Roughness

Characteristics

of Natural Channels

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Color photographs and descriptive
data for 50 stream channels for
which roughness coefficients have
been determined

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science for a changing world

2–1885.   South Beaverdam Creek near Dewy Rose, Ga.

Gage location.—Lat 34°11′, long 82°57′, on left bank 50 ft upstream from highway bridge, 1 mile northeast of Dewy Rose, Elbert County, and 3 miles upstream from confluence with North Beaverdam Creek. Section 1 is about 100 ft downstream from gage.

Drainage area.—35.8 sq mi.

Date of flood.—Nov. 26, 27, 1957.

Gage height.—8.02 ft, 4.86 ft at gage; 7.83 ft, 4.64 ft at section 1.

Peak discharge.—820 cfs; 221 cfs.

Computed roughness coefficient.—Manning $n = 0.052$; 0.047.

Description of channel.—Bed consists of sand about 1 ft deep over clay and rock. Banks are irregular with trees and bushes growing down to the low waterline.

Reach properties

Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
Nov. 26, 1957							
1...........	268	71	3.8	3.62	3.06	....	....
2...........	288	56	5.1	4.97	2.85	71	0.14
3...........	278	59	4.7	4.34	2.95	66	.12
4...........	281	59	4.8	4.41	2.92	81	.13
5...........	260	58	4.5	4.13	3.15	64	.06
Nov. 27, 1957							
1...........	91	44	2.1	2.02	2.43	....	....
2...........	128	46	2.8	2.69	1.73	71	0.11
3...........	108	51	2.1	2.00	2.05	66	.10
4...........	108	54	2.0	1.98	2.05	81	.08
5...........	101	46	2.2	2.04	2.19	64	.14

Notes.—
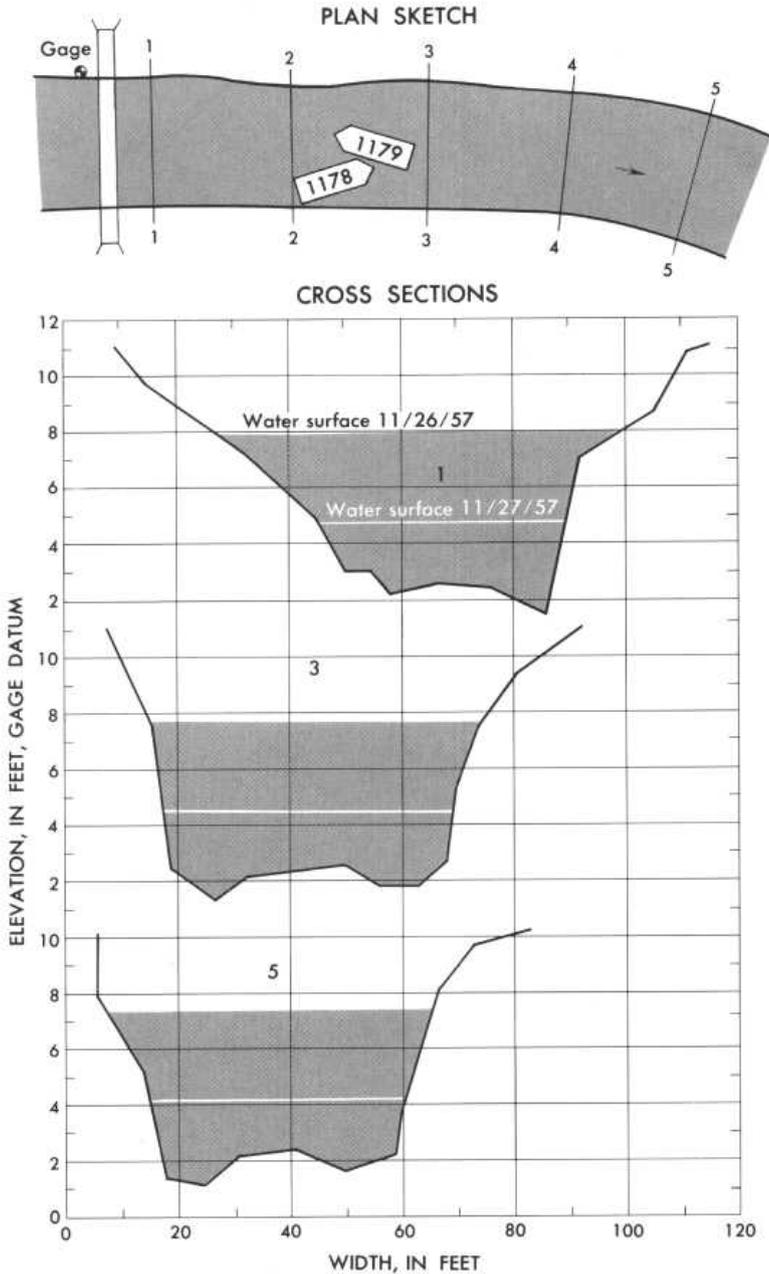
Plan sketch and cross sections, South Beaverdam Creek near Dewy Rose, Ga.

