32,000
174	58.3	1.19	3.10	1.18	---	---	29,400
175	57.3	1.22	2.89	1.21	0.00606	0.031	31,100
176	56.4	1.22	3.22	1.21	0.00366	0.021	29,000
177	55.8	0.84	2.72	0.83	---	---	16,700
178	38.1	0.57	2.02	0.56	0.00379	0.021	17,800
179	37.8	0.52	1.91	0.52	---	---	17,000
180	44.5	0.80	2.66	0.79	---	---	43,000
181	34.8	0.51	1.92	0.51	---	---	20,700
182	35.4	0.47	1.76	0.47	---	---	9,500
184	43.0	0.65	1.96	0.64	---	---	6,800
185	45.4	0.56	1.95	0.56	0.00404	0.022	9,400

Table 1.--Hydraulic data for station 14241100, North

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
186	C	Mar 9, 1983	1213	10.0	7.05	92.4	44.1
187	C	Mar 10, 1983	0933	9.0	7.19	125	52.2
188	C	Mar 10, 1983	1528	9.0	7.16	115	48.7
189	C	Mar 11, 1983	1118	8.5	7.12	86.8	37.7
190	C	Mar 18, 1983	1155	9.0	6.76	42.9	21.7
191	C	Mar 29, 1983	1210	8.5	7.00	¹ 73.1	34.2
192	C	Mar 30, 1983	1058	9.5	7.07	101	45.7
193	C	Apr 8, 1983	1153	9.0	6.84	41.1	23.6
194	C	Apr 13, 1983	1205	11.5	6.68	34.0	17.1
195	C	Apr 18, 1983	1118	12.5	6.70	31.7	17.5
196	C	Apr 26, 1983	1213	11.5	6.68	32.1	17.7
197	C	May 3, 1983	1145	11.0	6.63	30.5	16.4
198	C	May 17, 1983	1248	--	6.67	32.7	18.7
199	C	May 24, 1983	1313	--	6.71	35.3	19.8
200	C	Jun 1, 1983	1203	12.5	6.69	30.4	16.8
201	C	Jun 13, 1983	1045	15.5	6.60	26.4	16.3
205	C	Jul 13, 1983	1240	16.0	7.22	87.8	40.9
207	C	Jul 25, 1983	1133	15.5	6.71	24.4	12.8
208	C	Aug 1, 1983	1114	17.5	6.60	19.8	11.3
209	C	Aug 12, 1983	1043	17.0	6.49	14.1	8.7
219	C	Nov 3, 1983	1050	13.0	7.44	132	47.0
220	C	Nov 3, 1983	1650	12.0	7.61	¹ 154	48.2
224	C	Nov 14, 1983	1218	6.0	7.05	92.4	36.3
225	C	Nov 17, 1983	1018	8.0	7.16	145	51.2
226	C	Nov 17, 1983	1340	8.0	7.20	140	52.1
228	C	Nov 22, 1983	1505	7.0	6.97	¹ 73.1	33.0
229	C	Nov 28, 1983	1120	8.0	7.03	69.3	34.4
230	C	Dec 5, 1983	1300	5.5	7.01	35.8	21.7
231	C	Dec 13, 1983	1025	7.5	7.24	¹ 69.6	32.8
232	C	Dec 21, 1983	1155	0.0	6.94	30.2	16.7
233	C	Dec 30, 1983	1026	4.0	7.11	65.5	31.7
234	C	Jan 4, 1984	1108	8.5	7.24	¹ 127	55.8
235	C	Jan 6, 1984	1345	8.5	7.11	85.5	38.7
236	C	Jan 10, 1984	1053	7.0	7.01	56.5	27.8
237	C	Jan 18, 1984	1105	0.0	6.92	29.8	17.4

¹ Extreme change in stage during the streamflow measurement.

Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
186	57.3	0.77	2.09	0.76	---	---	20,500
187	56.4	0.92	2.41	0.92	0.00687	0.032	32,000
188	56.1	0.87	2.35	0.86	0.00535	0.028	25,000
189	55.2	0.68	2.30	0.68	---	---	21,000
190	44.5	0.49	1.97	0.49	---	---	12,000
191	55.5	0.62	2.14	0.61	---	---	21,000
192	56.1	0.82	2.20	0.81	---	---	15,000
193	55.2	0.43	1.74	0.43	0.00371	0.020	7,700
194	34.2	0.50	1.99	0.50	---	---	7,800
195	34.8	0.50	1.81	0.50	---	---	8,200
196	30.5	0.58	1.82	0.58	---	---	7,600
197	30.8	0.53	1.85	0.53	---	---	6,600
198	34.5	0.54	1.74	0.54	---	---	6,400
199	42.1	0.47	1.79	0.47	0.00383	0.021	6,100
200	31.7	0.53	1.81	0.53	0.00401	0.023	9,500
201	34.2	0.48	1.62	0.48	0.00408	0.024	7,200
205	57.6	0.71	2.15	0.71	---	---	24,000
207	24.1	0.53	1.90	0.49	0.00720	0.028	6,200
208	22.9	0.49	1.76	0.49	---	---	4,900
209	23.8	0.37	1.62	0.36	---	---	2,190
219	56.1	0.84	2.81	0.83	---	---	135,000
220	55.8	0.86	3.20	0.86	---	---	50,000
224	48.5	0.75	2.54	0.66	---	---	27,000
225	56.4	0.91	2.83	0.90	---	---	34,100
226	57.0	0.91	2.68	0.90	---	---	35,400
228	56.1	0.59	2.21	0.59	---	---	12,300
229	56.4	0.61	2.01	0.61	---	---	10,800
230	46.7	0.46	1.65	0.39	---	---	9,800
231	54.6	0.60	2.12	0.57	---	---	10,100
232	40.9	0.41	1.81	0.40	---	---	4,900
233	56.7	0.56	2.07	0.56	---	---	17,500
234	58.0	0.96	2.28	0.96	---	---	17,500
235	56.1	0.69	2.21	0.69	0.00371	0.021	17,000
236	55.8	0.50	2.02	0.49	---	---	15,500
237	38.1	0.46	1.71	0.32	---	---	9,000

Table 1.--Hydraulic data for station 14241100, North

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
238	C	Jan 24, 1984	1250	7.0	7.66	¹ 245	77.3
239	C	Jan 25, 1984	1110	6.5	7.57	¹ 232	74.0
241	C	Feb 6, 1984	0943	7.5	6.70	¹ 30.8	15.1
242	C	Feb 13, 1984	1200	6.5	6.93	88.2	39.4
243	C	Feb 21, 1984	1208	6.0	6.83	55.0	27.2
244	C	Feb 27, 1984	1220	6.5	6.74	39.4	21.6
245	C	Mar 8, 1984	1119	9.0	6.68	34.2	17.8
247	C	Mar 21, 1984	1104	4.5	7.03	93.1	42.8
248	C	Mar 26, 1984	1151	7.5	7.16	77.1	36.3
249	C	Mar 29, 1984	0953	6.5	7.15	65.9	31.8
251	C	Apr 10, 1984	1110	5.0	7.20	72.6	34.9
252	C	Apr 20, 1984	1019	8.5	6.98	45.4	23.2
254	C	May 3, 1984	1310	9.0	7.16	60.4	29.1
255	C	May 14, 1984	1408	11.5	7.40	86.8	41.0
256	C	May 22, 1984	1228	--	7.15	54.2	25.9
257	C	Jun 1, 1984	1112	12.0	7.21	50.5	21.7
259	C	Jun 21, 1984	1140	11.0	7.34	110	45.8
261	C	Jul 12, 1984	1205	15.0	6.90	24.0	13.7
262	C	Jul 25, 1984	1036	20.0	6.75	17.1	9.8
264	C	Aug 9, 1984	1112	16.5	6.60	9.4	6.3

¹ Extreme change in stage during the streamflow measurement.

Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
238	58.0	1.33	3.17	1.32	0.00289	0.020	40,000
239	58.3	1.27	3.14	1.25	0.00273	0.019	29,000
241	32.6	0.46	2.04	0.29	0.00491	0.015	8,600
242	55.5	0.71	2.24	0.71	0.00386	0.022	14,000
243	42.4	0.64	2.03	0.51	0.00428	0.021	9,400
244	37.5	0.57	1.83	0.42	0.00446	0.020	7,100
245	40.0	0.45	1.92	0.33	0.00460	0.017	7,800
247	57.3	0.75	2.18	0.74	0.00385	0.023	5,000
248	57.0	0.64	2.13	0.63	0.00716	0.029	7,000
249	55.5	0.57	2.07	0.57	0.00449	0.022	6,100
251	57.0	0.61	2.08	0.61	0.00465	0.024	6,000
252	49.7	0.47	1.96	0.41	---	---	5,600
254	55.8	0.52	2.07	0.52	0.00476	0.021	6,500
255	56.4	0.73	2.12	0.72	0.00505	0.027	10,000
256	51.9	0.50	2.10	0.46	0.00519	0.020	13,000
257	55.8	0.39	2.33	0.37	0.00502	0.016	10,100
259	56.4	0.81	2.39	0.80	0.00422	0.023	10,200
261	28.4	0.48	1.76	0.25	0.00528	0.016	5,300
262	19.8	0.49	1.75	0.49	---	---	5,000
264	19.8	0.32	1.48	0.32	---	---	2,000

Table 2.--Water discharge and associated suspended-sediment concentration for selected peak flows, North Fork Toutle River near Kid Valley, Washington

		Peak water discharge		Peak sediment concentration		
		Water	Suspended-	Suspended-		
		dis-	sediment	Water		
		charge	concen-	dis-		
Date	Time	charge	tration	Time	charge	tration
	(hour)	(m ³ /sec)	(mg/l)	(hour)	(m ³ /sec)	(mg/l)
1981 Water Year						
Nov 7, 1980	2230	¹ 164	140,000	2200	110	^{1,2} 180,000
Nov 21, 1980	1545	166	365,000	1530	155	400,000
Dec 2, 1980	1530	² 286	133,000	1530	219	135,000
1982 Water Year						
Oct 6, 1981	1800	249	93,000	1815	248	94,100
Dec 2, 1981	0900	197	65,000	0915	193	66,300
Dec 5, 1981	1300	354	93,000	1300	343	104,000
Dec 15, 1981	1400	156	39,900	1400	156	39,900
Jan 16, 1982	2000	261	29,500	1800	260	36,000
Jan 23, 1982	1000	402	61,700	1015	399	61,800
Jan 24, 1982	0345	654	87,000	0415	612	89,300
Jan 25, 1982	0810	¹ 309	19,000	0840	255	¹ 58,000
Feb 13, 1982	2330	¹ 416	12,800	2400	277	¹ 67,800
Feb 16, 1982	1030	300	50,000	1030	300	50,000
Feb 17, 1982	0430	394	69,000	0445	368	82,500
Feb 20, 1982	0730	¹ 963	258,000	0800	850	¹ 285,000
Mar 19, 1982	2215	^{2,3} 963	510,000	2240	663	^{2,3} 1,600,000
1983 Water Year						
Oct 29, 1982	0200	210	67,200	0245	198	93,000
Dec 3, 1982	2115	² 725	164,000	2100	717	166,000
Dec 16, 1982	0145	340	119,000	0230	297	² 199,000
Jan 5, 1983	1315	300	101,000	1415	263	131,000
Jan 7, 1983	1330	234	18,500	1345	227	32,500
1984 Water Year						
Nov 3, 1983	0830	309	352,000	0830	309	² 352,000
Nov 13, 1983	2000	180	63,900	2030	178	65,500
Nov 17, 1983	0400	216	63,600	0430	219	65,400
Nov 17, 1983	2100	228	39,500	2130	228	40,400
Nov 19, 1983	2330	165	41,500	2400	165	43,700
Jan 3, 1984	1000	261	63,400	1030	259	83,000
Jan 25, 1984	0315	² 416	39,000	0400	374	50,300

¹ Peak resulted partly from pond breakouts on the avalanche deposit.

² Annual maximum value.

³ Peak resulted from a mudflow originating in the crater.

Table 3.--Concentration and particle-size distribution of suspended sediment, North Fork Toutle River near Kid Valley, Washington

[Analysis; S, wet sieve for particles coarser than .062 mm; P, pipet for particles finer than .062 mm; V, visual-accumulation tube for particles coarser than .062 mm]

Meas. no.	Anal-ysis	Sediment concen- tration (mg/l)	Percent finer than indicated size, in millimeters												
			.002	.008	.031	.125	.500	2.00	8.00						
			.004	.016	.062	.250	1.00	4.00							
5	S	504,000	-	-	-	-	-	57	74	92	99	100			
5	S	344,000	-	-	-	-	-	78	92	98	100				
6	P,V	20,800	1	21	35	53	69	82	93	99	100				
6	P,S	20,700	1	21	36	54	69	83	92	98	100				
13	P,V	33,100	1	17	24	37	53	70	86	97	99	99	100		
13	P,S	40,000	11	15	26	39	52	63	75	93	99	100			
19	P,S	229,000	12	15	21	34	49	64	85	97	100				
21	P,S	26,600	10	12	17	26	37	51	70	92	99	100			
22	P,S	14,000	5	6	10	16	24	34	50	75	95	100			
23	P,V	6,000	5	7	13	20	29	42	57	75	92	100			
70	P,S	52,600	-	28	45	70	82	86	90	96	99	100			
71	P,S	73,300	-	25	46	69	81	86	89	97	99	100			
74	S	445	-	-	-	-	-	68	80	86	95	99	100		
75	P,V	19,006	18	19	27	43	67	83	92	96	99	100			
76	P,V	4,980	11	11	14	23	40	62	84	91	96	99	100		
77	P,S	2,280	-	9	13	21	33	46	68	88	92	95	97	100	
78	P,S	10,500	-	14	24	37	53	66	81	93	98	100			
79	P,S	84,700	-	12	21	34	49	61	78	95	99	100			
81	P,V	26,000	10	11	14	22	34	52	78	94	99	99	100		
82	P,V	12,000	10	12	14	25	36	50	70	92	99	99	100		
84	P,S	26,800	14	17	19	33	47	60	76	93	98	100			
85	P,V	12,300	6	8	15	23	35	51	71	92	99	100			
86	P,S	93,500	10	12	16	28	39	55	72	93	99	100			
88	P,S	41,300	10	11	16	26	39	53	72	90	98	100			
93	P,V	6,500	5	8	10	18	27	41	61	88	97	99	100		
94	P,V	10,300	7	7	12	20	30	43	62	88	99	100			
96	S	8,700	-	-	-	-	-	39	57	83	96	99	100		
99	S	3,290	-	-	-	-	-	31	49	75	94	100			
100	P,V	12,300	7	7	9	15	24	37	55	80	93	99	100		
101	P,S	33,800	9	10	12	24	37	49	66	86	96	99	100		
103	P,S	33,000	8	9	11	19	29	41	56	80	94	99	100		
105	P,S	18,200	9	10	11	21	31	45	62	81	94	99	100		
106	S	7,600	-	-	-	-	-	31	49	94	95	100			
107	S	5,340	-	-	-	-	-	35	53	78	96	100			
108	S	4,000	-	-	-	-	-	31	47	77	96	99	100		

Table 3.--Concentration and particle-size distribution of suspended sediment, North Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Anal-ysis	Sediment concen- tration (mg/l)	Percent finer than indicated size, in millimeters										
			.002	.008		.031		.125		.500		2.00	8.00
			.004	.016	.062	.250	1.00	4.00					
109	S	3,200	-	-	-	-	-	33	46	64	92	99	100
110	P,S	45,100	8	9	18	28	41	55	75	91	98	99	100
111	P,S	34,600	9	10	12	23	34	46	62	85	97	99	100
112	P,S	48,500	9	10	14	24	34	47	66	87	96	99	100
113	P,S	42,100	7	9	12	21	31	44	59	82	95	99	100
114	P,S	30,500	6	8	12	19	28	40	57	78	94	99	100
115	P,S	107,600	9	14	24	38	53	66	81	96	99	100	
116	P,S	64,900	13	15	21	38	54	67	79	94	99	100	
117	S	19,800	-	-	-	-	-	46	65	87	97	100	
118	P,S	25,200	13	15	20	34	48	62	78	93	99	100	
120	S	11,700	-	-	-	-	-	43	60	74	97	100	
121	S	14,300	-	-	-	-	-	70	80	91	96	99	100
122	S	5,310	-	-	-	-	-	38	55	71	94	99	100
124	S	400,000	-	-	-	-	-	72	86	97	100		
125	P,S	165,400	10	17	27	40	58	72	87	96	99	100	
126	P,S	59,800	14	19	27	43	61	74	89	98	100		
126	P,S	58,200	14	17	24	40	57	71	88	98	100		
126	P,S	47,700	11	17	26	41	57	71	86	97	100		
126	P,S	46,600	16	18	24	41	59	74	91	98	100		
127	S	23,500	-	-	-	-	-	72	90	98	100		
128	V	18,200	-	-	-	-	-	50	73	94	99	100	
129	S	11,500	-	-	-	-	-	51	71	94	99	100	
130	V	7,430	-	-	-	-	-	54	76	93	99	99	100
131	V	22,300	-	-	-	-	-	50	72	92	99	100	
132	V	8,200	-	-	-	-	-	41	62	90	99	100	
133	V	6,940	-	-	-	-	-	52	75	92	98	100	
134	V	5,700	-	-	-	-	-	46	67	91	100		
135	S	4,450	-	-	-	-	-	47	70	91	98	100	
136	S	6,700	-	-	-	-	-	40	61	84	96	99	100
137	S	4,200	-	-	-	-	-	49	64	87	97	100	
138	S	3,800	-	-	-	-	-	38	57	83	94	96	99 100
139	S	3,560	-	-	-	-	-	33	52	77	94	98	100
140	S	4,270	-	-	-	-	-	53	69	88	97	99	99 100
141	S	4,400	-	-	-	-	-	47	67	81	98	100	
142	S	4,400	-	-	-	-	-	36	47	95	96	99	100

Table 3.--Concentration and particle-size distribution of suspended sediment, North Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Anal-ysis	Sediment concen- tration (mg/l)	Percent finer than indicated size, in millimeters												
			.002	.008	.031	.125	.500	2.00	8.00						
			.004	.016	.062	.250	1.00	4.00							
151	V	2,210	-	-	-	-	-	56	71	91	99	100			
152	S	9,720	-	-	-	-	-	60	74	90	98	99	100		
153	S	2,650	-	-	-	-	-	41	59	82	92	94	96	100	
154	V	1,620	-	-	-	-	-	37	60	89	98	100			
155	S	27,700	-	-	-	-	-	57	78	95	100				
156	S	22,600	-	-	-	-	-	42	42	66	89	99	100		
156	S	23,400	-	-	-	-	-	41	65	89	99	100			
157	P,S	13,100	7	8	12	18	27	37	52	78	97	100			
158	V	3,670	-	-	-	-	-	10	38	86	100				
158	V	7,100	-	-	-	-	-	37	59	87	97	100			
159	S	71,500	-	-	-	-	-	50	60	92	99	100			
160	S	48,500	-	-	-	-	-	48	60	89	99	100			
161	S	31,300	-	-	-	-	-	55	74	93	99	100			
162	S	33,200	-	-	-	-	-	52	72	91	99	100			
163	P,S	127,000	8	9	16	26	38	50	72	90	98	100			
165	P,S	45,300	7	8	13	21	31	42	54	85	96	99	100		
166	P,S	38,500	7	8	14	23	33	44	56	84	96	99	100		
167	P,S	33,200	7	8	13	21	32	42	59	81	96	99	100		
169	S	45,000	-	-	-	-	-	48	69	88	97	100			
170	S	37,800	-	-	-	-	-	38	53	72	94	99	100		
171	S	20,700	-	-	-	-	-	40	57	78	95	100			
172	S	25,700	-	-	-	-	-	51	65	85	98	100			
173	S	35,000	-	-	-	-	-	49	68	88	97	99	100		
174	P,S	30,600	8	8	13	21	31	42	59	83	97	100			
175	P,S	32,800	5	8	12	19	29	38	60	81	94	99	100		
176	P,S	29,300	7	10	18	29	42	58	77	83	97	100			
177	P,S	15,800	6	8	14	21	30	41	55	77	95	99	100		
178	S	18,200	-	-	-	-	-	53	70	89	98	100			
179	S	18,000	-	-	-	-	-	45	62	84	98	100			
180	S	33,000	-	-	-	-	-	50	68	86	97	99	100		
181	S	20,000	-	-	-	-	-	60	74	89	99	100			
182	V	8,720	-	-	-	-	-	29	49	81	98	100			
184	V	6,400	-	-	-	-	-	37	56	81	95	100			
185	S	9,890	-	-	-	-	-	43	60	83	97	100			
186	S	29,300	-	-	-	-	-	57	72	90	99	100			

Table 3.--Concentration and particle-size distribution of suspended sediment, North Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Anal-ysis	Sediment concen-tration (mg/l)	Percent finer than indicated size, in millimeters													
			.002		.008		.031		.125		.500		2.00		8.00	
			.004	.016	.062	.250	1.00	4.00								
187	P,S	35,600	11	12	17	29	43	56	66	92	98	100				
188	P,S	25,700	6	10	16	26	38	50	66	87	97	99	100			
189	P,S	20,000	7	8	10	20	29	42	58	82	95	99	100			
190	S	12,000	-	-	-	-	-	41	60	86	98	100				
191	S	26,400	-	-	-	-	-	42	64	84	96	100				
192	S	16,500	-	-	-	-	-	40	60	85	97	99	100			
193	S	7,520	-	-	-	-	-	42	62	85	97	100				
194	V	7,850	-	-	-	-	-	40	59	86	97	99	100			
195	S	8,110	-	-	-	-	-	38	54	80	97	99	99	100		
196	S	7,380	-	-	-	-	-	35	51	77	97	100				
197	S	6,690	-	-	-	-	-	34	49	73	92	99	100			
198	S	6,390	-	-	-	-	-	37	51	77	95	99	100			
199	S	6,040	-	-	-	-	-	45	59	77	97	100				
200	S	9,220	-	-	-	-	-	49	68	88	98	100				
201	S	7,160	-	-	-	-	-	42	56	78	97	100				
205	S	25,200	-	-	-	-	-	49	69	89	97	99	100			
207	S	5,920	-	-	-	-	-	47	66	88	98	100				
208	S	4,880	-	-	-	-	-	50	68	89	99	100				
209	S	2,080	-	-	-	-	-	39	58	87	99	100				
219	S	183,000	11	12	18	31	45	61	76	93	99	100				
219	S	123,000	-	-	-	-	-	62	82	96	99	100				
220	P,S	45,900	5	6	11	18	28	38	46	74	98	100				
224	S	26,800	-	-	-	-	-	42	59	83	97	100				
225	P,S	34,300	7	8	11	19	28	38	50	80	97	100				
226	P,S	31,500	3	5	9	15	23	33	48	75	96	100				
228	S	12,100	-	-	-	-	-	34	49	73	96	99	100			
229	S	10,700	-	-	-	-	-	37	55	80	97	100				
230	S	10,000	-	-	-	-	-	37	53	79	96	100				
231	S	13,800	-	-	-	-	-	31	43	71	92	98	100			
232	P,S	4,370	7	10	14	19	25	30	39	66	94	100				
233	P,S	17,200	10	11	15	28	39	50	64	86	98	100				
234	S	21,400	-	-	-	-	-	43	59	80	85	98	100			
235	S	16,700	-	-	-	-	-	35	50	74	93	98	99	100		
236	S	15,300	-	-	-	-	-	33	46	73	93	98	99	100		
237	S	9,350	-	-	-	-	-	39	53	75	94	99	100			

