Sharman's Branch 4/28/09

Team 1

Field Day 1 Presentation Order: Reference Reach

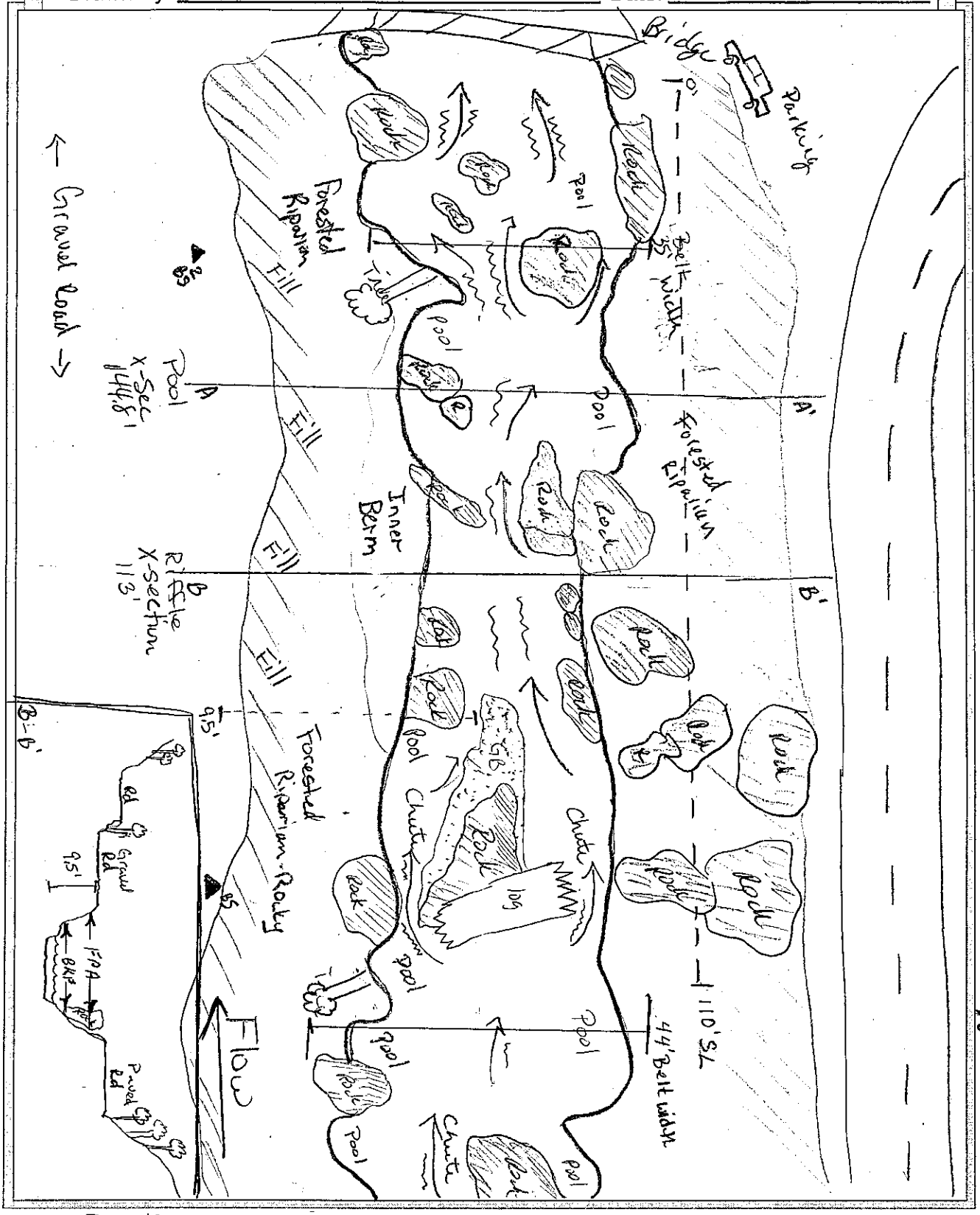
River Morphology and Applications

- Sketch Map
- Cross-sections
  - Riffle cross-section
  - Pool cross-section
- Longitudinal Profile
- Pebble Counts
  - Representative pebble count
  - Riffle pebble count
- Velocity (Worksheet A-2)
- Stream Classification (Worksheet A-1)
- Dimensionless Ratios (Worksheet A-3)

AREA-SITE LOCATION....REACH MAP

Stream: Sharman's Branch Reach: 1- Team 1

Drawn By: EG Date: 4-28-09



Copyright © 2009 Wildland Hydrology

Worksheet A-1. Field Form for Level II Stream Classification.

Stream: SHARMAN CREEK			
Basin:	Drainage Area:	acres	mi^2
Location:			
Twp. & Rge:	Sec. & Qtr.:		
Cross-Section Monuments (Lat./Long.):		Date: 28 APRIL 09	
Observers: CHRIS, JOE, LOREN – TEAM 1		Valley Type:	

Bankfull WIDTH (W_{bkf}) WIDTH of the stream channel at bankfull stage elevation, in a riffle section.	25.53	ft
Bankfull DEPTH (d_{bkf}) Mean DEPTH of the stream channel cross-section, at bankfull stage elevation, in a riffle section ($d_{bkf} = A / W_{bkf}$).	1.88	ft
Bankfull X-Section AREA (A_{bkf}) AREA of the stream channel cross-section, at bankfull stage elevation, in a riffle section.	48	ft^2
✓ **Width/Depth Ratio (W_{bkf} / d_{bkf})** 25.53/1.88 = Bankfull WIDTH divided by bankfull mean DEPTH, in a riffle section.	13.6	ft/ft
Maximum DEPTH (d_{max}) Maximum depth of the bankfull channel cross-section, or distance between the bankfull stage and Thalweg elevations, in a riffle section.	3.2	ft
d_{max} = 2 x 3.7 = 7.4 87.1 + 2.91 = **WIDTH of Flood-Prone Area (W_{fpa})** Twice maximum DEPTH, or (2 x d_{max}) = the stage/elevation at which flood-prone area WIDTH is determined in a riffle section.	42	ft
✓ **Entrenchment Ratio (ER)** 42/25.53 = The ratio of flood-prone area WIDTH divided by bankfull channel WIDTH (W_{fpa} / W_{bkf})(riffle section).	1.65	ft/ft
✓ **Channel Materials (Particle Size Index) D_{50}** The D_{50} particle size index represents the mean diameter of channel materials, as sampled from the channel surface, between the bankfull stage and Thalweg elevations.	166	mm
✓ **Water Surface SLOPE (S)** Channel slope = "rise over run" for a reach approximately 20–30 bankfull channel widths in length, with the "riffle-to-riffle" water surface slope representing the gradient at bankfull stage.	0.042	ft/ft
Channel SINUOSITY (k) Sinuosity is an index of channel pattern, determined from a ratio of stream length divided by valley length (SL / VL); or estimated from a ratio of valley slope divided by channel slope (VS / S).	STRAIGHT	

Stream Type B3 B2/1 (BASED ON DATA) **See Classification Key**

Copyright © 2009 Wildland Hydrology

HOWEVER, WE BELIEVE D_{50} IS TOO LOW. D_{50} SHOULD BE IN THE BOULDER RANGE, THEREFORE, CHANNEL IS B2/1

Worksheet A-2. Computations of velocity and discharge using various methods.