No. 1178 downstream along left bank from section 2,
South Beaverdam Creek near Dewy Rose, Ga.

No. 1179 upstream from section 2,
South Beaverdam Creek near Dewy Rose, Ga.

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2–1005. Deep River at Ramseur, N.C.

Gage location.—Lat 35°44′, long 79°30′, on right bank 0.25 mile downstream from Main Street bridge in Ramseur, Randolph County, 0.5 downstream from mill dam, and 1.5 miles downstream from Sandy Creek. Section 1 is about 30 ft downstream from gage.

Drainage area.—346 sq mi.

Date of flood.—Dec. 28, 1958.

Gage height.—13.65 ft at gage; 13.62 ft at section 1.

*Peak discharge.*—8,300 cfs.

Computed roughness coefficient.—Manning *n* = 0.049.

Description of channel.—Bed is mostly coarse sand and contains some gravel and one conspicuous outcrop. Three small islands in the reach have a dense stand of small birch trees. The banks are fairly steep and contain medium growths of underbrush and large trees.

Reach properties

Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1	2,474	215	11.5	10.8	3.36	. . . .	. . . .
2	2,135	198	10.8	10.4	3.89	219	0.17
3	2,137	240	9.8	9.34	3.88	218	.05
4	2,403	250	9.6	8.73	3.45	182	.12
5	2,061	244	8.4	7.94	4.03	185	.20
6	2,265	194	11.8	10.8	3.66	337	.30
7	2,026	189	10.7	10.4	4.10	265	.24

Notes.—
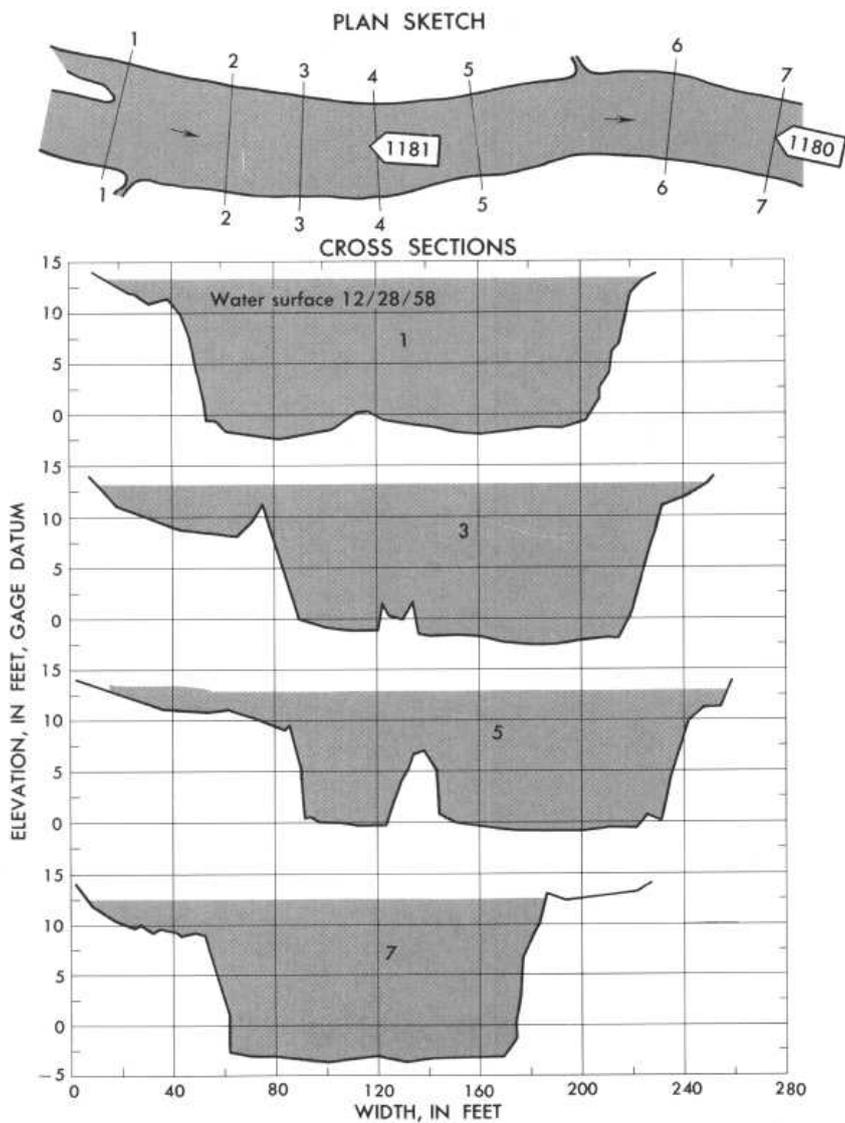
Plan sketch and cross sections, Deep River at Ramseur, N.C.