Table 3.--Concentration and particle-size distribution of suspended sediment, North Fork Toutle River near Kid Valley, Washington -continued

Meas. no.	Anal-ysis	Sediment	Percent finer than indicated size, in millimeters													
		concen- tration (mg/l)	.002		.008		.031		.125		.500		2.00		8.00	
			.004		.016		.062		.250		1.00		4.00			
238	P,S	39,300	8	8	14	24	35	47	61	79	94	99	100			
239	P,S	28,800	7	8	12	20	29	42	56	84	96	99	100			
241	S	8,950	-	-	-	-	-	29	47	74	95	100				
242	P,S	14,400	7	8	9	18	26	38	52	78	96	99	100			
243	S	9,340	-	-	-	-	-	35	55	78	95	99	100			
244	S	7,430	-	-	-	-	-	35	49	76	94	99	100			
245	S	6,830	-	-	-	-	-	41	55	81	96	100				
247	S	7,920	-	-	-	-	-	40	55	81	96	100				
248	S	7,230	-	-	-	-	-	36	50	76	93	99	100			
249	S	6,100	-	-	-	-	-	28	41	66	90	98	100			
251	S	5,120	-	-	-	-	-	34	51	77	81	99	100			
252	V	5,680	-	-	-	-	-	37	55	71	86	100				
254	S	6,430	-	-	-	-	-	39	55	80	96	99	100			
255	P,S	4,890	5	7	12	19	26	34	49	71	91	98	100			
255	P,S	94,900	21	23	38	60	78	91	95	98	99	100				
255	P,S	81,800	13	20	35	54	74	85	92	97	99	100				
256	S	14,300	-	-	-	-	-	38	55	78	93	99	100			
257	S	9,160	-	-	-	-	-	38	45	74	94	100				
259	S	10,600	-	-	-	-	-	36	53	78	95	99	100			
261	S	5,300	-	-	-	-	-	42	59	85	98	100				
262	S	4,810	-	-	-	-	-	50	66	88	99	100				
264	S	1,910	-	-	-	-	-	31	48	81	97	100				

Table 4.--Lateral variation of concentration and particle-size distribution of suspended sediment, North Fork Toutle River near Kid Valley, Washington

[Analysis: S, wet sieve; V, visual-accumulation tube; Lateral stationing: distances are from reference mark on left bank; first and last distances in each set are stations at edges of water; other stations are located at the centroid of equal segments of discharge]

Meas. no.	Anal-ysis	Lateral stationing (m)	Sediment concen-tration (mg/l)	Percent finer than indicated size, in millimeters					
				.062	.125	.250	.500	1.00	2.00
5		3.0							
		14.3	558,000	52	69	90	98	100	
		21.6	568,000	54	71	89	97	99	100
		29.6	472,000	60	78	94	99	100	
		36.6	416,000	63	80	96	100		
		42.7							
	S	Averages	504,000	57	74	92	99	100	
5		3.0							
		14.3	357,000	83	94	99	100		
		21.6	359,000	72	89	97	99	100	
		29.6	340,000	79	91	98	100		
		36.6	320,000	80	93	99	100		
		42.7							
	S	Averages	344,000	78	92	98	100		
6		1.8							
		18.3	19,200	85	96	100			
				86	94	99	100		
		25.9	19,600	82	94	99	100		
				84	93	98	100		
		32.6	20,900	79	91	97	99	100	
				80	91	97	99	100	
		38.4	25,600	77	90	98	100		
				87	89	96	99	99	100
		42.7	18,500	86	96	100			
				87	95	100			
		47.2							
	V	Averages	20,800	82	93	99	100		
	S			83	92	98	100		
124		30.5							
		35.7	180,000	72	89	99	100		
		38.4	158,000	76	90	98	100		
		43.9	171,000	72	85	97	100		
		49.8	189,000	68	83	95	99	100	
		58.8	172,000	70	84	96	99	100	
		66.1							
	S	Averages	174,000	72	86	97	100		

Table 5.--Lateral variation of particle-size distribution of surface bed material, North Fork Toutle River near Kid Valley, Washington

[Remarks: N, multiple attempts yielded no sample; C, samples composited; A, armoured bed; B, sampler broken; L, less than 100 grams; Lateral stationing: distances are from reference mark at left bank; first and last distances are edges of water; other stations are located at the centroid of equal segments of discharge.]

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
29		3.1												
		7.0	0	0	3	13	24	35	46	69	100			
		10.7	0	2	8	29	52	64	71	78	100			
		14.1	0	0	5	49	96	96	98	99	100			
		18.2	0	0	11	70	94	99	100					
		26.7	0	0	3	19	46	58	64	69	80	100		
		49.1												
		Averages	0	0	6	36	62	70	76	83	96	100		
43		12.8												
	N	19.9	--	--	--	--	--	--	--	--	--	--	--	--
	N	25.0	--	--	--	--	--	--	--	--	--	--	--	--
		35.4	0	0	5	35	74	90	99	100				
	N	46.6	--	--	--	--	--	--	--	--	--	--	--	--
		56.3	0	0	1	11	38	67	95	100				
		62.8												
44		12.5												
		20.5	0	1	8	42	73	94	100					
		35.9	0	1	10	38	66	82	94	98	100			
	N	45.5	--	--	--	--	--	--	--	--	--	--	--	--
	N	51.3	--	--	--	--	--	--	--	--	--	--	--	--
	N	58.5	--	--	--	--	--	--	--	--	--	--	--	--
		65.3												
47		13.7												
		37.7	0	0	2	14	33	52	73	90	94	100		
		46.0	0	0	2	14	42	78	96	100				
		51.6	0	0	2	10	38	79	96	100				
		55.8	0	0	0	2	9	25	46	59	63	100		
		59.9	0	0	0	2	14	44	74	95	100			
		65.0												
		Averages	0	0	1	8	27	56	77	89	91	100		

Table 5.--Lateral variation of particle-size distribution of surface bed material, North Fork Toutle River near Kid Valley, Washington
-continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
48		12.5												
		21.4	0	1	7	24	50	73	88	97	100			
		34.6	0	0	3	20	37	53	69	81	86	100		
		43.5	0	1	8	36	64	80	88	92	94	100		
		52.0	0	0	4	21	56	80	94	100				
		59.2	0	0	2	8	31	69	88	85	98	100		
		66.2												
		Averages	0	0	5	22	48	71	85	93	96	100		
50		12.2												
		25.8	0	1	7	29	76	96	99	100				
		36.7	1	4	16	41	71	89	94	96	100			
		44.3	0	1	7	20	42	73	92	96	100			
		50.0	0	2	8	20	40	66	81	85	93	100		
		56.8	0	1	3	9	42	86	95	98	100			
		67.1												
		Averages	0	2	8	24	54	82	92	95	99	100		
53		15.9												
	N	31.6	--	--	--	--	--	--	--	--	--	--	--	--
	N	40.5	--	--	--	--	--	--	--	--	--	--	--	--
	C	47.1	--	--	--	--	--	--	--	--	--	--	--	--
	C	53.0	--	--	--	--	--	--	--	--	--	--	--	--
	C	58.2	--	--	--	--	--	--	--	--	--	--	--	--
		63.7												
		Composite	0	0	2	10	35	58	72	89	98	100		
106		13.1												
		20.7	0	2	18	78	97	100						
		32.1	0	1	9	41	82	97	99	100				
		42.5	0	1	8	35	67	85	94	99	100			
		50.4	0	0	1	4	21	50	69	85	95	100		
		57.6	0	0	1	1	10	49	80	93	98	100		
		65.9												
		Averages	0	1	7	32	55	76	88	95	99	100		
107		12.5												
	C	20.5	--	--	--	--	--	--	--	--	--	--	--	--
	C	30.5	--	--	--	--	--	--	--	--	--	--	--	--
	A,N	38.6	--	--	--	--	--	--	--	--	--	--	--	--
	A,N	48.5	--	--	--	--	--	--	--	--	--	--	--	--
	C	57.5	--	--	--	--	--	--	--	--	--	--	--	--
		65.3												
		Composite	0	2	7	25	54	74	84	94	100			

Table 5.--Lateral variation of particle-size distribution of surface bed material, North Fork Toutle River near Kid Valley, Washington
-continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
112		11.6								
		21.2	0	8	24	51	90	97	99	100
		31.0	1	3	9	26	62	88	96	99 100
		40.2	1	3	7	19	48	74	88	98 100
		50.0	3	8	15	20	24	27	32	39 43 100
		58.6	1	5	12	25	37	47	52	60 74 100
		67.4								
		Averages	1	5	13	28	52	67	73	79 83 100
117		12.5								
		19.2	1	4	24	83	99	99	100	
		27.1	1	4	22	76	98	100		
		38.3	1	2	7	18	44	66	78	91 100
		48.1	0	1	5	16	37	57	70	82 96 100
		57.4	1	3	14	58	97	100		
		67.4								
		Averages	1	3	14	50	75	84	89	95 99 100
122		12.2								
		19.2	0	2	16	73	95	99	100	
		32.1	0	3	18	71	97	100		
		43.8	0	1	5	25	69	92	95	97 100
		50.0	0	1	4	19	46	65	74	86 95 100
		58.1	0	0	0	1	11	55	93	100
		66.5								
		Averages	0	1	9	38	64	82	92	97 99 100
125		28.7								
		34.9	3	9	21	54	72	87	96	99 100
		41.4	3	6	13	27	55	74	81	88 100
		47.6	3	7	14	30	56	79	95	98 100
		52.9	4	11	20	29	33	37	49	64 85 100
		58.5	11	30	52	72	84	93	97	100
		66.2								
		Averages	5	13	24	42	60	74	84	90 97 100
128		-0.6								
	C	4.7	--	--	--	--	--	--	--	--
	C	10.8	--	--	--	--	--	--	--	--
	C	18.2	--	--	--	--	--	--	--	--
	C	46.9	--	--	--	--	--	--	--	--
	C	50.3	--	--	--	--	--	--	--	--
		54.0								
		Composite	0	3	16	51	79	90	93	100

Table 5.--Lateral variation of particle-size distribution of surface bed material, North Fork Toutle River near Kid Valley, Washington
-continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
130		11.9								
		17.7	0	1	10	42	75	95	99	100
		30.0	0	2	7	28	53	74	88	96 98 100
		45.9	0	3	12	30	50	75	93	99 100
		56.7	0	2	8	31	55	75	87	97 100
	N	63.6	--	--	--	--	--	--	--	-- --
		67.4								
131		11.6								
		16.0	0	1	5	18	52	83	95	99 100
		23.5	0	1	5	18	51	79	94	98 100
		37.3	0	2	10	32	68	90	98	100
		52.7	0	2	6	19	41	62	76	88 95 100
		62.7	0	1	4	6	21	51	74	87 100
		68.3								
		Averages	0	1	6	19	47	73	87	94 99 100
132		11.6								
		17.1	0	1	6	23	52	78	95	99 100
		25.9	0	1	5	14	26	50	90	99 100
		39.9	0	2	10	28	50	75	98	100
		55.3	0	1	6	26	48	72	100	
		63.0	0	2	6	24	63	95	99	100
		67.7								
		Averages	0	1	7	23	48	74	96	100
133		11.6								
		18.0	0	0	1	5	21	62	90	98 100
		24.4	0	1	9	31	65	94	99	100
		30.7	0	1	5	22	45	68	87	97 100
		47.9	0	1	3	15	34	59	75	85 97 100
		61.4	0	1	4	26	72	98	100	
		67.7								
		Averages	0	1	4	20	47	76	90	96 99 100
134		12.2								
		17.9	0	0	1	2	4	22	58	79 97 100
		23.4	0	2	12	35	59	75	86	99 100
		50.8	3	22	71	88	90	92	93	95 100
		57.2	1	7	20	48	73	85	94	99 100
		61.9	0	1	3	11	36	74	93	99 100
		67.4								
		Averages	1	6	21	37	52	70	85	94 99 100

Table 5.--Lateral variation of particle-size distribution of surface bed material, North Fork Toutle River near Kid Valley, Washington
-continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
135		12.2												
	C	17.5	--	--	--	--	--	--	--	--	--	--	--	--
	C	23.9	--	--	--	--	--	--	--	--	--	--	--	--
	N	50.5	--	--	--	--	--	--	--	--	--	--	--	--
	C	56.5	--	--	--	--	--	--	--	--	--	--	--	--
	C	61.2	--	--	--	--	--	--	--	--	--	--	--	--
		67.1												
		Composite	0	1	6	18	32	47	66	84	96	100		
136		12.2												
		17.1	1	4	10	21	48	82	95	98	99	100		
		21.6	0	2	8	29	52	73	85	94	100			
	A, N	27.2	--	--	--	--	--	--	--	--	--	--	--	--
		54.4	0	1	6	19	38	65	83	90	95	100		
		60.8	0	0	1	5	27	68	91	98	100			
		67.1												
137		12.2												
	C	17.1	--	--	--	--	--	--	--	--	--	--	--	--
	N	21.6	--	--	--	--	--	--	--	--	--	--	--	--
	N	27.2	--	--	--	--	--	--	--	--	--	--	--	--
	C	54.4	--	--	--	--	--	--	--	--	--	--	--	--
	C	60.8	--	--	--	--	--	--	--	--	--	--	--	--
		67.1												
		Composite	0	1	2	8	22	43	56	76	90	100		
138		13.7												
		19.0	0	0	0	0	4	28	61	84	97	100		
		25.6	1	10	40	84	93	96	97	97	100			
		53.0	0	3	17	48	74	83	90	96	100			
		56.6	0	2	9	36	66	80	90	96	100			
		60.8	0	1	2	3	8	21	41	62	81	100		
		66.5												
		Averages	0	3	14	34	49	62	76	87	96	100		
139		13.4												
		18.6	0	0	0	0	4	33	65	90	100			
		24.9	0	3	17	57	83	91	95	98	100			
	L	53.0	1	5	22	47	57	60	63	68	68	100		
		56.4	0	1	4	19	40	61	78	92	98	100		
		60.1	0	0	3	14	39	68	86	98	100			
		66.2												
		Averages	0	2	9	27	45	63	77	89	93	100		

Table 5.--Lateral variation of particle-size distribution of surface bed material, North Fork Toutle River near Kid Valley, Washington
-continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters													
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.		
140		14.0														
	A	23.7	0	0	1	3	33	77	90	97	100					
	A,L	51.8	0	1	4	16	36	52	63	79	91	100				
	A	54.6	0	2	7	31	63	78	87	92	100					
	A	57.3	0	1	3	18	66	95	98	100						
	A	60.5	0	0	0	0	2	11	19	22	22	100				
		66.5														
	Averages		0	1	3	14	40	63	71	78	83	100				
141		14.0														
	A	49.6	0	0	1	4	6	20	79	100						
	A	52.6	0	0	0	1	2	12	34	70	98	100				
	A	54.8	0	1	6	32	82	98	99	100						
	A	57.2	0	3	15	51	83	91	94	96	100					
	A	60.1	0	0	0	0	0	1	1	1	1	100				
		66.2														
	Averages		0	1	4	18	35	44	61	73	80	100				
182		-2.1														
	B	9.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		13.7	0	2	11	43	80	93	97	99	100					
		18.0	0	1	8	34	72	88	90	91	93	100				
		22.1	0	2	12	42	61	68	74	83	97	100				
		27.8	0	0	1	1	1	6	31	77	100					
		33.2														
233		11.3														
	A,N	32.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--
		39.9	0	3	13	39	70	88	95	99	100					
		45.6	0	2	12	37	58	73	85	93	100					
		53.1	0	2	9	21	33	50	64	75	86	100				
		60.9	0	0	3	7	14	60	90	98	100					
		68.0														
234		10.7														
		20.0	1	5	21	62	80	86	90	92	96	100				
		29.9	0	1	5	16	40	60	75	88	100					
		41.4	1	2	7	20	41	62	78	87	94	100				
		51.0	0	2	6	20	42	64	81	91	100					
		60.4	0	1	2	3	6	17	49	84	96	100				
		68.6														
	Averages		0	2	8	24	42	58	75	88	97	100				

*Table 5.--Lateral variation of particle-size distribution of surface bed material, North Fork Toutle River near Kid Valley, Washington
-continued*

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
236		11.6								
		21.5	0	1	9	32	57	73	80	85 89 100
		28.9	0	2	12	34	67	82	88	94 100
	N	53.1	--	--	--	--	--	--	--	-- --
	N	56.0	--	--	--	--	--	--	--	-- --
	N	59.2	--	--	--	--	--	--	--	-- --
		67.4								
239		11.0								
		18.6	0	1	2	10	46	80	95	99 100
	L	28.7	1	5	13	20	26	30	35	38 41 100
		40.3	0	2	8	16	29	49	72	87 100
		50.1	0	2	6	18	50	72	81	88 97 100
		61.0	0	1	2	3	5	14	36	66 92 100
		69.2								
		Averages	0	2	6	13	31	49	64	76 86 100

Table 6.--Lengths of intermediate diameters of particles located at nodes on the particle-count grid, North Fork Toutle River near Kid Valley, Washington, 1981

[*, intermediate diameter of particle is less than 2 mm in length; w, node located in water; log, log located at node]

Distance upstream from cableway (m)	Lengths of intermediate diameters, in millimeters								
	Distance from reference mark at left bank, in meters								
	27	30	34	37	40	43	46	49	52
0	*	560w	128w	147w	257w	11w	68w	145	86
3.0	31w	* w	114w	30w	72w	26w	105w	120	21
6.1	* w	12w	85w	58w	7w	52w	79w	21	63
9.1	* w	* w	95w	66w	21w	log	49w	10	85
12.2	* w	250w	92w	88w	112w	37w	23w	55	59
15.2	11w	* w	25w	62w	195w	* w	95w	76	37
18.3	* w	* w	28w	32w	75w	29w	13w	57	*
21.3	* w	* w	38w	135w	28w	65w	* w	53	*
24.4	27w	160w	58w	34w	78w	120w	96w	190	69
27.4	* w	73w	162w	128w	200w	122w	167w	87	136
30.5	* w	70w	* w	48w	205w	32w	75w	140	*
33.5	116w	25w	80w	22w	104w	53w	60w	100	50
36.6	73w	62w	30w	13w	355w	72w	28w	60	98
39.6	75w	114w	25w	10w	124w	102w	44w	28	37
42.7	* w	170w	45w	34w	68w	* w	* w	29	25
45.7	60w	64w	4w	* w	35w	log	65w	210	75
48.8	113w	* w	122w	157w	42w	log	66w	25	93
51.8	29w	* w	82w	180w	31w	145w	23w	30	*
54.9	69w	42w	105w	137w	98w	45w	19w	183	65
57.9	* w	35w	105w	72w	134w	22w	12w	240	*
61.0	* w	34w	201w	134w	122w	92w	39w	210	*
64.0	* w	7w	23w	42w	38w	52w	35w	11	27
67.1	* w	* w	260w	5w	52w	67w	55w	17	14
70.1	16w	* w	* w	62w	188w	120w	18w	15	6
73.1	* w	* w	145w	104w	112w	44w	* w	8	8
76.2	* w	* w	398w	58w	* w	38w	29w	6	*
79.2	* w	* w	* w	22w	180w	* w	28w	*	7
82.3	8w	* w	* w	22w	42w	27w	20w	29	43w
85.3	* w	45w	log	15w	* w	92w	33w	10	295w
88.4	* w	* w	* w	44w	45w	42w	12w	21	19w
91.4	*	* w	57w	38w	95w	100w	6w	21	59
94.5	* w	101w	340w	44w	115w	* w	22w	34w	* w

Table 6.--Lengths of intermediate diameters of particles located at nodes on the particle-count grid, North Fork Toutle River near Kid Valley, Washington, 1981 -continued

Distance upstream from cableway (m)	<u>Lengths of intermediate diameters, in millimeters</u>								
	Distance from reference mark at left bank, in meters								
	27	30	34	37	40	43	46	49	52
97.5	8w	89w	75w	162w	10w	240w	98w	20w	32w
100.6	* w	640w	48w	59w	28w	* w	172w	29w	15w
103.6	* w	123w	120w	95w	* w	* w	33w	33w	19w
106.7	*	* w	78w	142w	* w	* w	* w	21w	40w
109.7	*	185w	92w	60w	35w	* w	22w	53w	23w
112.8	*	195w	105w	80w	* w	* w	49w	60w	44w
115.8	*	285w	* w	140w	110w	* w	33w	11w	24w
118.9	*	100w	75w	29w	56w	25w	19w	77w	59w
121.9	*	650w	* w	90w	9w	* w	35w	67w	15w
125.0	*	93w	120w	155w	39w	105w	11w	110w	18w
128.0	12	log	68w	108w	40w	70w	53w	98w	32w
131.1	69	238w	128w	* w	94w	69w	27w	61w	99w
134.1	*	* w	130w	92w	34w	99w	20w	27w	58w
137.2	*	*	60w	43w	105w	130w	44w	90w	32w
140.2	*	67w	120w	115w	87w	48w	* w	23w	66w
143.3	*	* w	105w	52w	74w	62w	* w	38w	55w
146.3	*	log	83w	83w	67w	55w	* w	45w	77w
149.4	*	log	60w	74w	* w	69w	32w	58w	55w
152.4	7	log	39w	100w	80w	18w	* w	22w	88w
155.5	35	430w	95w	58w	110w	21w	90w	12w	500w
158.5	*	log	10w	130w	42w	55w	20w	72w	55w
161.6	6	log	100w	135w	12w	48w	49w	36w	42w
164.6	*	log	96w	140w	67w	23w	53w	44w	36w
167.7	*	61w	90w	190w	16w	65w	49w	85w	37w
170.7	*	220w	51w	96w	17w	58w	103w	96w	50w
173.8	*	* w	190w	117w	* w	55w	95w	260w	67w
176.8	*	17w	89w	21w	* w	50w	38w	77w	62w
179.9	*	27	* w	76w	50w	52w	50w	73w	24w
183.9	*	*	* w	* w	70w	95w	81w	83w	39w

Table 6.--Lengths of intermediate diameters of particles located at nodes on the particle-count grid, North Fork Toutle River near Kid Valley, Washington, 1981 -continued

