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

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1–1805. Middle Branch Westfield River at Goss Heights, Mass.

Gage location.—Lat 42°15′31″, long 72°52′23″, on right bank at upstream side of highway bridge at Goss Heights, Hampshire County, 0.35 mile upstream from mouth, and 1.7 miles north of Huntington. Section 1 is about 1,000 ft downstream from gage.

Drainage area.—52.6 sq mi.

Date of flood.—Mar. 22, 1948.

Gage height.—6.46 ft at gage; 19.07 ft at section 1.

Peak discharge.—3,400 cfs.

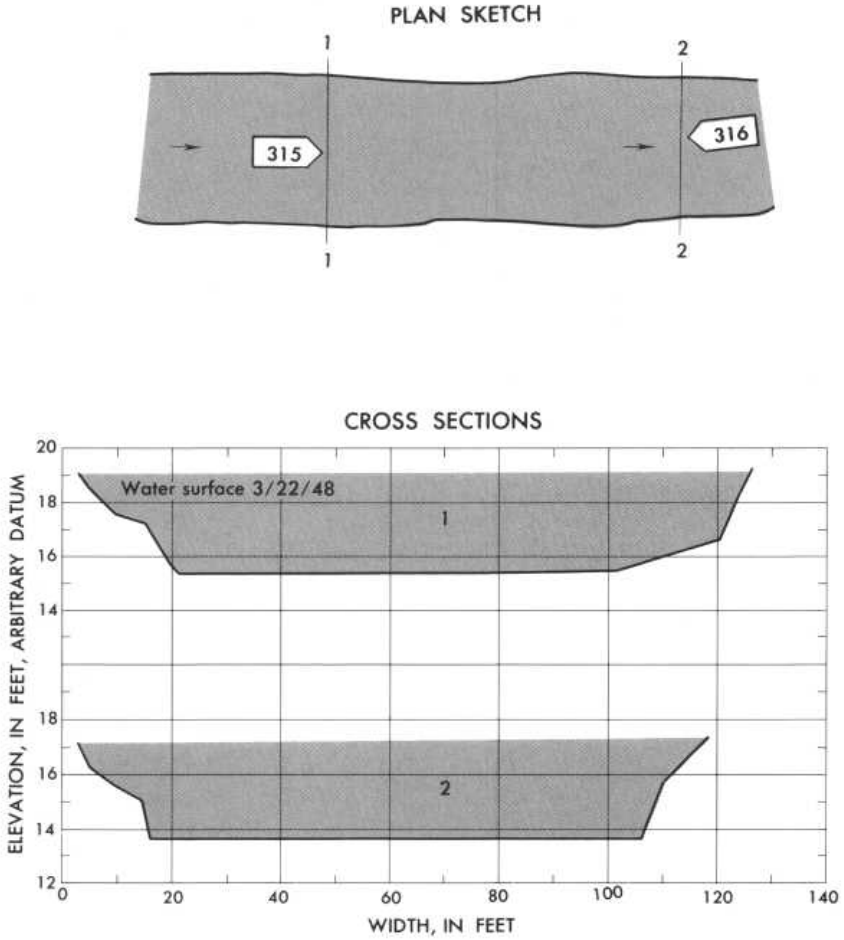
Computed roughness coefficient.—Manning $n = 0.056$.

Description of channel.—Bed is rocks and coarse gravel with boulders as much as 5 ft in diameter.