No. 1180 upstream from section 7, Deep River at
Ramseur, N.C.

No. 1181 upstream from section 4, Deep River at
Ramseur, N.C.

6–7195. Clear Creek near Golden, Colo.

Gage location.—Lat 39°45′05″, long 105°14′55″, in NE¼ sec. 32, T. 3 S., R. 70 W., on left bank 0.5 mile downstream from Golden Canal diversion and 1 mile west of Golden. Section 12 is about 3.5 miles upstream from gage.

Drainage area.—399 sq mi.

Date of flood.—May 26, 1958.

Gage height.—5.25 ft at gage; 61.70 ft (different datum) at section 15.

Peak discharge.—1,380 cfs.

*Computed roughness coefficient.*—Manning $n = 0.050$.

Description of channel.—Bed and banks are composed of angular boulders as much as 2 ft in diameter.

Reach properties

Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
12..........	200	43	4.6	4.22	6.90	....	....
13..........	206	50	4.1	3.83	6.70	47	0.85
14..........	183	52	3.5	3.29	7.54	39	.65
15..........	184	51	3.6	3.36	7.50	46	.65
16..........	184	55	3.3	2.69	7.50	32	.60

Notes.—
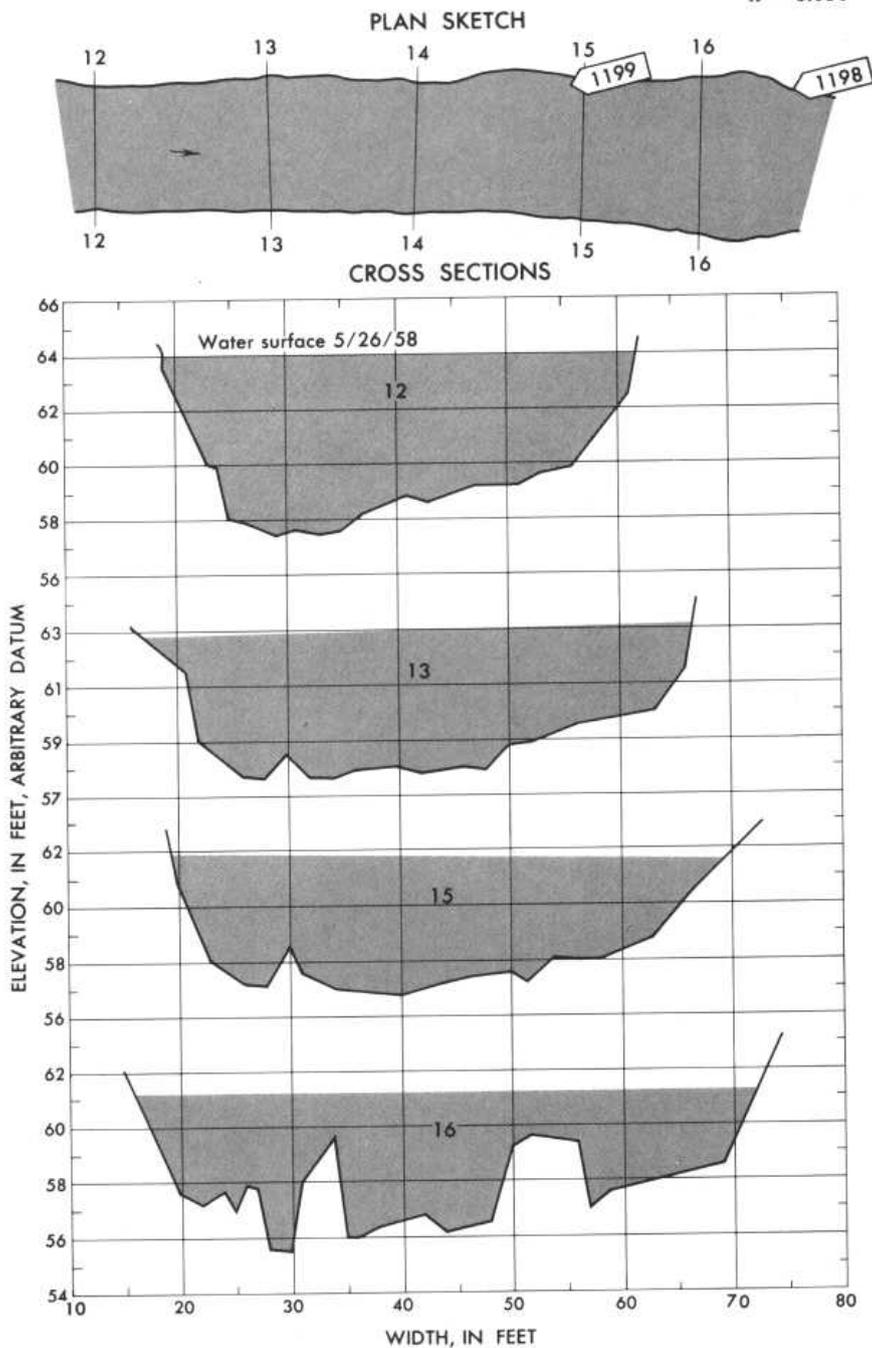
Plan sketch and cross sections, Clear Creek near
Golden, Colo.

