



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

$n = 0.053; 0.079$

## 11-4510. Cache Creek near Lower Lake, Calif.

*Gage location.*—Lat  $38^{\circ}55'27''$ , long  $122^{\circ}33'53''$ , 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  $n = 0.053; 0.079$ .

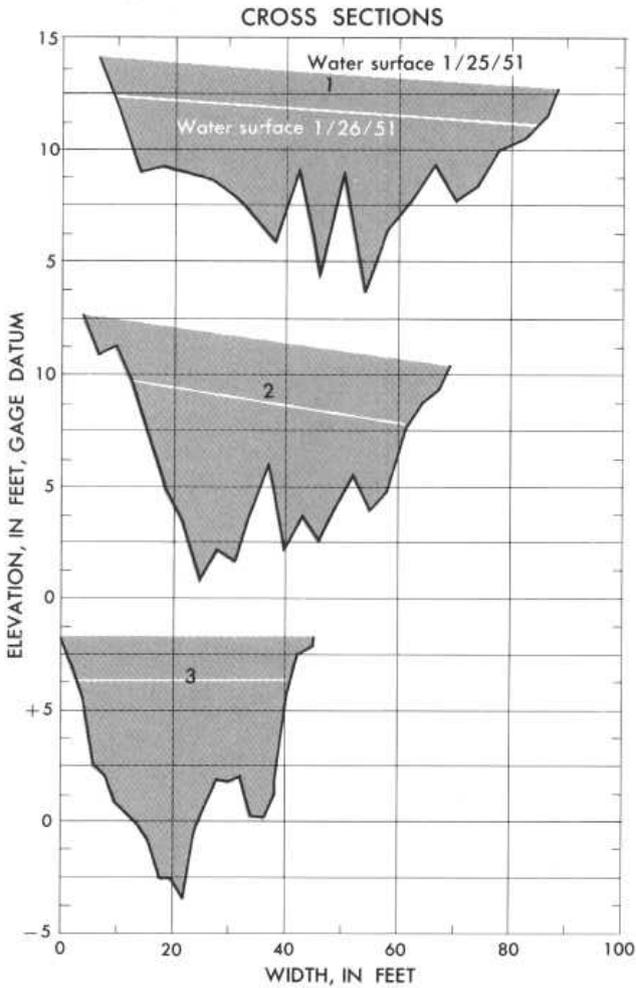
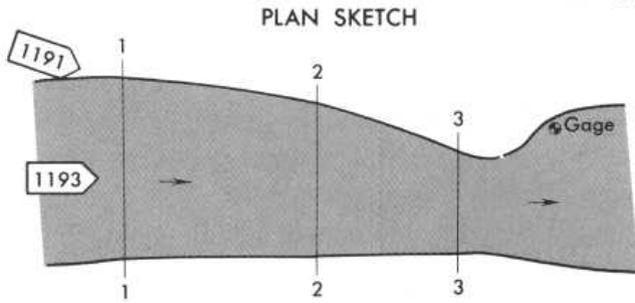
*Description of channel.*—Bed is composed of large angular boulders. Banks consist of exposed rock, boulders, and some trees.

### *Reach properties*

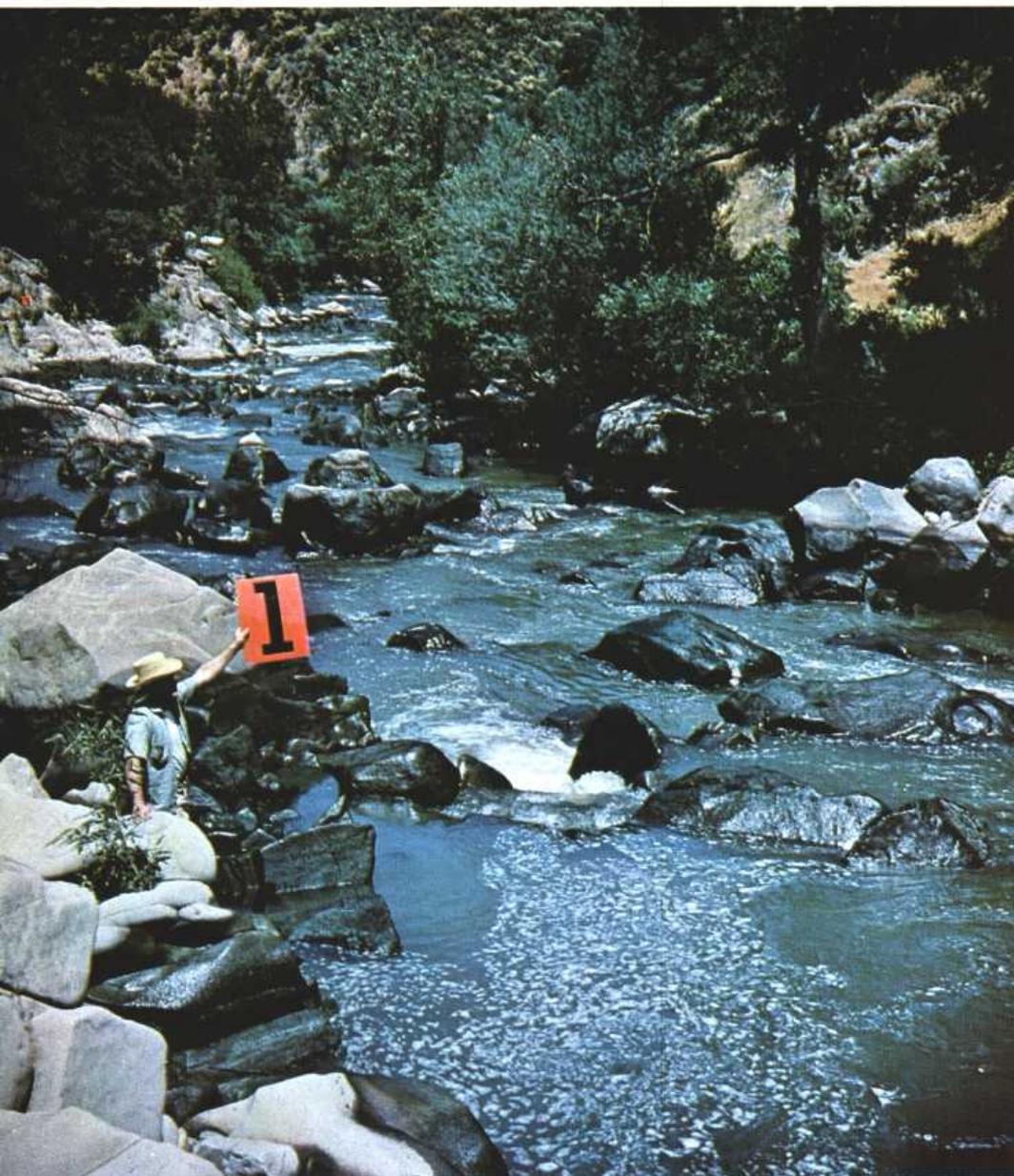
Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
<b>Jan. 25, 1951</b>							
1.....	401	81	5.0	4.27	9.59	.....	.....
2.....	384	65	5.9	5.02	10.00	102	1.80
3.....	295	45	6.6	5.27	13.02	62	3.10
<b>Jan. 24, 1951</b>							
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.—

$n = 0.053; 0.079$



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.

$n = 0.055$

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

*Gage location.*—Lat  $44^{\circ}26'20''$ , long  $73^{\circ}40'55''$ , 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  $n = 0.055$ .

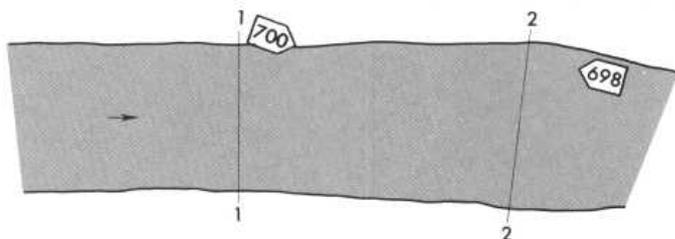
*Description of channel.*—Bed consists of gravel, rock, and boulders as much as 5 ft in diameter. Banks are lined with boulders, small trees, and bushes.