Reach properties

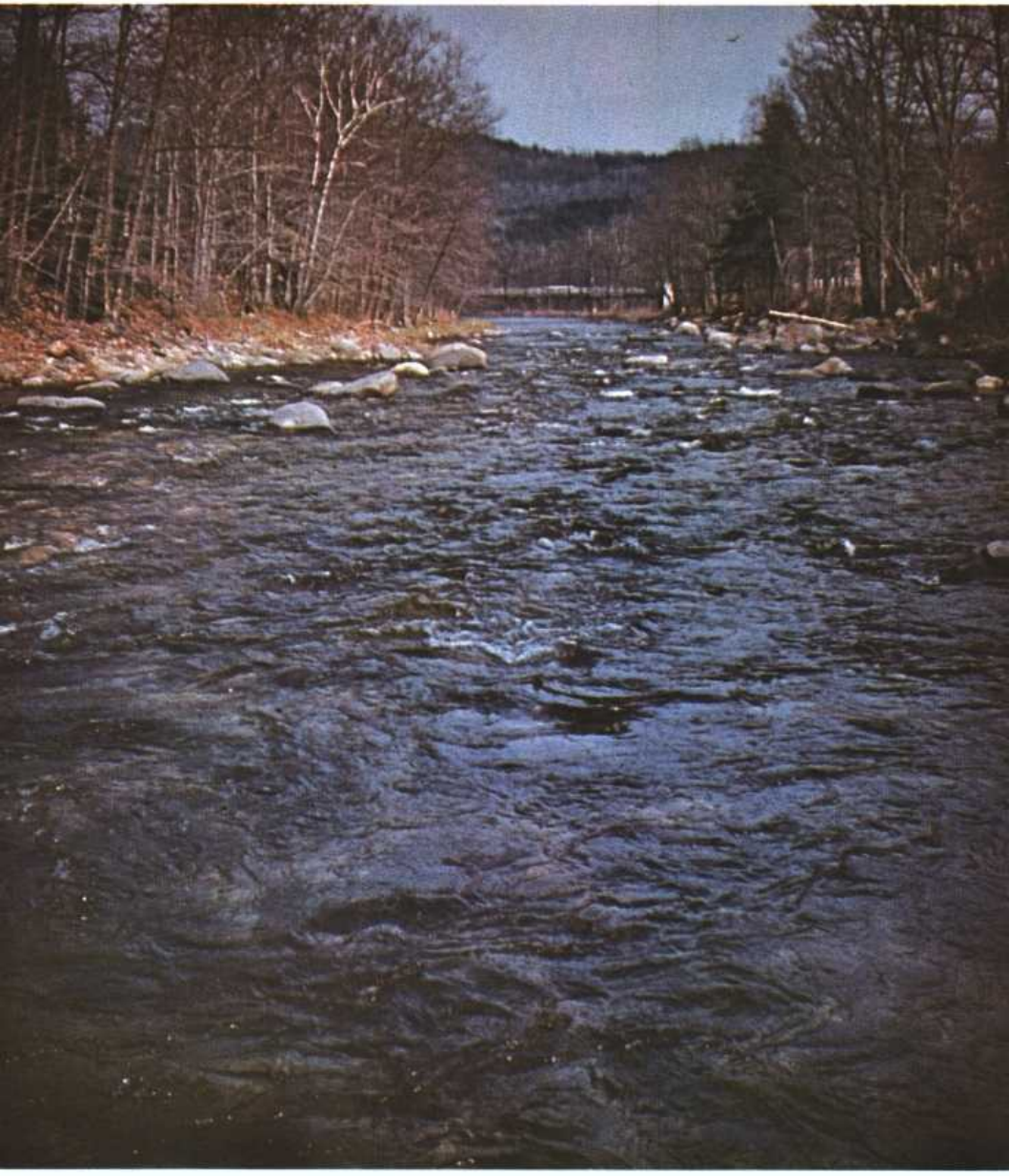
Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1	502	123	4.1	4.05	6.78	.....	.....
2	531	114	4.6	4.50	6.42	159	1.38

Notes.—



Plan sketch and cross sections, Middle Branch Westfield River at Goss Heights, Mass.

$n = 0.056$



No. 315 downstream from above section 1, Middle Branch Westfield River at Goss Heights, Mass.

$n = 0.056$

No. 316 upstream from below section 2, Middle Branch Westfield River at Goss Heights, Mass.

$n = 0.057$

12–4620. Mission Creek near Cashmere, Wash.

Gage location.—Lat 47°30′15″, long 120°28′30″, in SE¼NE¼ sec. 8, T. 23 N., R. 19 E., on right bank 1.5 miles upstream from mouth and 1.5 miles south of Cashmere. Section 1 is about 0.5 mile downstream.

Drainage area.—79.1 sq mi.

Date of flood.—May 19, 1955.

Gage height.—1.73 ft at gage; 14.00 ft (different datum) at section 1.