$n = 0.050$

No. 1198 upstream from section 16, Clear Creek near
Golden, Colo.

No. 1199 upstream from left bank at section 15,
Clear Creek near Golden, Colo.

2–3310.   Chattahoochee River near Leaf, Ga.

Gage location.—Lat 34°35′, long 83°38′, on left bank 700 ft upstream from bridge on State Highway 115, 1.5 miles east of Leaf, White County, 2.5 miles downstream from Blue Creek, 3 miles upstream from Soque River, 7.5 miles southeast of Cleveland, and at mile 405.6.   Section 2 is about 680 ft upstream from gage.

Drainage area.—150 sq mi.

Date of flood.—Feb. 7, Feb. 27, 1959.

Gage height.—7.50 ft, 4.95 ft at gage; 9.12 ft, 6.92 ft at section 2.

Peak discharge.—5,100 cfs; 2,350 cfs.

Computed roughness coefficient.—Manning *n* = 0.051; 0.074.

Description of channel.—Bed is mostly rock and very irregular. Banks are covered with low thick rhododendron and small trees.

Reach properties

Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
Feb. 7, 1959							
2	1,510	147	10.3	9.84	3.38	. . . .	. . . .
3	850	133	6.4	6.18	6.00	353	1.19
4	1,110	158	7.0	6.79	4.59	214	.35
5	1,070	151	7.1	6.84	4.77	125	.14
Feb. 27, 1959							
2	1,215	132	9.2	8.90	1.93	. . . .	. . . .
3	555	112	5.0	4.80	4.23	353	1.42
4	750	138	5.4	5.26	3.13	214	.37
5	720	134	5.4	5.18	3.26	125	.13

Notes.—

PLAN SKETCH
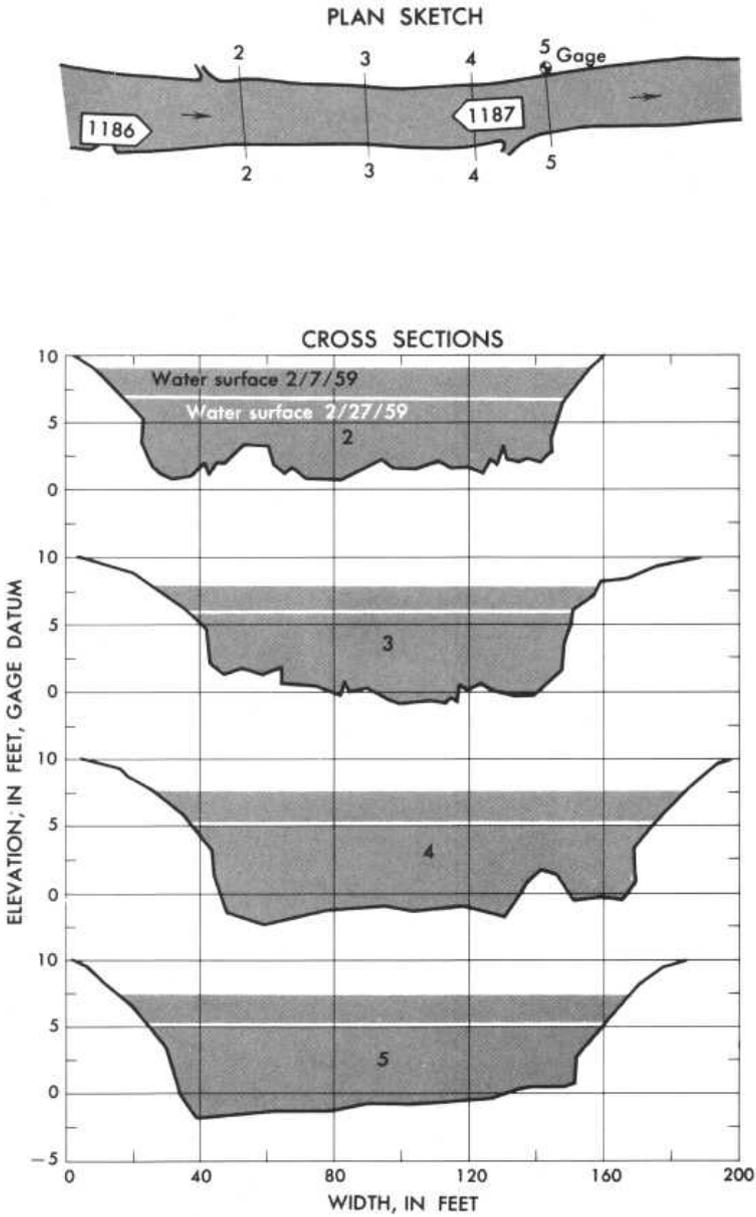
CROSS SECTIONS

Plan sketch and cross sections, Chattahoochee River near Leaf, Ga.