Distance upstream from cableway (m)	Lengths of intermediate diameters, in millimeters								
	Distance from reference mark at left bank, in meters								
	55	58	61	64	67	70	73	76	79
0	log	*	60	*	142	15	*	16	*
3.0	*	*	*	16	49	54	196	9	*
6.1	*	220	70	138	75	112	47	*	1,100
9.1	*	10	95	*	174	40	170	*	*
12.2	*	55	*	*	*	*	*	190	*
15.2	110	42	*	*	*	135	*	59	205
18.3	90	32	*	12	84	83	86	*	*
21.3	98	40	117	13	*	155	15	*	*
24.4	168	99	60	67	107	63	40	*	*
27.4	*	112	34	*	*	75	*	*	*
30.5	3	74	70	37	*	43	27	170	13
33.5	65	55	105	72	43	47	65	63	70
36.6	103	118	*	37	110	*	60	100	21
39.6	18	65	*	85	26	*	150	110	48
42.7	*	85	*	16	38	52	*	58	7
45.7	108	64	26	90	53	47	240	50	42
48.8	34	*	*	103	75	97	*	62	33
51.8	112	*	80	85	52	59	*	60	*
54.9	130	*	29	111	*	65	265	60	10
57.9	*	38	22	94	20	13	*	30	15
61.0	*	*	*	82	*	82	154	26	*
64.0	*	90	*	195	*	23	75	155	*
67.1	60	*	*	16	51	53	*	59	*
70.1	*	75	96	82	126	114	248	66	14
73.1	19w	*	29	120	77	53	62	70	88
76.2	* w	49	*	49	245	70	100	14	55
79.2	* w	*	*	*	72	128	70	105	*
82.3	* w	34	56	140	*	*	13	21	80
85.3	65w	52	77	35	*	28	65	65	30
88.4	145	*	96	140	110	*	*	*	57
91.4	*	66	58	*	*	25	*	45	log
94.5	* w	153	19	*	*	21	15	50	*

Table 6.--Lengths of intermediate diameters of particles located at nodes on the particle-count grid, North Fork Toutle River near Kid Valley, Washington, 1981 -continued

Distance upstream from cableway (m)	Lengths of intermediate diameters, in millimeters								
	Distance from reference mark at left bank, in meters								
	55	58	61	64	67	70	73	76	79
97.5	*	21	380	30	*	*	*	19	224
100.6	*	*	108	94	*	*	73	*	*
103.6	*	86	*	16	*	*	72w	*	*
106.7	*	*	*	175	35	*	39	*	*
109.7	51	35	39	220	23	*	48	61	*
112.8	*	142	21	*	*	27	98	13	37
115.8	*	96	48	13	*	45	53	16	7
118.9	*	86	75	*	180	15	6	25	*
121.9	65w	48	48	20	88	*	34	14	*
125.0	69	45	*	*	*	*	26	54	*
128.0	33w	22	355	*	78	308	42	13	*
131.1	12w	94	63	12	57	78	* w	97	23
134.1	22w	63	*	155	149	*	* w	*	3
137.2	85w	79	47	10	42	62	6w	*	12
140.2	* w	*	82	60	*	566	18w	78	*
143.3	93w	42	8	235	*	400	* w	146	*
146.3	270w	108	22	*	42	34	* w	54	*
149.4	122w	*	*	52	*	31	7w	14	14
152.4	118w	75	*	50	75	255	*	104	70
155.5	35w	*	22	23	*	119	30	*	17
158.5	203w	39	*	48	3	* w	107	106	60
161.6	83w	*	*	90	67	373	*	3	12
164.6	42w	235	16	*	73	*	12	137	*
167.7	72w	*	*	*	57	27	11	*	*
170.7	62w	88w	27	*	*	*	24	*	40
173.8	72w	55w	17	*	21	*	30	*	27
176.8	86w	87w	*	285	*	*	58	*	10
179.9	160w	55w	130	*	*	194	*	*	*
183.9	37w	10w	240	101	*	103	69	93	20

Table 7.--Lengths of intermediate diameters of particles located at nodes on the particle-count grid, North Fork Toutle River near Kid Valley, Washington, 1985

[c, subsample retained for lab analysis; w, node located in water; *, intermediate diameter of particle is less than 2 mm in length; log, log located at node]

Distance upstream from cableway (m)	Lengths of intermediate diameters, in millimeters								
	Distance from reference mark at left bank, in meters								
	21	24c	27c	30c	34	37c	40c	43	46c
0		39w	39	*	27	*	201	*	44w
1.5		50w	*	*	47	*	*	*	34w
3.0		47w	*	*	25	*	*	127	140w
4.6		34w	35	62	19	*	37	*	45w
6.1		65	62	*	19	86	17	*	70w
7.6		100	*	8	*	*	*	131	60w
9.1		100	*	13	*	*	*	*	100w
10.7		*	*	17	*	168	*	*	42w
12.2		*[1]	*	*	*	9	*	*	40w
13.7		*	*	*	137	*	80	*	47w
15.2	35w	11	*	*	*	*	*	*	30w
16.8	38w	78	*	*	40	*	*	*	50w
18.3	24w	*	*	*	*	80	*	27	110w
19.8	27w	115	*	*	*	53	*	35	42w
21.3	22w	*	*	*	*	*	*	*	69w
22.9	37w	*	45	*	*	*	33	21	80w
24.4	36w	*	*	*	*	*	22	*	60w
25.9	65w	*	*	*	105	*	19	*	37w
27.4	80w	*	*	*	13	*	*	77	34w
29.0	23w	70	*	*	*	120	*	*	120w
30.5	* w	*	*	*	*	*	*	*	86w
32.0	* w	*	*	63	146	*	*	*	40w
33.5	* w	90	*	35	*	*	*	5	27w
35.1	* w	*	*	*	*	*	*	8	137w
36.6	20w	*	*	*	*	*	*	11	100w
38.1	*	42	*	*	55	*	*	60	40w
39.6	*	30	*	*	*	*	*	*	19w
41.1	*	36	*	*	105	*	*	9	44w
42.7	45	*	*	*	*	*	91	9	47w
44.2	100	*	145	*	*	*	*	8	18w
45.7	*	*	*	*[2]	*	*	110	*	12w
47.2	59	*	*	*	*	*	67	*	41w
48.8	47	*	*	*	71	20	*	*	70w
50.3	*	*	*	*	56	log	7	*	36w
51.8	33	*	*	*	*	14	34	*	38w

[1] Bulk density = 2.32 g/cm³.

[2] Bulk density = 2.35 g/cm³.

Table 7.--Lengths of intermediate diameters of particles located at nodes on the particle-count grid, North Fork Toutle River near Kid Valley, Washington, 1985 -continued

Distance upstream from cableway (m)	Lengths of intermediate diameters, in millimeters								
	Distance from reference mark at left bank, in meters								
	21	24c	27c	30c	34	37c	40c	43	46c
53.3	*	*	*	*	*	*	140	*	57w
54.9	*	*	*	*	57	87	*	*	114w
56.4	*	*	*	*	*	107	*	11	25w
57.9	*	*	*	*	76	105	*	*[3]	54w
59.4	*	*	*	*	*	*	19	*	70w
61.0	*	*	*	*	*	*	*	*	39w

[3] Bulk density = 2.21 g/cm³.

Table 8.--Lengths of diameters, density, lithology, and shape of selected particles coarser than 2 mm, from particle count, North Fork Toutle River near Kid Valley, Washington, 1985

[Distance: distance upstream from cableway, in meters;
Lithology: AB, andesite/basalt; AD, ancestral dacite;
BD, blast dacite; MD, modern dacite; PU, pumice; TM,
tertiary metamorphic. Shape: A, angular; R, rounded;
SA, sub-angular; SR, sub-rounded]

Distance (m)	Length of diameter			Density (g/cm ³)	Lith- ology	Shape
	short (mm)	int. (mm)	long (mm)			
24 meters from reference mark at left bank						
0	31	39	41	2.29	AB	SR
1.5	46	50	70	2.75	TM	SA
3.0	35	47	70	2.32	AB	SR
4.6	30	34	47	1.87	BD	R
6.1	57	65	70	2.50	MD	SR
7.6	89	100	189	2.42	MD	A
9.1	64	100	140	1.83	BD	SR
15.2	10	11	16	0.70	PU	SR
16.8	48	78	88	2.21	AB	SA
19.8	103	115	150	2.56	TM	SA
29.0	45	70	75	2.44	AD	SA
33.5	88	90	105	2.49	AD	SA
38.1	41	42	49	2.43	AB	R
39.6	27	30	52	2.75	MD	SA
41.1	28	36	40	2.78	MD	SR
27 meters from reference mark at left bank						
0	24	39	45	2.57	MD	SR
4.6	27	35	35	2.48	MD	SA
6.1	50	62	70	2.10	AB	SR
22.9	40	45	70	2.37	AB	R
45.7	64	145	165	2.16	AD	R
30 meters from reference mark at left bank						
4.6	43	62	80	2.77	MD	SR
7.6	5	8	11	--	AB	SR
9.1	11	13	21	2.54	AB	SR
10.7	13	17	26	2.38	MD	SR
32.0	46	63	86	2.36	AD	R
33.5	29	35	54	2.64	MD	SA

Table 8.--Lengths of diameters, density, lithology, and shape of selected particles coarser than 2 mm, from particle count, North Fork Toutle River near Kid Valley, Washington, 1985 -continued

Distance	Length of diameter			Density	Lith- ology	Shape
	short	int.	long			
(m)	(mm)	(mm)	(mm)	(g/cm3)		
37 meters from reference mark at left bank						
6.1	79	86	130	2.46	AD	R
10.7	122	168	251	--	BD	R
12.2	5	9	12	--	MD	SA
18.3	71	80	105	2.45	AB	SA
19.8	33	53	62	2.48	AB	SA
29.0	115	120	164	2.29	AB	R
48.8	14	20	19	2.59	AB	R
50.3	--	--	--	--	BD	--
51.8	10	14	19	2.05	MD	SA
54.9	83	87	107	2.79	MD	SR
56.4	69	107	116	2.32	AB	R
57.9	94	105	116	2.31	MD	SA
40 meters from reference mark at left bank						
0	150	201	270	--	AD	SA
4.6	31	37	50	2.73	MD	SA
6.1	10	17	25	2.94	AB	SA
13.7	57	80	102	2.52	AD	SR
22.9	21	33	34	2.71	AD	R
24.4	14	22	25	2.26	AD	R
25.9	18	19	27	2.71	AD	R
42.7	64	91	109	1.61	AB	R
45.7	81	110	154	--	BD	R
47.2	49	67	109	2.44	MD	SA
50.3	5	7	8	--	MD	SR
51.8	31	34	45	2.47	AD	SR
53.3	99	140	157	2.17	AD	R
59.4	11	19	21	2.64	MD	SR

Table 8.--Lengths of diameters, density, lithology, and shape of selected particles coarser than 2 mm, from particle count, North Fork Toutle River near Kid Valley, Washington, 1985 -continued

Distance (m)	Length of diameter			Density (g/cm ³)	Lith- ology	Shape
	short (mm)	int. (mm)	long (mm)			
46 meters from reference mark at left bank						
0	28	44	47	2.35	AD	SA
1.5	33	34	43	2.54	MD	SA
3.0	95	140	150	2.32	AD	SR
4.6	27	45	58	2.43	AD	R
6.1	51	70	87	2.37	AB	R
7.6	39	60	78	2.23	AD	SR
9.1	97	100	126	2.51	AD	SR
10.7	42	42	66	2.52	MD	SA
12.2	35	40	57	2.49	AB	SA
13.7	47	47	64	2.33	MD	R
15.2	22	30	38	2.75	AB	SA
16.8	42	50	67	2.18	AB	SR
18.3	100	110	137	2.47	MD	SA
19.8	26	42	79	2.72	AB	SA
21.3	50	69	128	2.24	MD	SA
22.9	59	80	102	2.43	AD	SA
24.4	33	60	74	1.89	AB	SR
25.9	31	37	53	2.52	AB	SR
27.4	31	34	55	2.42	AD	SR
29.0	78	120	149	2.21	AB	SR
30.5	58	86	112	2.33	AD	SR
32.0	39	40	64	2.35	AD	SR
33.5	27	27	27	2.69	MD	A
35.1	110	137	196	2.16	AD	SR
36.6	97	100	185	2.60	AB	SR
38.1	33	40	52	2.41	AD	SR
39.6	14	19	19	2.53	AD	R
41.1	34	44	49	2.46	AD	SR
42.7	36	47	60	2.33	MD	SR
44.2	13	18	25	2.62	MD	R
45.7	10	12	12	--	MD	R
47.2	33	41	45	2.45	MD	SA
48.8	25	70	128	2.57	AD	R
50.3	30	36	51	2.63	AD	R
51.8	36	38	44	2.47	AD	R
53.3	29	57	97	2.54	MD	SR
54.9	113	114	130	2.26	AB	SA
56.4	20	25	42	2.66	AD	SR
57.9	31	54	60	2.45	AD	R
59.4	54	70	84	2.41	AD	A
61.0	35	39	64	2.57	AD	SR

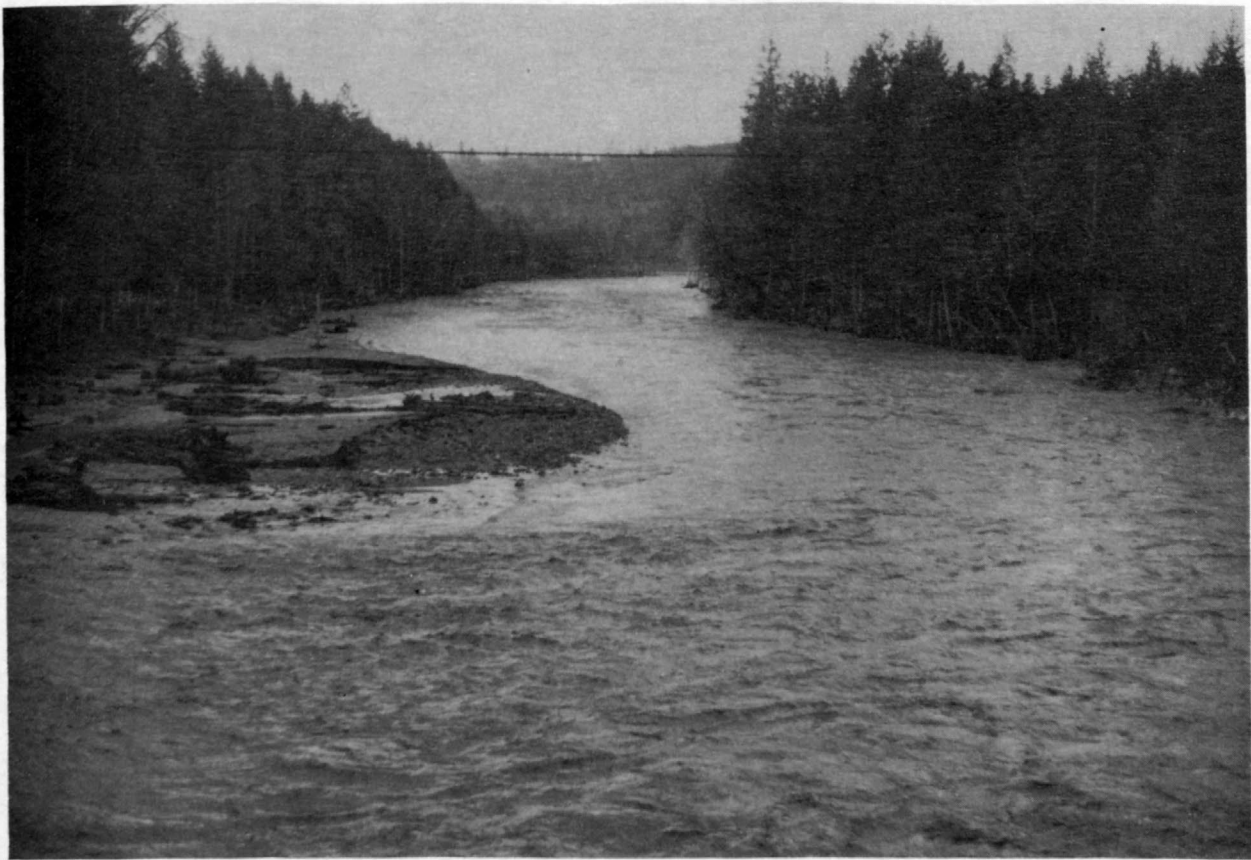
Table 9. --Particle-size distributions of sediment less than 2.0 millimeters in diameter collected at particle-count sampling nodes, North Fork Toutle River at Kid Valley, Washington, 1985

[Lateral stationing: distances are from reference mark on left bank]

Lateral stationing (m)	Percent finer than indicated size, in millimeters					
	.062	.125	.250	.500	1.00	2.00
24	13	36	78	96	91	100
27	8	25	66	92	99	100
30	9	21	53	93	99	100
37	9	19	45	91	99	100
40	9	23	61	91	99	100
Average	10	25	61	93	99	100



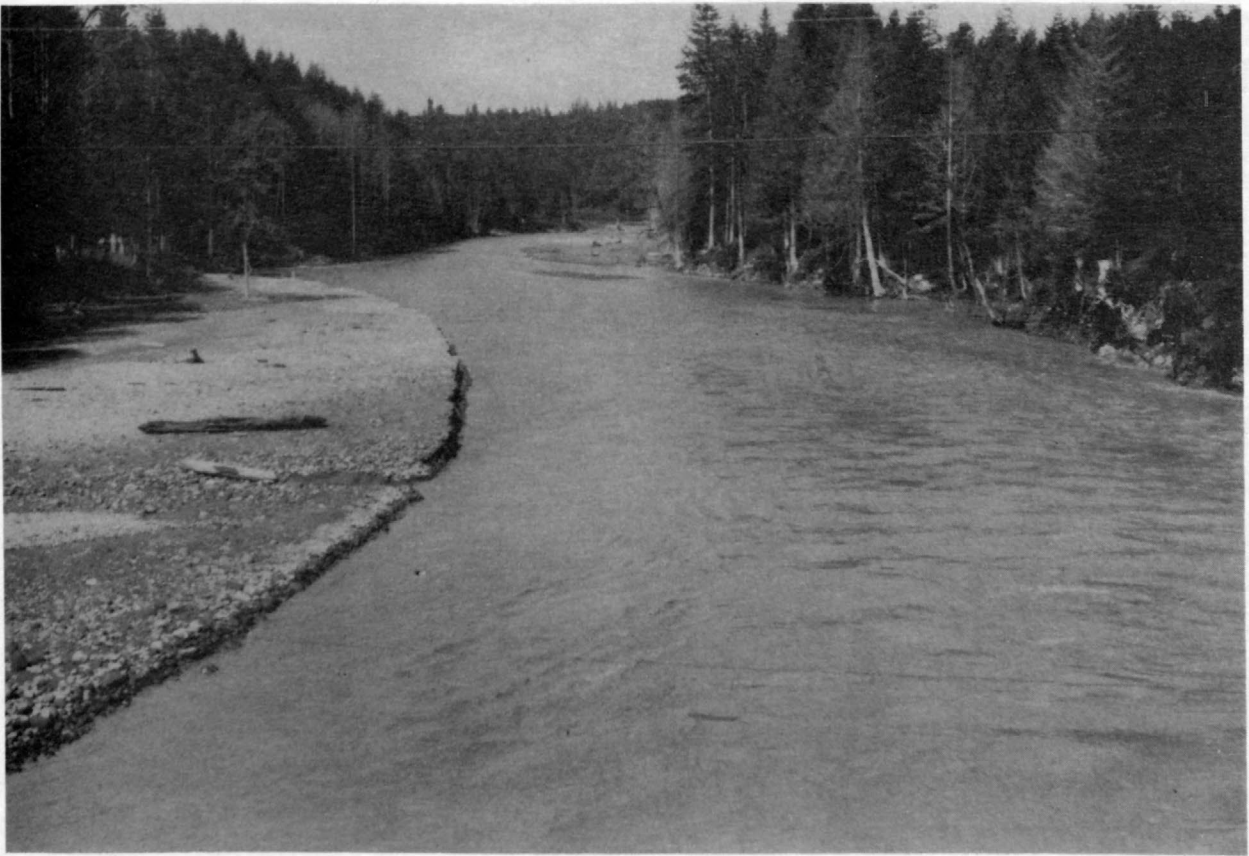
Toutle River at Tower Road, near Silver Lake, Washington, looking downstream from the bridge, March, 1982.



Toutle River at Tower Road, near Silver Lake, Washington, looking downstream from the bridge, April, 1982



Toutle River at Tower Road, near Silver Lake, Washington, looking downstream from the bridge, September, 1982.



Toutle River at Tower Road, near Silver Lake, Washington, looking downstream from the bridge, June, 1984.



Toutle River at Tower Road, near Silver Lake, Washington, looking downstream from the bridge, September, 1984. Photo taken during particle count.



Toutle River at Tower Road near Silver Lake, Washington, looking upstream toward the bridge from the right bank, September, 1984. Photo taken during particle count.

