1976 bedload measurements, East Fork River, Wyoming

(fluvial geomorphology/sediment transport/bedload)

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Reprinted from the Proceedings of The National Academy of Sciences
Vol. 74, No. 7, pp. 2644–2648, July 1977

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Proc. Natl. Acad. Sci. USA
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Contributed by Luna B. Leopold, May 9, 1977

ABSTRACT **Quantitative measurements of bedload-transport rate in the East Fork River, Wyoming, show large spatial and temporal variabilities in traction load. The standard deviation for 1-min increments of the mean transport rate is commonly 50–100% of the mean transport rate. The transport rates measured individually over eight equal-length increments of channel width indicate greater than 10-fold variations in transport rates from subwidth sections of minimum transport to subwidth sections of maximum transport.**

Bedload data from the East Fork River for the period 1973–1975 have been published (1). The earlier paper directed attention to the paucity of bedload data from natural rivers and indicated that the data reported there were unique. Utilization of the reported data has been gratifying and justifies publication of additional and more detailed information.

In 1976, above-average snowfall accumulations in the drainage area above the bedload trap resulted in a prolonged runoff, as a result of which the total number of data collected in 1976 exceeded the combined total of the previous 3 years. Our data-collection scheme was modified to document cross-channel (spatial) variations in bedload transport as well as its time variation. Minute-by-minute recordings of transport rate provide not only information on mean transport rates but also standard deviations of these means. This latter information provides insight as to temporal variations in transport rates.

Collection and presentation of data

The earlier paper (1) contained a brief description of the East Fork River, the bedload trap, and our measurement technique; the reader is referred to that paper for details. The bedload trap consists of a concrete trough forming an open slot in the streambed into which would fall any moving sediment debris. The trough may be opened or closed incrementally, or in any combination, by a series of eight gates, each 1.83 m in length. Sediment falling into the trough is carried by a series of conveyor belts to a weighing hopper, accumulated weights of the trapped load are recorded at 60-sec increments, samples are retained for grain-size analysis, and the weighed sediment is returned to the river downstream of the bedload trap. By operating the trap one gate at a time, data reflecting cross-channel variability are obtained and the incremental time record reflects temporal variability.

The data in Table 1 include the summary hydraulic information most useful for interpretation of the transport rates recorded. Data on grain-size distribution of the trapped load are presented in Table 2. Table 3 provides a summary of the gate-by-gate transport rates, standard deviation of rates, and median bedload size. Tables 1 and 2 represent stream-wide conditions. The bedload-transport rate for the whole river is computed by adding the rates recorded in Table 3 for the eight gates individually opened.

The next-to-last line of Table 2 shows composite data reflecting the size distribution of total bedload transported by the river in the period May–June 1976. This may be compared to the size distribution of bed material (sediment available for transport), which is also included at the bottom of Table 2.

We thank R. M. Myrick and H. A. Mahoney for their assistance in collecting the present data. The bedload trap on the East Fork River is part of the sediment-investigation program of the U.S. Geological Survey.

The costs of publication of this article were defrayed in part by the payment of page charges from funds made available to support the research which is the subject of the article. This article must therefore be hereby marked "advertisement" in accordance with 18 U. S. C. §1734 solely to indicate this fact.

1. Leopold, L. B. & Emmett, W. W. (1976) "Bedload measurements, East Fork River, Wyoming," *Proc. Nat. Acad. Sci. USA* **73**, 1000–1004.