$n = 0.051; 0.074$

No. 1186 downstream from above section 2,
Chattahoochee River near Leaf, Ga.

No. 1187 upstream from section 4,
Chattahoochee River near Leaf, Ga.

13–3380.   South Fork Clearwater River near Grangeville, Idaho

Gage location.—Lat 45°55′, long 116°01′, in SE¼NW¼ sec. 30, T. 30 N., R. 4 E., on right bank just downstream from powerhouse of Washington Water Power Co., 6 miles east of Grangeville.   Section 1 is about 1.8 miles upstream from gage.

Drainage area.—865 sq mi.

Date of flood.—May 29, 1948.

Gage height.—12.50 ft at gage; 30.85 ft at section 1.

Peak discharge.—12,600 cfs.

Computed roughness coefficient.—Manning $n = 0.051$.

Description of channel.—Bed consists of rock and boulders; $d_{50} = 250$ mm, $d_{84} = 440$ mm.   Banks are mostly boulders and have trees and brush along tops.

Reach properties

Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1	1,326	134	9.90	9.40	9.50	. . . .	. . . .
2	1,310	143	9.16	8.68	9.62	255	1.40
3	1,434	181	7.92	7.71	8.79	295	1.45
4	1,267	148	8.56	8.23	9.94	357	2.85

