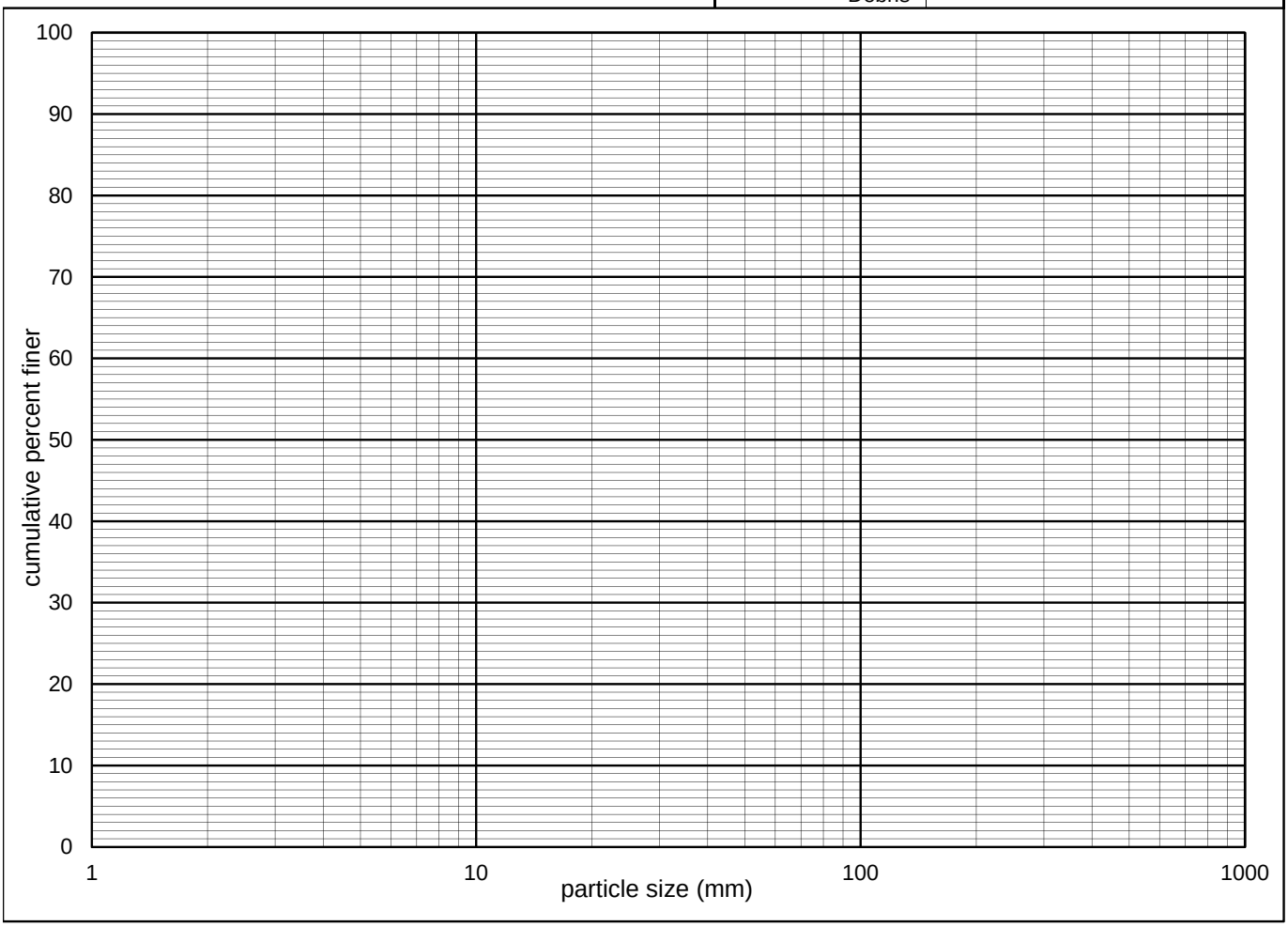
G3. Schafer Tributary pebble count data, XS10 site location.