Bankfull VELOCITY / DISCHARGE Estimates

Site:	SHARMAN CREEK	Location:	TEAM 1
Date:	4/28/09	Stream Type:	
Valley Type:			
Observers:		HUC:	

INPUT VARIABLES			OUTPUT VARIABLES		
Bankfull Cross-sectional AREA	48	A_{bkf} (ft^2)	Bankfull Mean DEPTH	1.88	d_{bkf} (ft)
Bankfull WIDTH	25.52	W_{bkf} (ft)	Wetted PERIMETER ~ $2 * d_{bkf} + W_{bkf}$	29.28	W_p (ft)
D_{84} @ Riffle 2.88FT	1878	Dia. (mm)	D_{84} mm / 304.8 =	2.88	D_{84} (ft)
Bankfull SLOPE	0.042	S_{bkf} (ft / ft)	Hydraulic RADIUS A_{bkf} / W_P	1.64	R (ft)
Gravitational Acceleration	32.2	g (ft / sec^2)	Relative Roughness R (ft) / D_{84} (ft)	0.569	
Drainage AREA	3.6	DA (mi^2)	Shear Velocity $u^* = \sqrt{gRS}$	1.49	u^* (ft / sec)

ESTIMATION METHODS	Bankfull VELOCITY		Bankfull DISCHARGE	
1. Friction Factor / Relative Roughness $u = [2.83 + 5.66 \text{ Log}\{R/D_{84}\}]u^*$	2.15	ft / sec	103	cfs
2. Roughness Coefficient: a) Manning's 'n' from friction factor / relative roughness $u = 1.4865*R^{2/3}*S^{1/2}/n$ n = 0.16	2.65	ft / sec	127	cfs
2. Roughness Coefficient: $u = 1.4865* R^{2/3}*S^{1/2}/n$ b) Manning's 'n' from Jarrett (USGS): $n = 0.39S^{.38}R^{-.16}$ n = 0.108 Note: This equation is for applications involving steep, step-pool, high boundary roughness, cobble- and boulder-dominated stream systems; i.e., for stream types A1, A2, A3, B1, B2, B3, C2 and E3.	3.92	ft / sec	188	cfs
2. Roughness Coefficient: $u = 1.4865* R^{2/3}*S^{1/2}/n$ c) Manning's 'n' from Stream Type B2 n = 0.080	5.20	ft / sec	249.6	cfs
3. Other Methods (Hey, Darcy-Weisbach, Chezy C, etc.) STREAM TYPE B2 → n=0.073	5.7	ft / sec	273	cfs
3. Other Methods (Hey, Darcy-Weisbach, Chezy C, etc.)		ft / sec		cfs
4. Continuity Equations: a) Regional Curves $u = Q / A$ Return Period for Bankfull Discharge Q = ____ Year		ft / sec		cfs
4. Continuity Equations: b) USGS Gage Data $u = Q / A$		ft / sec		cfs

$R^{2/3} = 1.4$
$S^{1/2} = 0.20$

LINE THROUGH DATA
P. 244

DATA POINT
P. 244

Options for using the D_{84} term in the relative roughness relation (R/D_{84}), when using estimation method 1.

Option 1. For **sand-bed** channels: Measure the **"protrusion height"** (h_{sd}) of sand dunes above channel bed elevations. Substitute an average sand dune protrusion height (h_{sd} in ft) for the D_{84} term in estimation method 1.

Option 2. For **boulder-dominated** channels: Measure several **"protrusion heights"** (h_{bo}) of boulders above channel bed elevations. Substitute an ave. boulder protrusion height (h_{bo} in ft) for the D_{84} term in estimation method 1.

Option 3. For **bedrock-dominated** channels: Measure several **"protrusion heights"** (h_{br}) of rock separations/steps/joints/ uplifted surfaces above channel bed elevations. Substitute an average bedrock protrusion height (h_{br} in feet) for the D_{84} term in estimation method 1.

Copyright © 2009 Wildland Hydrology

Worksheet A-3. Morphological relations, including dimensionless ratios of river reach sites.

Stream: Sharmans Creek Location: Reach 1

Observers: Team 1 Date: 4-28-09 Valley Type: VI Stream Type: B2/1

River Reach Summary Data

Channel Dimension

Mean Riffle Depth (d_{bkf})	1.88	ft	Riffle Width (W_{bkf})	25.52	ft	Riffle Area (A_{bkf})	48	ft^2
Mean Pool Depth (d_{bkfp})	1.91	ft	Pool Width (W_{bkfp})	42.7	ft	Pool Area (A_{bkfp})	81.4	ft^2
Mean Pool Depth/Mean Riffle Depth	1.02	d_{bkfp}/d_{bkf}	Pool Width/Riffle Width	1.67	W_{bkfp}/W_{bkf}	Pool Area/Riffle Area	1.7	A_{bkfp}/A_{bkf}
Max Riffle Depth (d_{maxrif})	3.16	ft	Max Pool Depth (d_{maxp})	3.1	ft	Max Riffle Depth/Mean Riffle Depth	1.68	
Max Pool Depth/Mean Riffle Depth	1.7		Point Bar Slope	—	ft/ft	Inner Berm Width (W_{ib})	18.7	ft
Inner Berm Depth (d_{ib})	1.54	ft	Inner Berm Width/Depth Ratio	12.1	W_{ib}/d_{ib}	Inner Berm Area (A_{ib})	28.8	ft^2
Streamflow: Estimated Mean Velocity at Bankfull Stage (u_{bkf})	3.92	ft/s	Estimation Method	Jarrets				
Streamflow: Estimated Discharge at Bankfull Stage (Q_{bkf})	188	cfs	Drainage Area	3.6	mi^2			

Channel Pattern

Geometry	Mean	Min	Max		Dimensionless Geometry Ratios	Mean	Min	Max
Meander Wavelength (L_m)	—	—	—	ft	Meander Length Ratio (L_m/W_{bkf})	—	—	—
Radius of Curvature (R_c)	~0	~0	~0	ft	Radius of Curvature/Riffle Width (R_c/W_{bkf})	—	—	—
Belt Width (W_{blt})	39.5	35	44	ft	Meander Width Ratio (W_{blt}/W_{bkf})	1.55	1.37	1.73
Individual Pool Length	9.6	8.7	11.3	ft	Pool Length/Riffle Width (25.52)	.38	.34	.44
Pool to Pool Spacing	37.53	26.75	48.3	ft	Pool to Pool Spacing/Riffle Width	1.47	1.05	1.89
Riffle Length	16.5	8	24	ft	Riffle Length/Riffle Width	.65	.31	.9

Fixed

Riffle lengths were actually much longer than pool length.

Fixed

Channel Profile

Valley Slope (VS)	?	ft/ft	Average Water Surface Slope (S)	0.042	ft/ft	Sinuosity (VS/S)	~1	
Stream Length (SL)	110	ft	Valley Length (VL)	?	ft	Sinuosity (SL/VL)	~1	
Low Bank Height (LBH) start		ft	Max Riffle Depth start		ft	Bank-Height Ratio (BHR) (LBH/Max Riffle Depth) start		
Low Bank Height (LBH) end		ft	Max Riffle Depth end		ft	Bank-Height Ratio (BHR) (LBH/Max Riffle Depth) end		

Facet Slopes	Mean	Min	Max		Dimensionless Slope Ratios	Mean	Min	Max
~~Riffle~~ Chute Slope (S_{rif})	.08	.05	.16	ft/ft	Riffle Slope/Average Water Surface Slope (S_{rif} / S)	2.0	1.1	3.7
~~Run Slope (S_{run})~~	—	—	—	ft/ft	Run Slope/Average Water Surface Slope (S_{run} / S)	—	—	—
Pool Slope (S_p)	.024	.02	.03	ft/ft	Pool Slope/Average Water Surface Slope (S_p / S)	.57	.48	.76
~~Glide Slope (S_g)~~	—	—	—	ft/ft	Glide Slope/Average Water Surface Slope (S_g / S)	—	—	—

