Stream Gauging

By:

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GEOB 309

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1| Results

1.1 Level Survey Table and Table Of Adjusted Water Levels and Times

See attached images field book for summary of level survey

A	B	C	D
WL A		WL B	
Time (HH:MM)	WL (m)	Time (HH:MM)	WL (m)
11:55 AM	6.884	11:05:00 AM	6.849
12:20 PM	6.905	12:00:00 PM	6.818
12:35	6.883	12:10:00 PM	6.925
1:14 PM	6.891	12:25:00 PM	6.83
1:32 PM	6.886	12:50:00 PM	6.924
1:40 PM	6.892	12:58:00 PM	6.917
2:00 PM	6.892	1:24:00 PM	6.905
2:15 PM	6.888	1:27:00 PM	6.917
		1:56:00 PM	6.913
		2:11:00 PM	6.93
		2:24:00 PM	6.923
		2:35:00 PM	6.928
		2:42:00 PM	6.93

Figure 1: Level survey data of adjusted water levels and associated times.

1.2 Table Of Streamflow and Discharge

F	G	H	I	J	K	L	M	N	O	P
STATION	LOC	DEPTH (m)	# OF REV	WIDTH (m)	VELOCITY (m/s)	PANEL DISCHARGE (m^3/s)	PANEL AREA	n (/s)	TIME	NOTES
0	10.600	0	0	0.935	0.007	0.000	0.000	0.000	1:57 PM	Left Bank
1	8.730	0.110	10	1.450	0.232	0.037	1.733	0.333		
2	7.700	0.260	34	0.920	0.774	0.185	8.661	1.133		
3	6.890	0.460	35	0.870	0.797	0.319	14.912	1.167		
4	5.960	0.480	42	0.990	0.955	0.454	21.220	1.400		
5	4.910	0.540	49	0.630	1.113	0.379	17.706	1.633		
6	4.700	0.500	45	0.340	1.022	0.174	8.130	1.500		
7	4.230	0.440	47	0.520	1.068	0.244	11.425	1.567		
8	3.660	0.380	27	0.570	0.616	0.133	6.241	0.900		
9	3.090	0.360	20	0.670	0.458	0.110	5.167	0.667		
10	2.320	0.260	14	1.225	0.323	0.103	4.805	0.467		
11	0.640	0.000	0	0.840	0.007	0.000	0.000	0.000	2:24 PM	Right Bank
Total						2.138030431				

Figure 2: Streamflow and Discharge Data.