particle size interval name	size interval (mm)	count or frequency	percent frequency	cumulative percent finer
medium boulders	512 to 724		0	100
	362 to 512	4	6	94
small boulders	256 to 362		0	94
	181 to 256	5	8	86
large cobbles	128 to 181	13	20	67
	90.5 to 128	11	17	50
small cobbles	64.0 to 90.5	15	23	27
	45.2 to 64.0	7	11	17
very coarse gravel	32.0 to 45.2	5	8	9
	22.6 to 32.0	1	2	8
coarse gravel	16.0 to 22.6	1	2	6
	11.3 to 16.0	2	3	3
medium gravel	8.0 to 11.3	1	2	2
	5.7 to 8.0		0	2
fine gravel	4.0 to 5.7		0	2
	2.8 to 4.0	1	2	0
very fine gravel	2.0 to 2.8		0	0
sand, silt, or clay	< 2		0	0
	Total count	66	100	

Project Name:	Schafer Tributary
Sample ID:	PC (XS10 channel, 8-22-03)
Sample Date:	8/22/2003
Sampler Name:	Cenderelli
Sample Locaton:	Riffle head, us from XS10
Sample Method:	grid method, 20 cm interval, 1 m spacing between transects, perpendicular to flow, bankfull.

percentile	particle size (mm)
d95	
d84	
d50	
d16	
d5	

Sample site descriptions by observation	
Channel type	
D100 (inches)	
Colluvium	
Debris	



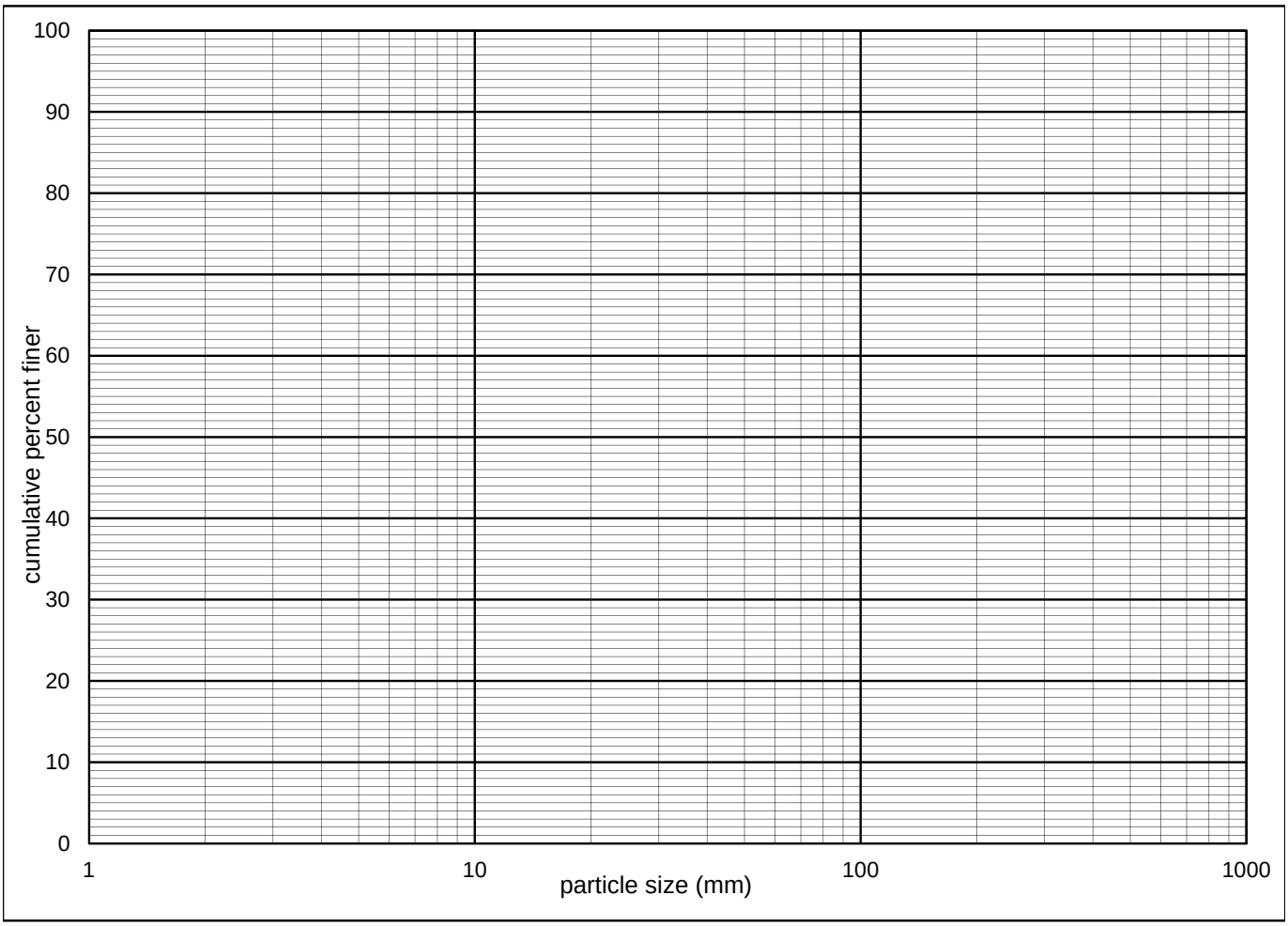
G5. Schafer Tributary pebble count data, XS11 site location.