Notes.—

PLAN SKETCH
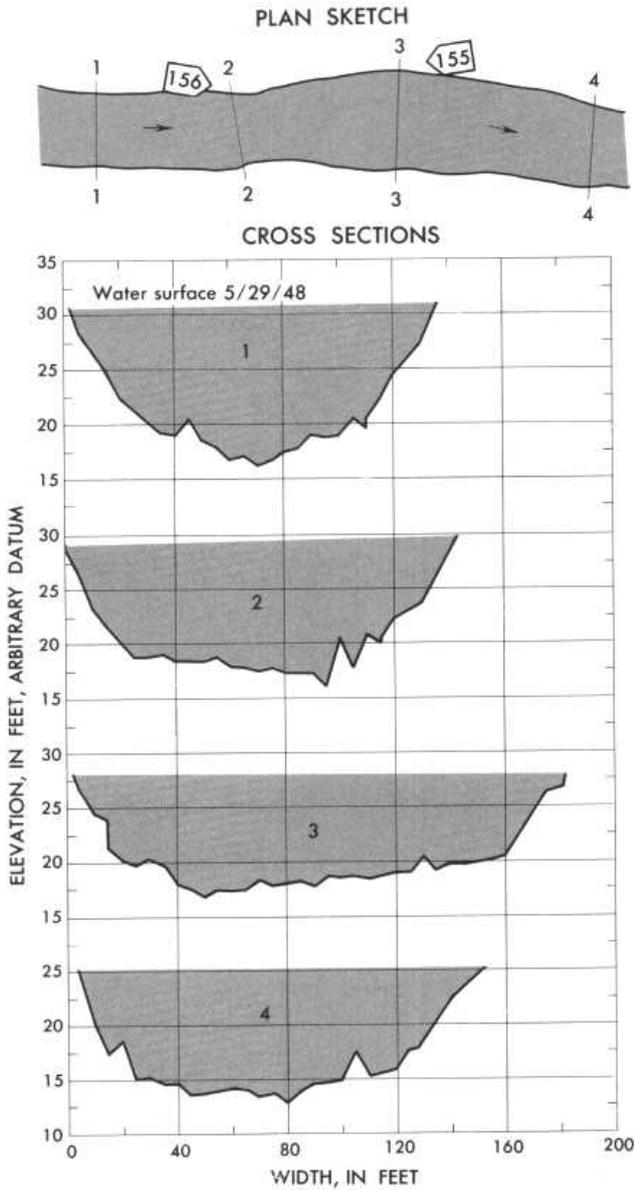
CROSS SECTIONS

Plan sketch and cross sections, South Fork Clearwater River near Grangeville, Idaho.
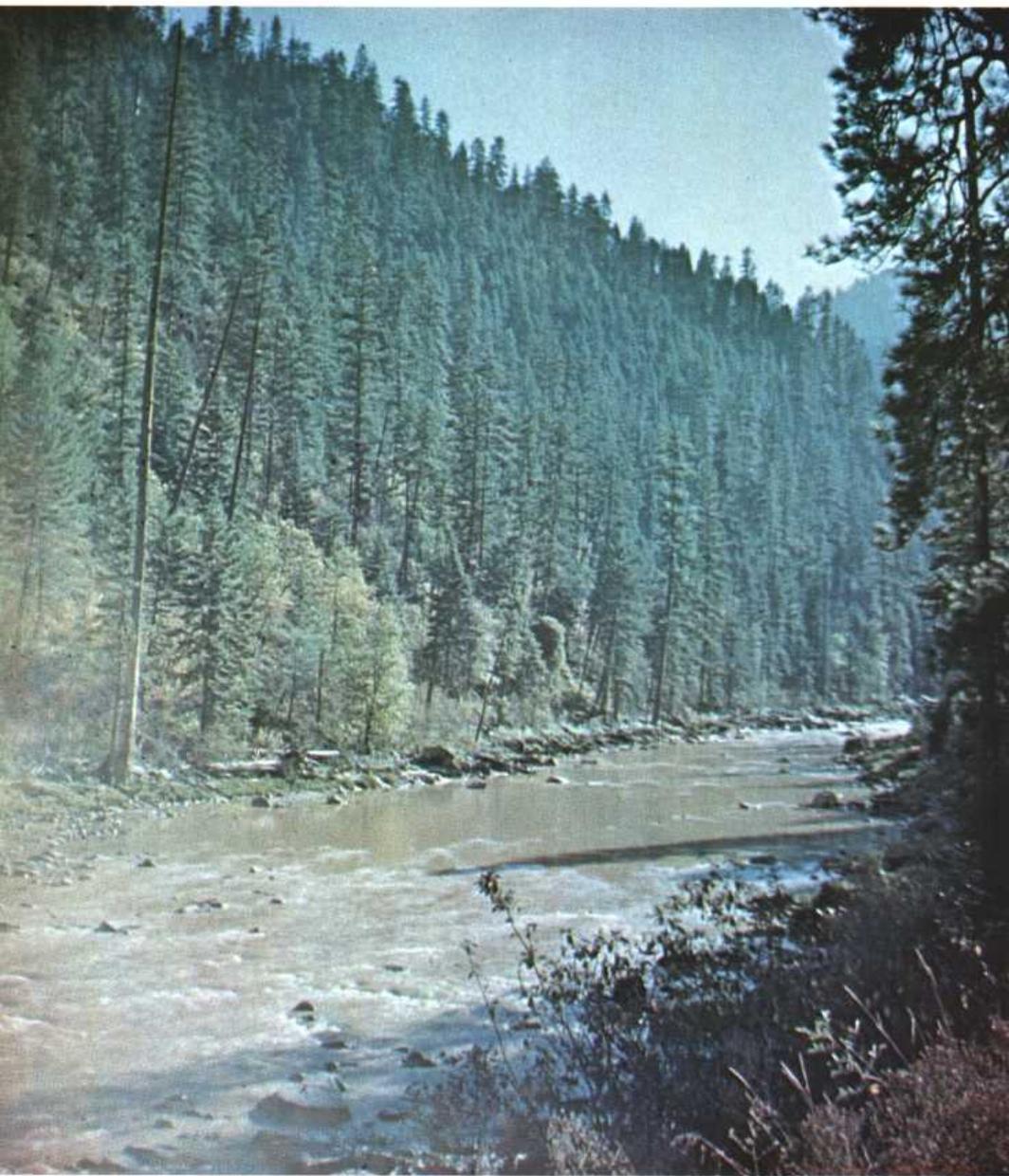
No. 155 upstream from left bank at section 3, South Fork
Clearwater River near Grangeville, Idaho.

No. 156 downstream from left bank at section 2, South Fork
Clearwater River near Grangeville, Idaho.

11–4510.   Cache Creek near Lower Lake, Calif.

Gage location.—Lat 38°55′27″, long 122°33′53″, in sec. 6, T. 12 N., R. 6 W., on left bank 500 ft downstream from Clear Lake Dam, 1.9 miles downstream from Copsey Creek, and 2.5 miles northeast of Lower Lake. Section 1 is 350 ft upstream from gage.

Drainage area.—528 sq mi.

Date of flood.—Jan. 24-25, 1951.

Gage height.—7.80 ft, 6.30 ft at gage; 13.35 ft, 11.70 ft at section 1.

Peak discharge.—3,840 cfs, 1,830 cfs.

*Computed roughness coefficient.*—Manning *n* = 0.053; 0.079.

Description of channel.—Bed is composed of large angular boulders. Banks consist of exposed rock, boulders, and some trees.

Reach properties

Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
Jan. 25, 1951							
1...........	401	81	5.0	4.27	9.59	....	....
2...........	384	65	5.9	5.02	10.00	102	1.80
3...........	295	45	6.6	5.27	13.02	62	3.10
Jan. 24, 1951							
1...........	271	76	3.6	3.09	6.75	....	....
2...........	236	51	4.6	3.88	7.75	102	2.75
3...........	211	38	5.6	4.45	8.67	62	2.55