Too many sig digit

H_2O surface

Feature Midpoint[a]	Mean	Min	Max		Dimensionless Depth Ratios	Mean	Min	Max
Max ~~Riffle~~ Chute Depth (d_{maxrif})	2.4	2.0	3.2	ft	Max Riffle Depth/Mean Riffle Depth (d_{maxrif} / d_{bkf})	1.3	1.1	1.7
Max Run Depth (d_{maxrun})	—	—	—	ft	Max Run Depth/Mean Riffle Depth (d_{maxrun} / d_{bkf})	—	—	—
Max Pool Depth (d_{maxp})	3.5	3.1	4.0	ft	Max Pool Depth/Mean Riffle Depth (d_{maxp} / d_{bkf})	1.9	1.7	2.1
Max Glide Depth (d_{maxg})	—	—	—	ft	Max Glide Depth/Mean Riffle Depth (d_{maxg} / d_{bkf})	—	—	—

Channel Materials

	Reach[b]	Riffle[c]	Bar		Reach[b]	Riffle[c]	Bar	Protrusion Height[d]	
% Silt/Clay	0	0		D_{16}	45	52		95	mm
% Sand	0	0		D_{35}	81	90		120	mm
% Gravel	29	23		D_{50}	166	161		130	mm
% Cobble	28	36		D_{84}	877	878		320	mm
% Boulder	28	35		D_{95}	2500	2048		450	mm
% Bedrock	15	6		D_{100}	3000	300		1024	mm

[a] Min, max, mean depths are ave. mid-point values except pools: Taken at deepest part of pool.
[b] Composite sample of riffles and pools within the designated reach.
[c] Active bed of a riffle.
[d] Height of roughness feature above bed.

Copyright © 2009 Wildland Hydrology

SURVEY DATA ⟹ CROSS - SECTION 2

SITE: SHARMAN CREEK Team 1 Date: 28 APRIL 09

15.39

Item	STATION ft	BS ft	HI ft	FS ft	Elevation ft	NOTES COMMENTS REMARKS
29					100	
30	0			10.37	89.63	SLOPE (LEFT)
31	1.0			10.85	89.15	SLOPE BREAK
32	1.5			11.62	88.38	SLOPE
33	2.0			12.4	87.6	SLOPE
34	3.0			12.65	87.35	BANKFULL
35	4.0			12.90	87.1	BANKFULL 2 - OUR CALL
36	5.0			13.42	86.58	BASE OF BOULDER
37	6.0			13.65	86.35	EDGE OF SLOPE BREAK (INDIR BERM
38	6.4			14.34	85.66	SLOPE BREAK
39	7.0			14.42	85.58	ON BOULDER TOP
40	8.0			14.79	85.21	GRAVEL DEPOSIT
41	9.0			14.63	85.37	GRAVEL DEPOSIT
42	10.0			14.84	85.16	WATER SURFACE
43	11.0			15.18	84.82	EDGE OF BOULDER
44	12.0			14.58	85.42	TOP OF BOULDER
45	12.5			15.05	84.95	BASE OF BOULDER
46	14.0			15.13	84.87	IN WATER
47	15.0			15.3	84.7	IN WATER
48	17.0			15.1	84.9	"
49	18.0			15.29	84.71	"
50	19.0			15.60	84.4	
51	20.0			16.06	83.94	POSSIBLE THALWEG
52	21.0			15.5	84.5	WATER
53	22.0			15.81	84.19	"
54	23.0			15.70	84.3	"
55	24.0			15.73	84.27	"
56	24.8			13.46	86.54	ON BOULDER ABOVE WATER
57	25.0			14.98	85.02	IN WATER ADJACENT TO BOULDER
58	26.0			14.33	85.67	RIGHT BANK ON SLOPE
59	27.0			14.13	85.87	SLOPE

Copyright © 2009 Wildland Hydrology

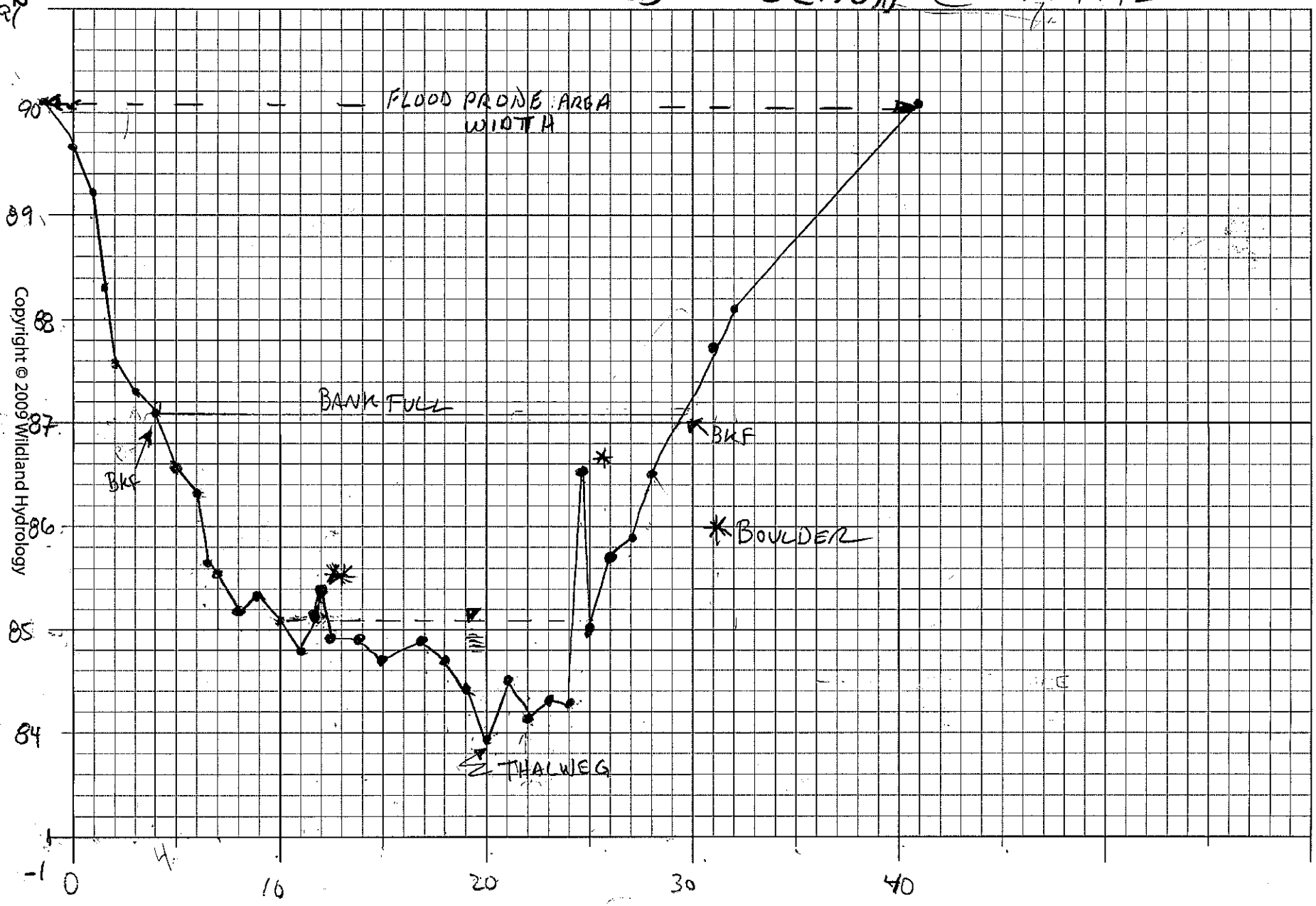
28.