Peak discharge.—123 cfs.

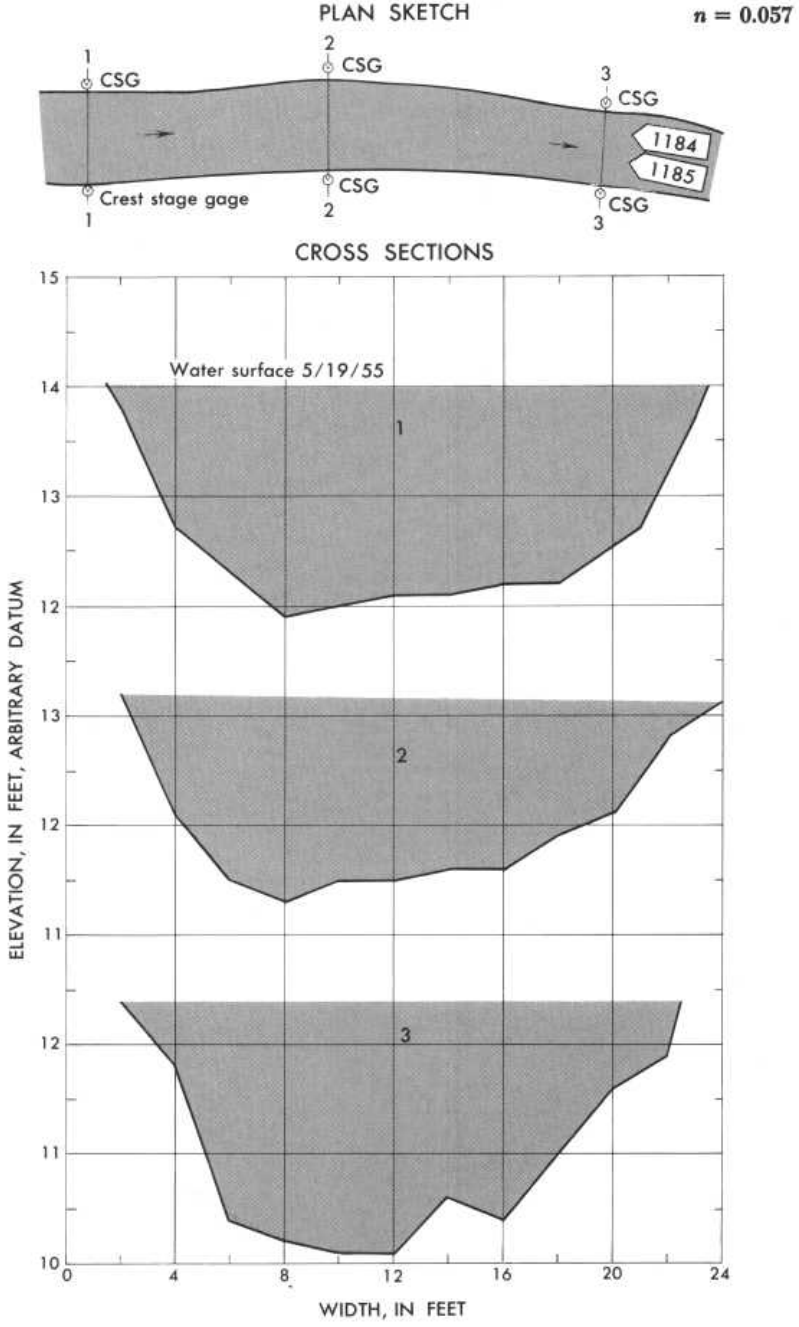
Computed roughness coefficient.—Manning $n = 0.057$.