*Reach properties*

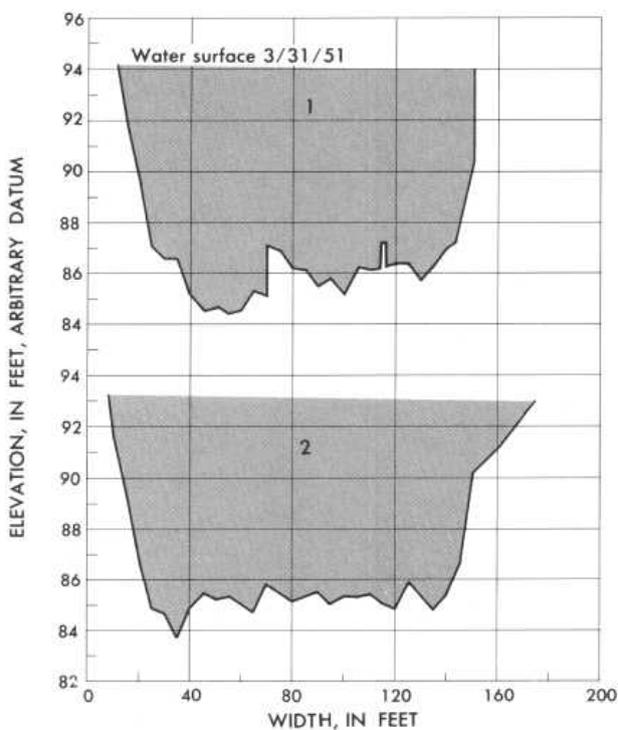
Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1 . . . . .	1,050	139	7.6	7.01	7.40	.....	.....
2 . . . . .	1,090	166	6.6	6.42	7.13	178	1.00

Notes.—

PLAN SKETCH



CROSS SECTIONS



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.

$n = 0.056$

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

*Gage location.*—Lat  $42^{\circ}15'31''$ , long  $72^{\circ}52'23''$ , 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  $n = 0.056$ .

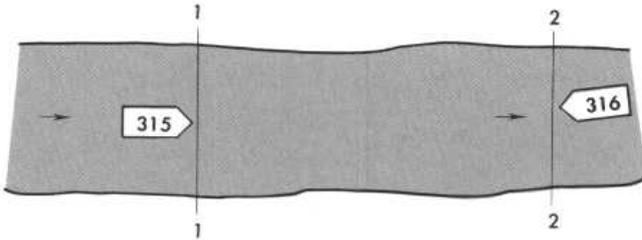
*Description of channel.*—Bed is rocks and coarse gravel with boulders as much as 5 ft in diameter.

### *Reach properties*

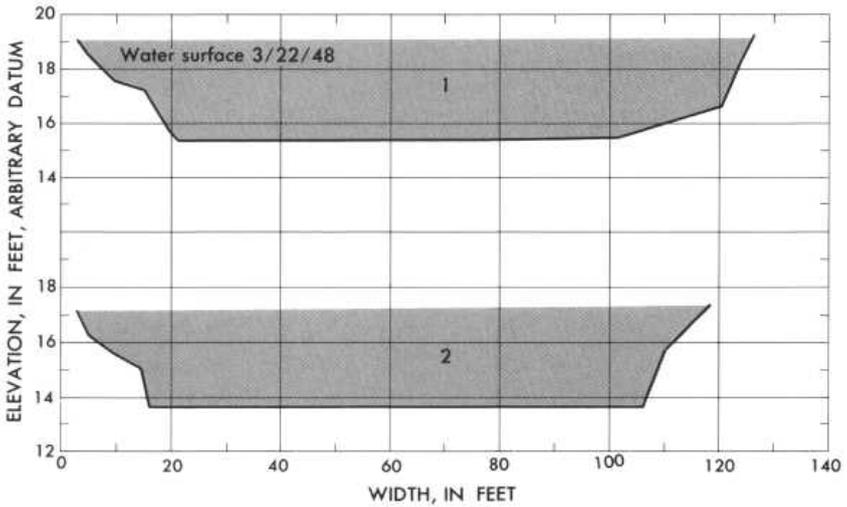
Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1.....	502	123	4.1	4.05	6.78	.....	.....
2.....	531	114	4.6	4.50	6.42	159	1.38