Table 10.--Hydraulic data for station 14242580, Toutle River

[Location: C, data

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
4	C	Apr 6, 1981	1429	7.4	5.37	67.6	37.9
5	C	Apr 9, 1981	1359	0.0	5.61	108	51.8
6	C	Apr 10, 1981	1516	0.0	5.58	89.3	49.8
8	C	Apr 22, 1981	1045	10.3	5.69	92.8	46.2
9	C	Apr 27, 1981	1105	8.5	5.47	58.1	35.3
10	C	May 7, 1981	1423	10.4	5.61	51.3	30.5
11	C	May 15, 1981	1103	10.4	5.54	41.1	31.7
12	C	May 26, 1981	1118	12.4	5.54	50.5	35.4
13	C	Jun 8, 1981	0950	11.5	5.44	55.3	33.5
14	C	Jun 9, 1981	1353	12.1	5.67	110	56.5
15	C	Jun 15, 1981	1120	12.0	5.29	59.3	34.9
16	C	Jun 22, 1981	1228	--	5.39	79.7	40.6
17	C	Jul 2, 1981	1118	18.9	5.00	12.1	18.9
19	C	Jul 13, 1981	1108	14.0	4.97	31.7	23.1
21	C	Jul 27, 1981	1059	22.3	4.82	16.4	16.6
22	C	Aug 4, 1981	1014	16.0	4.78	15.9	16.3
23	C	Aug 11, 1981	1001	22.0	4.67	11.3	13.7
24	C	Aug 18, 1981	1005	18.0	4.65	11.3	14.0
25	C	Aug 26, 1981	1101	13.8	4.58	9.0	12.2
26	C	Sep 1, 1981	0935	12.0	4.77	20.7	21.5
27	C	Sep 9, 1981	1053	17.0	4.57	9.2	11.9
28	C	Sep 15, 1981	1137	15.0	4.53	8.2	10.5
29	C	Sep 21, 1981	1100	12.5	4.64	13.9	15.0
31	C	Oct 6, 1981	1112	13.0	5.58	¹ 207	76.8
32	C	Oct 6, 1981	1430	13.0	5.76	219	84.9
33	C	Oct 7, 1981	1105	11.0	5.29	128	54.4
35	C	Oct 19, 1981	1105	10.5	4.64	20.7	17.7
36	C	Oct 27, 1981	1330	12.0	4.72	28.8	21.1
37	C	Oct 28, 1981	1105	11.0	5.07	73.0	41.0
38	C	Nov 4, 1981	1158	7.0	4.72	33.3	24.1
39	C	Nov 12, 1981	1055	9.5	5.00	64.6	37.9
40	C	Nov 14, 1981	1435	9.5	5.56	197	79.9
41	C	Nov 14, 1981	1945	7.5	5.47	191	85.5
42	C	Nov 16, 1981	1110	7.0	5.11	¹ 96.8	55.7
43	C	Nov 18, 1981	1041	7.5	5.26	138	67.7

¹ Extreme change in stage during the streamflow measurement.

at Tower Road, near Silver Lake, Washington

collected at cableway]

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
4	65.9	0.58	1.78	0.56	---	---	2,600
5	65.9	0.79	2.09	0.78	---	---	4,300
6	65.9	0.76	1.80	0.75	---	---	3,900
8	65.9	0.70	2.01	0.69	---	---	5,800
9	65.9	0.54	1.64	0.53	---	---	1,400
10	65.0	0.47	1.68	0.47	---	---	2,600
11	64.7	0.49	1.30	0.49	---	---	1,600
12	65.9	0.54	1.42	0.54	---	---	1,300
13	65.6	0.51	1.65	0.51	---	---	2,700
14	65.0	0.87	1.95	0.87	---	---	3,300
15	63.1	0.55	1.70	0.55	---	---	500
16	63.4	0.64	1.96	0.64	---	---	800
17	36.6	0.52	0.64	0.51	---	---	400
19	57.0	0.40	1.37	0.38	---	---	1,600
21	39.0	0.43	0.99	0.42	---	---	200
22	38.7	0.42	0.98	0.42	---	---	200
23	38.7	0.35	0.83	0.35	---	---	400
24	39.0	0.36	0.81	0.36	---	---	400
25	38.6	0.32	0.73	0.32	---	---	300
26	55.5	0.39	0.96	0.36	---	---	1,300
27	38.4	0.31	0.77	0.31	---	---	400
28	37.5	0.28	0.78	0.28	---	---	270
29	38.1	0.39	0.93	0.39	---	---	870
31	66.5	1.15	2.69	1.14	---	---	16,800
32	66.5	1.28	2.58	1.26	---	---	29,900
33	65.3	0.83	2.35	0.83	---	---	23,800
35	56.4	0.31	1.17	0.30	---	---	350
36	58.6	0.36	1.36	0.34	---	---	280
37	64.4	0.64	1.78	0.63	---	---	31,300
38	60.1	0.40	1.38	0.40	---	---	1,400
39	64.4	0.59	1.70	0.59	---	---	10,000
40	66.8	1.20	2.47	1.18	---	---	59,000
41	62.5	1.37	2.23	1.32	---	---	42,000
42	65.3	0.85	1.74	0.84	---	---	14,000
43	65.6	1.03	2.04	1.02	---	---	14,000

Table 10.--Hydraulic data for station 14242580, Toutle River

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
44	C	Nov 24, 1981	1040	5.5	5.05	107	55.4
45	C	Dec 1, 1981	1033	6.0	4.84	71.8	42.6
46	C	Dec 2, 1981	1023	8.0	5.84	¹ 289	102
47	C	Dec 2, 1981	1205	8.0	5.81	¹ 279	97.2
48	C	Dec 2, 1981	1406	8.0	5.71	¹ 235	88.1
49	C	Dec 5, 1981	1308	8.0	6.36	513	147
50	C	Dec 5, 1981	1948	9.0	6.17	397	118
51	C	Dec 6, 1981	0054	8.5	5.96	¹ 367	109
52	C	Dec 6, 1981	0758	7.5	5.99	¹ 358	111
53	C	Dec 6, 1981	1318	3.0	5.84	325	108
54	C	Dec 8, 1981	1230	7.0	4.82	167	68.3
55	C	Dec 10, 1981	1100	6.4	4.63	138	62.3
56	C	Dec 15, 1981	1029	8.0	4.68	167	69.2
59	C	Dec 21, 1981	1027	6.0	4.48	105	51.1
60	C	Dec 29, 1981	1033	2.9	4.07	65.0	35.0
61	C	Jan 8, 1981	1420	3.2	3.63	34.2	19.5
62	C	Jan 12, 1982	1108	5.0	3.76	48.6	25.7
63	C	Jan 16, 1982	1435	7.5	4.79	¹ 199	76.1
64	C	Jan 17, 1982	1133	5.0	5.29	¹ 287	120
65	C	Jan 19, 1982	1108	6.0	4.38	137	60.7
66	C	Jan 23, 1982	1320	8.5	6.09	584	150
68	C	Jan 23, 1982	1846	--	5.91	549	147
69	C	Jan 23, 1982	2320	8.0	6.13	589	154
70	C	Jan 24, 1982	0815	6.5	6.87	¹ 859	203
71	C	Jan 24, 1982	1238	--	6.41	¹ 711	182
72	C	Jan 26, 1982	1358	--	4.99	282	102
73	C	Jan 29, 1982	1053	6.0	4.06	121	55.3
74	C	Feb 2, 1982	1108	6.5	4.01	119	54.0
76	C	Feb 9, 1982	1113	2.3	3.32	51.9	30.1
77	C	Feb 12, 1982	1053	5.3	3.30	51.4	30.4
78	C	Feb 14, 1982	0930	7.3	5.18	¹ 327	113
79	C	Feb 16, 1982	1050	18.0	5.68	486	149
80	C	Feb 17, 1982	1037	9.0	5.51	¹ 425	133
81	C	Feb 19, 1982	0803	7.5	5.00	¹ 255	92.5
83	C	Feb 24, 1982	1141	5.0	4.10	155	60.2

¹ Extreme change in stage during the streamflow measurement.

at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
44	65.3	0.85	1.93	0.84	---	---	5,700
45	62.5	0.68	1.68	0.68	---	---	4,700
46	66.8	1.52	2.85	1.50	0.00380	0.028	32,800
47	66.8	1.45	2.87	1.44	0.00380	0.027	40,400
48	66.8	1.32	2.66	1.31	0.00424	0.029	27,600
49	66.8	2.20	3.49	2.16	0.00469	0.033	79,500
50	66.2	1.78	3.37	1.74	---	---	66,500
51	67.1	1.62	3.38	1.60	---	---	12,200
52	67.1	1.66	3.23	1.63	0.00436	0.028	10,500
53	66.8	1.61	3.01	1.58	0.00432	0.030	10,000
54	63.1	1.08	2.45	1.07	---	---	10,600
55	63.4	0.98	2.21	0.97	---	---	9,600
56	64.7	1.07	2.42	1.06	---	---	7,600
59	61.0	0.84	2.06	0.83	0.00060	0.010	4,700
60	58.0	0.60	1.85	0.60	0.00044	0.008	2,000
61	36.0	0.54	1.75	0.54	---	---	2,200
62	43.9	0.59	1.89	0.58	0.00027	0.006	4,000
63	62.2	1.22	2.62	1.21	---	---	12,500
64	62.8	1.91	2.40	1.53	---	---	12,300
65	61.3	0.99	2.25	0.98	0.00235	0.021	4,800
66	67.1	2.23	3.90	2.21	---	---	22,100
68	67.1	2.18	3.74	2.16	0.00431	0.029	18,100
69	67.1	2.30	3.82	2.26	---	---	22,400
70	67.7	3.00	4.19	2.91	0.00527	0.035	33,300
71	67.1	2.71	3.91	2.65	0.00489	0.034	25,400
72	65.6	1.56	2.76	1.53	0.00313	0.027	10,500
73	62.4	0.89	2.19	0.88	0.00243	0.021	2,800
74	61.9	0.87	2.20	0.87	0.00247	0.020	4,500
76	57.6	0.52	1.72	0.52	0.00167	0.015	950
77	57.3	0.53	1.69	0.52	0.00188	0.017	800
78	65.6	1.73	2.89	1.68	0.00351	0.029	8,700
79	67.4	2.21	3.26	2.15	0.00407	0.033	33,000
80	65.9	2.01	3.21	1.97	0.00380	0.030	46,000
81	65.3	1.42	2.76	1.39	0.00355	0.027	24,400
83	63.7	0.94	2.58	0.94	0.00231	0.018	7,000

Table 10.--Hydraulic data for station 14242580, Toutle River

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
84	C	Mar 1, 1982	1033	8.0	4.03	100	46.6
85	C	Mar 5, 1982	1320	8.0	3.86	95.2	44.6
86	C	Mar 9, 1982	1115	8.5	4.03	100	47.1
87	C	Mar 15, 1982	1138	6.0	3.94	118	51.8
88	C	Mar 19, 1982	0458	11.9	4.52	86.3	32.9
89	C	Mar 20, 1982	1323	9.0	4.33	69.9	30.6
90	C	Mar 22, 1982	1303	8.0	4.44	52.0	26.2
91	C	Mar 29, 1982	1040	6.7	4.83	50.0	27.3
92	C	Apr 6, 1982	1115	8.0	5.06	62.4	33.0
93	C	Apr 12, 1982	1128	7.2	5.90	168	62.6
94	C	Apr 19, 1982	1205	9.0	5.64	69.0	37.2
95	C	Apr 26, 1982	1145	10.6	5.80	62.3	32.4
96	C	May 3, 1982	1108	9.0	5.83	64.5	35.3
97	C	May 10, 1982	1053	9.0	5.76	44.0	30.3
98	C	May 17, 1982	1123	11.8	5.92	65.6	38.1
99	C	May 24, 1982	1148	14.3	5.82	53.3	31.8
100	C	Jun 1, 1982	1118	11.8	5.73	43.6	31.3
101	C	Jun 8, 1982	0958	13.0	5.65	37.5	28.4
102	C	Jun 14, 1982	1050	12.0	5.72	37.5	30.9
103	C	Jun 21, 1982	1153	16.0	5.70	41.2	32.9
104	C	Jun 28, 1982	1020	15.0	5.64	24.3	23.5
105	C	Jul 7, 1982	1000	14.5	5.61	20.6	21.4
106	C	Jul 13, 1982	1255	17.5	5.62	17.2	18.9
107	C	Jul 19, 1982	0958	16.5	5.64	15.3	16.6
108	C	Aug 4, 1982	1020	15.0	5.64	12.2	15.8
109	C	Aug 13, 1982	0933	15.5	5.69	11.7	13.9
110	C	Aug 24, 1982	1104	16.5	5.65	8.2	12.2
113	C	Sep 15, 1982	1159	14.5	5.64	14.8	16.1
114	C	Sep 21, 1982	1003	12.0	5.72	20.0	19.1
115	C	Sep 28, 1982	1143	12.5	5.73	16.0	15.3
116	C	Oct 7, 1982	1355	10.5	5.89	30.4	25.7
117	C	Oct 13, 1982	1235	11.5	5.73	18.4	19.0
118	C	Oct 22, 1982	1043	12.0	5.88	33.9	23.6
119	C	Oct 23, 1982	1301	11.0	5.92	40.7	24.6
120	C	Oct 28, 1982	1300	8.5	6.01	¹ 45.1	26.3

¹ Extreme change in stage during the streamflow measurement.

at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
84	63.1	0.74	2.15	0.73	0.00244	0.019	11,000
85	62.2	0.72	2.14	0.71	0.00193	0.016	4,600
86	64.1	0.74	2.13	0.73	0.00223	0.018	7,300
87	63.4	0.82	2.27	0.81	0.00224	0.018	4,100
88	54.9	0.60	2.63	0.60	0.00313	0.015	3,100
89	57.3	0.53	2.28	0.53	---	---	65,000
90	62.2	0.42	1.98	0.42	0.00233	0.014	16,000
91	64.1	0.43	1.83	0.43	0.00307	0.017	11,400
92	65.6	0.50	1.89	0.50	0.00297	0.018	8,700
93	66.8	0.94	2.68	0.93	0.00367	0.022	45,200
94	67.4	0.55	1.85	0.55	0.00333	0.021	6,000
95	66.8	0.49	1.92	0.48	0.00356	0.019	5,400
96	68.0	0.52	1.83	0.52	0.00427	0.023	6,500
97	67.1	0.45	1.45	0.45	0.00328	0.023	4,100
98	68.0	0.56	1.72	0.56	0.00340	0.023	6,000
99	63.4	0.50	1.67	0.47	0.00318	0.020	4,400
100	67.4	0.46	1.39	0.46	0.00300	0.024	3,500
101	66.5	0.43	1.32	0.43	0.00276	0.023	2,900
102	67.4	0.46	1.21	0.46	0.00290	0.026	3,400
103	67.4	0.49	1.25	0.49	---	---	5,030
104	68.3	0.34	1.04	0.33	0.00273	0.024	3,000
105	68.3	0.31	0.96	0.31	0.00256	0.024	1,700
106	68.3	0.28	0.91	0.28	0.00259	0.024	2,000
107	68.3	0.24	0.92	0.24	0.00265	0.022	1,500
108	67.7	0.23	0.77	0.23	0.00260	0.025	970
109	60.7	0.23	0.84	0.21	0.00279	0.022	690
110	62.5	0.20	0.67	0.18	0.00275	0.025	320
113	62.8	0.26	0.92	0.24	0.00273	0.022	2,300
114	68.0	0.28	1.05	0.28	0.00276	0.021	2,800
115	68.0	0.23	1.04	0.22	0.00276	0.019	1,800
116	67.7	0.38	1.18	0.38	0.00207	0.020	5,800
117	68.3	0.28	0.97	0.28	0.00264	0.023	1,300
118	68.6	0.34	1.43	0.34	0.00178	0.014	71,500
119	65.9	0.37	1.66	0.37	0.00274	0.016	30,000
120	66.8	0.39	1.72	0.39	0.00274	0.016	13,400

Table 10.--Hydraulic data for station 14242580, Toutle River

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge ³ (m /sec)	Area ² (m)
121	C	Oct 29, 1982	1208	8.5	6.56	¹ 229	84.4
123	C	Oct 30, 1982	1205	9.0	6.05	107	46.6
124	C	Nov 4, 1982	1353	9.5	5.87	50.3	29.1
125	C	Nov 10, 1982	1058	3.0	6.06	53.8	27.0
126	C	Nov 17, 1982	1243	4.0	6.64	131	53.0
127	C	Nov 23, 1982	1112	2.5	6.13	62.6	32.7
128	C	Dec 2, 1982	1034	7.0	6.28	111	47.6
129	C	Dec 3, 1982	1101	9.0	7.12	337	99.2
132	C	Dec 4, 1982	1301	8.0	7.17	¹ 424	119
133	C	Dec 4, 1982	1457	8.0	7.03	¹ 392	120
134	C	Dec 5, 1982	1455	8.0	6.44	243	83.7
135	C	Dec 9, 1982	1058	4.0	5.83	92.4	39.9
136	C	Dec 15, 1982	1121	7.0	6.11	109	48.4
137	C	Dec 16, 1982	0930	9.0	7.07	¹ 433	119
140	C	Dec 17, 1982	1135	--	6.67	292	97.2
141	C	Dec 20, 1982	1059	6.0	6.28	168	68.7
142	C	Dec 28, 1982	1147	2.0	5.76	56.9	29.6
143	C	Jan 5, 1983	1919	6.0	7.39	482	134
144	C	Jan 6, 1983	1048	7.0	7.23	363	108
145	C	Jan 7, 1983	1106	8.0	7.17	373	123
146	C	Jan 10, 1983	1139	8.0	6.69	243	89.1
147	C	Jan 17, 1983	1120	7.0	5.80	75.9	36.6
148	C	Feb 2, 1983	1055	4.0	5.67	64.3	33.3
149	C	Feb 16, 1983	1035	7.5	6.11	105	51.5
150	C	Feb 22, 1983	1113	9.0	6.00	112	52.9
151	C	Mar 7, 1983	1035	9.0	5.73	78.8	39.9
152	C	Mar 9, 1983	1613	11.0	6.57	207	83.4
153	C	Mar 10, 1983	0819	9.0	6.52	222	84.5
154	C	Mar 10, 1983	1102	10.0	6.55	234	86.6
155	C	Mar 10, 1983	1533	10.0	6.55	240	90.1
156	C	Mar 11, 1983	1042	8.0	6.08	175	67.5
157	C	Mar 11, 1983	1211	--	6.04	170	67.3
158	C	Mar 18, 1983	1029	7.0	5.69	76.8	39.5
159	C	Mar 24, 1983	1034	8.0	5.42	52.1	30.1
160	C	Mar 29, 1983	1429	9.0	6.22	¹ 166	69.1

¹ Extreme change in stage during the streamflow measurement.

at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
121	69.5	1.21	2.71	1.21	0.00337	0.024	24,500
123	66.8	0.70	2.30	0.70	0.00287	0.018	13,000
124	68.3	0.43	1.73	0.42	0.00256	0.017	7,300
125	68.6	0.39	1.99	0.39	0.00313	0.015	30,000
126	69.2	0.77	2.47	0.76	0.00358	0.020	66,500
127	68.3	0.48	1.92	0.48	0.00288	0.017	22,500
128	69.2	0.69	2.33	0.68	0.00270	0.017	18,000
129	71.4	1.39	3.40	1.38	0.00379	0.022	45,000
132	70.5	1.70	3.55	1.68	0.00369	0.024	39,000
133	70.5	1.70	3.27	1.68	0.00365	0.026	35,000
134	68.9	1.21	2.91	1.21	0.00328	0.022	23,500
135	67.7	0.59	2.32	0.59	0.00274	0.016	20,000
136	65.3	0.74	2.26	0.74	0.00325	0.021	16,500
137	70.8	1.69	3.62	1.67	0.00381	0.024	57,000
140	70.2	1.39	3.00	1.38	0.00344	0.024	26,000
141	69.8	0.98	2.45	0.98	0.00300	0.022	22,900
142	67.1	0.44	1.92	0.44	0.00249	0.015	16,500
143	71.7	1.87	3.59	1.86	0.00374	0.026	27,500
144	71.4	1.51	3.37	1.50	0.00382	0.024	23,200
145	69.8	1.76	3.04	1.75	0.00371	0.029	16,300
146	69.8	1.28	2.73	1.27	0.00327	0.025	14,500
147	66.8	0.55	2.08	0.55	0.00208	0.015	8,600
148	65.6	0.51	1.93	0.51	0.00181	0.014	8,900
149	67.7	0.76	2.04	0.76	0.00232	0.020	9,400
150	67.4	0.78	2.12	0.78	0.00212	0.018	4,900
151	65.6	0.61	1.98	0.61	0.00208	0.017	7,500
152	70.2	1.19	2.49	1.18	0.00284	0.024	16,500
153	69.8	1.21	2.62	1.20	0.00278	0.023	14,700
154	69.8	1.24	2.70	1.23	0.00285	0.023	17,800
155	69.8	1.29	2.66	1.28	0.00271	0.023	20,300
156	67.4	1.00	2.59	1.00	0.00230	0.018	11,500
157	67.4	1.00	2.53	1.00	0.00221	0.019	11,400
158	65.3	0.61	1.95	0.60	0.00228	0.018	8,300
159	58.0	0.52	1.73	0.52	0.00219	0.017	7,800
160	67.7	1.02	2.40	1.02	0.00258	0.021	16,200

Table 10.--Hydraulic data for station 14242580, Toutle River

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
161	C	Mar 30, 1983	0810	8.0	6.36	¹ 215	82.7
162	C	Apr 4, 1983	1025	7.0	5.75	96.5	47.7
163	C	Apr 11, 1983	1008	6.0	5.42	63.5	34.6
164	C	Apr 22, 1983	1138	8.0	5.19	52.9	30.4
165	C	Apr 22, 1983	1230	--	5.20	50.6	29.3
166	C	May 2, 1983	0948	9.0	5.11	45.7	27.1
167	C	May 17, 1983	0948	11.0	5.07	47.0	27.7
168	C	May 25, 1983	1048	15.0	5.09	48.4	28.5
169	C	Jun 9, 1983	1143	16.0	4.87	32.5	20.9
170	C	Jun 15, 1983	1018	14.0	4.95	40.2	23.1
171	C	Jul 12, 1983	1027	17.0	4.87	35.0	20.2
172	C	Jul 18, 1983	0953	14.0	4.98	53.6	28.8
173	C	Aug 10, 1983	1040	15.0	4.44	17.5	12.6
174	C	Aug 30, 1983	1055	16.0	4.84	44.1	24.4
175	C	Sep 7, 1983	1118	14.0	4.46	18.9	13.7
176	C	Sep 14, 1983	1122	16.5	4.51	19.8	13.5
177	C	Sep 21, 1983	1315	11.0	4.44	16.3	12.1
178	C	Sep 30, 1983	1114	9.0	4.49	19.7	13.6
179	C	Oct 5, 1983	1015	10.0	4.48	19.1	13.5
180	C	Oct 14, 1983	1048	11.0	4.50	18.8	13.1
181	C	Oct 28, 1983	1245	11.0	4.52	18.5	12.5
182	C	Oct 31, 1983	1024	11.0	4.75	32.6	18.5
184	C	Nov 3, 1983	1447	12.0	6.24	221	78.2
185	C	Nov 3, 1983	1604	12.0	6.23	228	82.0
186	C	Nov 3, 1983	1850	12.0	6.39	262	82.0
187	C	Nov 3, 1983	2204	12.0	6.28	254	85.8
188	C	Nov 4, 1983	0822	10.2	5.94	187	69.7
190	C	Nov 7, 1983	1123	--	5.55	121	51.9
191	C	Nov 14, 1983	0958	8.0	6.08	¹ 176	74.8
192	C	Nov 14, 1983	1210	8.0	6.02	167	72.2
193	C	Nov 17, 1983	0758	8.0	6.64	¹ 355	113
194	C	Nov 17, 1983	1024	8.0	6.41	¹ 289	96.9
195	C	Nov 17, 1983	1221	8.0	6.33	¹ 275	97.8
196	C	Nov 18, 1983	0854	7.0	6.57	¹ 336	111
197	C	Nov 22, 1983	1003	7.0	5.34	¹ 135	58.4

¹ Extreme change in stage during the streamflow measurement.