Table 1. Summary data of river hydraulics and bedload transport

Date[a]	River discharge Total[h] (Q), m³/s	River discharge Effective[i] (Q'), m³/s	Flow area[b] (A), m²	Mean depth[c] (d), m	Hydraulic radius[d] (R), m	Mean velocity[e] ($\bar{u}$), m/s	Bedload transport rate[f] (I_b), kg/s	Bedload size[g] (D_{50}), mm	Water temperature (T), °C
5-18-76	10.4	9.87	11.3	0.78	0.70	0.87	0.763	0.98	5.5
5-19-76	15.7	14.8	14.8	1.01	0.89	1.00	1.238	1.04	6.0
5-20-76	20.3	18.9	17.4	1.19	1.02	1.09	1.059	0.96	5.5
	21.0	19.6	17.8	1.22	1.04	1.10	1.179	1.04	5.0
5-21-76	24.0	22.4	19.4	1.33	1.12	1.15	1.620	1.52	5.5
5-22-76	18.6	17.5	16.5	1.13	0.98	1.06	0.687	1.56	5.5
5-26-76	10.3	9.77	11.3	0.77	0.70	0.87	0.118	0.71	7.0
5-27-76	15.2	14.3	14.5	0.99	0.87	0.99	0.211	0.59	6.0
	14.5	13.7	14.0	0.96	0.85	0.97	0.274	0.61	6.5
	13.8	13.0	13.6	0.93	0.82	0.96	0.212	0.77	7.0
5-28-76	20.1	18.8	17.3	1.18	1.02	1.08	0.398	0.95	6.5
	21.2	19.8	17.9	1.23	1.05	1.10	0.414	1.11	7.0
5-29-76	22.0	20.5	18.3	1.25	1.07	1.12	0.649	1.30	6.5
5-29-76	22.4	20.9	18.5	1.27	1.08	1.12	0.563	1.67	7.0
5-30-76	22.4	20.9	18.5	1.27	1.08	1.12	0.705	1.29	6.0
5-31-76	17.7	16.6	15.9	1.09	0.95	1.04	0.565	1.09	6.0
	16.8	15.8	15.5	1.06	0.92	1.02	0.369	0.98	6.0
6-01-76	15.2	14.3	14.5	0.99	0.87	0.99	0.329	0.81	6.0
	14.7	13.9	14.2	0.97	0.86	0.98	0.296	0.80	6.5
6-02-76	19.1	17.9	16.8	1.15	0.99	1.07	0.525	0.94	6.5
	19.0	17.8	16.7	1.14	0.99	1.06	0.422	1.04	6.5
6-03-76	23.2	21.6	19.1	1.30	1.11	1.14	0.760	1.18	8.0
6-04-76	23.4	21.8	19.1	1.30	1.11	1.14	0.794	1.40	7.5
6-05-76	23.0	21.4	18.8	1.29	1.09	1.13	0.836	1.76	8.0
	24.0	22.4	19.4	1.33	1.12	1.15	0.714	1.51	8.5
6-06-76	24.2	22.6	19.5	1.33	1.13	1.16	0.827	1.30	8.0
6-07-76	26.5	24.6	20.6	1.41	1.18	1.19	0.791	1.35	9.0
6-08-76	22.7	21.1	18.7	1.28	1.09	1.13	0.519	1.24	8.0
6-09-76	20.1	18.8	17.3	1.18	1.02	1.08	0.468	1.03	7.0
	20.3	18.9	17.4	1.19	1.02	1.09	0.315	1.08	7.0
6-10-76	19.5	18.2	16.7	1.16	1.00	1.07	0.264	1.06	6.5
6-11-76	14.6	13.8	14.2	0.97	0.85	0.98	0.231	0.84	8.5
	15.4	14.5	14.6	1.00	0.88	0.99	0.263	1.05	8.0
	16.6	15.7	15.4	1.05	0.92	1.02	0.255	1.02	7.0
	16.1	15.2	15.0	1.03	0.90	1.01	0.573	1.07	6.5
	15.3	14.4	14.5	0.99	0.87	0.99	0.214	0.79	6.5
6-12-76	13.9	13.1	13.7	0.93	0.83	0.96	0.165	0.81	6.0
	13.2	12.5	13.2	0.90	0.80	0.94	0.154	0.77	6.0
6-12-76	11.8	11.2	12.3	0.84	0.75	0.91	0.148	0.81	5.5
	11.0	10.5	11.8	0.81	0.73	0.89	0.132	0.82	5.5
	10.1	9.64	11.2	0.76	0.69	0.86	0.096	0.82	5.0
	8.89	8.50	10.3	0.70	0.64	0.83	0.076	0.77	5.5
6-13-76	6.80	6.55	8.68	0.59	0.55	0.76	0.025	0.49	6.0
6-14-76	5.13	4.97	7.24	0.50	0.46	0.69	0.020	0.41	4.5
	4.79	4.65	6.93	0.47	0.45	0.67	0.018	0.53	4.5
6-15-76	3.96	3.87	6.14	0.42	0.40	0.64	0.003	0.66	6.0
	3.51	3.44	5.69	0.39	0.37	0.61	0.004	0.88	9.5
6-16-76	5.13	4.97	7.24	0.50	0.46	0.69	0.008	0.50	8.0
6-18-76	3.99	3.90	6.17	0.42	0.40	0.63	0.005	0.42	7.0
6-19-76	4.30	4.20	6.48	0.44	0.42	0.65	0.008	0.44	8.0
6-20-76	4.70	4.57	6.85	0.47	0.44	0.67	0.021	0.43	10.5
6-21-76	10.0	9.53	11.1	0.76	0.69	0.86	0.164	0.68	10.5