Description of channel.—Bed of angular-shaped boulders as much as 1 ft in diameter. Both banks are lined with overhanging 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	34	22	1.54	1.50	3.64	.....	.....
2	28	22	1.27	1.24	4.39	44	0.82
3	31	20.5	1.53	1.46	3.92	51	.79

Notes.—

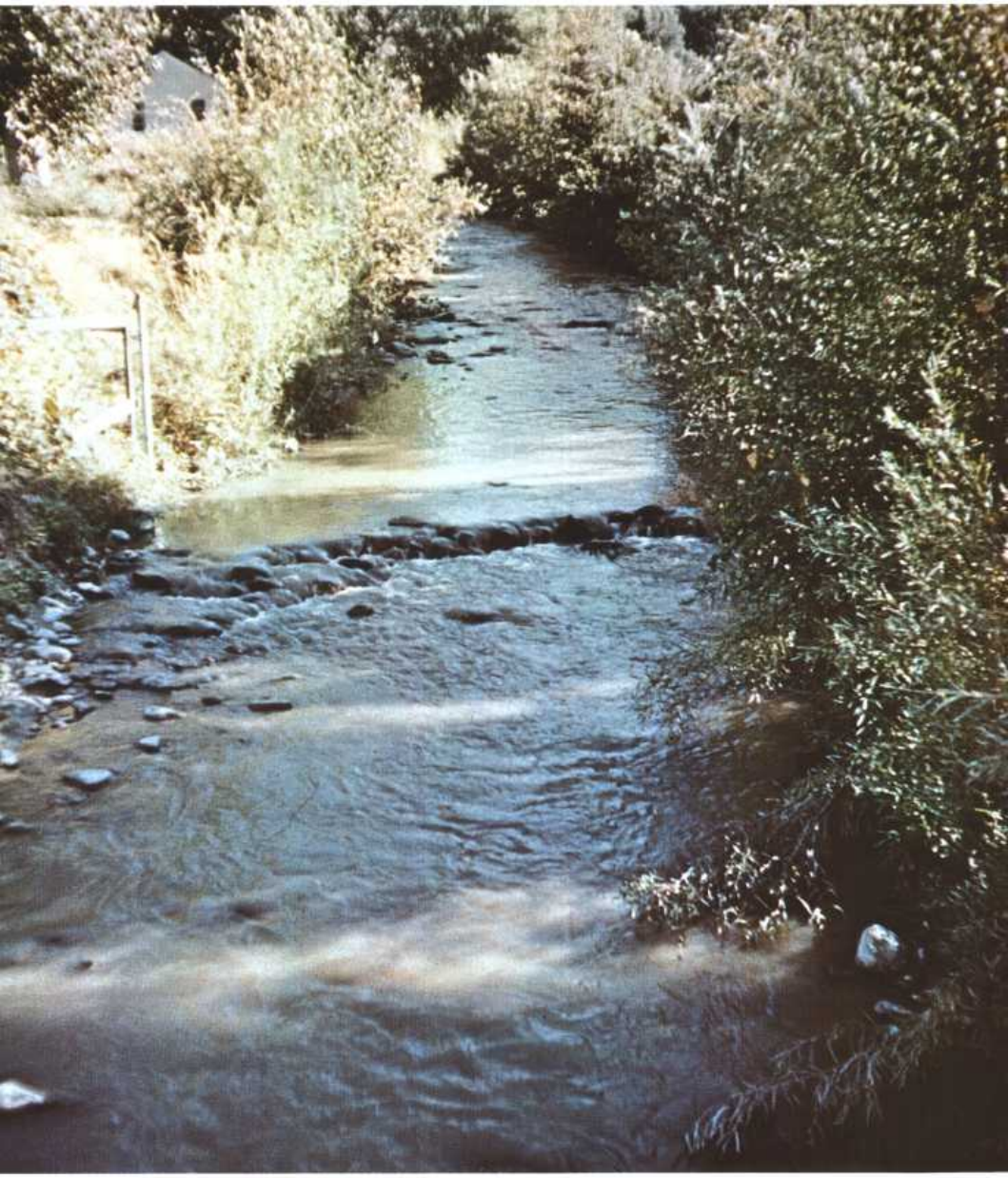


Plan sketch and cross sections, Mission Creek near Cashmere, Wash.

$n = 0.057$

No. 1184 upstream from below section 3, Mission Creek near Cashmere, Wash.

$n = 0.057$



No. 1185 upstream from below section 3, Mission Creek near Cashmere, Wash.

2–935. Haw River near Benaja, N.C.