at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
161	68.6	1.20	2.60	1.20	0.00240	0.021	13,300
162	64.7	0.74	2.02	0.74	0.00253	0.020	6,500
163	58.3	0.59	1.83	0.59	0.00135	0.014	6,400
164	53.7	0.57	1.74	0.56	0.00210	0.018	6,000
165	53.7	0.55	1.73	0.54	---	---	5,700
166	51.2	0.53	1.69	0.53	0.00243	0.019	6,500
167	50.9	0.54	1.70	0.54	0.00254	0.020	4,700
168	51.2	0.56	1.70	0.65	0.00251	0.020	5,400
169	47.0	0.45	1.55	0.44	0.00239	0.018	6,600
170	47.9	0.48	1.74	0.48	0.00244	0.017	7,600
171	40.9	0.49	1.73	0.43	0.00258	0.017	7,600
172	50.3	0.57	1.86	0.57	0.00274	0.019	5,400
173	27.4	0.46	1.38	0.46	0.00275	0.023	1,700
174	43.6	0.56	1.81	0.49	0.00258	0.017	9,400
175	27.8	0.49	1.38	0.49	0.00273	0.024	1,600
176	27.8	0.49	1.47	0.48	0.00290	0.023	1,600
177	27.1	0.44	1.35	0.44	0.00288	0.023	1,400
178	27.8	0.49	1.44	0.49	0.00286	0.023	6,200
179	27.8	0.49	1.42	0.48	0.00285	0.023	5,300
180	27.8	0.47	1.44	0.47	0.00287	0.022	7,400
181	28.1	0.44	1.48	0.44	0.00280	0.021	4,400
182	29.0	0.64	1.76	0.64	0.00291	0.023	12,900
184	67.4	1.16	2.83	1.16	0.00346	0.023	120,000
185	67.7	1.21	2.78	1.21	0.00302	0.022	128,000
186	68.0	1.21	3.19	1.20	0.00354	0.021	101,000
187	67.7	1.27	2.96	1.26	0.00312	0.022	80,000
188	66.8	1.04	2.68	1.04	0.00288	0.021	54,000
190	64.7	0.80	2.34	0.80	0.00267	0.019	16,200
191	67.7	1.11	2.36	1.09	0.00280	0.024	20,900
192	67.7	1.07	2.31	1.05	0.00262	0.023	20,000
193	69.5	1.63	3.13	1.48	0.00311	0.023	37,800
194	68.6	1.41	2.98	1.39	0.00301	0.023	24,000
195	68.3	1.43	2.82	1.41	0.00292	0.024	23,500
196	69.5	1.59	3.03	1.57	0.00405	0.028	21,000
197	65.6	0.89	2.31	0.88	0.00197	0.018	10,900

Table 10.--Hydraulic data for station 14242580, Toutle River

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
199	C	Nov 25, 1983	1033	6.0	5.85	171	70.7
200	C	Dec 1, 1983	1015	2.5	5.22	77.2	35.9
201	C	Dec 5, 1983	1000	5.0	5.06	59.0	30.6
202	C	Dec 12, 1983	1100	6.0	5.41	101	42.9
203	C	Dec 19, 1983	0930	4.0	5.02	62.5	31.7
204	C	Dec 30, 1983	1130	3.5	5.32	99.2	46.9
205	C	Jan 3, 1984	1140	8.0	6.40	¹ 296	97.5
206	C	Jan 6, 1984	1009	8.0	5.62	126	57.0
207	C	Jan 11, 1984	1010	7.0	5.32	86.4	52.6
208	C	Jan 18, 1984	1148	0.5	4.73	40.9	23.4
209	C	Jan 24, 1984	0929	7.0	6.86	¹ 391	125
210	C	Jan 24, 1984	1123	7.0	6.79	¹ 354	119
211	C	Jan 24, 1984	1405	7.0	6.83	¹ 368	122
212	C	Jan 25, 1984	1045	7.0	6.85	¹ 375	130
213	C	Jan 25, 1984	1547	7.0	6.58	328	112
214	C	Jan 26, 1984	1230	6.5	6.07	¹ 231	91.8
215	C	Feb 1, 1984	1000	5.5	5.00	68.3	35.3
216	C	Feb 7, 1984	1058	6.0	4.65	44.9	25.6
217	C	Feb 13, 1984	1026	7.0	5.70	163	67.6
218	C	Feb 14, 1984	1047	6.0	5.40	125	52.3
219	C	Feb 21, 1984	1100	6.5	5.12	102	49.5
220	C	Feb 28, 1984	1058	7.0	4.86	71.9	38.1
221	C	Mar 9, 1984	1021	10.0	4.71	50.2	28.6
222	C	Mar 14, 1984	1010	8.0	5.08	¹ 86.1	45.0
223	C	Mar 23, 1984	0945	9.0	5.31	¹ 131	58.2
224	C	Mar 29, 1984	0826	7.0	5.03	103	49.5
225	C	Apr 6, 1984	1031	8.0	4.67	60.7	34.8
226	C	Apr 10, 1984	1019	6.5	5.14	109	53.0
227	C	Apr 18, 1984	1053	10.0	4.85	79.8	42.1
228	C	Apr 24, 1984	0940	7.0	4.56	53.2	33.1
229	C	May 3, 1984	0908	8.0	5.01	¹ 99.8	50.4
230	C	May 14, 1984	1209	12.0	4.97	96.9	48.5
231	C	May 14, 1984	1859	12.0	5.04	¹ 101	50.9
232	C	May 15, 1984	1000	9.5	4.96	94.1	48.2
233	C	May 24, 1984	0945	9.0	4.92	90.9	45.6

¹ Extreme change in stage during the streamflow measurement.

at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
199	66.5	1.06	2.42	1.05	0.00269	0.022	13,400
200	56.7	0.63	2.15	0.54	0.00279	0.016	7,300
201	54.6	0.56	1.93	0.46	0.00287	0.017	7,800
202	54.9	0.78	2.36	0.64	0.00302	0.017	6,000
203	49.7	0.64	1.97	0.48	0.00262	0.016	5,300
204	52.8	0.89	2.12	0.69	0.00287	0.020	13,100
205	68.6	1.42	3.04	1.40	0.00427	0.027	38,000
206	67.4	0.85	2.21	0.83	0.00306	0.022	10,600
207	59.5	0.88	1.64	0.87	0.00329	0.032	7,000
208	38.4	0.61	1.75	0.59	0.00281	0.021	5,000
209	70.8	1.76	3.14	1.74	0.00373	0.028	39,000
210	69.8	1.70	2.99	1.68	0.00380	0.029	32,200
211	70.8	1.73	3.01	1.71	0.00377	0.029	27,600
212	70.8	1.84	2.88	1.82	0.00371	0.032	25,500
213	69.8	1.61	2.92	1.59	0.00360	0.028	22,200
214	68.3	1.34	2.52	1.32	0.00279	0.025	13,100
215	65.9	0.54	1.94	0.53	0.00212	0.016	9,700
216	62.5	0.41	1.74	0.41	0.00199	0.014	4,400
217	67.1	1.01	2.42	1.00	0.00293	0.022	11,200
218	66.5	0.79	2.39	0.78	0.00251	0.018	12,200
219	66.5	0.74	2.05	0.74	0.00238	0.019	7,600
220	63.4	0.60	1.89	0.60	0.00247	0.019	5,400
221	47.0	0.61	1.75	0.61	0.00236	0.020	5,200
222	65.6	0.69	1.91	0.68	0.00282	0.022	8,200
223	65.9	0.88	2.26	0.88	0.00274	0.021	8,800
224	65.3	0.76	2.08	0.74	0.00258	0.020	6,400
225	47.9	0.73	1.75	0.71	0.00234	0.022	5,100
226	65.9	0.81	2.05	0.80	0.00269	0.022	6,500
227	52.5	0.80	1.89	0.79	0.00278	0.024	5,500
228	44.8	0.74	1.61	0.72	0.00218	0.023	4,500
229	60.7	0.83	1.98	0.82	0.00297	0.024	7,300
230	63.7	0.76	2.00	0.75	0.00284	0.022	5,500
231	63.7	0.80	1.98	0.79	0.00291	0.023	32,800
232	63.7	0.76	1.95	0.75	0.00287	0.023	12,800
233	59.8	0.76	1.99	0.75	0.00289	0.022	8,600

Table 10.--Hydraulic data for station 14242580, Toutle River

Meas. no.	Loca- tion	Date	Time (hour)	Water temperature (°C)	Gage height (m)	Discharge (m ³ /sec)	Area (m ²)
234	C	Jun 7, 1984	1111	11.5	4.59	61.7	31.5
235	C	Jun 19, 1984	1130	12.5	4.45	49.7	32.4
236	C	Jun 21, 1984	1133	12.5	5.47	¹ 179	82.2
237	C	Jun 21, 1984	1504	12.5	5.38	¹ 169	77.9
238	C	Jul 6, 1984	1125	14.0	4.44	43.6	29.3
239	C	Jul 11, 1984	1148	15.0	4.36	34.2	23.2
240	C	Jul 27, 1984	1200	16.5	4.22	24.2	17.8
241	C	Aug 3, 1984	1255	18.5	4.10	14.5	12.1
242	C	Aug 10, 1984	1134	18.0	4.07	12.0	10.4
243	C	Aug 17, 1984	1143	21.0	4.05	11.5	10.4
244	C	Aug 24, 1984	1045	16.0	4.05	10.7	10.3
245	C	Sep 7, 1984	1105	14.0	4.21	20.1	15.2
246	C	Sep 11, 1984	1033	10.0	4.14	14.4	11.4
247	C	Sep 21, 1984	1126	14.0	4.18	10.1	9.9

¹ Extreme change in stage during the streamflow measurement.

at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Width (m)	Average depth (m)	Average velocity (m/sec)	Hydraulic radius (m)	Slope	Manning n	Sediment concentration (mg/l)
234	46.7	0.68	1.96	0.67	0.00290	0.021	6,500
235	41.2	0.79	1.53	0.77	0.00225	0.026	6,800
236	67.1	1.23	2.18	1.21	0.00298	0.028	12,600
237	66.5	1.17	2.17	1.15	0.00282	0.027	8,600
238	44.8	0.65	1.49	0.64	0.00100	0.016	3,000
239	41.2	0.56	1.47	0.55	0.00242	0.023	4,800
240	30.5	0.58	1.36	0.57	---	---	4,800
241	36.6	0.33	1.20	0.33	---	---	2,500
242	33.6	0.31	1.15	0.31	---	---	1,700
243	35.1	0.30	1.11	0.30	---	---	800
244	36.6	0.28	1.04	0.28	---	---	1,000
245	41.2	0.37	1.32	0.37	---	---	4,200
246	30.8	0.37	1.26	0.37	---	---	1,500
247	39.7	0.25	1.02	0.25	---	---	700

Table 11.--Water discharge and associated suspended-sediment concentration for selected peak flows, Toutle River at Tower Road, near Silver Lake, Washington

		Peak water discharge			Peak sediment concentration		
				Suspended-			Suspended
		Water	sediment		Water	sediment	
		dis-	concen-		dis-	concen-	
Date	Time	charge	tration		charge	tration	
	(hour)	(m ³ /sec)	(mg/l)		(hour)	(m ³ /sec)	(mg/l)
1981 Water Year							
Jun 8, 1981	1600	¹ 229	94,000		1900	187	¹ 13,000
1982 Water Year							
Oct 6, 1981	1900	306	66,100		2000	289	94,700
Dec 2, 1981	1115	326	38,200		1145	271	43,000
Dec 5, 1981	1400	558	75,000		1200	542	88,400
Dec 15, 1981	1620	296	18,300		1600	285	18,800
Jan 17, 1982	0000	462	24,500		0000	296	24,500
Jan 24, 1982	0445	1,040	52,000		0530	994	54,400
Feb 14, 1982	0130	¹ 524	44,800		0230	348	55,000
Feb 17, 1982	0630	595	71,500		0730	487	93,000
Feb 20, 1982	0845 ^{1,2}	1,050	275,000		0930	965	299,000
Mar 20, 1982	0010	³ 674	130,000		0050	445 ^{1,3}	1,170,000
1983 Water Year							
Oct 29, 1982	0445	436	45,000		0530	357	46,400
Dec 3, 1982	2245	¹ 1,080	94,500		2315	866	¹ 101,000
Dec 16, 1982	0400	634	99,800		0400	634	99,800
Jan 5, 1983	1515	663	39,000		1500	651	39,400
Mar 10, 1983	1300	264	20,400		1400	260	21,400
1984 Water Year							
Nov 3, 1983	1715	295	101,000		1730	256	¹ 111,000
Nov 13, 1983	2245	309	47,000		2330	292	48,500
Nov 18, 1983	0015	377	43,100		0030	365	43,300
Nov 20, 1983	0215	315	35,300		0230	311	35,500
Nov 24, 1983	1630	276	33,000		1730	264	33,300
Jan 3, 1984	1230	¹ 388	54,500		1245	368	62,300

¹ Annual maximum value.

² Peak resulted partly from pond breakouts on the avalanche deposit.

³ Peak resulted from a mudflow originating in the crater.

Table 12.--Concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington

[Analysis; P, pipet for particles finer than .062 mm; V, visual-accumulation tube for particles coarser than .062 mm; S, wet sieve for particles coarser than .062 mm]

Meas. no.	Anal-ysis	Sediment concen-tration (mg/l)	Percent finer than indicated size, in millimeters															
			.002		.008		.031		.125		.500		2.00		8.00			
29	P,V	889	45	73	83	84	85	85	88	90	95	99	100					
31	P,V	20,200	10	19	32	49	64	73	83	92	98	100						
32	P,V	27,700	13	24	40	60	75	80	88	95	98	99	100					
33	P,V	22,600	16	28	44	62	74	83	90	95	99	100						
37	P,S	31,200	-	21	38	59	80	89	93	96	99	100						
38	P,S	1,900	-	10	16	24	35	52	71	86	98	100						
39	P,S	9,060	-	12	21	34	50	64	82	93	98	100						
40	P,S	52,800	-	16	26	41	59	71	85	95	98	100						
41	P,S	41,900	-	13	21	34	49	60	78	88	95	99	100					
42	P,S	13,800	-	11	18	29	44	56	74	92	99	100						
43	P,S	14,000	-	10	17	28	39	49	71	89	98	100						
44	P,S	5,770	-	9	14	23	33	45	61	84	96	99	100					
45	P,S	4,690	-	13	19	29	38	51	67	88	98	100						
46	P,S	37,100	-	11	22	34	49	67	82	94	98	99	100					
47	P,S	34,100	-	14	21	34	49	65	79	91	97	100						
48	P,S	23,200	-	11	20	31	43	56	69	88	95	99	100					
49	P,S	61,900	-	11	17	27	38	53	60	87	95	99	100					
50	P,S	40,700	-	10	14	23	34	47	66	87	97	100						
51	P,S	30,800	-	9	14	25	35	49	67	86	95	99	100					
52	P,S	23,300	-	9	14	24	34	50	63	86	95	99	100					
53	P,S	21,000	-	9	14	23	34	47	61	86	96	100						
54	P,S	10,200	-	7	13	21	30	42	58	83	97	100						
55	P,S	8,830	-	9	13	21	31	42	57	84	97	100						
56	P,S	12,800	-	8	10	17	27	40	63	86	97	99	100					
59	P,V	6,940	6	7	9	16	24	35	55	67	98	100						
59	P,S	6,300	-	8	12	19	28	39	57	82	97	100						
60	P,V	2,290	3	5	9	13	20	30	45	75	97	100						
61	P,V	2,110	4	5	10	15	20	30	44	71	97	100						
62	P,V	9,130	2	5	8	13	20	31	57	71	98	100						
63	P,V	12,500	4	4	6	13	21	40	66	94	100							
64	P,S	12,200	-	5	8	13	20	29	41	68	90	99	100					
65	P,S	4,150	-	6	9	14	20	28	42	68	93	99	99	100				
66	P,S	17,800	-	13	19	32	45	61	79	95	100							
68	P,S	18,500	-	13	19	31	46	63	80	96	100							
69	P,S	28,500	-	12	16	28	41	58	79	96	99	100						

Table 12.--Concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Anal-ysis	Sediment concen- tration (mg/l)	Percent finer than indicated size, in millimeters											
			.002	.008	.031	.125	.500	2.00	8.00					
			.004	.016	.062	.250	1.00	4.00						
70	P,S	43,000	-	12	19	30	45	63	83	98	100			
70	P,S	32,100	-	13	18	28	41	59	81	97	100			
71	P,S	22,400	-	11	15	25	37	51	74	95	100			
72	P,S	11,100	-	9	13	21	31	43	62	86	98	100		
73	P,S	4,130	-	8	11	18	25	35	49	80	97	100		
74	P,V	4,980	4	6	9	15	21	29	45	58	97	100		
76	P,V	1,610	4	8	13	20	26	36	45	67	93	98	100	
79	P,S	30,500	5	8	15	24	27	50	68	92	99	100		
80	P,S	44,000	6	13	14	24	35	48	71	93	99	100		
81	P,S	24,800	6	7	11	18	27	37	53	80	98	100		
83	P,V	8,920	5	7	9	15	22	31	49	80	99	100		
84	P,V	9,320	11	12	13	25	36	51	68	88	98	100		
85	V	5,680	-	-	-	-	-	38	54	81	98	100		
86	V	7,670	-	-	-	-	-	46	63	85	88	100		
87	V	4,910	-	-	-	-	-	32	48	81	98	99	100	
88	P,S	292,000	8	11	20	31	46	61	80	95	99	100		
88	S	281,000	-	-	-	-	-	66	84	96	99	100		
89	P,S	69,900	14	19	27	43	61	74	89	98	100			
89	P,S	57,100	14	17	24	40	57	71	88	98	100			
89	P,S	49,000	11	17	26	41	57	71	86	97	100			
90	V	19,500	-	-	-	-	-	70	87	97	100			
91	V	11,500	-	-	-	-	-	59	80	96	100			
92	V	9,490	-	-	-	-	-	46	63	87	98	100		
93	V	32,900	-	-	-	-	-	54	74	89	96	99	100	
94	V	4,900	-	-	-	-	-	33	53	79	97	100		
95	V	5,540	-	-	-	-	-	50	66	85	97	99	100	
96	V	6,020	-	-	-	-	-	42	64	88	99	100		
97	V	4,250	-	-	-	-	-	43	55	85	99	100		
98	V	5,980	-	-	-	-	-	42	63	85	97	100		
99	V	3,500	-	-	-	-	-	43	58	86	98	100		
100	V	3,710	-	-	-	-	-	41	59	83	97	100		
101	V	2,680	-	-	-	-	-	46	66	90	99	100		
102	V	3,340	-	-	-	-	-	51	66	87	99	100		
103	S	5,030	-	-	-	-	-	63	77	91	98	99	99 100	
104	V	2,980	-	-	-	-	-	58	74	92	100			

Table 12.--Concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Anal-ysis	Sediment concentration (mg/l)	Percent finer than indicated size, in millimeters							
			.002	.008	.031	.125	.500	2.00	8.00	
			.004	.016	.062	.250	1.00	4.00		
105	V	1,750	-	-	-	-	41	65	95	100
106	V	1,960	-	-	-	-	61	77	96	100
107	V	1,450	-	-	-	-	65	67	97	100
108	V	958	-	-	-	-	40	63	90	99 100
109	V	678	-	-	-	-	35	55	94	100
110	V	443	-	-	-	-	34	49	83	98 100
113	S	2,280	-	-	-	-	25	30	42	64 84 92 100
114	S	2,980	-	-	-	-	46	58	78	83 85 93 100
115	V	3,640	-	-	-	-	26	35	49	80 98 100
116	V	5,290	-	-	-	-	39	58	76	87 98 100
117	V	1,100	-	-	-	-	44	63	89	99 100
118	P,S	79,500	17	18	30	49	68	88	97	99 100
119	P,S	30,900	9	10	13	24	36	50	74	93 99 100
120	P,S	13,600	6	7	8	14	21	33	55	86 99 100
121	P,S	26,000	7	8	10	19	27	39	62	86 96 99 100
123	P,S	12,400	6	6	8	15	22	33	52	83 97 99 100
123	P,S	14,300	7	8	12	18	27	37	52	78 97 100
124	P,S	7,220	6	6	10	18	26	36	51	79 98 100
125	S	28,700	-	-	-	-	59	76	92	98 100
126	P,S	59,100	6	8	15	25	37	49	66	87 96 100
127	S	21,100	-	-	-	-	43	65	88	98 100
128	S	13,200	-	-	-	-	41	59	81	97 100
129	S	47,300	-	-	-	-	51	69	88	98 99 100
129	P,S	43,900	9	10	16	27	40	54	71	88 97 99 100
132	S	36,800	-	-	-	-	42	60	84	97 99 100
132	P,S	41,400	5	6	10	16	25	37	58	83 95 99 100
132	S	37,800	-	-	-	-	42	59	84	97 99 100
133	S	33,800	-	-	-	-	41	60	86	96 99 100
133	P,S	31,900	5	7	12	20	30	43	62	86 97 99 100
133	S	34,600	-	-	-	-	41	60	86	96 99 100
134	S	27,200	-	-	-	-	36	51	79	95 99 100
134	P,S	23,200	6	6	11	19	29	40	57	82 95 99 100
134	S	27,700	-	-	-	-	36	51	79	95 99 100
135	S	20,900	-	-	-	-	40	55	78	96 100
136	S	18,200	-	-	-	-	42	61	84	98 100

Table 12.--Concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Anal- ysis	Sediment concen- tration (mg/l)	Percent finer than indicated size, in millimeters											
			.002		.008		.031		.125		.500		2.00	8.00
			.004		.016		.062		.250		1.00		4.00	
137	P,S	53,300	9	11	10	24	34	45	65	86	97	100		
140	P,S	20,200	9	10	13	24	36	48	68	93	99	100		
141	S	20,200	-	-	-	-	-	26	39	61	89	99	100	
142	S	14,600	-	-	-	-	-	47	60	85	98	100		
143	S	21,700	-	-	-	-	-	50	73	94	99	100		
143	P,S	21,600	9	10	12	23	34	49	72	94	99	100		
143	S	22,000	-	-	-	-	-	50	73	94	99	100		
144	P,S	19,300	8	9	10	19	28	42	64	89	98	99	100	
145	P,S	15,500	6	8	13	21	30	44	65	91	99	100		
146	P,S	14,000	7	7	9	16	23	34	50	78	94	99	100	
147	V	8,490	-	-	-	-	-	56	69	89	100			
148	V	9,820	-	-	-	-	-	45	64	90	98	99	100	
149	V	9,420	-	-	-	-	-	19	29	61	96	98	100	
150	V	4,570	-	-	-	-	-	31	46	78	97	99	100	
151	V	10,600	-	-	-	-	-	48	66	85	97	100		
152	P,S	17,900	7	8	14	23	35	48	64	82	94	98	100	
153	P,S	16,900	7	7	14	22	34	46	65	86	96	100		
154	P,S	19,600	10	11	16	27	40	54	71	88	96	99	100	
155	P,S	19,200	9	11	16	27	38	50	66	81	95	99	100	
157	P,S	12,100	7	8	9	19	29	41	58	82	97	100		
158	V	7,560	-	-	-	-	-	44	62	87	98	100		
159	V	7,470	-	-	-	-	-	45	62	87	96	100		
160	P,S	16,900	4	6	8	15	24	38	60	92	97	100		
161	P,S	13,800	6	8	10	18	28	40	50	78	97	100		
162	V	6,350	-	-	-	-	-	30	46	76	96	100		
163	V	7,000	-	-	-	-	-	29	40	58	79	97	100	
165	V	5,560	-	-	-	-	-	36	55	84	98	100		
166	S	6,540	-	-	-	-	-	46	58	82	98	100		
167	S	4,780	-	-	-	-	-	36	50	73	97	100		
168	S	5,740	-	-	-	-	-	44	59	76	98	100		
169	S	6,910	-	-	-	-	-	47	63	83	98	100		
170	S	7,340	-	-	-	-	-	41	59	74	98	100		
171	S	7,620	-	-	-	-	-	50	73	91	99	100		
172	S	4,840	-	-	-	-	-	36	53	78	94	99	100	
173	S	1,830	-	-	-	-	-	31	46	79	98	100		