[a] Dates correspond to dates listed in Tables 2 and 3.
[b] Flow area of effective width, w; $A = Q'/\bar{u} = wd = 14.6d$.
[c] Mean depth over effective width; $d = A/w = A/14.6$.
[d] Hydraulic radius of effective area; $R = A/(w + 2d) = A/(14.6 + 2d)$.
[e] Mean velocity of effective discharge; $\bar{u} = Q'/A = Q'/wd = Q'/14.6d$.
[f] Transport rate of solids in immersed weight per second, over 14.6-m width of bedload trap; immersed weight is $[(\sigma - \rho)/\sigma]$ times dry weight. σ = 2,650 kg/m³, specific weight of solids; ρ = 1000 kg/m³, specific weight of fluid; dry weight = 0.85 × measured wet weight; therefore, I_b = 0.53 × measured wet weight.
[g] D_{50} is median diameter of grains; complete grain-size data are given in Table 2.
[h] Complete river discharge including overbank flow.
[i] Discharge over 14.6-m width of bedload trap; includes all flow over the active width of the streambed.

Table 2. Grain-size distribution of bedload sediment

Date[a]	Distribution, % (wt/wt) finer than sieve size (mm) indicated												
	0.25	0.35	0.50	0.71	1.00	1.41	2.00	2.83	4.00	5.66	8.00	11.3	16.0
5-18-76	2.2	7.8	22.0	38.0	50.7	64.4	78.3	88.3	94.2	97.3	98.7	98.7	99.5
5-19-76	1.8	5.7	18.3	34.9	48.3	62.3	75.9	86.1	92.4	96.4	98.5	99.0	99.0
5-20-76	1.7	5.8	18.5	37.1	51.9	66.9	80.2	88.8	93.7	96.5	98.0	98.6	99.2
	1.6	4.9	15.3	33.4	48.3	63.0	76.6	86.3	91.8	95.2	97.1	97.9	98.1
5-21-76	1.1	3.8	11.1	22.9	33.9	46.8	61.5	73.8	82.0	87.6	90.3	94.3	96.8
5-22-76	2.6	5.8	12.5	22.9	33.2	45.8	60.4	73.9	84.6	92.6	97.0	98.8	99.4
5-26-76	2.6	12.0	31.6	50.1	61.0	70.9	80.9	88.7	94.1	97.3	97.3	98.6	100.0
5-27-76	4.7	19.8	42.0	58.3	67.4	75.3	82.9	89.2	94.0	97.8	99.4	100.0	—
	4.4	19.5	40.8	56.3	65.8	74.5	83.0	89.6	94.3	97.2	98.7	99.2	99.6
	3.3	13.2	30.7	47.5	58.4	68.7	78.8	87.2	92.8	96.8	98.6	100.0	—
5-28-76	3.5	13.6	29.0	42.5	51.4	60.2	69.8	78.2	85.8	91.6	95.8	97.3	97.8
	2.3	8.5	20.3	34.7	46.3	58.6	71.2	81.6	89.6	94.8	97.9	98.8	100.0
5-29-76	2.8	8.1	19.1	32.3	42.2	52.6	64.3	75.5	85.1	92.2	96.2	98.0	99.1
	1.8	6.1	14.6	24.8	33.7	43.9	56.6	70.1	81.7	90.3	94.3	95.8	96.9
5-30-76	1.3	5.6	16.5	30.1	41.3	53.1	65.9	77.5	86.8	93.5	97.5	98.8	99.7
5-31-76	1.8	7.6	21.1	36.7	47.5	58.0	68.8	78.2	86.1	92.4	96.4	98.2	99.1
	1.3	6.0	19.0	36.5	49.3	61.6	73.5	83.1	90.4	95.6	98.4	99.1	100.0
6-01-76	3.0	11.7	27.3	45.3	57.0	67.5	77.5	85.6	91.8	95.5	97.9	98.9	99.6
	2.2	10.0	25.5	45.1	58.2	69.3	79.2	87.3	93.0	96.6	98.8	99.7	100.0