Notes.—

PLAN SKETCH

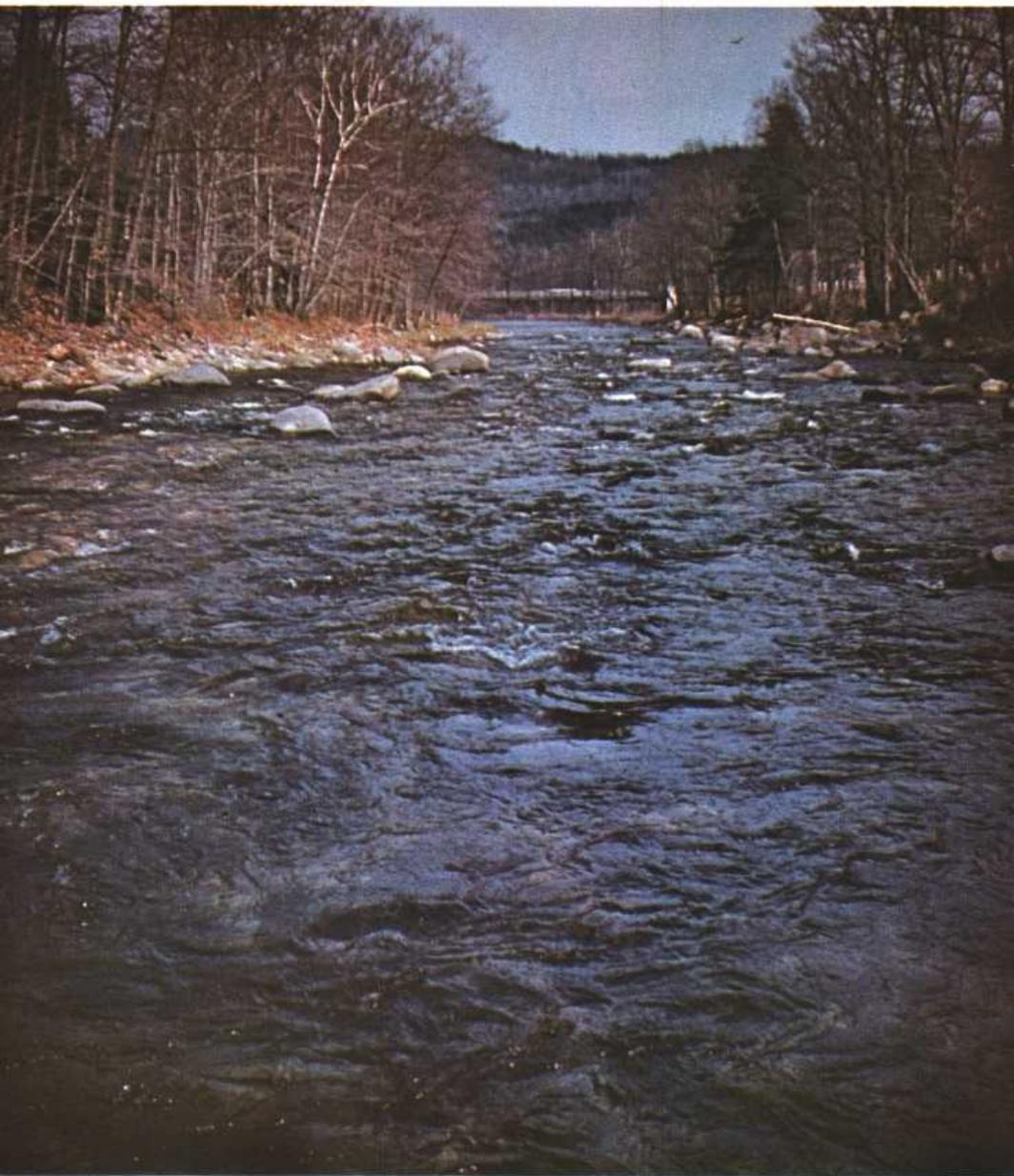


CROSS SECTIONS

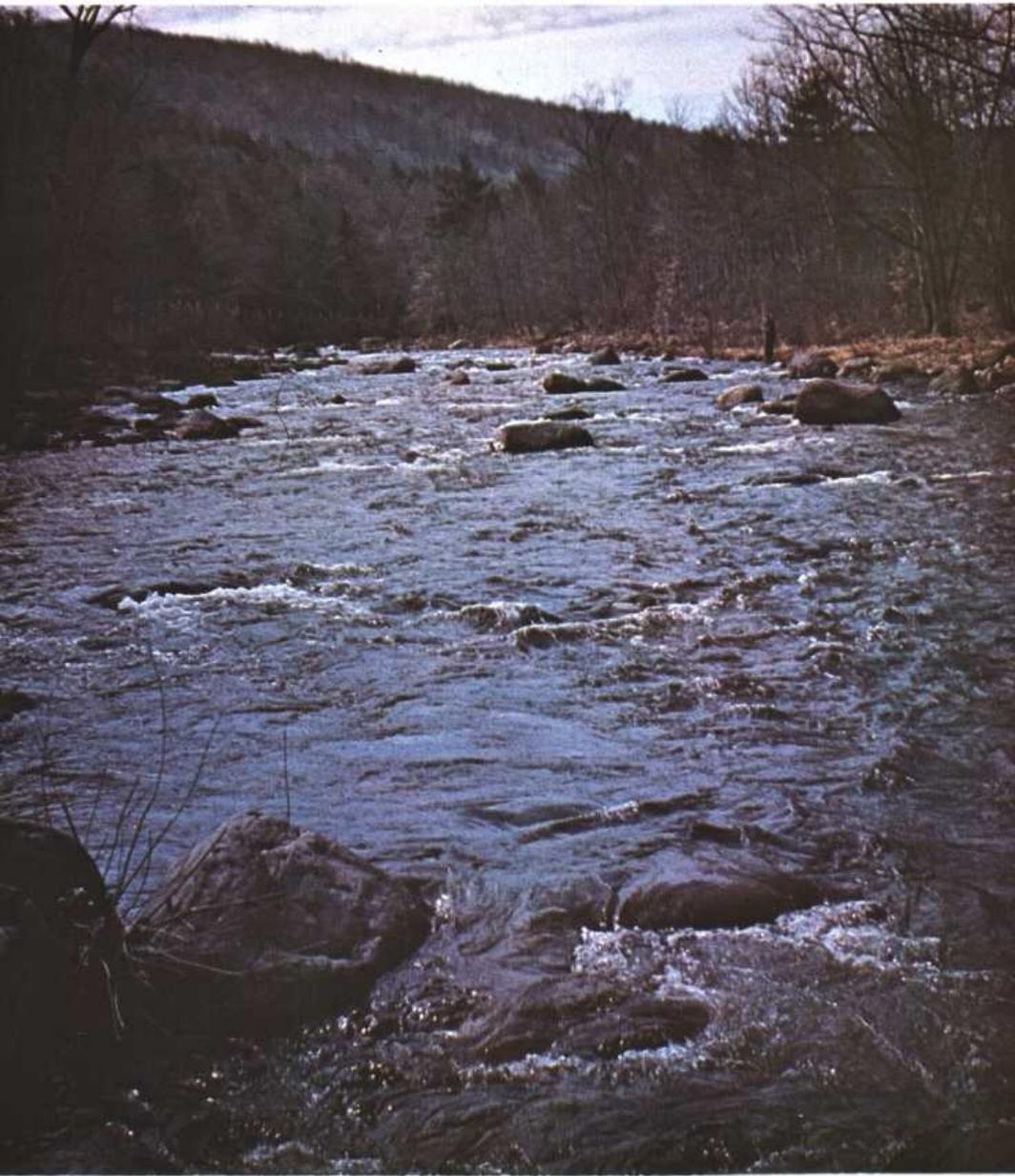


Plan sketch and cross sections, Middle Branch Westfield River at Goss Heights, Mass.

$n = 0.056$



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



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  $47^{\circ}30'15''$ , long  $120^{\circ}28'30''$ , in SE $\frac{1}{4}$ NE $\frac{1}{4}$  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.

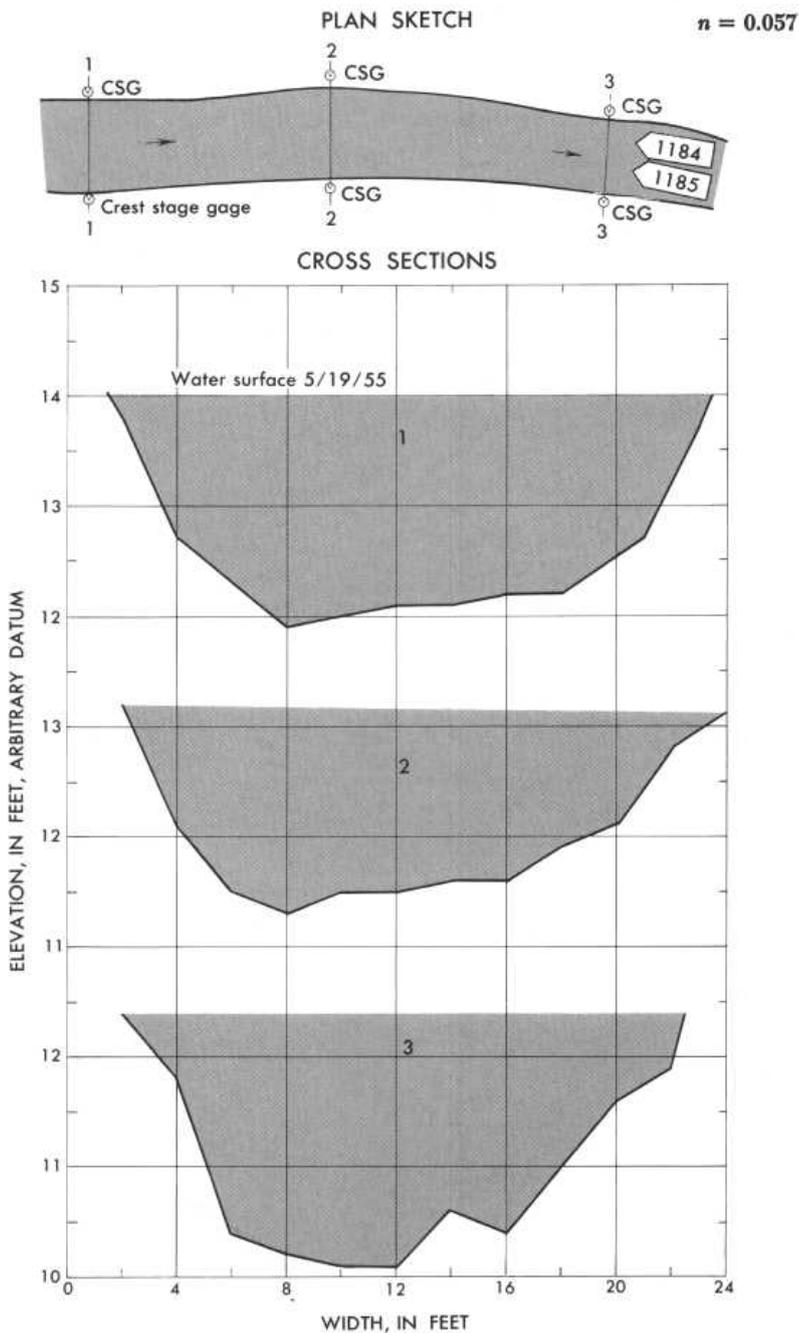
*Computed roughness coefficient.*—Manning  $n = 0.057$ .