Table 12.--Concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Anal- ysis	Sediment concen- tration (mg/l)	Percent finer than indicated size, in millimeters							
			.002	.008	.031	.125	.500	2.00	8.00	
			.004	.016	.062	.250	1.00	4.00		
174	S	8,830	-	-	-	-	51	67	90	99 100
175	S	1,570	-	-	-	-	43	60	86	99 100
176	S	1,560	-	-	-	-	32	48	82	98 100
177	S	1,490	-	-	-	-	28	43	79	98 100
178	S	6,180	-	-	-	-	58	79	95	99 100
179	S	5,320	-	-	-	-	50	72	95	100
180	S	5,670	-	-	-	-	45	70	93	99 100
181	V	4,910	-	-	-	-	51	74	95	99 100
182	S	12,700	-	-	-	-	67	79	94	99 99 100
184	P,S	128,000	14	16	24	38	53	66	77	97 99 100
185	P,S	95,000	11	13	23	36	54	71	87	98 100
186	P,S	74,400	10	15	20	33	47	59	80	96 99 100
187	P,S	67,000	9	10	16	28	42	57	70	94 99 100
188	P,S	39,000	6	7	11	17	26	41	60	89 98 100
190	S	18,000	-	-	-	-	34	59	87	99 100
191	S	19,500	-	-	-	-	32	52	80	95 99 100
192	S	20,000	-	-	-	-	29	46	81	99 100
193	P,S	28,600	7	9	13	21	31	41	53	77 93 99 100
194	P,S	25,200	8	9	10	20	29	38	51	79 95 99 100
195	P,S	24,800	6	7	9	16	23	32	43	77 97 100
196	P,S	20,400	6	7	11	17	25	34	50	79 92 99 100
197	S	10,900	-	-	-	-	28	37	63	93 99 100
199	S	14,200	-	-	-	-	31	47	73	96 100
200	S	7,110	-	-	-	-	30	41	60	90 99 100
201	S	7,790	-	-	-	-	35	48	70	93 99 100
203	S	5,360	-	-	-	-	26	36	58	90 99 100
204	P,S	13,100	10	1	15	25	35	46	60	78 93 99 100
205	P,S	52,600	13	1	20	35	56	64	76	93 99 100
206	S	10,700	-	-	-	-	44	58	81	96 99 100
207	S	8,580	-	-	-	-	43	56	78	96 100
208	S	5,320	-	-	-	-	29	39	64	90 98 100
209	P,S	30,400	9	10	15	24	35	47	67	90 98 100
210	P,S	28,700	6	8	10	16	24	33	42	73 94 99 100
211	P,S	33,000	9	11	16	26	38	47	61	83 97 99 100
212	P,S	27,000	8	10	13	22	32	42	53	84 95 99 100

Table 12.--Concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Anal- ysis	Sediment concen- tration (mg/l)	Percent finer than indicated size, in millimeters													
			.002		.008		.031		.125		.500		2.00		8.00	
				.004		.016		.062		.250		1.00		4.00		
213	P,S	24,000	8	10	11	21	31	40	57	83	96	99	100			
214	S	17,600	-	-	-	-	-	26	39	66	81	81	100			
215	S	9,760	-	-	-	-	-	42	55	78	94	99	100			
216	S	4,320	-	-	-	-	-	31	48	82	98	100				
217	S	10,600	-	-	-	-	-	28	42	68	90	98	100			
218	S	9,140	-	-	-	-	-	28	41	67	91	99	100			
219	S	6,710	-	-	-	-	-	29	44	73	95	100				
220	S	5,700	-	-	-	-	-	32	45	68	93	99	100			
221	S	5,640	-	-	-	-	-	35	47	71	95	100				
222	S	8,360	-	-	-	-	-	28	45	73	93	99	100			
223	S	7,590	-	-	-	-	-	27	40	64	85	98	100			
224	S	6,480	-	-	-	-	-	20	30	53	81	96	99	100		
225	S	4,620	-	-	-	-	-	32	42	64	88	98	100			
226	S	5,380	-	-	-	-	-	23	35	62	90	99	100			
227	S	5,280	-	-	-	-	-	35	46	65	84	98	100			
228	S	4,080	-	-	-	-	-	39	50	70	90	99	100			
229	S	7,020	-	-	-	-	-	27	38	62	88	98	100			
230	P,S	5,120	4	5	9	14	20	28	41	65	88	99	100			
231	P,S	22,800	18	24	36	55	70	78	84	92	98	100				
232	P,S	14,100	10	11	20	33	47	58	72	85	95	99	100			
233	S	8,620	-	-	-	-	-	32	45	69	89	98	99	100		
234	S	7,060	-	-	-	-	-	45	59	79	93	99	100			
237	P,S	10,400	5	7	9	16	23	34	53	81	96	99	100			
239	S	4,620	-	-	-	-	-	20	27	41	63	88	98	100		
241	S	2,570	-	-	-	-	-	19	27	54	88	97	99	100		
242	S	1,410	-	-	-	-	-	30	42	73	96	100				
243	S	782	-	-	-	-	-	30	46	83	99	100				
244	S	1,030	-	-	-	-	-	23	63	77	98	100				
245	S	4,160	-	-	-	-	-	16	27	52	89	99	99	100		
246	S	1,500	-	-	-	-	-	18	27	51	64	100				
247	S	700	-	-	-	-	-	31	45	84	100					

Table 13.--Lateral variation of concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington

[Analysis: S, wet sieve; V, visual-accumulation tube;
Lateral stationing: distances are from reference mark on left bank; first and last distances in each set are stations at edges of water; other stations are located at the centroid of equal segments of discharge]

Meas. no.	Anal-ysis	Lateral stationing (m)	Sediment concentration (mg/l)	Percent finer than indicated size, in millimeters						
				.062	.125	.250	.500	1.00	2.00	4.00
88		9.2								
		34.6	275,000	61	80	95	99	100		
		42.4	253,000	75	90	98	100			
		46.0	316,000	59	77	93	99	100		
		49.9	312,000	64	86	97	100			
		55.2	251,000	70	87	96	99	100		
		64.1								
	S	Averages	281,000	66	84	96	99	100		
90		7.0								
		16.4	18,800	71	89	99	100			
		38.7	19,500	71	88	97	100			
		49.6	17,400	75	89	97	100			
		55.3	20,000	68	86	98	100			
		62.1	20,900	64	81	96	100			
		70.2								
	V	Averages	19,300	70	87	97	100			
91		7.0								
		21.4	11,300	61	85	99	100			
		31.2	12,600	54	74	94	100			
		40.7	11,700	58	76	93	100			
		50.0	10,800	63	82	95	99	100		
		61.2	11,100	61	81	97	99	100		
		71.1								
	V	Averages	11,500	59	80	96	100			
92		6.7								
		20.1	5,630	68	85	99	100			
		32.9	11,200	37	53	87	100			
		42.3	10,600	40	59	89	99	100		
		49.6	12,300	34	45	69	91	100		
		59.8	7,720	51	71	92	99	100		
		72.3								
	V	Averages	9,490	46	63	87	98	100		

Table 13.--Lateral variation of concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington
-continued

Meas. no.	Anal-ysis	Lateral stationing (m)	Sediment concentration (mg/l)	Percent finer than indicated size, in millimeters						
				.062	.125	.250	.500	1.00	2.00	4.00
93		6.1								
		14.1	31,900	56	82	99	100			
		28.5	37,700	47	65	83	99	100		
		41.1	32,800	53	75	89	97	98	100	
		50.8	34,500	50	66	78	84	97	100	
		60.6	27,700	62	83	94	98	100		
		72.9								
	V	Averages	32,900	54	74	89	96	99	100	
129		4.0								
		14.4	45,000	51	69	89	100			
		27.6	57,300	42	61	85	99	100		
		38.7	48,500	49	66	83	96	99	100	
		49.6	43,400	55	74	89	96	99	100	
		60.5	42,500	57	76	92	97	99	100	
		75.3								
	S	Averages	47,300	51	69	88	98	99	100	
132		4.0								
		15.1	40,500	38	53	84	100			
		27.1	37,200	62	82	96	99	100		
		38.6	28,000	54	73	93	99	100		
		59.7	34,400	44	64	82	90	97	99	100
		74.4	32,500	46	65	89	96	99	100	
	S	Averages	37,800	42	59	84	97	99	100	
133		4.0								
		17.8	24,700	56	78	99	100			
		31.0	46,700	29	46	85	99	100		
		40.6	37,700	36	52	81	98	100		
		49.1	34,600	38	56	78	90	98	100	
		59.3	28,900	46	67	88	94	98	100	
		74.4								
	S	Averages	34,600	41	60	86	96	99	100	
134		4.3								
		18.0	27,600	35	55	94	100			
		30.5	32,600	29	44	78	99	100		
		38.8	37,700	26	34	58	92	100		
		48.2	22,100	41	57	75	87	96	100	
		58.2	17,700	50	65	88	97	98	100	
		73.2								
	S	Averages	27,700	36	51	79	95	99	100	

Table 13.--Lateral variation of concentration and particle-size distribution of suspended sediment, Toutle River at Tower Road, near Silver Lake, Washington
-continued

Meas. no.	Anal-ysis	Lateral stationing (m)	Sediment concentration (mg/l)	Percent finer than indicated size,						
				in millimeters						
				.062	.125	.250	.500	1.00	2.00	4.00
143		3.7								
		19.4	23,300	49	72	98	100			
		31.1	22,900	48	71	93	100			
		40.6	20,800	53	77	95	99	100		
		49.6	21,800	50	71	90	97	100		
		59.9	21,300	51	76	93	99	100		
		75.3								
	S	Averages	22,000	50	73	94	99	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington

[Remarks: N, multiple attempts yeilded no sample; C, samples composited; A, armoured bed; B, sampler broken; L, less than 100 grams; M, multiple samples to obtain enough sediment for analysis; H, hand sample; Lateral stationing: distances are from reference mark at left bank; first and last distances in each set are at edges of water; other stations are located at the centroid of equal segments of discharge]

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
4		6.7								
		12.7	0	4	27	86	99	100		
		25.9	0	1	20	57	86	95	97	98 100
		40.9	0	1	10	17	88	98	99	100
		51.2	0	1	7	31	69	89	94	98 100
		61.0	0	2	9	33	79	94	99	100
		72.6								
		Averages	0	2	15	45	84	95	98	99 100
5		6.7								
		17.3	0	0	3	14	60	92	98	100
		30.1	0	0	2	20	49	62	69	76 91 100
		41.1	0	1	6	24	72	96	99	99 100
		50.7	0	0	3	10	33	54	66	76 89 100
		60.7	0	1	5	15	49	90	97	99 100
		72.6								
		Averages	0	0	4	17	53	79	86	90 96 100
6		6.7								
		16.9	0	1	11	42	77	94	96	98 98 100
		35.6	0	2	13	50	75	86	90	94 100
		44.7	0	0	4	25	54	72	80	86 93 100
	N	51.3	--	--	--	--	--	--	--	--
	N	59.7	--	--	--	--	--	--	--	--
		72.6								
		Averages								
8		6.7								
		13.3	0	0	2	10	36	57	65	75 87 100
		24.3	0	2	18	66	93	98	100	
		38.1	0	0	2	27	78	92	96	98 100
		49.6	0	0	2	6	23	53	75	89 100
		63.0	0	0	1	2	4	9	14	22 62 100
		72.6								
		Averages	0	0	5	22	47	62	70	77 90 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
9		6.7												
		12.6	0	0	0	1	4	12	22	57	84	100		
		21.8	0	0	2	12	29	45	61	74	93	100		
		32.4	0	0	7	46	91	99	99	100				
		49.6	0	0	4	28	71	90	96	99	100			
		63.3	0	0	2	12	34	49	58	69	78	100		
		72.6												
		Averages	0	0	3	20	46	59	67	80	91	100		
10		7.6												
		19.7	0	0	5	18	47	84	98	100				
		40.8	0	1	6	30	76	94	99	100				
		50.0	0	1	7	34	68	92	98	99	100			
		56.1	0	1	12	49	87	97	99	100				
		62.9	0	0	4	33	84	96	97	98	100			
		72.6												
		Averages	0	1	7	33	72	93	98	99	100			
11		7.6												
		30.7	0	2	8	27	76	98	100					
		43.8	0	0	8	37	79	92	95	96	97	100		
		48.9	0	0	21	26	50	64	75	84	96	100		
		53.8	0	1	7	26	55	77	88	93	96	100		
		60.3	0	1	5	18	47	68	79	89	100			
		72.3												
		Averages	0	1	10	27	61	80	87	92	98	100		
12		6.7												
		31.2	0	1	2	8	25	51	74	90	98	100		
		42.5	0	0	1	6	38	84	96	100				
		48.6	0	2	12	37	74	91	96	98	100			
		53.6	0	1	6	35	73	90	97	99	99	100		
		60.8	0	0	2	8	38	63	72	79	85	100		
		72.6												
		Averages	0	1	5	19	50	76	87	93	96	100		
13		7.0												
	N	16.2	--	--	--	--	--	--	--	--	--	--	--	--
		37.2	0	0	7	38	72	82	87	91	100			
		45.3	0	1	6	26	55	77	88	92	98	100		
		52.8	0	0	2	14	34	52	74	95	100			
		61.7	0	0	4	20	67	90	95	98	100			
		72.6												

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
14		7.0								
		18.8	0	1	3	8	25	54	76	89 98 100
		32.0	0	3	21	65	85	93	97	100
		41.3	0	2	9	29	63	84	94	98 99 100
	N	50.4	--	--	--	--	--	--	--	-- --
	N	60.6	--	--	--	--	--	--	--	-- --
		72.0								
15		7.0								
		13.1	0	0	1	4	18	65	92	99 100
		24.3	0	0	12	58	85	96	98	100
		35.0	0	1	6	42	90	99	99	100
	N	44.7	--	--	--	--	--	--	--	-- --
	N	57.9	--	--	--	--	--	--	--	-- --
		70.2								
16		6.7								
		12.3	0	0	1	4	21	56	77	89 96 100
		20.2	0	0	8	42	76	94	96	97 97 100
		29.4	0	0	4	35	88	97	98	100
	N	40.5	--	--	--	--	--	--	--	-- --
	N	61.0	--	--	--	--	--	--	--	-- --
		70.2								
17		30.5								
		33.3	0	0	0	4	39	86	98	100
		38.8	0	0	2	17	40	60	76	90 97 100
		43.9	0	0	2	24	51	62	72	86 98 100
		51.3	0	0	1	8	33	54	66	76 91 100
		61.2	0	0	4	36	76	88	94	98 99 100
		67.1								
		Averages	0	0	2	18	48	70	81	90 97 100
19		7.6								
	C	13.3	--	--	--	--	--	--	--	--
	C	20.6	--	--	--	--	--	--	--	--
	C	31.0	--	--	--	--	--	--	--	--
	C	38.1	--	--	--	--	--	--	--	--
	C	51.6	--	--	--	--	--	--	--	--
		67.7								
		Composite	0	0	3	26	58	79	86	92 97 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
21		0.0												
		6.3	0	0	1	20	64	85	92	96	100			
		13.8	0	0	2	22	47	66	78	89	98	100		
		20.8	0	0	1	17	48	71	84	93	100			
		26.7	0	0	4	20	34	49	59	69	82	100		
		34.2	0	0	1	18	52	76	89	96	100			
		39.0												
		Averages	0	0	2	19	49	69	80	89	96	100		
22		0.3												
	C	7.6	--	--	--	--	--	--	--	--	--	--	--	--
	C	15.9	--	--	--	--	--	--	--	--	--	--	--	--
	C	21.2	--	--	--	--	--	--	--	--	--	--	--	--
	C	27.1	--	--	--	--	--	--	--	--	--	--	--	--
	C	34.8	--	--	--	--	--	--	--	--	--	--	--	--
		39.0												
		Composite	0	0	1	12	32	48	59	74	85	100		
23		0.0												
		8.1	0	0	1	16	44	67	80	89	97	100		
		16.2	0	0	1	12	41	68	83	94	100			
		21.0	0	0	1	14	49	77	89	96	100			
		26.9	0	1	6	24	45	62	71	79	88	100		
		33.6	0	0	2	14	30	43	54	65	80	100		
		38.7												
		Averages	0	0	2	16	42	63	75	85	93	100		
24		-0.9												
	C	4.6	--	--	--	--	--	--	--	--	--	--	--	--
	C	12.1	--	--	--	--	--	--	--	--	--	--	--	--
	C	18.9	--	--	--	--	--	--	--	--	--	--	--	--
	C	26.8	--	--	--	--	--	--	--	--	--	--	--	--
	C	32.9	--	--	--	--	--	--	--	--	--	--	--	--
		38.1												
		Composite	0	0	1	13	43	63	73	84	93	100		
25		0.5												
		5.7	0	0	1	10	37	63	80	92	100			
		9.1	0	0	3	14	38	60	77	91	98	100		
		17.0	0	0	1	15	45	70	87	92	96	100		
		25.2	0	0	2	18	49	67	74	88	95	100		
		33.7	0	0	2	18	49	65	73	84	97	100		
		39.0												
		Averages	0	0	2	15	44	65	78	89	97	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters									
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	64.0
26		-0.6										
	C	5.0	--	--	--	--	--	--	--	--	--	--
	C	11.2	--	--	--	--	--	--	--	--	--	--
	C	18.7	--	--	--	--	--	--	--	--	--	--
	C	27.0	--	--	--	--	--	--	--	--	--	--
	C	33.8	--	--	--	--	--	--	--	--	--	--
		58.0										
		Composite	0	0	4	24	54	73	84	92	99	100
27		-0.9										
		4.1	0	0	2	14	39	56	66	75	91	100
		7.3	0	0	3	22	53	79	92	97	100	
		13.7	0	1	6	34	72	93	98	99	100	
		20.6	0	0	1	12	38	66	82	92	98	100
		31.4	0	0	3	22	58	78	87	92	98	100
		37.5										
		Averages	0	0	3	21	52	74	85	91	97	100
28		-0.3										
		5.7	0	0	2	12	35	60	75	85	90	100
		13.3	0	0	1	9	26	44	57	71	84	100
		18.5	0	0	2	11	30	50	66	80	90	100
		24.0	0	0	1	11	34	60	77	87	94	100
		30.0	0	0	2	12	34	54	67	74	88	100
		37.2										
		Averages	0	0	2	11	32	54	68	79	89	100
32		6.4										
		17.3	1	2	10	45	91	99	100			
		31.7	1	2	14	52	83	93	97	99	100	
		40.0	0	1	4	20	75	93	96	98	100	
		48.6	0	1	3	5	10	29	52	76	100	
		59.1	0	1	1	1	2	9	39	83	100	
		72.9										
		Averages	0	1	6	25	52	65	77	91	100	
33		6.7										
		17.2	1	5	42	80	86	95	98	100		
		31.1	0	2	12	63	96	99	100			
		41.3	0	1	6	17	53	88	97	99	100	
		50.3	0	1	6	14	34	62	75	84	95	100
		60.0	0	1	4	15	61	97	99	100		
		72.0										
		Averages	0	2	14	38	66	88	94	97	99	100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
35		2.1												
		6.8	0	0	6	35	62	74	84	90	97	100		
		13.4	1	2	8	28	62	81	92	98	100			
		19.7	0	0	4	29	52	66	74	81	86	100		
		27.3	1	1	5	29	60	75	82	87	95	100		
		44.6	1	1	3	10	25	35	40	49	57	100		
		61.6												
		Averages	1	1	5	26	52	66	74	81	87	100		
36		7.6												
		12.7	0	0	2	7	41	79	90	95	100			
		19.9	0	0	3	30	75	97	100					
		26.1	0	0	2	22	57	78	87	95	99	100		
		33.5	0	0	6	42	92	99	100					
		41.6	0	0	2	21	68	90	96	98	100			
		68.9												
		Averages	0	0	3	24	67	89	95	98	100			
37		7.6												
	C	13.3	--	--	--	--	--	--	--	--	--	--	--	--
	C	22.3	--	--	--	--	--	--	--	--	--	--	--	--
	C	31.5	--	--	--	--	--	--	--	--	--	--	--	--
	C	43.0	--	--	--	--	--	--	--	--	--	--	--	--
	C	57.9	--	--	--	--	--	--	--	--	--	--	--	--
		72.0												
		Composite	0	1	4	22	51	72	84	92	97	100		
43		6.7												
		18.9	1	9	51	90	96	98	100					
		31.4	1	3	12	51	79	89	94	98	100			
		39.9	0	2	7	25	75	88	92	94	98	100		
	N	48.6	--	--	--	--	--	--	--	--	--	--	--	--
	N	60.0	--	--	--	--	--	--	--	--	--	--	--	--
		72.3												
44		7.0												
		14.1	0	0	1	2	8	47	86	99	100			
		24.7	0	2	17	63	83	92	95	98	100			
		34.5	0	0	3	25	76	90	96	99	100			
		45.8	0	0	2	7	26	51	60	67	77	100		
		60.0	0	4	14	20	25	54	85	99	100			
		72.3												
		Averages	0	1	7	23	44	67	84	92	95	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
45		7.3								
		13.7	0	1	6	24	73	94	99	100
	N	20.9	--	--	--	--	--	--	--	--
		29.3	0	1	2	13	61	91	97	100
		41.4	0	1	3	8	17	24	28	35 48 100
		59.2	1	7	20	43	67	87	96	100
		69.8								
56		7.3								
		17.7	0	2	13	47	77	92	96	98 100
		27.3	0	3	18	65	84	89	92	97 100
		35.7	0	2	8	30	76	88	93	97 100
		44.1	0	2	6	18	54	94	99	100
		56.9	2	11	30	50	58	67	75	84 100
		72.0								
		Averages	0	4	15	42	70	86	91	95 100
64		11.6								
	L	36.9	1	7	20	31	36	42	51	66 100
	L	52.4	0	1	2	3	4	10	22	56 100
		59.0	0	1	3	14	44	72	79	81 83 100
	L	62.6	1	2	6	14	41	73	88	93 100
	L	69.3	--	--	--	--	--	--	--	--
		75.9								
65		7.3								
		13.8	0	1	3	15	39	77	89	94 96 100
		24.0	0	1	3	18	68	90	94	97 98 100
		34.6	0	1	7	35	51	56	61	68 78 100
		44.6	0	4	40	92	98	99	100	
	N	56.2	--	--	--	--	--	--	--	--
		68.6								
72		6.7								
		13.3	0	2	17	86	100			
		21.7	0	1	11	69	98	100		
		35.8	0	0	3	21	69	92	96	97 100
	N	46.8	--	--	--	--	--	--	--	--
	N	59.6	--	--	--	--	--	--	--	--
		72.3								