6-02-76	2.1	9.6	23.4	40.4	52.3	63.1	74.0	83.4	91.3	96.1	98.9	99.5	100.0
	1.5	6.4	18.2	36.1	48.8	59.8	69.6	78.5	86.3	91.5	95.2	96.5	98.3
6-03-76	2.5	8.2	19.4	33.6	44.6	55.9	67.5	76.9	83.9	89.1	92.9	95.1	95.9
6-04-76	1.4	5.4	14.1	27.5	38.9	50.3	61.3	70.3	77.6	87.1	93.4	96.5	98.2
6-05-76	1.2	4.6	12.3	23.3	33.1	43.2	53.9	64.2	73.8	83.2	92.0	97.3	99.4
	1.1	4.4	13.7	25.8	36.4	47.8	59.5	69.4	77.9	86.0	92.4	96.1	99.0
	1.2	5.3	16.9	30.1	40.9	52.8	65.1	75.3	83.0	89.6	94.6	97.5	98.9
6-07-76	1.3	5.9	18.6	33.3	42.6	51.2	60.3	69.3	77.8	85.3	92.0	96.5	98.6
6-08-76	1.2	4.9	14.9	29.7	42.1	55.0	68.0	78.6	87.1	92.4	95.6	97.6	99.9
6-09-76	1.8	7.5	19.9	36.3	48.8	61.0	73.2	83.6	90.8	96.1	98.8	99.7	100.0
	1.6	6.7	17.5	33.5	47.0	60.3	72.5	82.2	89.2	94.2	97.1	98.2	100.0
6-10-76	1.6	7.5	19.0	35.3	47.8	59.9	72.0	82.3	90.0	95.0	98.1	99.0	99.6
6-11-76	1.7	7.1	21.3	42.5	57.7	70.5	81.2	88.8	93.8	97.3	98.9	100.0	—
	1.7	6.8	17.6	34.2	48.1	61.6	75.0	86.6	94.4	98.5	99.8	100.0	—
	1.7	6.7	17.6	34.9	49.1	62.3	75.0	85.4	92.1	96.8	99.3	100.0	—
	2.0	9.3	22.1	37.0	47.8	58.5	71.7	81.6	89.8	95.4	98.2	99.3	100.0
	2.5	10.6	26.5	45.5	59.2	71.0	81.5	89.3	94.6	98.2	99.4	100.0	—
6-12-76	2.4	9.8	25.3	44.7	58.6	70.2	80.3	87.9	93.7	97.8	99.5	100.0	—
	2.6	11.1	27.5	46.9	60.2	71.6	81.7	89.8	94.9	97.6	99.0	99.3	100.0
	2.1	9.5	24.2	44.3	59.4	72.6	83.6	91.2	95.8	98.4	99.4	100.0	—
	2.4	10.0	24.8	43.7	58.9	72.1	83.3	91.2	96.7	98.7	100.0	—	—
	2.3	8.9	22.9	43.0	58.8	72.2	82.7	89.5	94.5	97.6	97.6	98.5	100.0
	2.7	10.3	26.0	46.4	61.8	74.9	85.4	92.8	97.0	99.3	99.8	100.0	—
6-13-76	10.4	28.2	51.2	72.0	83.4	90.8	95.4	97.9	99.3	100.0	—	—	—
6-14-76	20.7	41.2	62.2	77.8	85.3	89.9	93.0	95.1	96.8	98.3	99.6	100.0	—
	14.2	28.6	46.9	63.7	72.5	78.5	83.3	87.4	91.3	95.0	97.9	99.2	100.0
6-15-76	7.2	20.1	37.5	53.5	63.0	70.6	76.9	81.6	85.2	87.8	91.1	94.3	98.2
	5.1	14.7	29.6	44.1	53.5	61.1	68.6	74.8	80.3	85.5	90.4	94.3	96.2
6-16-76	8.7	26.4	50.3	70.0	80.6	87.3	91.3	93.0	94.0	94.9	96.3	96.6	100.0
6-18-76	13.5	37.8	61.9	77.7	85.0	89.7	92.4	93.6	94.3	94.8	95.6	98.2	100.0
6-19-76	10.5	34.3	60.4	75.2	81.4	85.4	88.0	89.3	90.1	90.6	91.9	93.4	100.0
6-20-76	10.9	35.9	62.1	77.0	84.1	89.2	92.8	94.8	95.3	95.6	96.9	98.0	98.7
6-21-76	3.6	17.4	37.7	51.4	60.0	68.6	77.6	85.2	91.1	95.7	98.5	99.3	100.0
Composite[b]	1.9	7.2	19.0	34.1	45.9	57.8	69.9	79.8	87.2	92.7	96.1	97.9	98.9
Bed material[c]	4.2	10.8	22.8	36.2	45.3	52.7	58.8	63.5	67.8	71.4	75.0	78.5	82.8