Notes.—

PLAN SKETCH

CROSS SECTIONS

$n = 0.053; 0.079$
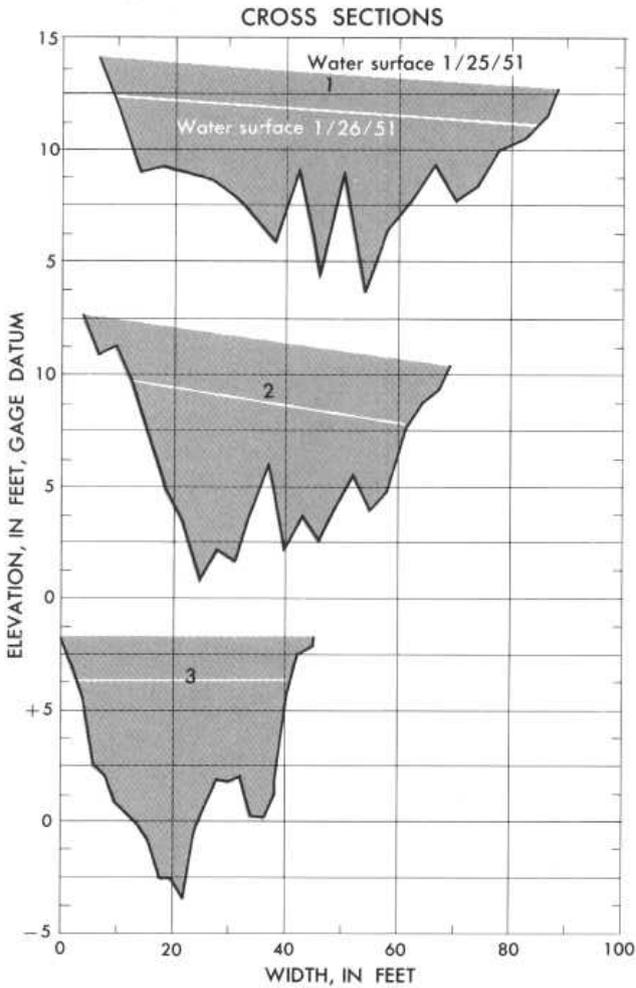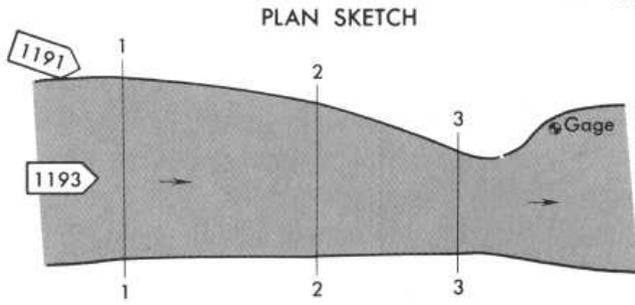
Plan sketch and cross sections, Cache Creek near
Lower Lake, Calif.
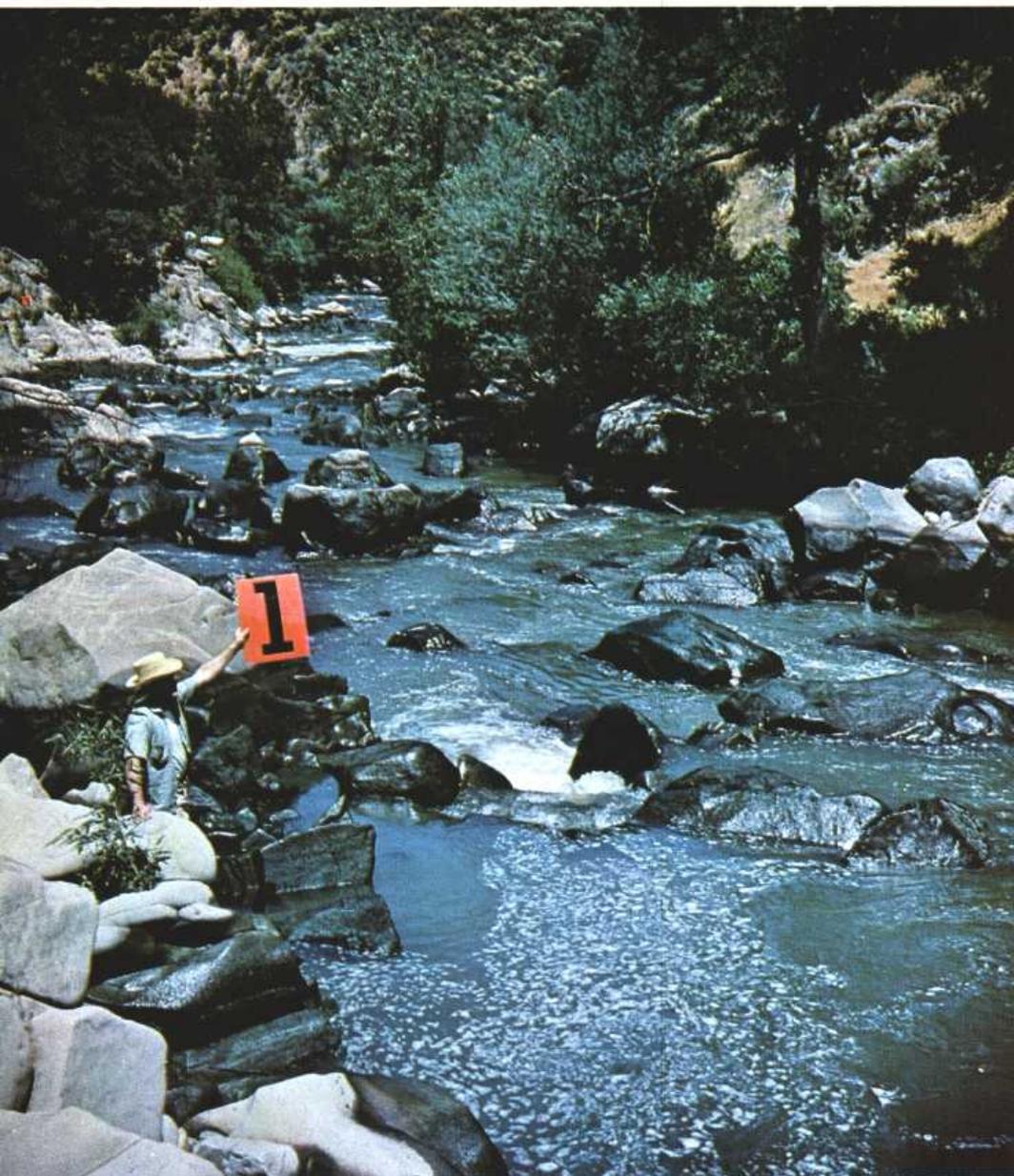
No. 1191 downstream from left bank above section 1,
Cache Creek near Lower Lake, Calif.