Gage location.—Lat 36°16′, long 79°34′, on left bank 200 ft upstream from site of old High Rock Mill, 500 ft upstream from bridge on Secondary Road 2620, 0.5 mile upstream from Rockingham-Guilford County line, 6 miles downstream from Troublesome Creek, and 6 miles east of Benaja, Rockingham County. Section 4 is about 400 ft upstream from gage.

Drainage area.—168 sq mi.

Date of flood.—Dec. 29, 1958.

Gage height.—5.70 ft at gage; 6.09 ft at section 4.

Peak discharge.—1,000 cfs.

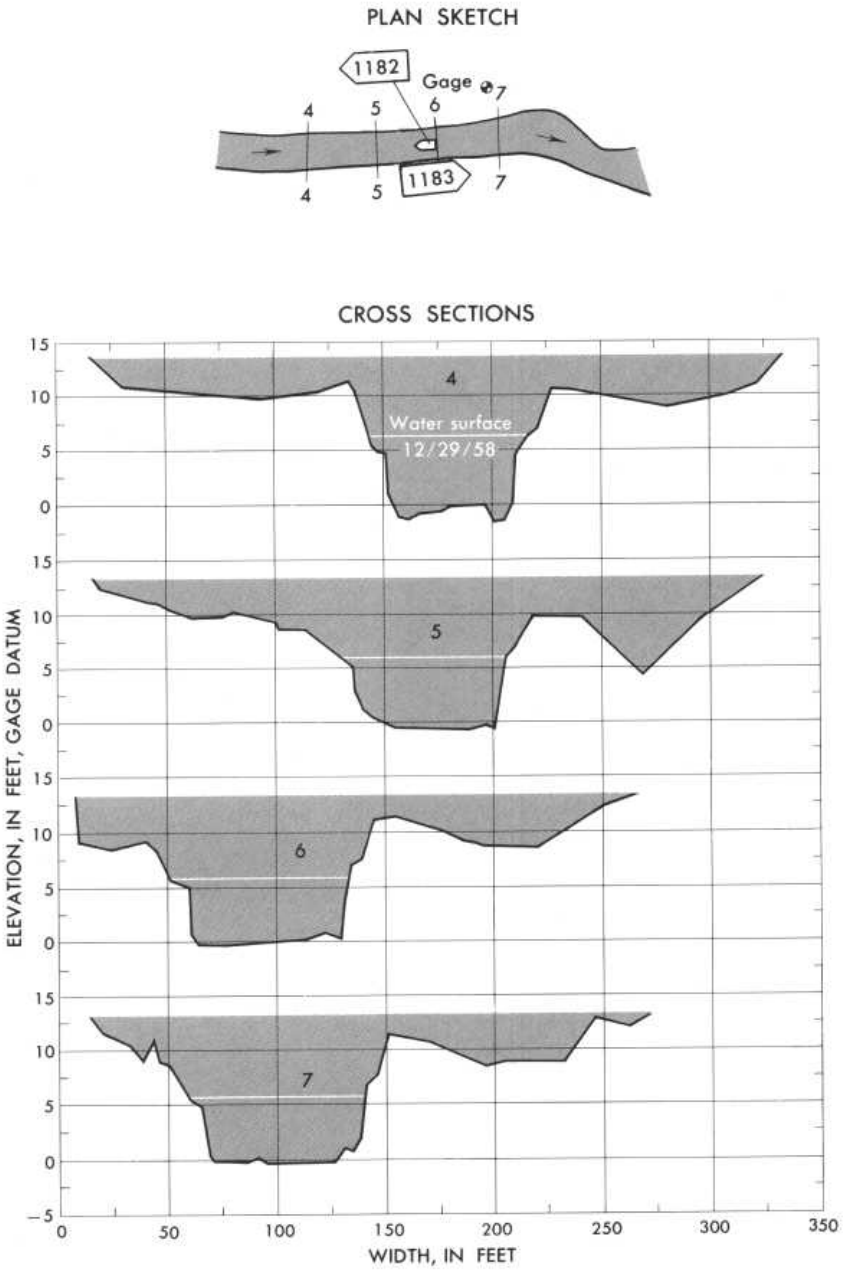
Computed roughness coefficient.—Manning $n = 0.059$.