13.5 86.5

TEAM 1 Sharman's Branch 4/28/09

A22

RIFFLE X-SECTION @ STN 1+12



Copyright © 2009 Wildland Hydrology

SURVEY DATA ⟹ **CROSS - SECTION 1**

SITE: SHARMAN CREEK Team 1 Date: 28 APRIL 09

Location:

Party / Notes: CHRIS, JOE, LOREN HUC:

Item	Distance, Point, or STATION ft	Back-Sight BS ft	Height of Instrument HI ft	Fore-Sight FS ft	Elevation ft	REMARKS / COMMENTS / NOTES
1	28.0			13.5	86.5	SLOPE
2	31.0			12.32	87.68	SLOPE BREAK (POSSIBLE BANKFULL)
3	32.0			11.92	88.08	SLOPE
4	33.0					
5	41.0			9.99	90.01	RIGHT SIDE - FLOOD PRONE AREA
6	–					
7	-1.0			9.99	90.01	LEFT SIDE - FLOOD PRONE AREA
8						
9						
10			X-Sectional area = 48.08 ft²			
11			D mean = 1.88 ft			
12			D max = 3.7			
13						
14			W bankfull = 25.53			
15			entrenchment ratio =			
16						
17			W/D = 13.55			
18						
19						
20						
21						
22						
23						
24						
25						25.53
26						
27						
28						

Copyright © 2009 Wildland Hydrology

SURVEY DATA ⟹ **CROSS - SECTION 2**

SITE: Sharman's Branch - Reach 1 Date: 4/28/09

STATION LOCATION 144.8 ft,

Item	STATION ft	BS ft	HI ft	FS ft	Elevation ft	NOTES / COMMENTS / REMARKS
29		16.1		15.71	99.61	BENCHMARK
30				15.71		
31	0			6.0	93.61	SLOPE
32	1.5			6.25	93.36	SLOPE
33	2.0			6.95	92.66	SLOPE
34	4.0			7.6	92.02	SLOPE
35	6.0			9.5	90.11	SLOPE BREAK
36	8.0			10.67	88.94	SLOPE
37	10.0			12.75	86.86	
38	~~12.5~~			~~13.45~~		
39	17.5			12.81	86.8	ON BOULDER
40	22.0			13.51	86.1	IN WATER
41	28.0			13.48	86.13	"
42	32.0			13.58	86.03	"
43	34.0			14.2	85.41	"
44	37.0			13.37	86.24	"
45	42.0			13.32	86.29	SLOPE
46	45.0			12.3	87.31	SLOPE
47	48.0			11.85	87.76	SLOPE
48	51.0			11.16	88.45	SLOPE BREAK
49	53.0			9.72	89.89	RIGHT PIN
50						
51						
52						
53						
54						
55						
56						
57						
58						
59						

Copyright © 2009 Wildland Hydrology

TEAM 1 ⇒ RIFLE X-SECTION CALC'S

CELL #	STN	ELEVATION	DEPTH (ft)	CELL WIDTH (ft)	AVG DEPTH (ft)	INCREMENTAL AREA (ft²)
1	4	87.10	0.00			
	5	86.58	(87.10-86.58) = 0.52	(5-4) = 1	(0+0.52)/2 = 0.26	1 X 0.26 = 0.26
	6	86.35	0.75	1.0	0.635	0.635
	6.4	85.66	1.44	0.4	1.095	0.438
	7.0	85.58	1.52	0.6	1.48	0.888
	8.0	85.21	1.89	1.0	1.71	1.71
	9.0	85.37	1.73	1.0	1.81	1.81
	10.0	85.16	1.94	1.0	1.84	1.84
	11.0	84.82	2.28	1.0	2.11	2.11
	12.0	85.42	1.68	1.0	1.98	1.98
	12.5	84.95	2.15	0.5	1.92	0.958
	14.0	84.87	2.23	1.5	2.19	3.29
	15.0	84.70	2.40	1.0	2.32	2.32
	17.0	84.90	2.20	2.0	2.30	4.60
	18.0	84.71	2.39	1.0	2.295	2.30
	19.0	84.40	2.70	1.0	2.55	2.55
	20.0	83.94	3.16	1.0	2.93	2.93
	21.0	84.50	2.60	1.0	2.88	2.88
	22.0	84.19	2.91	1.0	2.76	2.76
	23.0	84.3	2.80	1.0	2.86	2.86
	24.0	84.27	2.83	1.0	2.82	2.82
	24.8	86.54	0.56	0.8	1.695	1.36
	25.0	85.02	2.08	0.2	1.32	0.264
	26.0	85.67	1.43	1.0	1.76	1.76
	27.0	85.87	1.23	1.0	1.33	1.33
	28.0	86.5	0.60	1.0	0.915	0.915
	29.52	87.1	0.00	1.52	0.3	0.456
	31.0	87.68				

$\Sigma A = 48$

y = mx + b

Copyright © 2009 Wildland Hydrology

TEAM 1 ⇒ RIFLE X-SECTION CALC'S

CELL #	STN	ELEVATION	DEPTH (ft)	CELL WIDTH (ft)	AVG DEPTH (ft)	INCREMENTAL AREA (ft²)
1	4	87.10	0.00			
	5	86.58	(87.10-86.58) = 0.52	(5-4) = 1	(0+0.52)/2 = 0.26	1 X 0.26 = 0.26
	6	86.35	0.75	1.0	0.635	0.635
	6.4	85.66	1.44	0.4	1.095	0.438
	7.0	85.58	1.52	0.6	1.48	0.888
	8.0	85.21	1.89	1.0	1.71	1.71
	9.0	85.37	1.73	1.0	1.81	1.81
	10.0	85.16	1.94	1.0	1.84	1.84
	11.0	84.82	2.28	1.0	2.11	2.11
	12.0	85.42	1.68	1.0	1.98	1.98
	12.5	84.95	2.15	0.5	1.92	0.958
	14.0	84.87	2.23	1.5	2.19	3.219
	15.0	84.70	2.40	1.0	2.32	2.32
	17.0	84.90	2.20	2.0	2.30	4.60
	18.0	84.71	2.39	1.0	2.295	2.30
	19.0	84.40	2.70	1.0	2.55	2.55
	20.0	83.94	3.16	1.0	2.93	2.93
	21.0	84.50	2.60	1.0	2.88	2.88
	22.0	84.19	2.91	1.0	2.76	2.76
	23.0	84.3	2.80	1.0	2.86	2.86
	24.0	84.27	2.83	1.0	2.82	2.82
	24.8	86.54	0.56	0.8	1.695	1.36
	25.0	85.02	2.08	0.2	1.32	0.264
	26.0	85.67	1.43	1.0	1.76	1.76
	27.0	85.87	1.23	1.0	1.33	1.33
	28.0	86.5	0.60	1.0	0.915	0.915
	29.52	87.1	0.00	1.52	0.3	0.456
	31.0	87.68				

$\Sigma A = 48$ ft²

y = mx + b

Copyright © 2009 Wildland Hydrology

BANKFULL AREA = 48 FT²

BANKFULL WIDTH = 29.52 − 4.0 = 25.52 FT

MEAN BANKFULL DEPTH = 48 FT²/25.52 FT = 1.88 FT

WIDTH/DEPTH RATIO = 25.52/1.88 = 13.57

WIDTH OF FLOOD PRONE AREA = 42 FT (AS MEASURED)