*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.



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

$n = 0.059$

## 2-935. Haw River near Benaja, N.C.

*Gage location.*—Lat  $36^{\circ}16'$ , long  $79^{\circ}34'$ , 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  $n = 0.059$ .

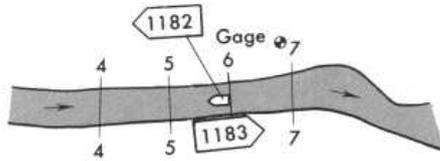
*Description of channel.*—Bed is composed of coarse sand and a few outcrops. Banks on both sides are heavily lined with overhanging birch trees.

*Reach properties*

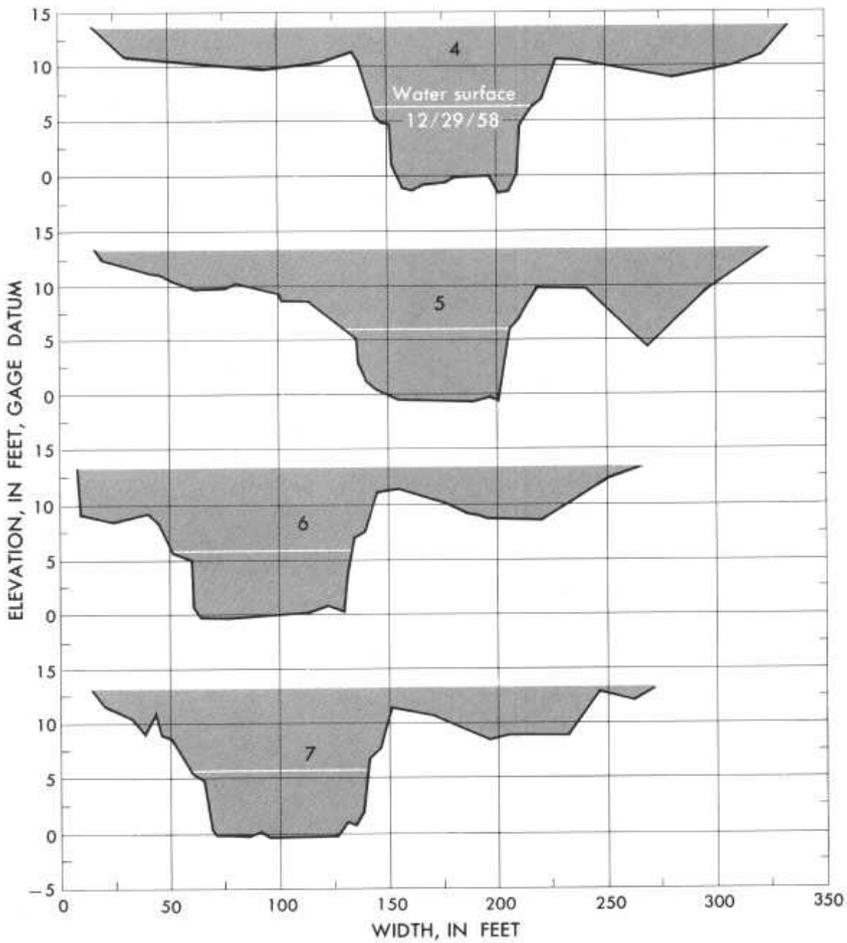
Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
4.....	403	73	5.5	4.98	2.48	.....	.....
5.....	417	73	5.7	5.22	2.40	172	0.16
6.....	400	81	4.9	4.58	2.50	115	.15
7.....	397	79	5.0	4.70	2.52	121	.16

Notes.—

## PLAN SKETCH



## CROSS SECTIONS



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.



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

$n = 0.059$

## 12-1135. North Fork Cedar River near Lester, Wash.

*Gage location.*—Lat  $47^{\circ}19'10''$ , long  $121^{\circ}30'05''$ , in SW $\frac{1}{4}$  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.

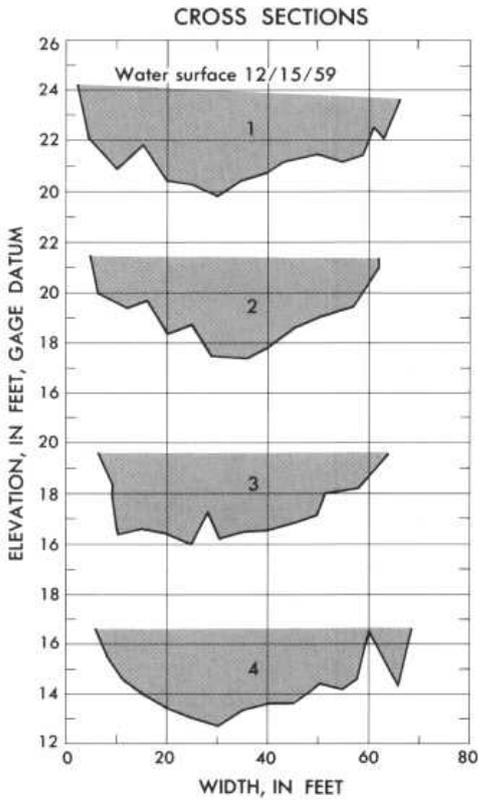
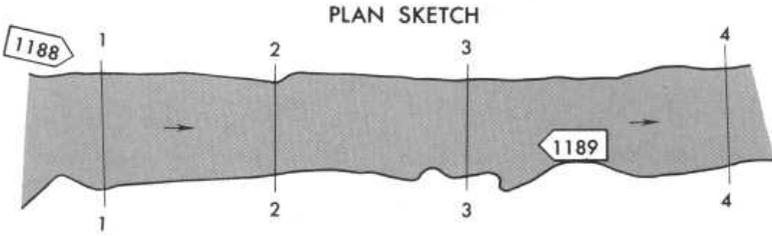
*Computed roughness coefficient.*—Manning  $n = 0.059$ .

*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.