Description of channel.—Bed is composed of coarse sand and a few outcrops. Banks on both sides are heavily lined with overhanging birch 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
4	403	73	5.5	4.98	2.48	.....	.....
5	417	73	5.7	5.22	2.40	172	0.16
6	400	81	4.9	4.58	2.50	115	.15
7	397	79	5.0	4.70	2.52	121	.16

Notes.—



Plan sketch and cross sections, Haw River near Benaja, N.C.

$n = 0.059$

No. 1182 upstream from section 6, Haw River near Benaja, N.C.

$n = 0.059$

No. 1183 downstream along right bank from section 6,
Haw River near Benaja, N.C.

12–1135. North Fork Cedar River near Lester, Wash.

Gage location.—Lat 47°19′10″, long 121°30′05″, in SW¼ sec. 11, T. 21 N., R. 10 E., on left bank 120 ft downstream from falls, 1.5 miles upstream from confluence with South Fork, and 7.5 miles north of Lester. Section 1 is about 700 ft upstream from gage.

Drainage area.—8.81 sq mi.

Date of flood.—Dec. 15, 1959.

Gage height.—3.85 ft at gage; 24.88 ft (different datum) at section 1.

Peak discharge.—996 cfs.

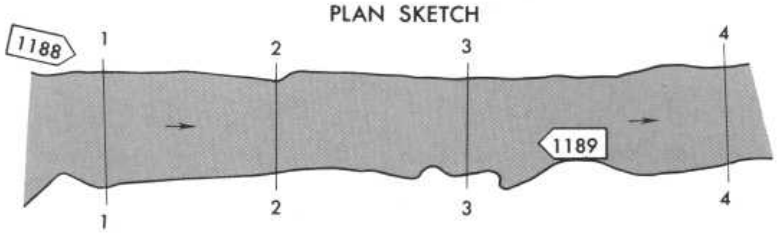
Computed roughness coefficient.—Manning $n = 0.059$.

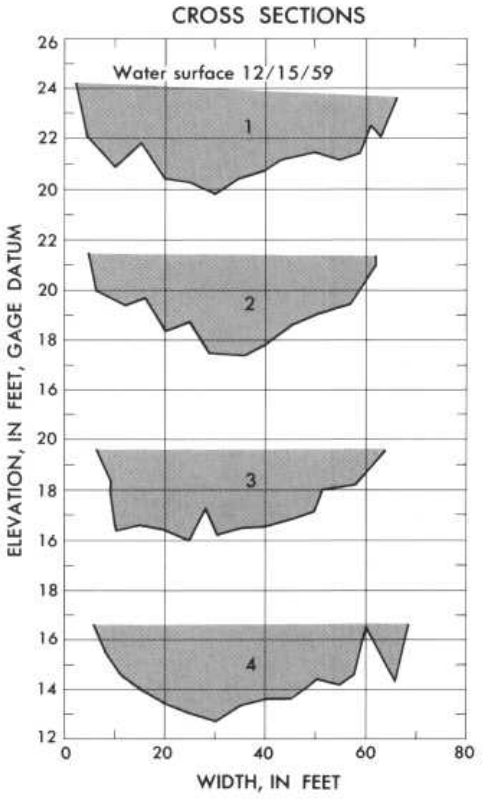
Description of channel.—Bed is large boulders. Banks are irregular and lined with brush, tree stumps, and roots.

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	178	64	2.7	2.65	5.60	.....	.....
2	150	58	2.6	2.53	6.60	86	2.54
3	144	58	2.5	2.40	6.92	96	1.82
4	157	63	2.5	2.39	6.34	130	3.04

Notes.—





Plan sketch and cross sections, North Fork Cedar River near Lester, Wash.

$n = 0.059$

No. 1188 downstream from left bank above section 1, North Fork Cedar River near Lester, Wash.

$n = 0.059$

No. 1189 upstream from right bank below section 3, North Fork Cedar River near Lester, Wash.

3–4485. Hominy Creek at Candler, N.C.

Gage location.—Lat 35°32′28″, long 82°40′35″, on left bank 0.1 mile downstream from Pole Creek, 0.4 mile downstream from bridge on State Highway 112, and 1 mile east of Candler, Buncombe County. Section 1 is about 250 ft downstream from gage.