particle size interval name	size interval (mm)	count or frequency	percent frequency	cumulative percent finer
medium boulders	512 to 724		0	100
	362 to 512		0	100
small boulders	256 to 362	1	2	98
	181 to 256	3	5	93
large cobbles	128 to 181	16	26	67
	90.5 to 128	12	20	48
small cobbles	64.0 to 90.5	11	18	30
	45.2 to 64.0	7	11	18
very coarse gravel	32.0 to 45.2	6	10	8
	22.6 to 32.0	2	3	5
coarse gravel	16.0 to 22.6		0	5
	11.3 to 16.0	2	3	2
medium gravel	8.0 to 11.3		0	2
	5.7 to 8.0		0	2
fine gravel	4.0 to 5.7		0	2
	2.8 to 4.0		0	2
very fine gravel	2.0 to 2.8		0	2
sand, silt, or clay	< 2	1	2	0
	Total count	61	100	

Project Name:	Schafer Tributary
Sample ID:	PC (XS11 channel, 8-22-03)
Sample Date:	8/22/2003
Sampler Name:	Cenderelli
Sample Locaton:	Riffle at XS11
Sample Method:	grid method, 20 cm interval, 1 m spacing between transects, perpendicular to flow, bankfull.

percentile	particle size (mm)
d95	
d84	
d50	
d16	
d5	

Channel type	
D100 (inches)	
Colluvium	
Debris	



Trib to Schafer Creek
Hydrology

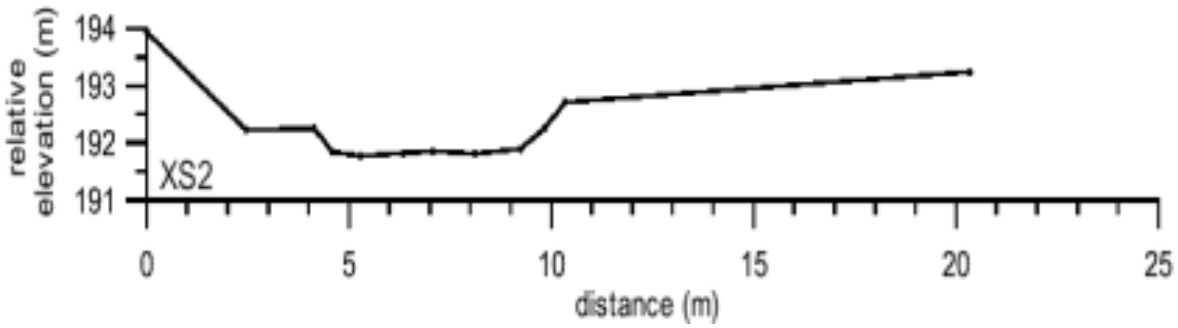
Hydrology
Using Washington State Magnitude and Frequency of Floods, USGS