ENTRENCHMENT RATIO = 42/25.52 = 1.65

d_{MAX} = 3.16 FT

d_{50} PROTRUSION HEIGHT = 130 mm = 0.427 FT ⇒ R/d_{50} = 3.84, U = 9.15 ft/s, Q = 439 cfs

AVG d_{50} FOR PROTRUSION HEIGHT = 187 mm = 0.614 FT ⇒ R/d_{50} = 2.67, U = 7.82 ft/s, Q = 375 cfs

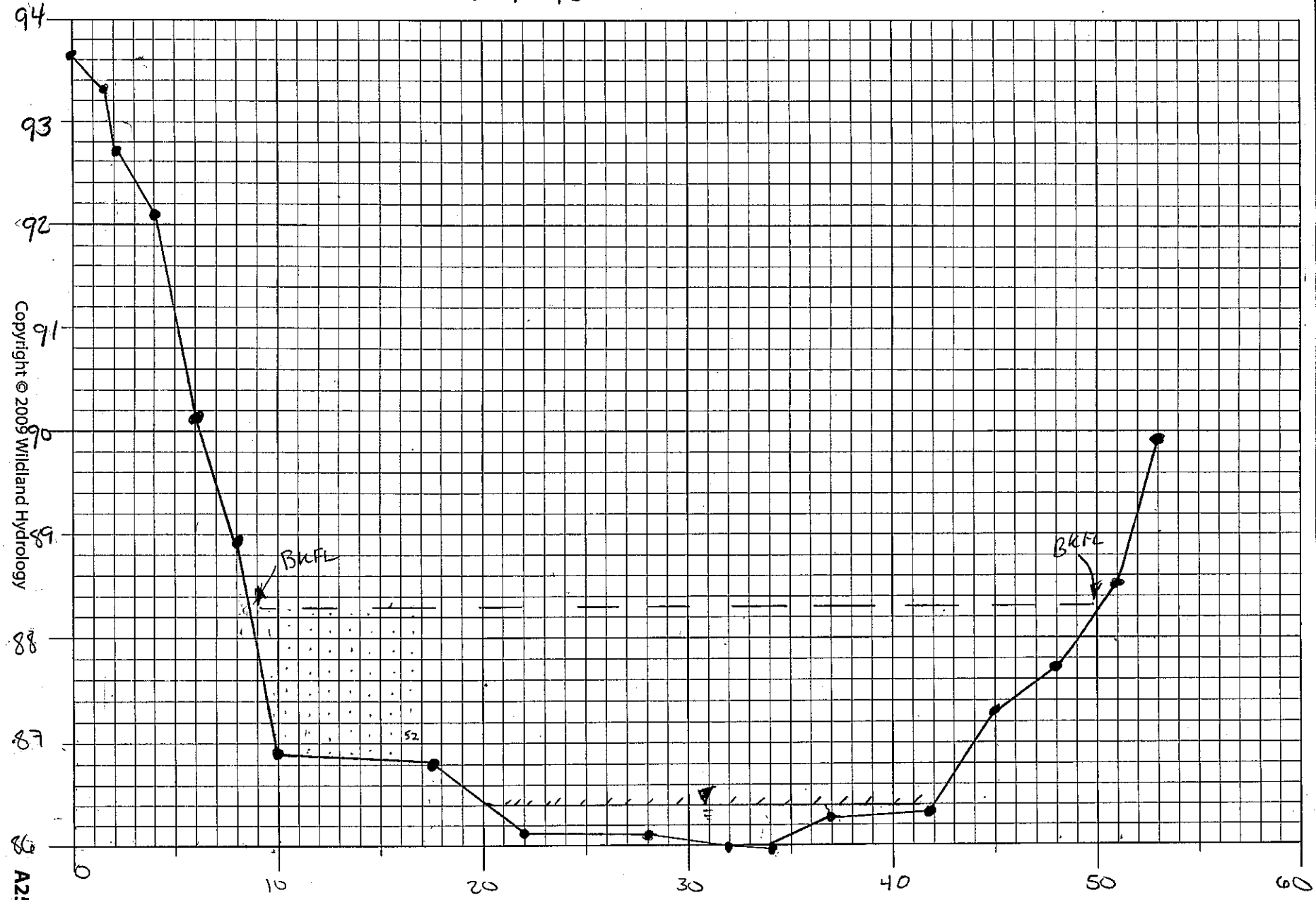
d_{84} OF THE PROTRUSIONS (IN RIFFLE) = 320 mm = 1.05 FT

LIMERINOS ⇒ R/d_{84} = 1.56, V = 5.815 ft/s, Q = 281 cfs

Copyright © 2009 Wildland Hydrology

Team 1
Pool X-section
@ STN 1+45

Sharman's Branch 4/28/09



Copyright © 2009 Wildland Hydrology

SURVEY DATA ⟶ **LONGITUDINAL PROFILE 1**

SITE: Reach 1, Sharman's Branch Date: 28 April 2009

Location: Reach 1

Party / Notes: Team 1 HUC:

	Distance, Point, or	Back-Sight	Height of Instrument	Thalweg		Water Surface		Bankfull		Low Bank HI		NOTES
				Fore-Sight	Elevation	Fore-Sight	Elevation	Fore-Sight	Elevation	Fore-Sight	Elevation	e.g. Riffle Run Pool Glide
	STATION	BS	HI	FS	Elev.	FS	Elev.	FS	Elev.	FS	Elev.	
	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	ft	
1	BM	9.9	109.9									Bankfull top of soil
2	0+00			11.38	98.52	10.72	99.18			other laser		Top of Riffle
3	0+20					11.50	98.40	9.58	100.32	2.15		Divide channel w/ 1.92
4	0+44					11.91	97.99	~~11.08~~	~~98.82~~	4.13	105.77	0.83
5	0+53.5			14.12	95.78	12.58	97.32					Bottom of Step
6	0+59					12.55	97.35	11.00	98.9	4.79		1.55
7	0+61.7			13.15	96.75	12.57	97.33					Top of Riffle / End of Pool
8	0+71			13.76	96.14	12.94	96.96					Chute
9	0+78.5			15.01	94.89	13.38	96.52					middle pool
10	0+85			13.70	96.2	13.41	96.49					Top of Riffle just above debris dam
11	0+96			14.85	95.05	14.00	96.2					middle of Pool
12	1+01			14.91	94.99	14.09	95.81					Chute
13	1+08			15.29	94.61	14.4	95.5					Chute
14	0+87.2			14.24	95.66	13.82	96.08	12.06	97.84	4.69	105.21	Chute 1.76
15	1+12.7			15.98	93.92	14.93	94.97	12.87	97.03			cross-section 1 2.06
16	1+12.7							12.48	97.42			Cross-section 2 2.45
17	1+12.7					14.76	95.14	- Bottom Bank	Full	Level		cross-section 1.89
18	1+24.0			15.44	94.46	14.76	95.14			6.76	103.14	top of step
19	1+30.4			17.22	92.68	15.76	94.14					chute
20	1+44.8			17.23	92.67	16.23	93.67					middle pool
21	1+48.8					16.24	93.66	14.88	95.02			Bank full 1.36
22	1+62.3			18.14	91.76	17.23	92.67			9.96	99.94	chute
23	1+71.0			18.46	91.44	17.51	92.39					chute
24	1+84.0			18.10	91.80	17.85	92.05				end	chute
25												
26												
27												