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



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

$n = 0.060$

### 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.

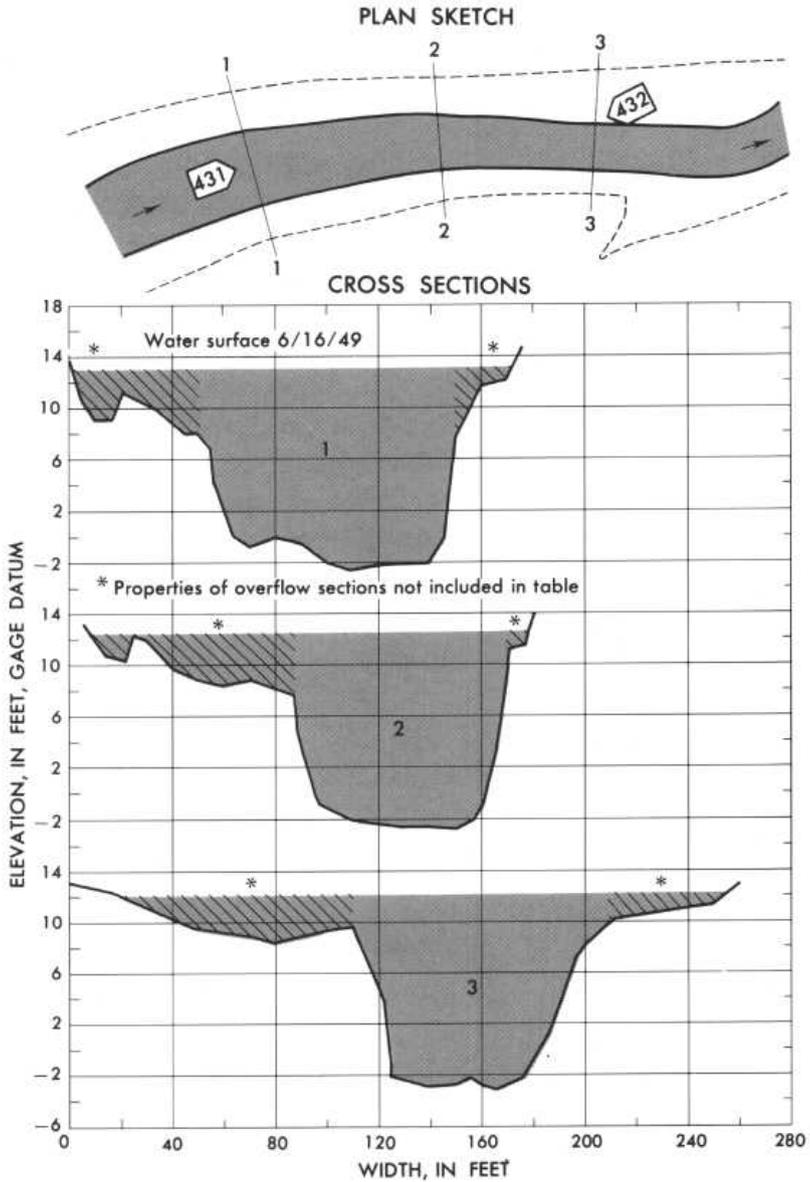
*Computed roughness coefficient.*—Manning  $n = 0.060$ .

*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.



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

$n = 0.060$

### 12-3455. Rock Creek Canal near Darby, Mont.

*Gage location.*—Lat  $46^{\circ}04'40''$ , long  $114^{\circ}12'40''$ , in SW $\frac{1}{4}$  sec. 28, T. 4 N., R. 21 W., on downstream side of footbridge, 0.25 mile downstream from diversion dam, 1.5 miles downstream from Como Lake, and 4 miles northwest of Darby. Section 1 is about 0.25 mile upstream from gage.

*Date of flood.*—Sept. 23, 1948.

*Gage height.*—3.34 ft at gage; 15.33 ft at section 1.

*Peak discharge.*—138 cfs.

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

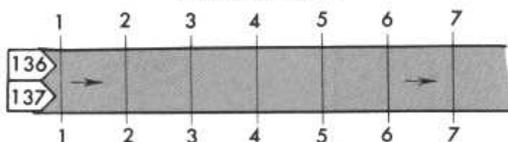
*Description of channel.*—Bed and bank consist of boulders;  $d_{50} = 210$  mm,  $d_{84} = 375$  mm.

#### *Reach properties*

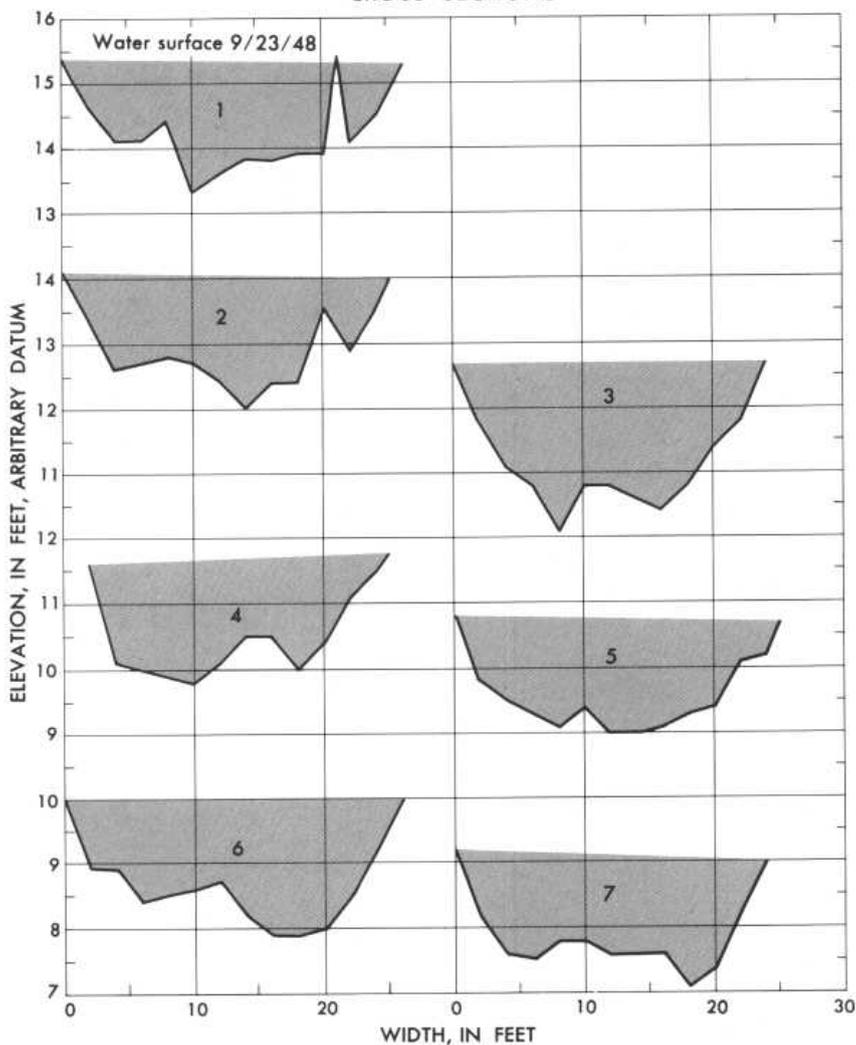
Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1.....	30	26	1.15	1.07	4.60	.....	.....
2.....	31	25	1.24	1.19	4.45	45	1.25
3.....	39	24	1.62	1.56	3.54	50	1.36
4.....	30	25	1.20	1.25	4.60	50	1.02
5.....	32	25	1.28	1.28	4.31	50	.93
6.....	37	26	1.42	1.37	3.73	50	.78
7.....	32	24	1.33	1.28	4.31	50	.85