$Q = aA^b P^c$

Q = flow (cfs)
A = basin area (sq miles)
P = mean annual precipitation (inches)
a, b, c = regression coefficients

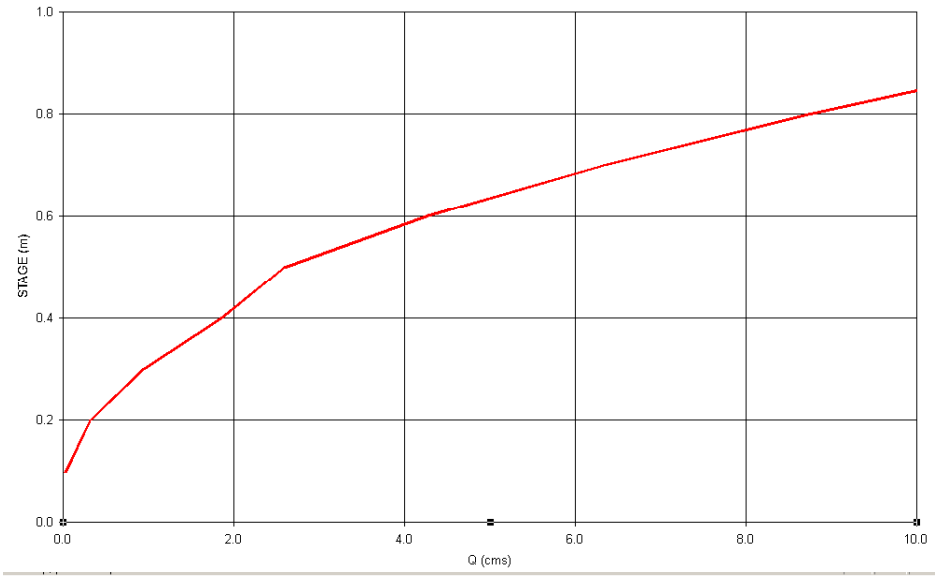
Trib to Schafer Creek
Drainage area: A = 1.16 sq miles
Mean annual precip: P = 130 inches

Recurrence interval	a	b	c	**Q (cms)**	Std Error (%)
2	0.350	0.923	1.240	**4.22**	32
10	0.520	0.921	1.260	**6.66**	33
25	0.590	0.921	1.260	**7.83**	34
50	0.666	0.921	1.260	**8.84**	36
100	0.745	0.922	1.260	**9.89**	37

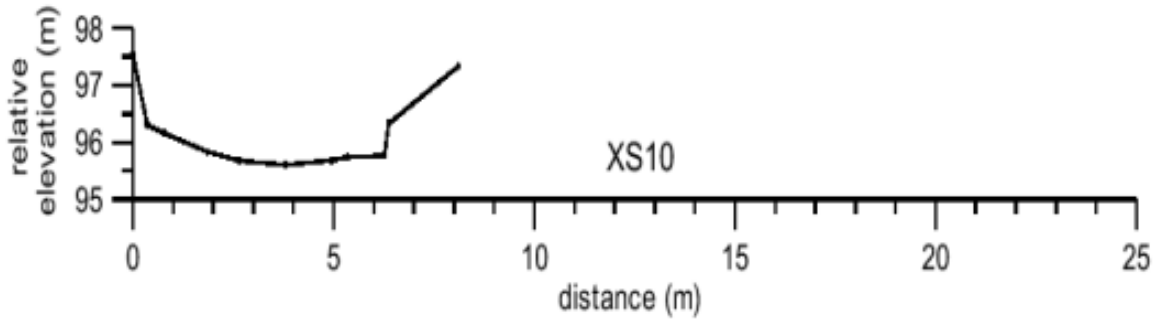


Sta	Elev
0.0	193.9
2.5	192.2
4.1	192.3
4.6	191.8
5.3	191.8
6.3	191.8
7.1	191.9
8.1	191.8
9.2	191.9
9.8	192.3
10.3	192.7
20.3	193.2