No. 1193 downstream from channel above section 1,
Cache Creek near Lower Lake, Calif.

4–2750.   East Branch Ausable River at Au Sable Forks, N.Y.

Gage location.—Lat 44°26′20″, long 73°40′55″, on left bank 700 ft upstream from upper highway bridge in Au Sable Forks, Essex County, and 0.5 mile upstream from confluence with West Branch.   Section 1 is about 0.75 mile upstream from gage.

Drainage area.—198 sq mi.

Date of flood.—Mar. 31, 1951.

Gage height.—8.20 ft at gage; 94.08 ft (different datum) at section 1.

Peak discharge.—7,790 cfs.

Computed roughness coefficient.—Manning *n* = 0.055.
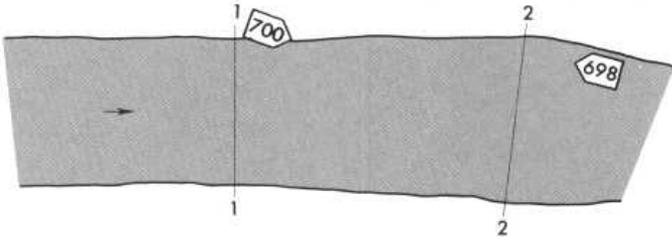
Description of channel.—Bed consists of gravel, rock, and boulders as much as 5 ft in diameter.   Banks are lined with boulders, small trees, and bushes.
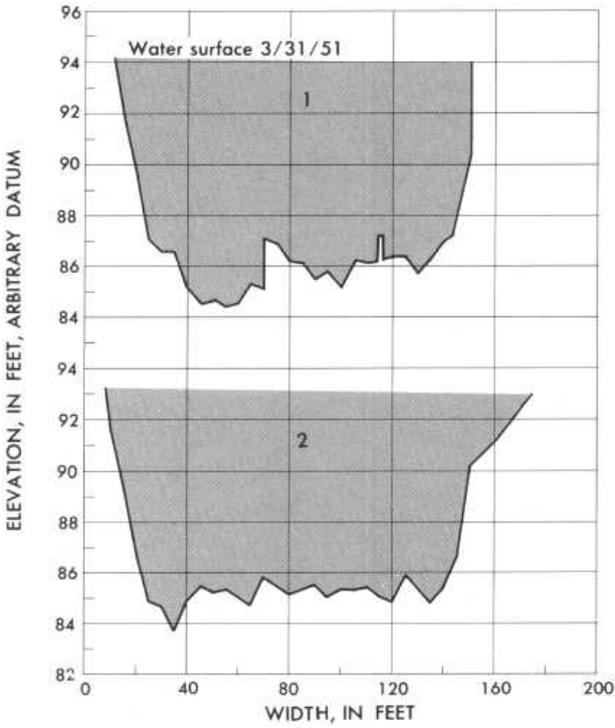
Reach properties

Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1...........	1,050	139	7.6	7.01	7.40	....	....
2...........	1,090	166	6.6	6.42	7.13	178	1.00

Notes.—

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Plan sketch and cross sections, East Branch Ausable River
at Au Sable Forks, N.Y.

No. 698 upstream along left bank from below section 2,
East Branch Ausable River at Au Sable Forks, N.Y.

No. 700 downstream from left bank at section 1,
East Branch Ausable River at Au Sable Forks, N.Y.