1.3 Stage As A Function Of Time

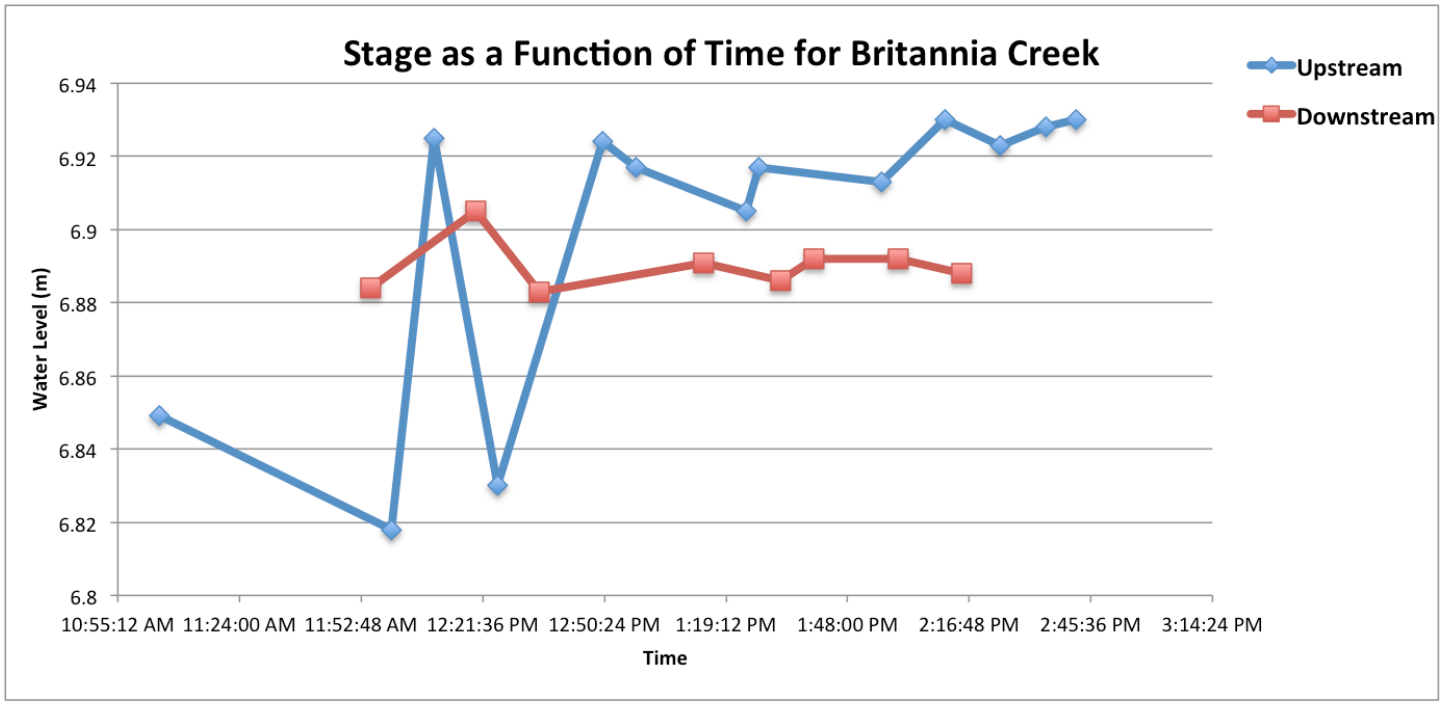

Figure 3: Stage as a function of time for Britannia Creek.