out of order ★

★

our laser - this
4.13 - 2.15 Diff 1.98

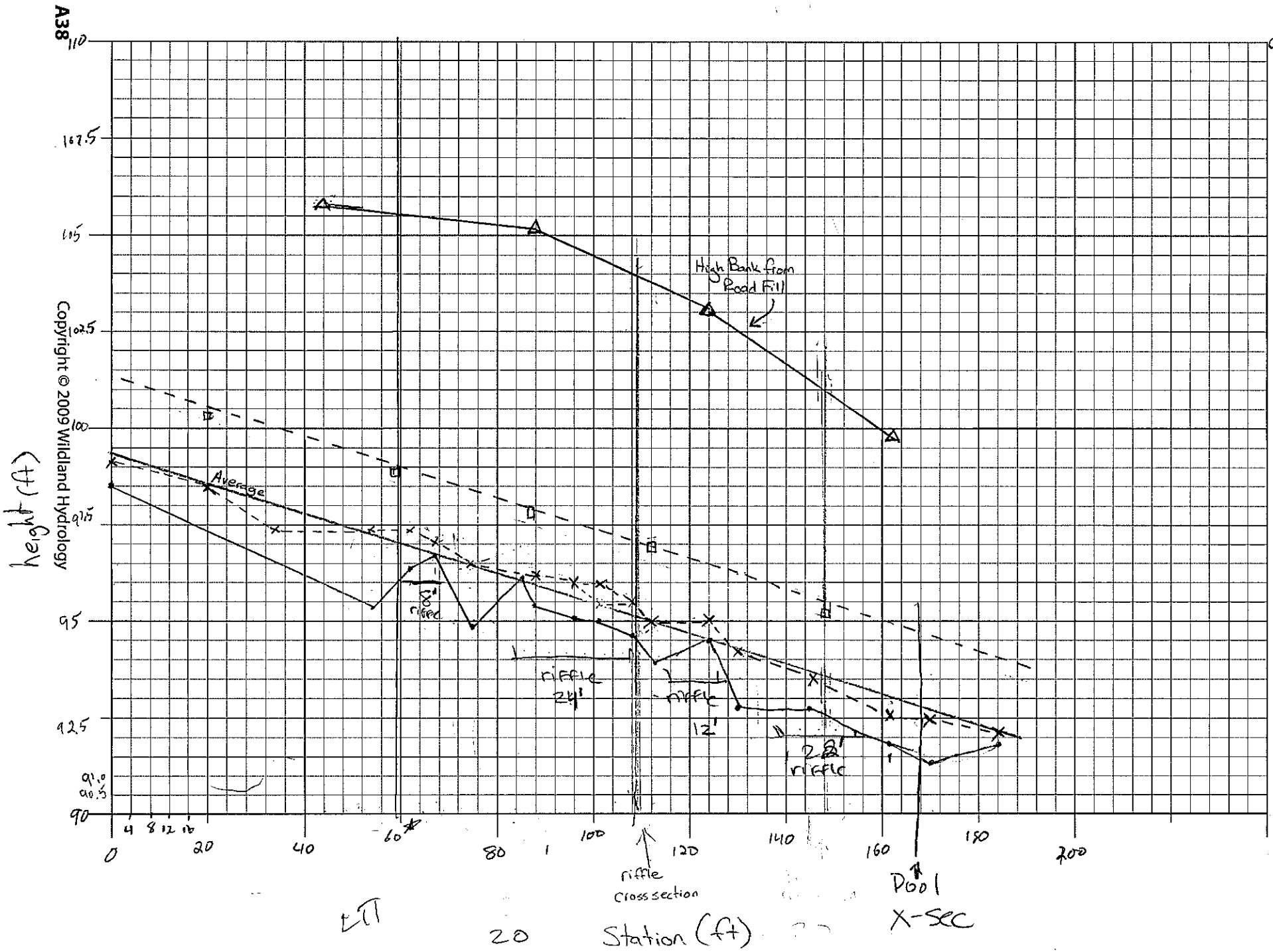
Differential - Get

Copyright © 2009 Wildland Hydrology

Sharman's Branch - Team 1

Reach 1 4/28/09

Legend: • thalweg
× water surface
□ bankfull
△ High bank - Fill



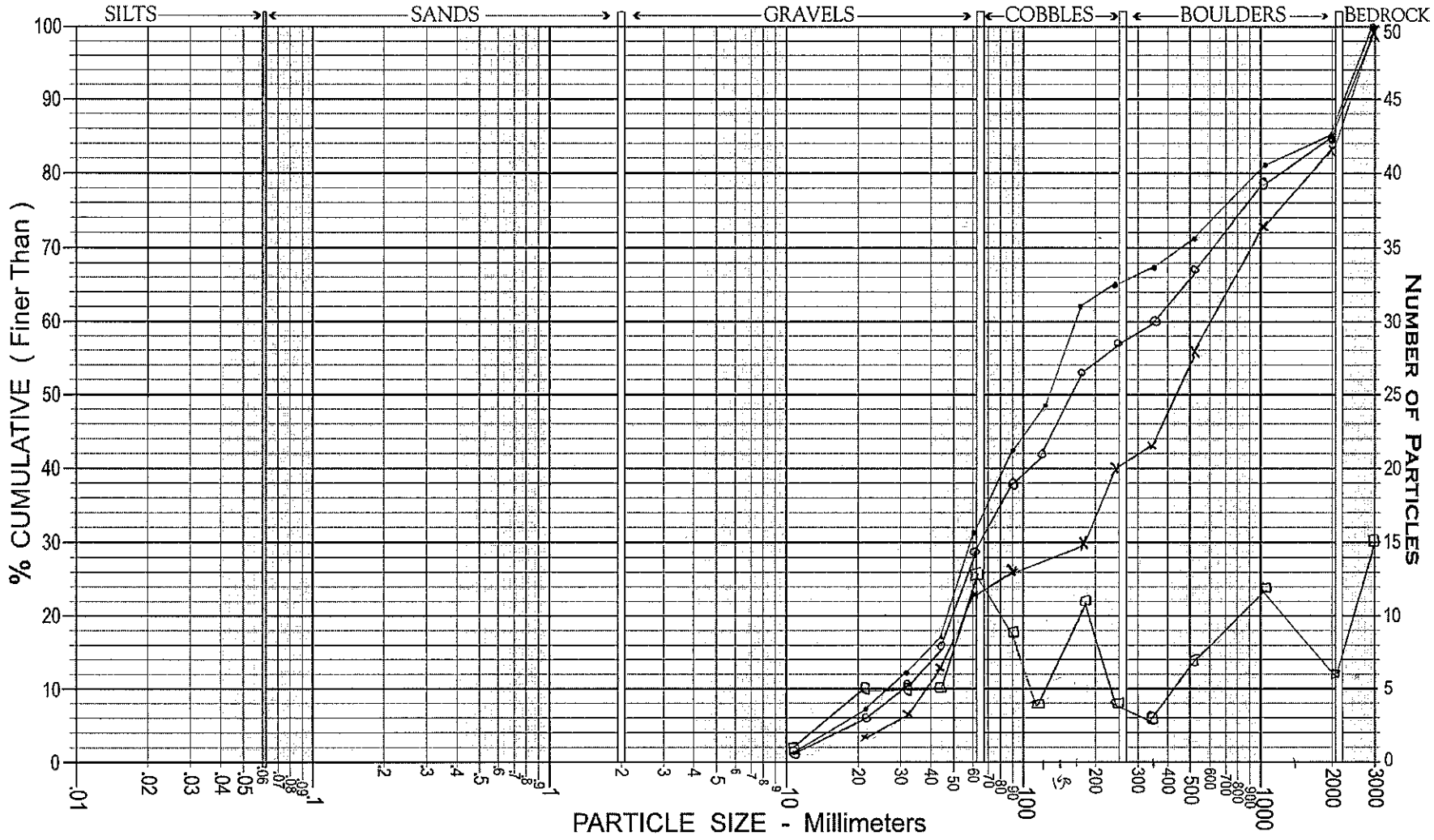
87.1
85.16

PEBBLE COUNT DATA

LOCATION: SHARMANS CREEK Date: 4-28-09

REACH: PARTY: 1

Stream Type: B Valley Type: VI HUC:

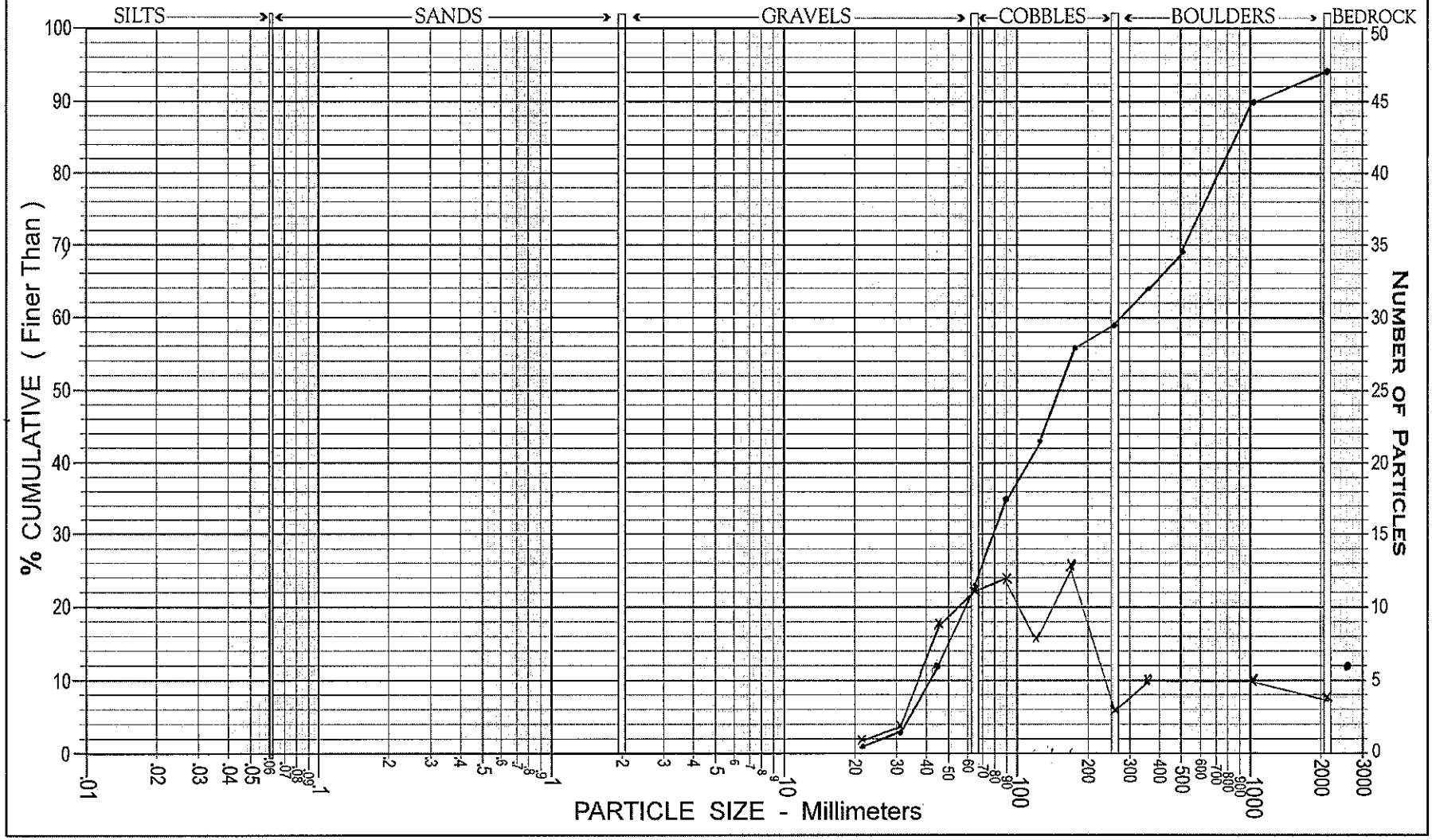


• Riffle
× Pool
○ Composite

Copyright © 2009 Wildland Hydrology

PEBBLE COUNT DATA

LOCATION: Sharma Creek
REACH: 1 - Riffle
Stream Type: B
PARTY: Group 1
Valley Type: VT
Date: 4/28/09
HUC:



• RIFFLE DISTRIB.
X RIFFLE COUNT

Copyright © 2009 Wildland Hydrology

Avg.- 187 mm

Refusions

LOCATION: SHARMANS CREEK

PEBBLE COUNT DATA

Date: 4-28-09

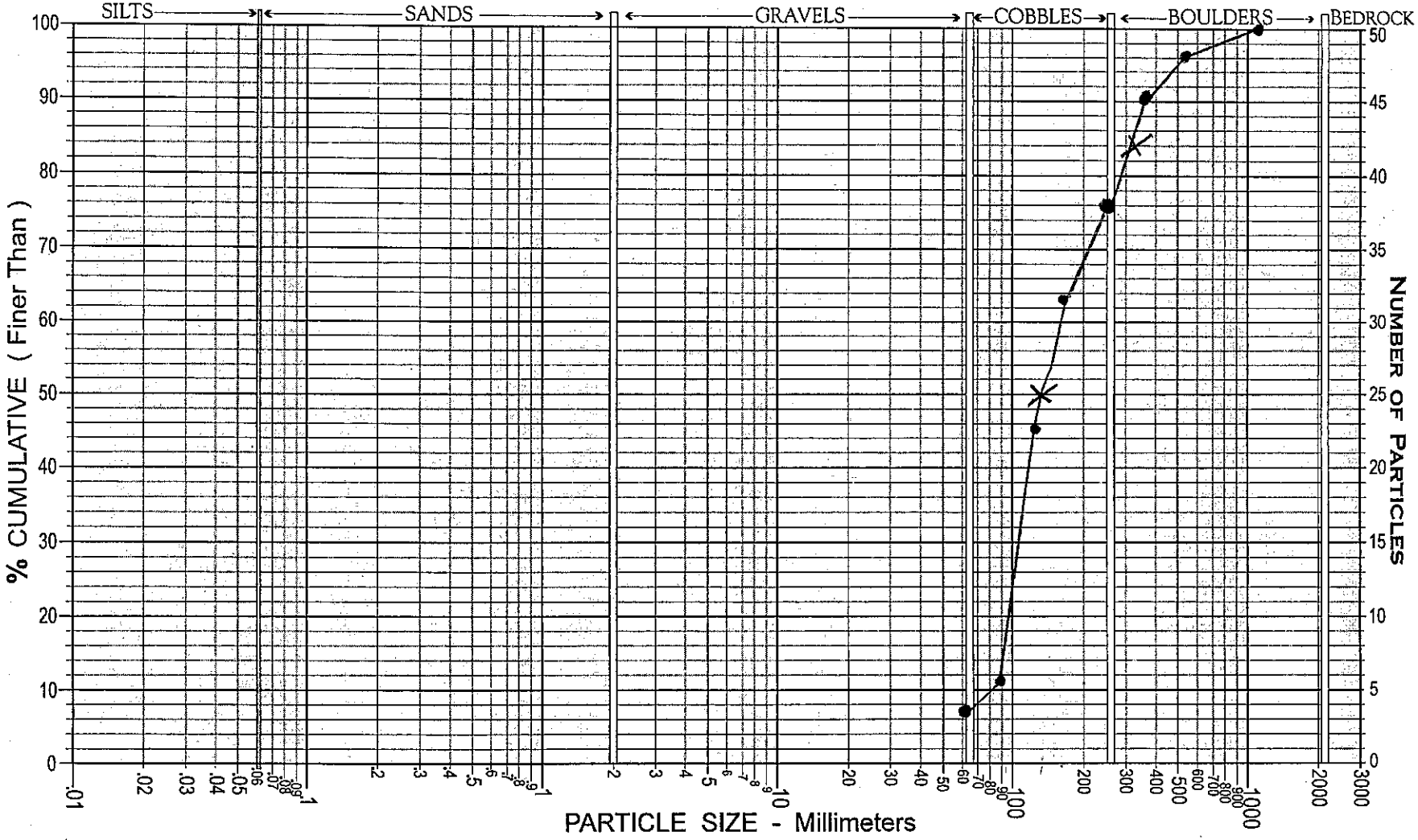
REACH:

PARTY: 1

Stream Type: B

Valley Type: TV

HUC:



D50 - 130

D84 - 320

Copyright © 2009 Wildland Hydrology

Site: Date:

Location: HUC:

Party:

Inches	PARTICLE	Millimeters		Dot Count for RIFFLE 1	POOL 2	COMP. 3	RIFFLE (1) TOT #	ITEM %	% CUM	POOL (2) TOT #	ITEM %	% CUM	COMPOSITE (3) TOT #	ITEM %	% CUM
							Reach:			Reach:			Reach:		
							Date:			Date:			Date:		
	Silt / Clay	< .062	S/C												
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25													
	Medium	.25 - .50													
	Coarse	.50 - 1.0													
.04 - .08	Very Coarse	1.0 - 2													
.08 - .16	Very Fine	2 - 4	GRAVEL												
.16 - .22	Fine	4 - 5.7													
.22 - .31	Fine	5.7 - 8													
.31 - .44	Medium	8 - 11.3													
.44 - .63	Medium	11.3 - 16													
.63 - .89	Coarse	16 - 22.6													
.89 - 1.3	Coarse	22.6 - 32													
1.3 - 1.8	Very Coarse	32 - 45													
1.8 - 2.5	Very Coarse	45 - 64		4		79									
2.5 - 3.5	Small	64 - 90	COBBLE			11 "									
3.5 - 5.0	Small	90 - 128				45 "									
5.0 - 7.1	Large	128 - 180				63 "									
7.1 - 10.1	Large	180 - 256				76 "									
10.1 - 14.3	Small	256 - 362	BOULDER			90 "									
14.3 - 20	Small	362 - 512				96 "									
20 - 40	Medium	512 - 1024				100 "									
40 - 80	Large-Vry Large	1024 - 2048													
	Bedrock		BDRK												
Stream Type:			**Valley Type:**			TOTAL→									

Copyright © 2009 Wildland Hydrology

Site: SHARMANS CREEK Date: 4-28-09

Location: 87-125 (RIFFLE) HUC:

Party: 1

Inches	PARTICLE	Millimeters		Dot Count for RIFFLE 1	POOL 2	COMP. 3	RIFFLE (1) TOT #	RIFFLE (1) ITEM %	RIFFLE (1) % CUM	POOL (2) TOT #	POOL (2) ITEM %	POOL (2) % CUM	COMPOSITE (3) TOT #	COMPOSITE (3) ITEM %	COMPOSITE (3) % CUM
							Reach:			Reach:			Reach:		
							Date:			Date:			Date:		
	Silt / Clay	< .062	S/C												
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25													
	Medium	.25 - .50													
	Coarse	.50 - 1.0													
.04 - .08	Very Coarse	1.0 - 2													
.08 - .16	Very Fine	2 - 4	GRAVEL												
.16 - .22	Fine	4 - 5.7													
.22 - .31	Fine	5.7 - 8													
.31 - .44	Medium	8 - 11.3													
.44 - .63	Medium	11.3 - 16													
.63 - .89	Coarse	16 - 22.6					1	1	1						
.89 - 1.3	Coarse	22.6 - 32					2	2	3						
1.3 - 1.8	Very Coarse	32 - 45					9	9	12						
1.8 - 2.5	Very Coarse	45 - 64					11	11	23						
2.5 - 3.5	Small	64 - 90	COBBLE				12	12	35						
3.5 - 5.0	Small	90 - 128					8	8	43						
5.0 - 7.1	Large	128 - 180					13	13	56						
7.1 - 10.1	Large	180 - 256					3	3	59						
10.1 - 14.3	Small	256 - 362	BOULDER				5	5	64						
14.3 - 20	Small	362 - 512					5	5	69						
20 - 40	Medium	512 - 1024					21	21	90						
40 - 80	Large-Vry Large	1024 - 2048					4	4	94						
	Bedrock		BDRK				6	6	100						
Stream Type: A			**Valley Type:** VI			TOTAL→	100								

Copyright © 2009 Wildland Hydrology

Site: SHARMANS CREEK Date: 4-28-01

Location: HUC:

Party: 1

Inches	PARTICLE	Millimeters		Dot Count for RIFFLE 1	POOL 2	COMP. 3	RIFFLE (1) TOT #	ITEM %	% CUM	POOL (2) TOT #	ITEM %	% CUM	COMPOSITE (3) TOT #	ITEM %	% CUM
							Reach:			Reach:			Reach:		
							Date:			Date:			Date:		
	Silt / Clay	< .062	S/C												
	Very Fine	.062 - .125	SAND												
	Fine	.125 - .25													
	Medium	.25 - .50													
	Coarse	.50 - 1.0													
.04 - .08	Very Coarse	1.0 - 2													
.08 - .16	Very Fine	2 - 4	GRAVEL												
.16 - .22	Fine	4 - 5.7													
.22 - .31	Fine	5.7 - 8													
.31 - .44	Medium	8 - 11.3					1	1.4	1.4				1	1	1
.44 - .63	Medium	11.3 - 16													
.63 - .89	Coarse	16 - 22.6					4	5.7	7.1	1	3.3	3.3	5	5	6
.89 - 1.3	Coarse	22.6 - 32					4	5.7	12.8	1	3.3	6.6	5	5	11
1.3 - 1.8	Very Coarse	32 - 45					3	4.3	17.1	2	6.7	13.3	5	5	16
1.8 - 2.5	Very Coarse	45 - 64					10	14.3	31.4	3	10	23.3	13	13	29
2.5 - 3.5	Small	64 - 90	COBBLE				8	11.4	42.8	1	3.3	26.6	9	9	38
3.5 - 5.0	Small	90 - 128					4	5.7	48.5				4	4	42
5.0 - 7.1	Large	128 - 180					10	14.3	62.8	1	3.3	29.9	11	11	53
7.1 - 10.1	Large	180 - 256					1	1.4	64.2	3	10	39.9	4	4	57
10.1 - 14.3	Small	256 - 362	BOULDER				2	2.9	67.1	1	3.3	43.2	3	3	60
14.3 - 20	Small	362 - 512					3	4.3	71.4	4	13.3	56.5	7	7	67
20 - 40	Medium	512 - 1024					7	10	81.4	5	16.7	73.2	12	12	79
40 - 80	Large-Vry Large	1024 - 2048					3	4.3	85.7	3	10	83.2	6	6	85
	Bedrock		BDRK				10	14.3	100	5	16.7	99.9	15	15	100
Stream Type:			**Valley Type:**			TOTAL→	70	100		30	100		100	100	

Copyright © 2009 Wildland Hydrology