X-Section 2
Win XSPro results

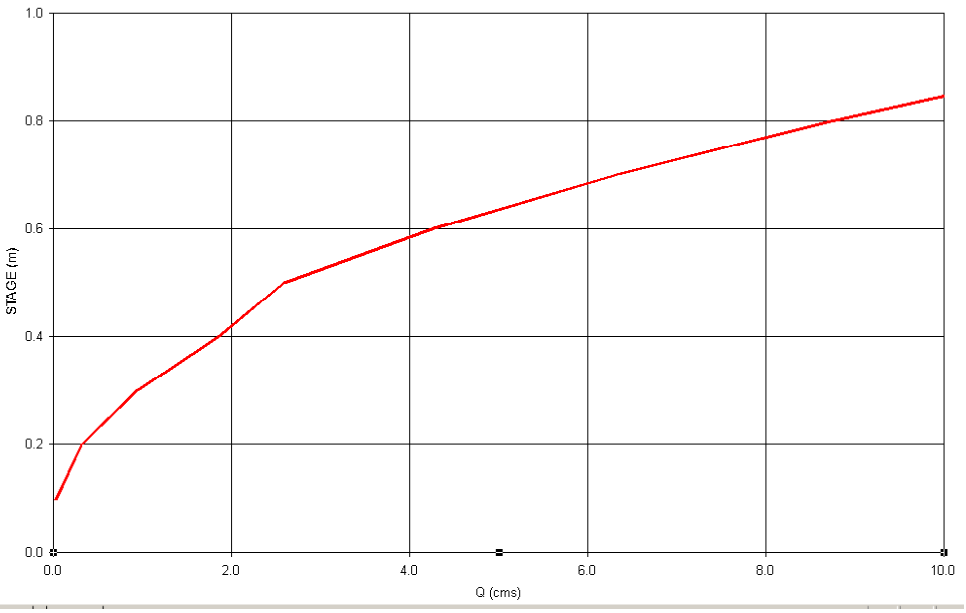


STAGE (m)	AREA (sq m)	PERIM (m)	WIDTH (m)	R (m)	DHYD (m)	SLOPE (m/m)	n	VAVG (m/s)	Q (cms)	SHEAR (N/sq m)	FROUDE
0.10	0.20	4.31	4.29	0.05	0.05	0.015	0.102	0.15	0.03	6.69	0.23
0.20	0.67	4.98	4.90	0.13	0.14	0.015	0.070	0.46	0.31	19.72	0.40
0.30	1.17	5.32	5.17	0.22	0.23	0.015	0.056	0.80	0.94	32.38	0.54
0.40	1.70	5.66	5.45	0.30	0.31	0.015	0.051	1.09	1.85	44.22	0.62
0.50	2.31	7.74	7.45	0.30	0.31	0.015	0.049	1.12	2.59	43.93	0.64
0.60	3.07	8.06	7.70	0.38	0.40	0.015	0.046	1.39	4.27	55.99	0.70
0.70	3.85	8.38	7.95	0.46	0.48	0.015	0.045	1.64	6.33	67.56	0.75
0.80	4.66	8.70	8.20	0.54	0.57	0.015	0.043	1.87	8.73	78.70	0.79
0.90	5.49	9.03	8.45	0.61	0.65	0.015	0.042	2.09	11.47	89.46	0.83
1.00	6.38	10.32	9.70	0.62	0.66	0.015	0.042	2.14	13.63	90.85	0.84
1.10	7.45	12.38	11.72	0.60	0.64	0.015	0.041	2.12	15.77	88.47	0.85
1.20	8.72	14.44	13.74	0.60	0.63	0.015	0.041	2.14	18.69	88.82	0.86
1.30	10.20	16.49	15.77	0.62	0.65	0.015	0.041	2.20	22.41	90.89	0.87
1.40	11.87	18.5	17.79	0.64	0.67	0.015	0.040	2.27	26.98	94.11	0.89
1.50	13.75	20.14	19.34	0.68	0.71	0.015	0.040	2.40	32.96	100.38	0.91