[a] Dates correspond to dates listed in Tables 1 and 3.
[b] Weighted composite of 1976 bedload. Additional size data: 22.6 mm, 99.4% finer; 32 mm, 99.8% finer; 45 mm, 100% finer.
[c] Composite of 232 samples (approximately 200 kg) collected from bed along 200-m reach near bedload trap. Additional size data: 22.6 mm, 86.9% finer; 32 mm, 92.0% finer; 45 mm, 97.2% finer; 64 mm, 100% finer.

Table 3. Summary data of gate-by-gate bedload transport rates, standard deviation of rates, and bedload size

Date[a]	Gate no.[b]	No. of 60-sec readings[c]	Bedload transport rate[d] (I_b), kg/s Mean	SD	Bedload size[e] (D_{50}), mm
5-18-76	8	15	0.123	0.085	0.82
	7	15	0.119	0.081	1.18
	6	15	0.114	0.060	1.18
	5	15	0.070	0.027	0.75
	4	15	0.147	0.066	1.04
	3	16	0.116	0.102	0.98
	2	15	0.073	0.026	0.88
	1	10	0.002	0.002	0.59
	Σ 1–8	—	0.763	—	0.98
5-19-76	8	20	0.106	0.062	1.07
	7	20	0.183	0.109	0.87
	6	20	0.148	0.042	0.91
	5	20	0.188	0.139	0.83
	4	20	0.303	0.128	1.08
	3	20	0.113	0.091	1.55
	2	20	0.187	0.084	1.12
	1	11	0.012	0.006	0.98
	Σ 1–8	—	1.238	—	1.04
5-20-76	8	25	0.069	0.045	0.69
	7	38	0.183	0.139	0.64
	6	26	0.113	0.036	0.78
	5	33	0.136	0.070	0.85
	4	31	0.192	0.126	1.34
	3	26	0.248	0.150	1.17
	2	25	0.110	0.043	1.10
	1	15	0.008	0.003	0.64
	Σ 1–8	—	1.059	—	0.96
	8	25	0.073	0.045	0.64
	7	26	0.177	0.109	0.77
	6	27	0.143	0.059	0.78
	5	27	0.140	0.053	0.86
	4	27	0.326	0.135	1.56
	3	25	0.270	0.118	1.18
	2	23	0.044	0.049	0.96
	1	10	0.007	0.002	0.60
	Σ 1–8	—	1.179	—	1.04
5-21-76	8	25	0.112	0.059	0.63
	7	31	0.221	0.174	0.82
	6	40	0.240	0.140	1.12
	5	27	0.255	0.081	1.75
	4	30	0.299	0.107	3.06
	3	28	0.367	0.112	1.75
	2	29	0.109	0.068	1.71
	1	11	0.009	0.004	0.78
	Σ 1–8	—	1.620	—	1.52
5-22-76	8	27	0.071	0.047	0.83
	7	35	0.121	0.088	0.94
	6	27	0.083	0.057	0.92
	5	27	0.113	0.050	2.05
	4	29	0.133	0.062	2.57