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters									
			.062	.250	1.00	4.00	16.0	64.0				
			.125	.500	2.00	8.00	32.0	128.				
76		9.2										
	L	14.3	--	--	--	--	--	--	--	--	--	--
		19.8	0	0	6	33	74	87	90	92	92	100
		25.3	0	1	8	46	88	97	98	99	100	
		31.0	0	0	2	16	42	63	71	76	79	100
	L	42.3	0	2	11	31	42	47	50	54	59	100
		66.8										
77		9.2										
	L	14.3	--	--	--	--	--	--	--	--	--	--
		19.4	0	1	6	43	90	98	100			
		24.6	0	0	3	12	34	59	77	90	100	
		29.3	0	0	3	15	46	68	78	88	93	100
	L	39.4	0	3	15	41	61	71	75	80	100	
		66.5										
78		6.4										
	L	13.3	5	24	53	87	96	99	100			
		19.8	1	4	21	78	100					
		31.5	0	1	5	19	71	99	100			
		42.7	1	5	10	12	14	14	18	20	43	100
	L	57.4	1	2	4	7	9	13	36	56	100	
		72.0										
		Averages	2	7	19	41	58	65	69	75	89	100
79		5.8										
		14.3	1	4	27	95	100					
		22.7	1	3	18	84	100					
		34.2	1	3	9	33	89	97	98	100		
		46.0	0	1	2	3	3	6	17	52	91	100
	N	58.9	2	10	21	27	30	33	43	65	84	100
		73.2										
		Averages	1	4	15	48	64	67	71	83	95	100
80		6.4										
		14.4	2	8	40	95	100					
		22.5	1	5	29	91	100					
		34.1	1	2	6	27	91	99	99	99	100	
		45.8	1	4	8	12	17	32	58	86	97	100
		58.7	5	14	24	29	30	31	32	35	62	100
		72.3										
		Averages	2	7	21	51	68	72	78	84	92	100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.125	.250	.500	1.00	2.00	4.00	16.0 64.0 128.
81		6.4								
		13.2	0	4	30	99	100			
		20.4	0	2	18	88	100			
		33.1	0	1	4	24	61	74	81	89 100
		43.2	0	1	7	28	72	94	97	99 100
		56.9	0	2	3	5	6	9	22	48 78 100
		71.7								
		Averages	0	2	12	49	68	75	80	87 96 100
83		7.0								
		15.7	0	1	8	31	63	86	95	98 100
		32.0	0	1	6	33	75	95	99	100
		41.2	0	0	4	41	71	76	77	78 80 100
		49.7	0	2	14	70	96	99	100	
		59.0	0	2	23	96	100			
		70.8								
		Averages	0	1	11	54	81	91	94	95 96 100
84		7.6								
	C	17.8	--	--	--	--	--	--	--	--
	C	31.2	--	--	--	--	--	--	--	--
	C	40.9	--	--	--	--	--	--	--	--
	C	49.0	--	--	--	--	--	--	--	--
	C	57.7	--	--	--	--	--	--	--	--
		70.8								
		Composite	0	2	12	44	74	86	90	95 100
85		7.6								
	C	19.7	--	--	--	--	--	--	--	--
	C	33.6	--	--	--	--	--	--	--	--
	C	42.8	--	--	--	--	--	--	--	--
	C	50.2	--	--	--	--	--	--	--	--
	C	58.5	--	--	--	--	--	--	--	--
		69.8								
		Composite	0	2	15	58	87	95	97	98 100
86		7.3								
		18.1	2	10	51	93	98	99	100	
		31.6	0	2	14	61	85	91	94	97 98 100
		41.4	0	2	14	60	95	99	100	
		49.3	0	2	12	48	82	95	98	99 100
		58.4	0	1	4	14	32	47	57	66 82 100
		71.4								
		Averages	0	3	19	55	78	86	90	92 96 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
87		7.6												
		21.1	0	1	17	88	100							
		35.7	0	2	14	62	93	99	99	100				
		43.0	0	1	7	43	92	100						
		49.4	0	0	4	31	69	90	98	100				
	L	58.1	1	3	10	26	46	64	74	80	100			
		71.1												
		Averages	0	1	10	50	80	91	94	96	100			
88		9.2												
		34.6	8	20	38	76	91	97	100					
		42.2	11	24	48	77	90	97	100					
		46.0	7	14	26	52	74	88	96	98	100			
		49.9	6	11	19	29	39	44	47	53	62	62	100	
		55.2	6	20	39	54	62	66	70	78	90	100		
		64.1												
		Averages	8	18	34	58	71	78	83	86	90	92	100	
90		7.9												
		16.4	1	4	29	84	97	99	100					
		38.7	1	3	18	67	94	99	100					
		49.6	1	8	30	76	97	100						
		55.3	1	4	17	53	89	97	99	100				
		62.1	2	7	23	59	86	98	99	100				
		70.2												
		Averages	1	5	23	68	93	99	100					
91		7.0												
	C	21.4	--	--	--	--	--	--	--	--	--	--	--	--
	C	31.2	--	--	--	--	--	--	--	--	--	--	--	--
	C	40.7	--	--	--	--	--	--	--	--	--	--	--	--
	C	50.0	--	--	--	--	--	--	--	--	--	--	--	--
	C	61.2	--	--	--	--	--	--	--	--	--	--	--	--
		71.1												
		Composite	0	4	14	45	78	94	98	99	100			
92		6.7												
	C	20.1	--	--	--	--	--	--	--	--	--	--	--	--
	C	32.9	--	--	--	--	--	--	--	--	--	--	--	--
	C	42.3	--	--	--	--	--	--	--	--	--	--	--	--
	C	49.6	--	--	--	--	--	--	--	--	--	--	--	--
	C	59.8	--	--	--	--	--	--	--	--	--	--	--	--
		72.3												
		Composite	0	3	12	42	75	91	95	96	98	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters								
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0 64.0 128.
93		6.1									
		14.1	2	11	49	97	100				
		28.5	1	3	11	47	82	92	97	99	100
		41.1	1	3	10	40	78	92	97	99	100
		50.8	0	1	3	7	30	60	72	77	79 100
		60.6	1	2	5	14	38	73	94	99	100
		72.9									
		Averages	1	4	16	41	66	83	92	95	96 100
94		5.8									
	C	37.6	--	--	--	--	--	--	--	--	--
	C	44.9	--	--	--	--	--	--	--	--	--
	C	50.4	--	--	--	--	--	--	--	--	--
	C	55.7	--	--	--	--	--	--	--	--	--
	C	62.0	--	--	--	--	--	--	--	--	--
		73.2									
		Composite	0	3	16	46	76	91	96	98	99 100
95		6.1									
	C	38.2	--	--	--	--	--	--	--	--	--
	C	45.8	--	--	--	--	--	--	--	--	--
	C	51.6	--	--	--	--	--	--	--	--	--
	C	56.9	--	--	--	--	--	--	--	--	--
	C	63.0	--	--	--	--	--	--	--	--	--
		72.9									
		Composite	0	1	8	39	76	92	97	98	100
97		6.1									
		31.7	0	2	13	23	45	81	96	99	100
		44.1	0	1	12	36	53	68	82	94	100
		50.8	0	2	14	56	87	96	99	100	
		56.2	0	0	3	29	77	94	98	100	
	N	63.7	--	--	--	--	--	--	--	--	--
		73.2									
98		5.2									
		29.1	0	2	4	10	44	83	94	97	100
		43.1	0	1	10	39	68	86	95	99	100
		50.4	0	3	16	50	77	91	96	99	100
	N	56.1	--	--	--	--	--	--	--	--	--
	N	63.1	--	--	--	--	--	--	--	--	--
		73.2									

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.125	.250	.500	1.00	2.00	4.00	16.0 64.0 128.
99		5.2								
		32.8	0	1	2	5	32	79	95	100
	N	42.9	--	--	--	--	--	--	--	--
		49.1	0	1	8	40	69	86	94	99 100
		54.7	0	1	6	37	87	98	99	100
		62.4	0	3	11	36	76	95	99	100
		73.2								
100		6.1								
	C	25.7	--	--	--	--	--	--	--	--
	C	42.4	--	--	--	--	--	--	--	--
	C	49.4	--	--	--	--	--	--	--	--
	C	55.6	--	--	--	--	--	--	--	--
	C	63.0	--	--	--	--	--	--	--	--
		73.5								
		Composite	0	1	7	24	51	75	90	97 99 100
101		6.7								
		23.3	0	1	4	10	36	84	98	100
		42.7	0	0	1	5	23	59	84	96 100
		50.4	0	1	7	32	53	70	89	99 100
		56.0	0	1	10	59	92	97	99	100
		63.4	0	2	8	22	39	60	79	89 99 100
		73.2								
		Averages	0	1	6	26	49	74	90	97 100
102		6.1								
	C	19.7	--	--	--	--	--	--	--	--
	C	38.8	--	--	--	--	--	--	--	--
	C	47.9	--	--	--	--	--	--	--	--
	C	54.6	--	--	--	--	--	--	--	--
	C	62.8	--	--	--	--	--	--	--	--
		73.5								
		Composite	0	1	6	26	53	79	90	96 97 100
104		18.0								
		27.4	0	1	2	6	21	55	83	96 100
		37.7	0	0	2	7	26	49	69	89 100
		46.5	0	1	14	54	76	82	83	84 88 100
		56.2	0	0	1	7	15	23	34	54 78 100
		73.9	0	0	3	21	44	57	65	74 84 100
		85.4								
		Averages	0	0	4	19	36	53	67	79 90 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
106		1.8								
		12.7	0	1	1	12	54	91	99	100
		20.5	0	1	8	22	43	72	89	100
		28.3	0	2	5	25	48	67	79	100
		39.8	0	0	3	15	35	64	87	100
		55.6	0	3	5	25	55	77	88	96
		70.2								
		Averages	0	1	4	20	47	74	88	96
113		-1.2								
		9.3	0	0	6	25	49	67	78	97
		37.6	0	0	5	22	44	60	68	74
		44.0	1	1	6	28	58	72	80	86
		51.0	0	0	6	30	58	79	90	96
		59.1	0	1	10	38	56	70	81	88
		66.5								
		Averages	0	0	7	29	53	70	79	86
114		-1.5								
	C	5.6	--	--	--	--	--	--	--	--
	C	22.0	--	--	--	--	--	--	--	--
	C	34.6	--	--	--	--	--	--	--	--
	C	45.2	--	--	--	--	--	--	--	--
	C	58.1	--	--	--	--	--	--	--	--
		66.5								
		Composite	0	1	6	22	44	65	79	89
115		-1.5								
	C	3.1	--	--	--	--	--	--	--	--
	C	8.7	--	--	--	--	--	--	--	--
	C	31.1	--	--	--	--	--	--	--	--
	C	46.1	--	--	--	--	--	--	--	--
	C	56.1	--	--	--	--	--	--	--	--
		66.5								
		Composite	0	1	7	31	52	68	79	88
117		-1.5								
	C	6.1	--	--	--	--	--	--	--	--
	C	23.3	--	--	--	--	--	--	--	--
	C	33.5	--	--	--	--	--	--	--	--
	C	41.7	--	--	--	--	--	--	--	--
	C	55.1	--	--	--	--	--	--	--	--
		66.8								
		Composite	0	0	6	28	49	64	75	83

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.0
118		5.2												
		11.1	3	5	7	20	56	87	97	100				
		15.6	2	4	12	46	72	88	95	99	100			
		28.4	3	4	10	39	59	70	78	83	91	100		
		55.6	2	3	6	18	33	44	51	58	69	100		
		66.0	2	4	8	23	39	48	58	74	90	100		
		73.8												
	Averages	2	4	9	29	52	67	76	83	90	100			
119		6.1												
		31.5	3	21	73	89	95	97	97	98	98	100		
		39.7	3	16	56	81	92	97	99	100				
		45.9	0	3	12	30	46	58	67	75	90	100		
		51.9	0	5	20	44	67	79	85	89	94	100		
		60.6	0	2	6	10	20	33	48	64	78	82	100	
		72.0												
	Averages	1	9	33	51	64	73	79	85	92	96	100		
120		6.1												
		30.7	1	6	31	73	89	96	98	99	100			
		42.9	0	4	31	72	88	92	94	96	100			
		49.5	0	2	13	63	85	92	94	96	98	100		
		56.0	0	2	15	53	78	89	93	95	96	100		
		63.5	0	3	13	32	60	79	87	92	98	100		
		72.9												
	Averages	0	3	21	59	80	90	93	96	98	100			
121		4.9												
		27.8	1	10	31	53	70	82	90	94	100			
		37.4	2	8	28	57	68	81	91	96	100			
		45.0	0	2	8	25	64	79	88	96	100			
		51.7	1	4	13	27	62	87	96	99	100			
		60.3	1	6	18	30	50	78	94	98	100			
		74.4												
	Averages	1	6	20	38	63	81	92	97	100				
123		5.2												
		32.3	1	12	56	88	94	98	99	100				
		41.5	0	2	15	62	93	97	98	99	100			
		48.6	0	2	11	35	66	96	100					
		55.3	0	1	7	26	53	77	91	97	100			
		62.7	0	4	16	36	63	83	90	93	94	100		
		72.0												
	Averages	0	4	21	49	74	90	96	98	99	100			

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
124		5.5												
		13.1	0	5	37	84	95	99	100					
		22.6	0	0	8	66	94	98	99	100				
		33.8	0	2	12	58	91	99	100					
		48.5	0	1	5	22	57	77	86	91	93	100		
		61.2	0	0	4	15	34	60	79	90	96	100		
		73.8												
		Averages	0	2	13	49	74	87	93	96	98	100		
125		5.2												
		9.5	1	2	11	42	66	82	90	95	100			
		13.6	0	2	8	49	86	97	99	100				
		20.5	1	2	8	31	74	93	98	100				
		31.4	1	3	13	32	48	65	77	85	92	100		
		66.2	0	1	4	8	16	33	49	63	81	100		
		73.8												
		Averages	1	2	9	32	58	74	83	89	95	100		
126		4.6												
	C	18.4	--	--	--	--	--	--	--	--	--	--	--	--
	C	31.2	--	--	--	--	--	--	--	--	--	--	--	--
	C	39.8	--	--	--	--	--	--	--	--	--	--	--	--
	C	49.7	--	--	--	--	--	--	--	--	--	--	--	--
	C	59.2	--	--	--	--	--	--	--	--	--	--	--	--
		73.8												
		Composite	4	18	45	76	91	96	98	99	100			
127		5.5												
		10.7	1	4	25	65	73	80	83	86	90	100		
		21.5	0	1	12	54	86	94	98	99	100			
		33.0	0	2	10	56	91	97	99	100				
		46.4	0	2	10	34	65	86	92	95	100			
		56.8	1	3	15	46	74	90	95	97	98	100		
		73.8												
		Averages	0	2	14	51	78	89	93	95	98	100		
128		4.9												
		11.2	0	6	46	93	95	97	99	100				
		20.1	0	1	14	69	90	96	99	100				
		36.0	0	1	8	45	78	86	90	93	97	100		
		50.4	0	4	15	43	77	92	96	98	100			
		61.2	0	3	18	52	90	99	100					
		74.1												
		Averages	0	3	20	60	86	94	97	98	99	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
135		5.5												
		17.8	1	5	37	76	84	91	96	99	100			
		36.6	0	2	15	64	90	97	99	100				
		45.4	0	2	12	58	91	97	98	99	100			
		51.8	0	1	5	22	68	96	99	100				
		58.4	0	1	9	40	74	94	99	100				
		73.2												
	Averages	0	2	16	52	81	95	98	100					
136		6.1												
		19.9	1	4	23	81	97	98	99	99	100			
		37.0	0	3	20	72	96	99	100					
		45.4	0	2	9	35	64	84	92	96	100			
		51.9	0	2	9	29	49	59	67	78	91	100		
		58.9	0	3	12	34	57	72	79	85	90	100		
		71.4												
	Averages	0	3	15	50	73	82	87	92	96	100			
141		4.3												
		13.3	9	67	95	99	100							
		26.2	0	1	17	83	95	97	98	100				
		37.0	0	1	6	51	97	99	100					
		46.9	0	1	4	14	40	61	69	75	84	100		
		58.0	1	4	20	41	53	69	88	97	100			
		74.1												
	Averages	2	15	28	58	77	85	91	94	97	100			
142		5.8												
		16.1	6	7	9	13	25	81	98	100				
		32.1	0	3	18	68	96	99	100					
		43.5	0	2	9	56	93	99	99	100				
		51.2	0	1	7	44	87	98	100					
		59.6	0	1	7	32	53	73	86	94	100			
		72.9												
	Averages	1	3	10	43	71	90	97	99	100				
146		4.0												
		14.4	0	3	40	99	100							
		27.0	1	4	20	58	90	96	97	98	100			
		37.2	0	2	10	37	85	96	98	99	100			
		48.0	0	1	2	6	17	44	60	73	81	83	100	
		59.8	0	0	4	7	9	16	30	44	65	75	100	
		73.8												
	Averages	0	2	15	41	60	70	77	83	89	92	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
147		5.8								
		17.2	0	2	16	76	94	96	98	100
		36.2	0	2	15	62	95	100		
		48.4	0	1	11	49	88	99	100	
		55.7	0	1	7	30	56	80	91	96 100
		63.5	0	1	4	21	40	55	68	84 94 100
		72.6								
		Averages	0	1	11	48	75	86	91	96 99 100
148		6.1								
	C	19.9	--	--	--	--	--	--	--	--
	C	35.6	--	--	--	--	--	--	--	--
	C	47.4	--	--	--	--	--	--	--	--
	C	55.9	--	--	--	--	--	--	--	--
	C	63.5	--	--	--	--	--	--	--	--
		71.7								
		Composite	0	2	16	60	89	96	98	99 100
149		5.2								
		14.4	0	7	60	66	90	98	99	100
		28.8	0	0	3	28	85	97	100	
		40.7	0	1	5	28	65	86	93	96 100
		51.2	0	0	1	5	25	75	96	100
		62.0	0	0	2	7	11	26	40	53 84 100
		72.9								
		Averages	0	2	14	27	55	76	86	90 97 100
150		5.2								
		17.6	0	2	20	81	97	99	100	
		32.7	0	2	13	63	95	98	99	100
		44.1	0	2	12	40	71	88	97	100
		52.6	0	1	4	21	45	65	74	83 94 100
		61.6	0	1	6	36	79	95	99	100
		72.6								
		Averages	0	2	11	48	77	89	94	97 99 100
151		6.1								
		20.9	0	3	29	91	94	96	98	100
		32.5	0	1	5	36	82	92	96	99 100
		43.5	0	1	2	11	35	65	76	82 92 100
		52.5	0	2	10	32	73	95	99	100
		60.7	0	2	13	55	74	81	87	93 97 100
		71.7								
		Averages	0	2	12	45	72	86	91	95 98 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
153		4.3												
		16.2	1	8	37	87	95	96	98	99	100			
		28.1	1	5	22	76	99	100						
		37.6	0	1	4	13	38	65	79	87	94	100		
		47.4	1	2	5	8	11	20	30	43	55	100		
		60.0	0	2	6	13	16	18	24	34	68	100		
		74.1												
		Averages	1	4	15	39	52	60	66	73	83	100		
156		4.9												
		19.8	1	11	51	93	100							
		31.8	0	1	7	44	88	95	97	99	100			
		40.1	0	1	5	23	71	94	97	99	100			
		48.1	0	1	4	11	32	74	89	94	98	100		
		57.7	0	1	4	6	13	32	51	67	80	100		
		72.3												
		Averages	0	3	14	35	61	79	87	92	96	100		
158		6.1												
		21.7	1	11	56	98	100							
		31.1	0	0	2	15	65	95	99	100				
		39.3	0	1	3	15	38	52	64	78	97	100		
		49.0	0	1	3	14	43	75	88	93	96	100		
		58.9	0	1	5	18	27	31	36	45	65	86	100	
		71.4												
		Averages	0	3	14	32	55	71	77	83	92	97	100	
159		10.7												
		24.2	0	6	44	90	97	99	100					
		32.3	0	0	6	33	83	97	99	100				
		39.3	0	0	2	16	41	60	71	89	93	100		
		47.7	1	5	12	30	52	68	79	88	97	100		
	A,L,M	57.9	4	13	57	72	88	93	97	100				
		68.6												
		Averages	1	5	24	48	72	83	89	94	98	100		
160		5.2												
		19.4	1	4	15	34	51	64	71	80	94	100		
		29.3	1	2	9	36	84	98	98	99	100			
	M	38.1	0	1	4	8	18	38	57	72	90	100		
		48.9	1	4	9	14	20	31	42	52	65	100		
		60.2	1	4	8	11	16	20	25	35	85	100		
		72.9												
		Averages	1	3	9	21	38	50	59	68	87	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
161		5.2								
		18.0	1	7	40	87	99	100		
		30.0	0	3	12	52	87	95	97	99 100
		40.3	0	1	3	11	32	79	94	98 100
		50.5	0	0	3	3	5	7	13	25 44 87 100
		61.2	1	8	44	72	73	75	79	86 94 100
		73.8								
		Averages	0	4	20	45	59	71	77	82 88 97 100
162		6.7								
		23.3	0	3	20	79	95	97	98	99 100
		30.7	0	0	2	10	50	83	95	99 100
	M	38.6	0	0	2	6	14	22	30	40 54 68 100
	M	49.9	0	0	1	2	3	4	5	7 14 54 100
		61.9	0	2	16	68	86	87	88	89 93 100
		71.4								
		Averages	0	1	8	33	50	59	63	67 72 84 100
163		12.2								
		25.3	0	5	34	92	99	99	99	100
		32.0	0	1	6	33	89	100		
	M	37.8	0	1	6	28	65	78	84	91 100
	M	47.3	0	3	7	17	22	28	33	42 50 69 100
	M	61.5	0	0	2	11	19	26	38	57 78 100
		70.5								
		Averages	0	2	11	36	59	66	71	78 86 94 100
164		15.9								
		25.7	1	7	38	78	94	99	100	
		31.4	0	1	9	42	88	98	100	
		36.8	0	3	13	38	63	74	81	83 85 100
	M	46.6	1	3	12	25	35	37	38	38 43 100
	M	61.6	1	3	8	13	14	16	21	38 89 100
		69.5								
		Averages	1	3	16	39	59	65	68	72 83 100
166		18.3								
		26.3	0	1	17	60	78	90	95	98 100
		30.6	0	1	12	74	99	100		
		33.9	0	2	10	48	90	98	99	100
		38.3	0	2	11	34	67	85	90	95 99 100
	M	59.0	0	1	5	10	16	44	71	86 92 100
		69.5								
		Averages	0	1	11	45	70	83	91	96 98 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
167		18.3												
		25.6	0	0	2	8	20	46	66	86	98	100		
		30.1	0	2	28	84	98	99	100					
		33.3	0	3	17	57	91	98	99	100				
		37.2	0	2	8	28	76	97	100					
	M	56.8	1	3	11	16	19	24	31	45	78	100		
		67.7												
		Averages	0	2	13	39	61	73	79	86	95	100		
168		18.0												
		25.8	0	4	22	63	85	94	97	99	100			
		29.8	0	6	43	92	99	100						
		33.6	1	5	23	56	79	86	91	97	100			
		37.7	0	1	3	12	39	60	70	77	84	100		
	M	57.5	1	2	10	14	17	20	24	32	49	100		
		69.2												
		Averages	0	4	20	47	64	72	76	81	87	100		
169		21.0												
	M	26.7	1	3	12	24	31	36	42	50	63	100		
		30.0	0	1	13	79	98	100						
		32.5	0	1	8	37	80	93	96	99	100			
	M	35.4	0	0	1	5	15	28	45	64	89	100		
		39.3	0	1	4	9	19	40	60	78	86	100		
		68.0												
		Averages	0	1	8	31	49	59	69	78	88	100		
171		21.4												
		27.2	0	2	10	26	39	50	59	73	87	100		
		30.6	4	20	70	97	100							
		33.5	0	1	4	17	38	50	59	69	84	100		
		36.9	0	1	2	6	32	58	65	72	85	100		
		40.7	0	1	3	4	7	17	29	48	83	100		
		67.7												
		Averages	1	5	18	30	43	55	62	72	88	100		
172		17.7												
		22.8	1	1	9	32	63	82	91	97	100			
		26.7	0	1	9	61	97	100						
		30.9	0	0	3	16	69	96	99	100				
		35.7	0	0	2	4	8	18	33	50	71	100		
		41.8	0	0	2	4	6	12	20	34	58	100		
		68.0												
		Averages	0	0	5	23	49	62	69	76	86	100		