Sta	Elev
0.000	97.540
0.360	96.300
0.780	96.158
1.864	95.837
2.663	95.682
3.802	95.606
4.943	95.687
5.347	95.742
6.264	95.768
6.373	96.331
8.108	97.335

X-Section 10
Win XSPro results



STAGE (m)	AREA (sq m)	PERIM (m)	WIDTH (m)	R (m)	SLOPE (m/m)	n	VAVG (m/s)	Q (cms)	SHEAR (N/sq m)	FROUDE
0.10	0.14	2.53	2.52	0.06	0.015	0.155	0.12	0.02	8.14	0.16
0.20	0.49	4.27	4.22	0.11	0.015	0.103	0.28	0.14	16.75	0.26
0.30	0.93	4.77	4.62	0.19	0.015	0.066	0.63	0.59	28.65	0.45
0.40	1.41	5.22	4.98	0.27	0.015	0.072	0.71	1.00	39.69	0.43
0.50	1.93	5.68	5.33	0.34	0.015	0.065	0.92	1.77	49.89	0.49
0.60	2.48	6.11	5.67	0.41	0.015	0.060	1.11	2.75	59.61	0.54
0.70	3.06	6.51	5.96	0.47	0.015	0.057	1.29	3.96	69.10	0.58
0.80	3.66	6.79	6.13	0.54	0.015	0.055	1.48	5.42	79.34	0.61
0.90	4.28	7.09	6.33	0.60	0.015	0.053	1.65	7.07	88.86	0.64
1.00	4.93	7.39	6.53	0.67	0.015	0.052	1.81	8.92	98.01	0.67
1.10	5.59	7.69	6.73	0.73	0.015	0.051	1.96	10.96	106.82	0.69
1.20	6.27	8.00	6.93	0.78	0.015	0.050	2.10	13.19	115.33	0.71
1.30	6.98	8.30	7.13	0.84	0.015	0.049	2.24	15.62	123.58	0.72
1.40	7.70	8.60	7.33	0.89	0.015	0.048	2.37	18.24	131.58	0.74
1.50	8.44	8.90	7.53	0.95	0.015	0.048	2.49	21.05	139.37	0.75

Stream Simulation bed by Bathurst critical unit discharge

Reference channel

$$Q_{c84} = \left[\frac{0.15 g^{0.5} D_{50}^{1.5}}{S^{1.12}} \left(\frac{D_{84}}{D_{50}} \right)^{b} \right] w + Q_{FP}$$

$$b = 1.5 \left[\frac{D_{16}}{D_{84}} \right]$$

Given

D95		mm	
D84		mm	
D50		mm	
D16		mm	
S		%	
w		m active channel width	
Qfp	0	cms active floodplain flow	
g	9.8	m/s/s	

Compare Q _____ cfs

Stream sim channel

equals

$$Q_{c84} = \left[\frac{0.15 g^{0.5} D_{50}^{1.5}}{S^{1.12}} \left(\frac{D_{84}}{D_{50}} \right)^{b} \right] w + Q_{FP}$$

$$b = 1.5 \left[\frac{D_{16}}{D_{84}} \right]$$

	Initial est		Multiplier	Resulting	
D95		mm	1.00	0	mm
D84		mm		0	mm
D50		mm		0	mm
D16		mm		0	mm
S		%			
w		m active channel width			
Qfp	0	cms active floodplain flow			
g	9.8	m/s/s			

_____ cms

D = particle median diameter
S = energy slope
w = active channel width
Qfp = floodplain flow

- Assumes D84 mobility equal in both channels
- Change variables to make total flow equal in both channels

CAUTION: Review Corps and Maynard references for limitations of source data