Notes.—

PLAN SKETCH



CROSS SECTIONS

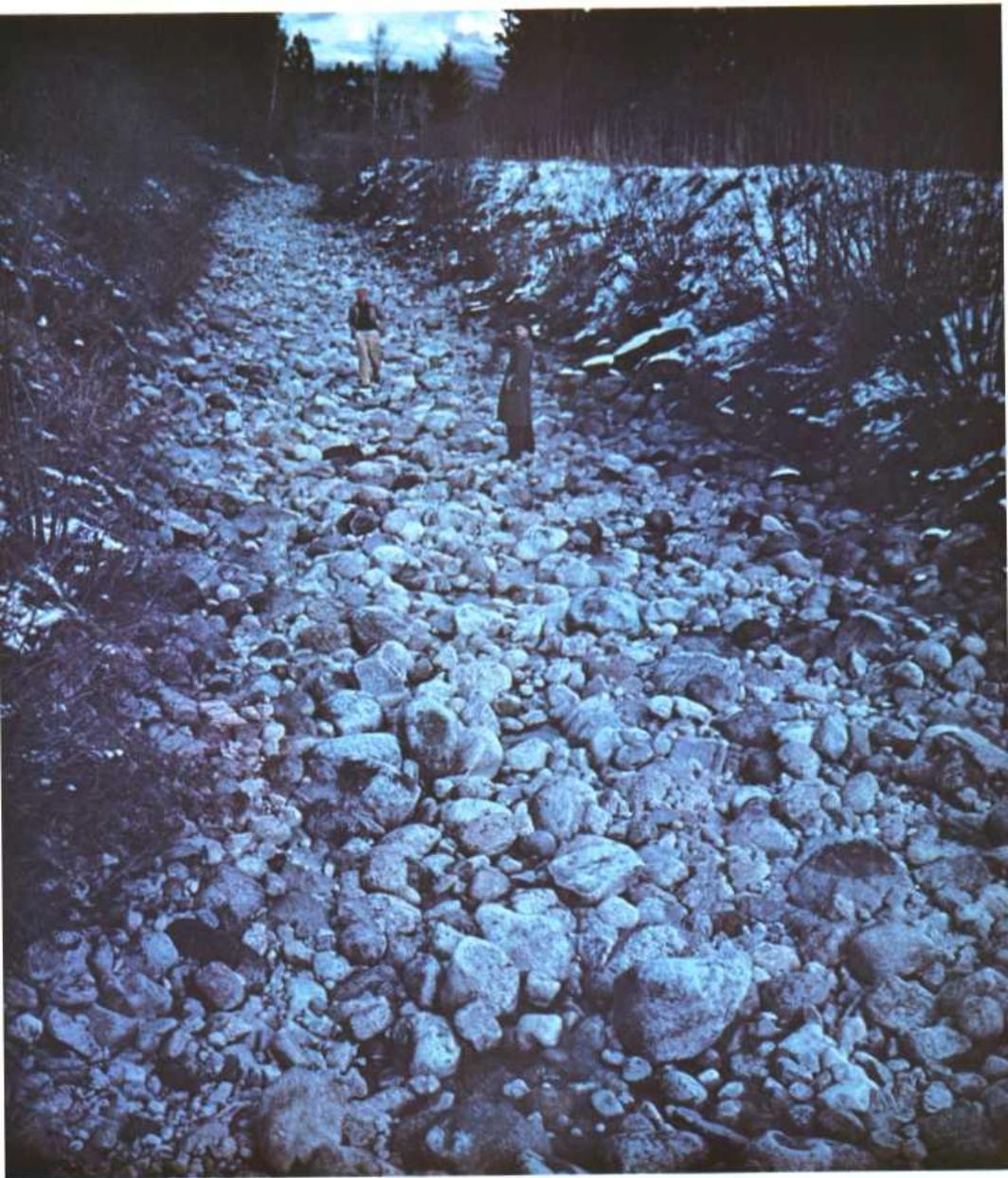


Plan sketch and cross sections, Rock Creek Canal near Darby, Mont.

$n = 0.060$



No. 136 downstream from above section 1,  
Rock Creek Canal near Darby, Mont.



No. 137 downstream from above section 1,  
Rock Creek Canal near Darby, Mont.

$n = 0.065$

## 11-2645. Merced River at Happy Isles Bridge, near Yosemite, Calif.

*Gage location.*—Lat  $37^{\circ}43'54''$ , long  $119^{\circ}33'28''$ , on right bank 10 ft downstream from Happy Isles Bridge, 0.4 mile downstream from Illilouette Creek, and 2 miles southeast of Yosemite National Park Headquarters, Mariposa County.

Section 1 is about 1,000 ft downstream from gage.

*Drainage area.*—181 sq mi.

*Date of flood.*—May 17, 1950.

*Gage height.*—6.06 ft at gage; 97.40 ft (different datum) at section 1.

*Peak discharge.*—1,950 cfs.

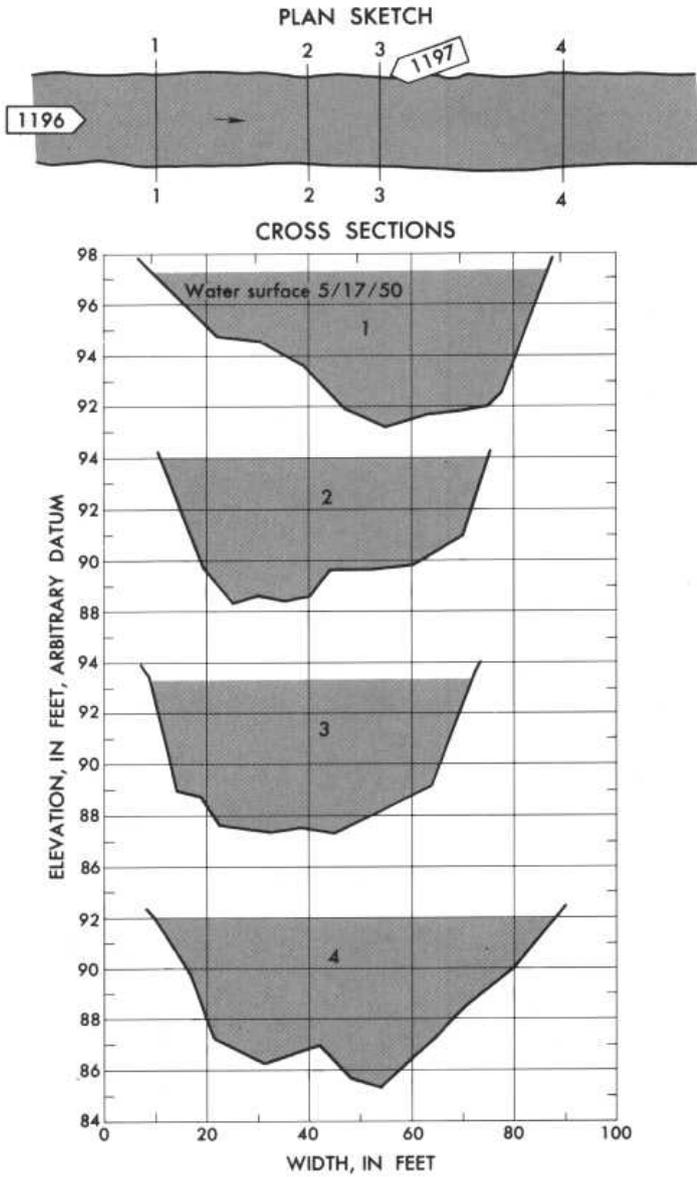
*Computed roughness coefficient.*—Manning  $n = 0.065$ .

*Description of channel.*—Fairly straight channel is composed of boulders with trees along top of banks;  $d_{50} = 253$  mm,  $d_{84} = 550$  mm.

*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 . . . . .	308	78	4.0	3.90	6.33	.....	.....
2 . . . . .	263	64	4.1	3.98	7.41	200	3.40
3 . . . . .	309	63	4.9	4.68	6.31	40	.50
4 . . . . .	327	78	4.2	4.09	5.96	180	1.55

Notes.—



Plan sketch and cross sections, Merced River at Happy Isles Bridge, near Yosemite, Calif.



No. 1196 downstream from above section 1, Merced River  
at Happy Isles Bridge, near Yosemite, Calif.



No. 1197 upstream from right bank at section 3, Merced River  
at Happy Isles Bridge, near Yosemite, Calif.

$n = 0.070$

### 3-3020. Pond Creek near Louisville, Ky.

*Gage location.*—Lat  $38^{\circ}07'11''$ , long  $85^{\circ}47'45''$ , on downstream side of bridge on Manslick Road, 0.4 mile south of Third Street Road, 0.6 mile downstream from Bee Lick Creek, and 2.4 miles south of Louisville City Limits, Jefferson County. Section 1 is about 550 ft upstream from gage.

*Drainage area.*—64.0 sq mi.

*Date of flood.*—Feb. 14, 1950.

*Gage height.*—15.00 ft at gage; 15.1 ft at section 1.

*Peak discharge.*—1,480 cfs.