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters									
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	64.0
174		18.0										
	L,M	23.2	1	11	42	72	84	90	93	100		
		27.0	1	6	20	47	63	74	84	96	100	
		30.2	0	2	14	49	92	99	100			
		35.0	0	0	2	3	10	44	66	76	83	100
	M	40.4	0	1	4	8	11	18	33	52	69	100
		67.7										
		Averages	0	4	16	36	52	65	75	85	90	100
175		-0.3										
		4.6	0	1	11	20	25	36	50	64	86	100
		8.7	0	2	12	46	67	76	82	90	96	100
		12.4	0	1	15	76	97	99	100			
		16.4	0	0	4	29	71	88	94	98	100	
		21.3	0	0	1	3	14	53	84	97	100	
		27.5										
		Averages	0	1	9	35	55	70	82	90	96	100
176		18.3										
		23.4	0	1	8	18	31	51	71	89	96	100
		27.4	0	3	17	48	70	84	94	99	100	
		30.9	0	1	14	71	96	99	100			
		34.6	0	1	6	31	56	66	75	86	100	
		39.7	0	0	1	2	12	50	81	98	100	
		46.1										
		Averages	0	1	9	34	53	70	84	94	99	100
177		18.6										
	M	23.7	0	1	6	14	17	21	27	37	68	100
		27.6	0	1	7	30	51	66	75	84	97	100
		30.9	0	1	16	78	99	100				
	M	34.7	0	1	6	45	73	82	88	93	97	100
		39.5	0	0	1	4	19	44	69	92	100	
		45.8										
		Averages	0	1	7	34	52	63	72	81	92	100
179		18.3										
		23.2	0	0	2	3	11	60	94	100		
		27.5	1	6	37	83	96	99	100			
		30.9	0	3	26	84	99	100				
		34.8	0	1	5	18	32	41	49	65	92	100
		39.9	0	0	2	2	8	56	92	99	100	
		46.1										
		Averages	0	2	14	38	49	71	87	93	98	100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
180		18.3												
		22.9	0	1	2	4	26	76	96	99	100			
		27.8	0	3	18	45	62	70	75	78	82	100		
		31.3	0	1	9	39	76	91	95	97	100			
		35.1	0	1	10	33	52	64	73	86	85	100		
		40.2	0	0	2	3	12	52	88	99	100			
		46.1												
		Averages	0	1	8	25	46	71	85	92	95	100		
181		18.3												
		22.6	0	1	6	8	13	40	71	94	100			
		27.0	0	2	24	67	83	90	92	94	98	200		
		30.7	0	2	17	68	94	98	99	99	100			
		35.4	0	1	4	17	72	94	97	98	100			
		40.7	0	0	1	1	3	20	52	89	100			
		46.4												
		Averages	0	1	10	32	53	68	82	95	100			
182		18.0												
		22.6	1	4	23	52	71	83	91	96	100			
		26.5	0	1	9	41	83	95	98	99	100			
		30.4	0	1	8	32	68	84	91	96	100			
		36.1	0	1	2	2	7	26	43	59	76	86	100	
		41.1	0	1	4	6	8	20	34	54	83	100		
		47.0												
		Averages	0	2	9	27	47	62	71	81	92	97	100	
188		5.5												
		14.6	1	13	73	98	100							
		25.7	1	4	17	61	95	99	100					
		34.5	1	4	12	29	42	46	47	47	47	100		
		46.5	0	2	5	11	26	78	96	99	100			
	L	58.4	0	3	5	6	6	7	12	22	43	100		
		72.3												
		Averages	1	5	22	41	54	66	71	74	78	89	100	
197		5.8												
		12.4	0	2	29	92	99	100						
		20.4	0	0	5	34	80	93	95	96	100			
		32.8	0	1	6	24	43	53	60	66	82	100		
		45.4	0	1	2	3	4	4	4	4	9	31	100	
	L	57.8	2	7	33	71	81	85	88	90	100			
		71.4												
		Averages	0	2	15	45	61	67	69	71	78	86	100	

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters																							
			.062		.125		.250		.500		1.00		2.00		4.00		8.00		16.0		32.0		64.0		128.	
201		6.1																								
		10.2	0	2	10	51	77	81	83	86	91	100														
		13.0	0	1	8	41	84	96	98	100																
		16.1	0	1	6	33	66	75	79	85	94	100														
		23.7	0	1	5	19	42	62	75	87	98	100														
		55.1	2	14	68	97	99	100																		
		72.0																								
	Averages	0	4	19	48	74	83	87	92	97	100															
202		6.1																								
		10.7	0	1	5	36	77	92	95	98	100															
	N	14.6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
		20.3	0	1	6	32	70	88	94	98	100															
	M	29.5	0	0	3	12	29	52	66	73	82	100														
	M	61.8	0	2	6	15	25	33	38	52	74	100														
		72.6																								
203		6.4																								
		10.4	0	0	2	19	51	67	76	85	96	100														
		12.9	0	1	5	45	85	93	95	96	100															
		16.1	0	0	4	34	85	98	100																	
		22.6	0	0	2	7	18	40	62	76	87	100														
		60.0	3	13	29	34	37	40	43	48	59	100														
		72.3																								
	Averages	1	3	8	28	55	68	75	81	88	100															
204		5.8																								
		10.5	0	0	2	12	34	52	62	72	85	100														
		12.9	0	1	4	25	59	76	82	87	92	100														
		16.1	0	1	4	18	34	51	63	73	94	100														
		23.9	0	1	3	10	19	33	48	62	79	90	100													
		61.1	5	13	17	20	23	28	37	55	84	100														
		72.6																								
	Averages	1	3	6	17	34	48	58	70	87	98	100														
206		5.8																								
		10.8	0	1	2	13	28	35	40	49	60	100														
		15.5	0	1	14	63	95	98	99	100																
		24.6	0	2	12	45	70	77	79	81	85	100														
		37.4	0	1	4	9	15	24	38	59	96	100														
		54.0	0	3	11	21	23	25	30	44	69	100														
		73.2																								
	Averages	0	2	9	30	46	52	57	67	82	100															

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
207		6.1								
		11.1	0	1	5	14	38	67	84	96 100
		13.3	0	1	6	34	81	93	96	98 100
		15.6	0	1	11	59	90	96	97	99 100
		18.6	0	1	18	76	90	94	97	99 100
		36.8	0	5	27	57	61	64	68	70 76 100
		65.6								
		Averages	0	2	13	48	72	83	88	92 95 100
208		6.4								
		10.8	0	1	6	30	84	99	100	
		13.0	0	0	3	17	47	71	83	89 96 100
		14.8	0	2	14	61	95	99	100	
		16.7	0	1	11	64	96	99	100	
		19.4	0	2	20	64	82	91	93	94 96 100
		44.8								
		Averages	0	1	11	47	81	92	95	97 98 100
211		4.0								
		13.8	1	3	27	94	100			
		24.1	0	2	16	78	96	97	98	98 98 100
		36.5	0	2	11	48	98	100		
		48.3	0	1	3	4	7	24	38	47 61 87 100
		59.9	0	2	5	7	10	27	54	77 96 100
		74.7								
		Averages	0	2	12	46	62	70	78	84 91 97 100
212		3.7								
		15.6	0	2	28	91	95	96	97	99 100
		28.3	0	2	14	72	98	99	99	99 100
		39.7	0	1	4	23	89	100		
		49.6	0	1	3	5	7	21	47	70 93 100
		60.3	0	1	3	4	4	6	9	21 50 100
		74.4								
		Averages	0	1	10	39	59	64	70	78 89 100
214		4.6								
		11.3	0	2	21	79	93	94	94	97 100
		22.0	0	1	10	60	99	100		
		35.9	0	1	9	33	74	90	92	93 95 100
		47.3	0	2	9	22	42	58	64	68 79 100
		59.6	0	1	10	30	40	46	61	84 100
		72.9								
		Averages	0	1	12	45	70	78	82	88 95 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.125	.250	1.00	2.00	4.00	8.00	16.0 32.0 64.0 128.
215		6.1								
		13.8	0	1	20	90	100			
		24.9	0	0	6	37	85	94	95	96 97 100
		35.0	0	1	4	23	56	82	87	90 96 100
		44.9	0	2	6	17	32	43	49	56 78 100
		56.7	0	2	12	28	32	38	48	63 82 100
		72.0								
		Averages	0	1	10	39	61	71	76	81 91 100
216		7.0								
		15.0	0	1	9	34	45	47	49	51 55 100
		19.3	0	1	10	61	93	98	99	100
		22.8	0	0	4	25	80	99	100	
		27.5	0	0	4	29	80	94	96	98 98 100
		44.9	2	7	21	37	41	44	55	79 96 100
		69.5								
		Averages	0	2	10	37	68	76	80	86 90 100
217		5.8								
		12.3	0	3	28	92	100			
		22.6	0	1	9	51	84	87	89	90 94 100
		32.9	0	0	4	16	56	83	86	89 94 100
		44.0	0	1	3	6	15	42	62	78 100
		58.4	0	1	5	12	18	36	45	58 74 100
		72.9								
		Averages	0	1	10	35	55	70	76	83 92 100
219		6.1								
		14.6	0	6	55	100				
		22.4	0	0	2	26	69	82	86	90 94 100
		32.1	0	1	2	7	19	42	54	61 71 100
		41.9	0	1	4	8	14	17	19	24 31 100
		53.8	2	8	27	41	43	45	49	59 79 100
		72.6								
		Averages	0	3	18	36	49	57	62	67 75 100
220		7.0								
		16.7	0	2	20	80	91	92	92	94 94 100
		22.7	0	0	1	3	5	6	7	8 10 23 23 100
		28.9	0	0	1	5	17	27	34	44 67 100
		36.3	0	1	6	29	70	90	96	98 100
		45.5	0	2	10	20	23	27	34	49 78 100
		70.5								
		Averages	0	1	8	27	41	48	53	59 70 85 85 100

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters											
			.062	.125	.250	.500	1.00	2.00	4.00	8.00	16.0	32.0	64.0	128.
222		6.7												
		16.0	0	4	24	85	100							
		23.8	0	1	6	24	60	83	92	96	100			
		31.1	0	1	3	12	34	54	62	72	94	100		
		39.1	0	1	4	11	21	25	26	27	33	100		
		49.6	1	7	22	32	32	33	37	47	70	100		
		72.3												
		Averages	0	3	12	33	49	59	63	68	79	100		
223		6.1												
		13.2	0	3	41	99	100							
		21.8	0	0	5	33	80	96	99	100				
		30.5	0	0	2	5	13	25	36	50	69	100		
	L	40.4	0	1	2	6	11	16	21	41	90	100		
		53.0	2	15	73	95	96	96	96	98	100			
		72.0												
		Averages	0	4	25	48	60	67	70	78	92	100		
224		6.4												
		10.6	0	0	2	8	30	48	60	76	95	100		
		14.1	0	1	9	49	91	98	99	100				
		21.4	0	0	2	7	15	24	32	43	56	100		
		37.2	1	6	34	83	98	100						
		49.3	2	13	50	69	70	71	73	76	87	100		
		71.7												
		Averages	1	4	19	43	61	68	73	79	88	100		
225		7.0												
		11.0	0	0	4	14	36	65	81	93	100			
		14.2	0	2	18	70	98	100						
		17.3	0	0	5	29	59	69	72	76	82	100		
	A	23.8	0	1	12	32	35	36	36	36	43	100		
	A, N	39.7	--	--	--	--	--	--	--	--	--	--	--	--
		54.9												
227		6.4												
		11.9	0	0	1	8	27	40	50	62	81	100		
		14.8	0	0	5	28	65	82	88	93	98	100		
		18.2	0	1	8	37	74	90	93	94	96	100		
	A, N	30.6	--	--	--	--	--	--	--	--	--	--	--	--
	A, N	42.7	--	--	--	--	--	--	--	--	--	--	--	--
		58.9												

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re-marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
234		7.0								
		11.2	0	1	4	15	33	49	63	82 92 100
		14.3	0	1	3	24	56	69	75	84 92 100
		17.5	0	1	8	33	78	94	96	97 100
	A,L	25.1	2	8	25	59	89	97	100	
	A,L	39.2	5	19	62	88	95	98	100	
		53.7								
		Averages	1	6	20	44	70	81	87	93 97 100
235		7.3								
		11.4	0	0	1	2	3	7	14	34 71 100
		14.1	0	1	4	15	45	78	90	97 100
		16.7	0	2	14	61	94	99	100	
		20.2	0	2	16	71	93	94	94	94 96 100
	L	35.5	1	3	13	28	33	33	33	33 100
		48.5								
		Averages	0	2	10	35	54	62	66	72 80 100
236		6.1								
		11.8	0	1	6	19	43	58	67	77 84 100
		15.9	0	1	8	30	53	66	75	85 96 100
		21.9	0	1	3	6	10	15	28	54 100
		32.9	0	1	3	8	19	29	36	47 65 100
		50.2	2	12	61	100				
		73.2								
		Averages	0	3	16	33	45	54	61	73 89 100
238		7.0								
		10.8	0	0	0	2	5	12	23	44 84 100
		13.8	0	2	10	49	91	98	99	99 100
		16.1	0	2	9	42	74	85	89	93 98 100
		19.1	0	3	30	95	100			
	N	31.4	--	--	--	--	--	--	--	-- --
		51.9								
239		7.0								
		10.6	0	1	5	16	25	35	49	70 93 100
	B	13.1	--	--	--	--	--	--	--	-- --
	B	15.2	--	--	--	--	--	--	--	-- --
	B	17.6	--	--	--	--	--	--	--	-- --
	B	21.7	--	--	--	--	--	--	--	-- --
		48.2								

Table 14.--Lateral variation of particle-size distribution of surface bed material, Toutle River at Tower Road, near Silver Lake, Washington -continued

Meas. no.	Re- marks	Lateral stationing (m)	Percent finer than indicated size, in millimeters							
			.062	.250	1.00	4.00	16.0	64.0		
			.125	.500	2.00	8.00	32.0	128.		
240		7.0								
		10.6	0	1	4	15	26	36	50	68 87 100
		13.3	0	0	3	18	54	73	80	85 87 100
		15.4	0	0	3	22	75	97	99	100
		17.5	0	1	7	57	97	99	100	
		20.6	0	5	54	100				
		37.5								
		Averages	0	1	14	42	70	81	86	91 95 100
241		0.0								
	A	6.7	0	1	21	87	99	100		
	A	9.4	0	1	16	79	98	99	99	100
		12.8	3	16	56	96	100			
		17.0	0	0	0	0	0	1	1	2 7 100
		23.1	0	0	0	0	0	0	0	2 26 100
		36.6								
		Averages	1	4	19	52	59	60	60	61 67 100
244		0.0								
	A,L	6.5	0	1	17	82	98	100		
	A,L	10.6	0	1	19	88	98	100		
	H	14.2	0	0	2	11	30	43	56	73 90 100
	H	18.7	1	2	4	17	53	77	88	100
	H	24.2	6	12	29	59	77	88	94	100
		36.6								
		Averages	1	3	14	51	71	82	88	95 98 100
245		6.7								
		11.0	0	2	9	39	78	92	97	100
		13.7	0	2	11	70	96	99	100	
		16.2	0	1	13	47	70	79	84	90 100
		20.6	0	1	3	7	28	57	72	83 91 100
	A,L,M	31.3	0	8	33	55	69	90	100	
		47.9								
		Averages	0	3	14	44	68	83	91	95 98 100

Table 15.--Lengths of intermediate diameters of particles located at nodes on the particle-count grid, Toutle River at Tower Road, near Silver Lake, Washington, 1984

[c, subsample retained for lab analysis; w, node located in water; *, intermediate diameter of particle is less than 2mm in length; +, specimen was buried or broken, the intermediate diameter length is approximate]

Distance upstream from	<u>Lengths of intermediate diameters, in millimeters</u>							
cableway, Distance from reference mark at left bank, in meters (m)	46	49	52c	55	58	61c	64	67c
1.5	* w	56w	*	*	22	*	*	*
3.0	* w	104w	*	141	99	*	*	*
4.6	* w	90w	162	129	139	118	*	*
6.1	95w	* w	33	16[1]	118	53	*[2]	*
7.6	* w	* w	*	42	126	107	*	*
9.1	76	* w	* w	127	116	*	*	*
10.7	*	28w	82w	187	106	*	*	*
12.2	48	37	43w	109w	45	*	65	*
13.7	*	19	16w	123w	140	*	*	103
15.2	*	45	46w	73w	95	*	*	*
16.8	*	13	21	69w	66w	*	*	54
18.3	*	*	*	* w	* w	*	*	*
19.8	*	*	86	*	* w	*	*	74
21.3	69	*	*	*	* w	*	*	*
22.9	*	*	36	*	* w	* w	46	*
24.4	24	*	51	*	100w	* w	145	*
25.9	*	*	*	*	* w	* w	*	*
27.4	*	*	*	*	* w	* w	137w	*
29.0	*	23	*	*	*	* w	* w	*
30.5	*[3]	*	*	*	*	* w	* w	*
32.0	*	*	*	*	*	* w	* w	*
33.5	*	*	*	*	*	* w	* w	*
35.1	48+	75	*	*	*	* w	* w	*
36.6	*	60	*	*	*	*	* w	600+
38.1	*	*	*	*	*	*	* w	*
39.6	79	46	*	120	*	*	* w	*
41.1	*	*	61	*	*	*	* w	*
42.7	*	*	*	*	*	*	* w	*
44.2	*	*	*	*	*	*	* w	*
45.7	*	96+	*	*	*	*	* w	*
47.2	*	71	66	*	*	*	* w	*
48.8	*	95	99	*	*	97	*	*
50.3	*	47	87	*	*	*	*	*
51.8	*	107	*	*	*	*	*	*

[1] Bulk density = 2.29 g/cm³.

[2] Bulk density = 1.89 g/cm³.

[3] Bulk density = 1.83 g/cm³.

*Table 15.--Lengths of intermediate diameters of particles
located at nodes on the particle-count grid,
Toutle River at Tower Road, near Silver Lake,
Washington, 1984 -continued*

Distance upstream from cableway, (m)	<u>Lengths of intermediate diameters, in millimeters</u>							
	Distance from reference mark at left bank, in meters							
	46	49	52c	55	58	61c	64	67c
53.3	*	85	*	*	*	*	*	*
54.9	*	*	33	*	*	*	*	*
56.4	*	*	48	*	*	*	*	*
57.9	*	*	*	137	*	*	*	*
59.4	*	*	57	*	*	*	*	*
61.0	*	108	*	*	*	*	*	*

Table 16.--Lengths of diameters, density, lithology, and shape of selected particles coarser than 2 mm, from particle count, Toutle River at Tower Road, near Silver Lake, Washington, 1984

[Distance: distance upstream from cableway, in meters;
Lithology: AB, andesite/basalt; AD, ancestral dacite;
MD, modern dacite; TM, tertiary metamorphic; Shape:
R, rounded; SA, sub-angular; SR, sub-rounded]

Distance (m)	Length of diameter			Density (g/cm ³)	Lith- ology	Shape
	short (mm)	int. (mm)	long (mm)			
52 meters from reference mark at left bank						
4.6	144	162	185	--	AB	R
6.1	20	33	46	2.50	TM	SR
10.7	61	82	119	2.73	TM	SA
12.2	27	43	70	2.33	MD	SR
13.7	15	16	21	2.50	MD	R
15.2	34	46	57	2.44	AD	R
16.8	16	21	30	2.86	MD	R
19.8	57	86	105	2.68	AD	R
22.9	36	36	51	2.49	TM	SR
24.4	37	51	65	2.46	AD	SA
41.1	55	61	105	2.56	AB	SA
47.2	61	66	85	2.60	AD	R
48.8	54	99	123	2.40	AD	R
50.3	69	87	122	2.23	AD	R
54.9	23	33	47	2.40	MD	SR
56.4	42	48	63	2.31	AB	SR
59.4	49	57	76	2.67	AB	SR
61 meters from reference mark at left bank						
4.6	97	118	120	--	AD	R
6.1	50	53	84	2.40	AD	R
7.6	61	107	200	2.71	AD	SR
48.8	67	95	123	2.39	AD	SA
67 meters from reference mark at left bank						
13.7	92	103	173	2.77	AD	SA
16.8	34	54	72	2.42	MD	R
19.8	37	74	93	2.97	AB	SA
¹ 36.6	--	600	--	--	--	R

¹ Specimen was partially buried, no further analysis was made.

Table 17. --Particle-size distributions of sediment less than 2.0 millimeters in diameter collected at particle-count sampling nodes, Toutle River at Tower Road, near Silver Lake, Washington, 1984

[Lateral stationing: distances are from reference mark on left bank]

Lateral stationing of sampling line (m)	Percent finer than indicated size, in millimeters			
	.062	.125	.250	.500
52	24	55	94	100
61	60	86	98	100
67	63	90	98	100
Average	49	77	97	100

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