Drainage area.—79.8 sq mi.

Date of flood.—June 16, 1949.

Gage height.—13.75 ft at gage; 13.33 ft at section 1.

Peak discharge.—6,800 cfs total; 6,460 cfs in the main channel.

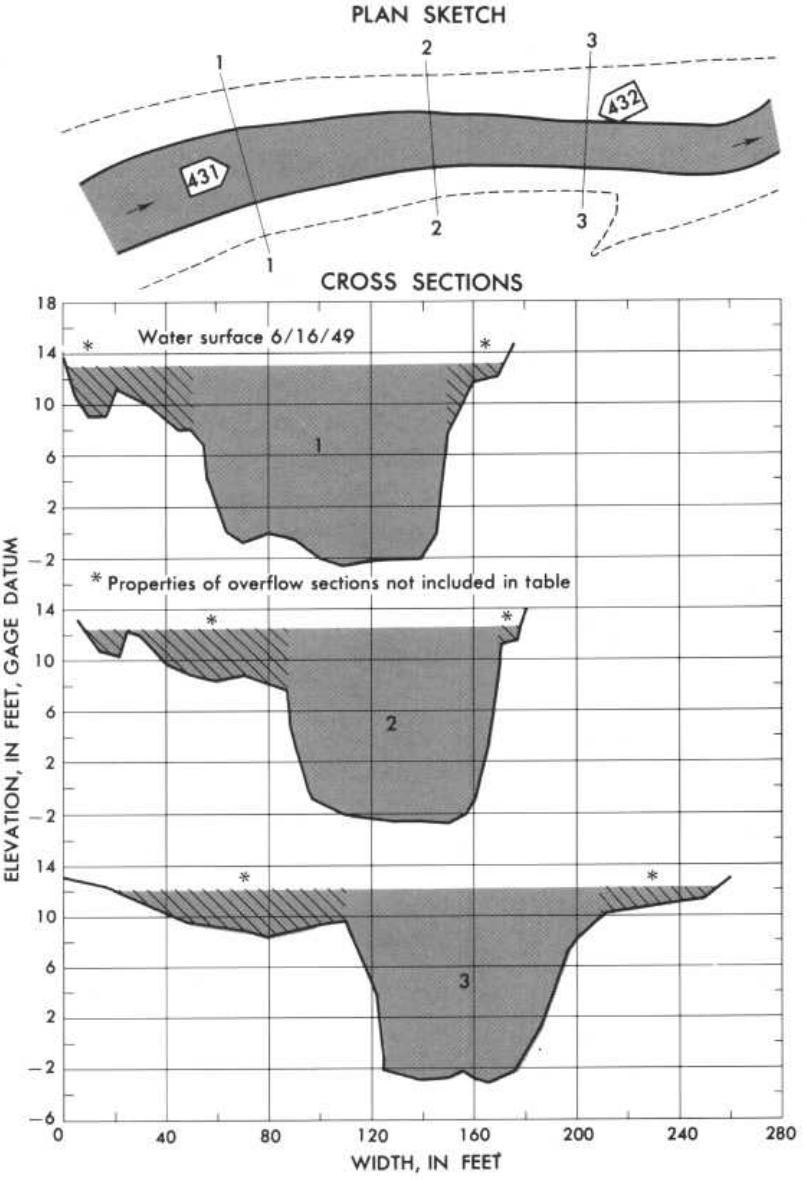
Computed roughness coefficient.—Manning $n = 0.060$.

Description of channel.—Bed is sand and gravel with some boulders as much as 20 inches in diameter. Both banks are lined with overhanging 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	1,400	110	12.7	11.77	4.76	.....	.....
2	1,160	90	12.9	11.62	5.50	308	0.68
3	1,090	90	12.2	11.28	5.72	262	.46

Notes.—



Plan sketch and cross sections, Hominy Creek at Candler, N.C. Dashed lines show limits of overbank flooding.

$n = 0.060$

No. 431 downstream from above section 1, Hominy Creek at Candler, N.C.

$n = 0.060$

No. 432 upstream from left bank at section 3, Hominy Creek at Candler, N.C.