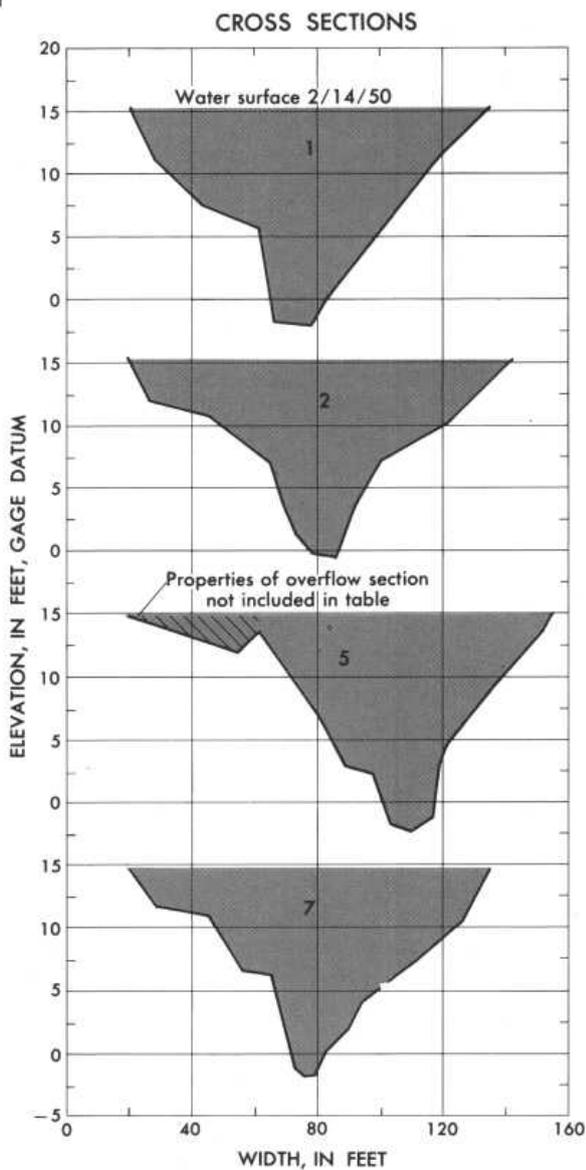
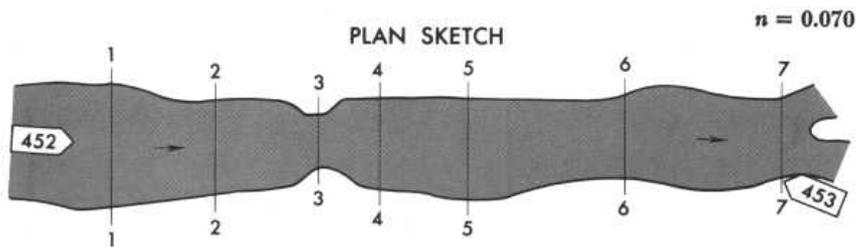
*Computed roughness coefficient.*—Manning  $n = 0.070$ .

*Description of channel.*—Bed is fine sand and silt. Banks are irregular with fairly heavy growth of 2- to 8-inch trees on the banks above low water, particularly on the left bank. Reach sections 1, 2, 5, 6, 7 used to determine roughness coefficient. Bridge abutments form constriction at section 3.

*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 . . . . .	888	115	7.7	7.10	1.67	.....	.....
2 . . . . .	830	122	6.8	6.48	1.78	90	0.05
3 . . . . .	591	52	11.4	8.23	2.50	95	.10
4 . . . . .	837	116	7.2	6.80	1.77	45	.02
5 . . . . .	818	94	8.7	8.06	1.81	79	.05
6 . . . . .	791	107	7.4	7.00	1.87	156	.10
7 . . . . .	854	115	7.4	7.00	1.73	147	.07

Notes.—



Plan sketch and cross sections, Pond Creek near  
Louisville, Ky.



No. 452 downstream from above section 1,  
Pond Creek near Louisville, Ky.



No. 453 upstream from right bank at section 7,  
Pond Creek near Louisville, Ky.

$n = 0.073$

### 12-3215. Boundary Creek near Porthill, Idaho

*Gage location.*—Lat 48°59'50", long 116°34'05", in SW $\frac{1}{4}$  sec. 11, T. 65 N., R. 2 W., on left bank near mouth of canyon, 0.2 mile south of international boundary, and 3 miles west of Porthill. Section 1 is 413 ft upstream from gage.

*Drainage area.*—97 sq mi, approximately.

*Date of flood.*—May 28, 1948.

*Gage height.*—5.34 ft at gage; 13.60 ft at section 1.

*Peak discharge.*—2,530 cfs.

*Computed roughness coefficient.*—Manning  $n = 0.073$ .

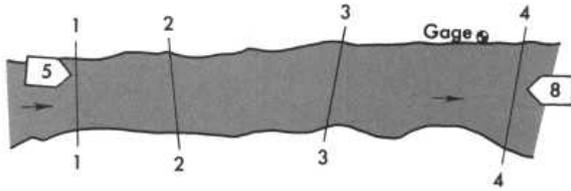
*Description of channel.*—Bed consists of boulders;  $d_{50} = 210$  mm,  $d_{84} = 375$  mm. Banks are composed of boulders and have trees and brush along top.

*Reach properties*

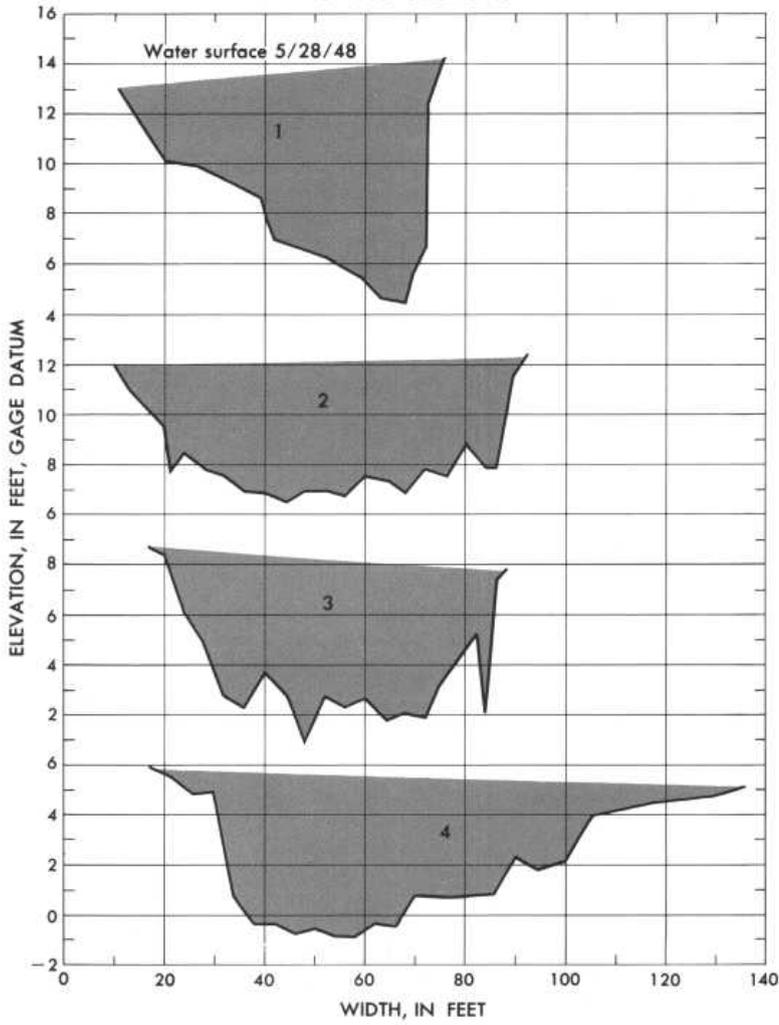
Section	Area (sq ft)	Top width (ft)	Mean depth (ft)	Hydraulic radius (ft)	Mean velocity (ft per sec)	Length (ft) between sections	Fall (ft) between sections
1 . . . . .	351	64	5.48	4.87	7.21	.....	.....
2 . . . . .	338	82	4.12	3.93	7.49	94	1.45
3 . . . . .	327	71	4.61	4.09	7.74	163	3.95
4 . . . . .	400	118	3.39	3.30	6.32	177	2.70