1.4 Discharge As A Function Of Time

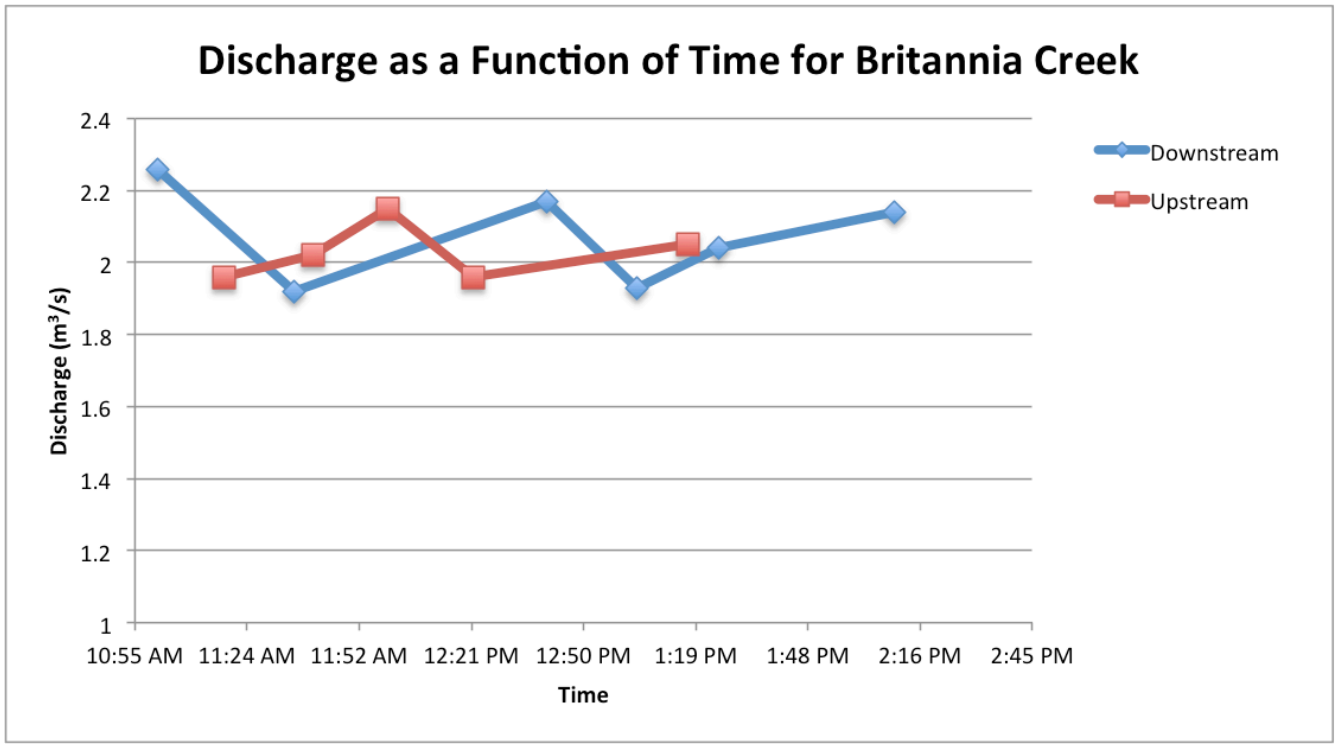

Figure 4: Discharge as a function of time for Britannia Creek.

1.5 Velocity Area Method

W	X	Y	Z
Velocity Area Method			
TRIAL	VELOCITY	DISCHARGE	TIME
ESTIMATED	1.412	2.648	12.3
1	1.537	5.534	11.3
2	1.809	6.514	9.6
3	1.703	6.131	10.2
ACTUAL	1.683	6.059	10.3666667
Actual width (m) =	8.00		
Actual Depth (m) =	0.450		
Estimated Average Width (m) =	5.000		
Estimated Average Depth (m) =	0.375		
Reach (m) =	17.370		

Figure 5: Velocity area method for Britannia Creek.

2| Discussion

2.1 Variability Of Measured Discharge In Relation To Stage/ Velocity Area Method

As seen from data collected from both level survey and current meter, upstream flow has relatively higher water level as expected (Figure 1), seeing that river flows intrinsically from upstream to downstream. Flows are steady throughout the channel. It is interesting to note that there appears to be relatively large shift in water level in the beginning of the survey (11:00 am – 12:30 pm; Figure 3); this could be attributed to human error considering that said portion of the survey—and hence data fluctuation—was attributed to data collected by one group. That part of the data is negligible. Possible errors include different grain sizes in the sampled riverbed, as the downstream part of the channel is relatively more fine grained, as well as sampling variability (due to differences in surveyor sampling sections). Measurements of stage that are higher upstream should be ignored, as they are most likely errors. The flow is steady considering that the study was conducted over a short period of time and the sampling sites were merely 100 m apart.

There is a side stream by the main river channel that was not taken into consideration when conducting the current meter and velocity-area surveys. The side stream is 0.1 m deep, 0.2 m wide, and has a velocity of 0. 2 m/s. From these values, the discharge of this side stream was determined to be 0.004 m^3/s, which was insignificant in comparison to our computed discharge value, hence could be negligible in regards to the total discharge of river.

Our estimated guess of average stream depth and width were half of the actual stream depth and width measured (Figure 5). This caused the actual stream discharge to be double our

estimated discharge. This is due to a lack of field experience and will improve with more experience.

There are some other sources of errors that led to the deviation from expected values. The survey yielded higher percentage of discharge per panel than the expected value of 10% (Canada Water Survey). It would be ideal to conduct the survey with additional 10 panels, in accordance to the standard protocol of 20 panels, so as to yield a more accurate representation of relative discharge per panel.