	3	27	0.120	0.034	2.15
	2	15	0.038	0.013	2.09
	1	—	0.008	—	—
	Σ 1–8	—	0.687	—	1.56
5-26-76	1–8	30	0.118	0.034	0.71
5-27-76	1–8	28	0.211	0.071	0.59
5-27-76	8	22	0.008	0.004	0.46
	7	26	0.049	0.010	0.40
	6	31	0.039	0.010	0.46
	5	30	0.034	0.013	0.57
	4	30	0.058	0.038	1.34
	3	34	0.073	0.039	1.16
	2	12	0.005	0.003	0.48
	1	15	0.008	0.005	0.40
	Σ 1–8	—	0.274	—	0.61
	1–8	35	0.212	0.045	0.77
5-28-76	8	25	0.020	0.008	0.47
	7	30	0.057	0.032	0.44
	6	30	0.053	0.024	0.60
	5	30	0.043	0.009	0.76
	4	34	0.109	0.054	2.11
	3	40	0.093	0.045	1.79
	2	30	0.018	0.010	0.68
	1	12	0.005	0.003	0.53
	Σ 1–8	—	0.398	—	0.95
	1–8	38	0.414	0.115	1.11
5-29-76	8	24	0.068	0.037	0.60
	7	30	0.085	0.058	0.61
	6	37	0.138	0.091	0.89
	5	36	0.092	0.044	1.93
	4	45	0.142	0.074	2.26
	3	41	0.100	0.041	2.26
	2	30	0.020	0.011	1.51
	1	16	0.004	0.003	0.69
	Σ 1–8	—	0.649	—	1.30
	1–8	34	0.563	0.155	1.67
5-30-76	1–8	43	0.705	0.158	1.29
5-31-76	8	35	0.028	0.012	0.49
	7	46	0.092	0.068	0.55
	6	52	0.074	0.032	1.10
	5	37	0.085	0.031	0.62
	4	38	0.140	0.072	1.89
	3	47	0.116	0.063	2.18
	2	20	0.023	0.012	1.85
	1	15	0.008	0.005	0.64
	Σ 1–8	—	0.565	—	1.09
	1–8	62	0.369	0.150	0.98
6-01-76	8	34	0.020	0.004	0.51
	7	26	0.041	0.015	0.48
	6	38	0.038	0.010	0.57
	5	37	0.054	0.031	0.74
	4	30	0.090	0.045	1.25
	3	30	0.064	0.034	1.50
	2	20	0.015	0.009	1.07
	1	11	0.007	0.003	0.57
	Σ 1–8	—	0.329	—	0.81
	1–8	43	0.296	0.076	0.80
6-02-76	8	39	0.030	0.016	0.47
	7	44	0.050	0.028	0.47
	6	33	0.076	0.041	0.61
	5	36	0.063	0.046	1.13
	4	30	0.122	0.068	1.13
	3	32	0.150	0.069	1.78
	2	20	0.024	0.015	1.18
	1	10	0.011	0.005	0.54
	Σ 1–8	—	0.525	—	0.94
	1–8	35	0.422	0.139	1.04
6-03-76	8	37	0.064	0.042	0.47
	7	34	0.131	0.060	0.65
	6	33	0.169	0.091	1.23
	5	33	0.097	0.039	2.21
	4	37	0.111	0.080	2.21
	3	31	0.143	0.110	1.50

(Table 3 continued on following page.)