Notes.—

PLAN SKETCH



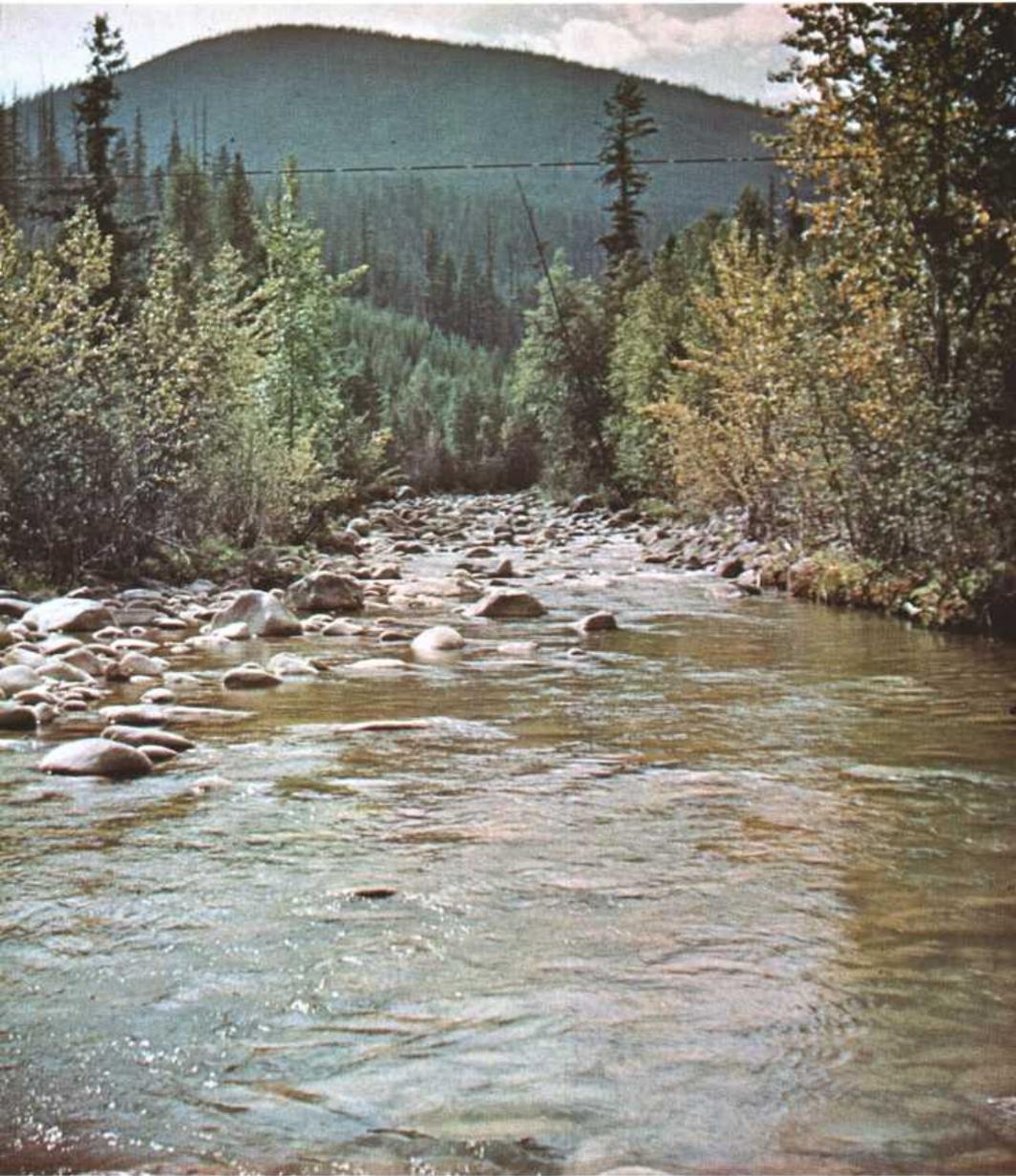
CROSS SECTIONS



Plan sketch and cross sections, Boundary Creek near Porthill, Idaho.



No. 5 downstream from left bank above section 1,  
Boundary Creek near Porthill, Idaho.



No. 8 upstream from below section 4,  
Boundary Creek near Porthill, Idaho.

$n = 0.075$

## 12-3450. Rock Creek near Darby, Mont.

*Gage location.*—Lat  $46^{\circ}04'10''$ , long  $114^{\circ}13'20''$ , in  $SE\frac{1}{4}SE\frac{1}{4}$  sec. 29, T. 4 N., R. 21 W., on left bank 0.6 mile downstream from Como Lake, 0.7 mile upstream from Rock Creek Canal, and 4 miles northwest of Darby. Section 1 is about 0.25 mile upstream from gage.

*Drainage area.*—55.4 sq mi.

*Date of flood.*—May 27, 1948.

*Gage height.*—5.78 ft at gage; 23.85 ft at section 1.

*Peak discharge.*—1,500 cfs.

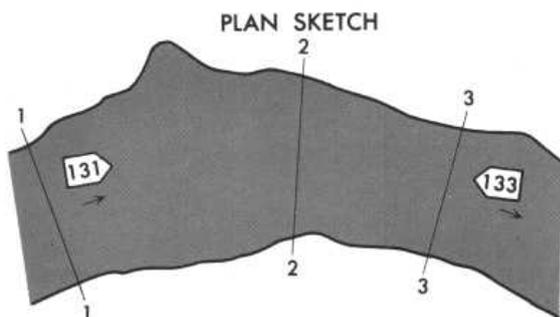
*Computed roughness coefficient.*—Manning  $n = 0.075$ .

*Description of channel.*—Bed consists of boulders;  $d_{50} = 220$  mm,  $d_{84} = 415$  mm. Banks are composed of boulders and have trees and brush.

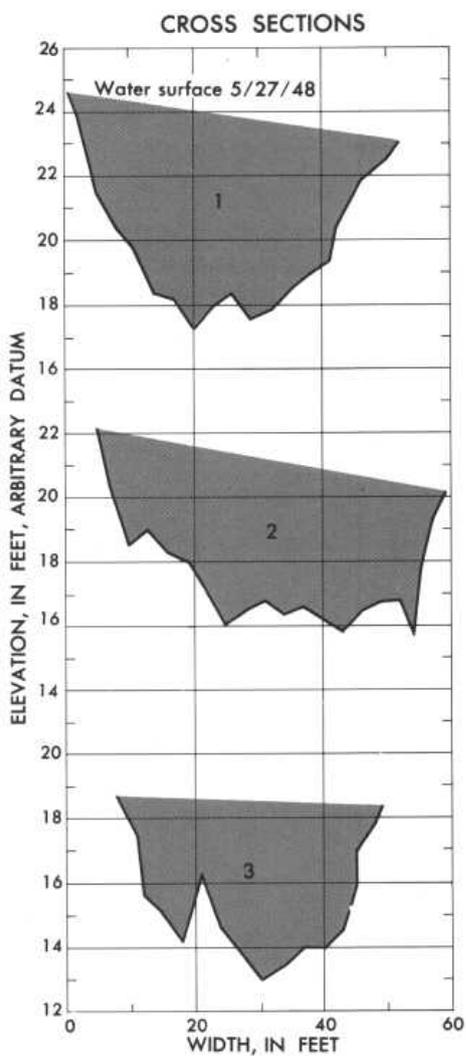
### *Reach properties*

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.....	214	51	4.20	3.96	7.01	.....	.....
2.....	203	54	3.76	3.50	7.39	79	2.65
3.....	134	43	3.12	2.91	11.19	47	2.45

Notes.—



$n = 0.075$



Plan sketch and cross sections, Rock Creek near Darby, Mont.

$n = 0.075$



No. 131 downstream from above section 2,  
Rock Creek near Darby, Mont.



No. 133, upstream from below section 3,  
Rock Creek near Darby, Mont.

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