Table 3. *(continued)*

Date[a]	Gate no.[b]	No. of 60-sec readings[c]	Bedload transport rate[d] (I_b), kg/s Mean	SD	Bedload size[e] (D_{50}), mm
	2	22	0.033	0.013	1.25
	1	21	0.011	0.004	0.59
	Σ 1–8	—	0.760	—	1.18
6-04-76	8	37	0.071	0.053	0.66
	7	35	0.130	0.083	0.69
	6	31	0.128	0.068	0.84
	5	33	0.096	0.038	1.62
	4	31	0.148	0.108	5.00
	3	45	0.158	0.086	2.22
	2	31	0.049	0.021	1.62
	1	20	0.013	0.013	0.84
	Σ 1–8	—	0.794	—	1.40
6-05-76	8	30	0.046	0.026	0.63
	7	30	0.133	0.118	0.74
	6	30	0.104	0.050	0.84
	5	30	0.135	0.075	2.44
	4	30	0.180	0.089	3.18
	3	30	0.174	0.094	3.26
	2	30	0.055	0.029	1.92
	1	15	0.009	0.004	0.77
	Σ 1–8	—	0.836	—	1.76
	1–4	58	0.332	0.143	—
	5–8	50	0.381	0.144	—
	Σ 1–4, 5–8	—	0.714	—	1.51
6-06-76	8	30	0.041	0.018	0.52
	7	30	0.149	0.107	0.58
	6	30	0.107	0.049	0.72
	5	30	0.165	0.091	1.85
	4	30	0.124	0.117	2.58
	3	30	0.204	0.097	1.84
	2	34	0.029	0.016	1.50
	1	15	0.009	0.004	0.57
	Σ 1–8	—	0.827	—	1.30
6-07-76	8	30	0.068	0.043	0.51
	7	30	0.126	0.128	0.59
	6	30	0.129	0.060	0.88
	5	30	0.121	0.030	2.37
	4	30	0.165	0.065	2.77
	3	30	0.141	0.083	2.80
	2	20	0.034	0.015	1.76
	1	15	0.009	0.003	0.61
	Σ 1–8	—	0.791	—	1.35
6-08-76	8–5	46	0.319	0.089	—
	4–1	56	0.200	0.082	—
	Σ 8–5, 4–1	—	0.519	—	1.24
6-09-76	8	35	0.032	0.012	0.57
	7	31	0.085	0.060	0.59
	6	40	0.074	0.040	0.74
	5	27	0.078	0.024	1.24
	4	30	0.118	0.049	1.79
	3	30	0.073	0.033	1.73
	2	20	0.006	0.006	0.66
	1	21	0.002	0.002	0.62
	Σ 1–8	—	0.468	—	1.03
	1–8	56	0.315	0.083	1.08
6-10-76	1–8	56	0.264	0.091	1.06
6-11-76	1–8	39	0.231	0.052	0.84
	1–8	37	0.263	0.049	1.05
	1–8	45	0.255	0.067	1.02
	8	30	0.069	0.027	1.12
	7	34	0.123	0.048	0.69
	6	30	0.080	0.032	0.74
	5	41	0.060	0.033	1.08
	4	30	0.076	0.032	1.90
	3	31	0.090	0.027	1.61
	2	30	0.055	0.025	1.24
	1	20	0.020	0.013	1.31
	Σ 1–8	—	0.573	—	1.07
	1–8	70	0.214	0.076	0.79
6-12-76	1–8	67	0.165	0.066	0.81
	1–8	61	0.154	0.047	0.77
	1–8	63	0.148	0.039	0.81
	1–8	63	0.132	0.037	0.82
	1–8	66	0.096	0.045	0.82
	1–8	60	0.076	0.028	0.77
6-13-76	1–8	78	0.025	0.020	0.49
6-14-76	1–8	60	0.020	0.024	0.41
	1–8	60	0.018	0.019	0.53
6-15-76	1–8	60	0.003	0.002	0.66
	1–8	60	0.004	0.003	0.88
6-16-76	1–8	60	0.008	0.004	0.50
6-18-76	1–8	80	0.005	0.006	0.42
6-19-76	1–8	60	0.008	0.003	0.44
6-20-76	1–8	53	0.021	0.012	0.43
6-21-76	1–8	71	0.164	0.050	0.68

[a] Dates correspond to dates listed in Tables 1 and 2.
[b] Each gate is 1.83 m in length; gate 8 is at left side of channel; gate 1 is at right side of channel.
[c] Accumulative wet weight in sediment-collection hopper is recorded at 60-sec intervals.
[d] See note f, Table 1; transport rate of solids in immersed weight per second; for single gate over 1.83 m of width; for gates 1–8 over 14.6 m total width of bedload trap. Standard deviation is based on the number of 60-sec readings.
[e] D_{50} is median diameter of grains; for Σ (gates 1–8), the median diameter is a transport-weighted average.