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Ex. 277-US-451

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Stream: Williamson River
Site: 636 (Scott Creek)
Date: 5/26/1993
Habitat: Run **Flow:** High

Date: 6/25/1993
Habitat: Run **Flow:** Mid

Date: 9/19/1993
Habitat: Run **Flow:** Low

(1) Level Loop Survey (BM & HP)

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	3.97	103.97		
HP1			4.60	99.37
HP2			4.70	99.27
HP3			4.33	99.64
TP				
HP3	4.69	104.33		
HP2			5.07	99.26
HP1			4.97	99.36
BM			4.34	99.99

Comment:

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	4.31	104.31		
HP1			4.93	99.38
HP2			5.03	99.28
HP3			4.65	99.66
TP				
HP3	4.65	104.31		
HP2			5.03	99.28
HP1			4.93	99.38
BM			4.31	100.00

Comment:

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	3.55	103.55		
HP1			4.18	99.37
HP2			4.27	99.28
HP3			3.90	99.65
TP				
HP3	4.24	103.89		
HP2			4.61	99.28
HP1			4.51	99.38
BM			3.88	100.01

Comment:

(2) Water Surface Elevation (WSE) Survey

	L/R WSE (ft)	Sta (ft)	HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
TR1	LWSE 104.33 RWSE 8.48	0	104.33	8.48	0.00	95.85	95.85	13.92
TR2	LWSE 104.33 RWSE 8.45	29.5	104.33	8.45	0.00	95.88	95.87	
TR3	LWSE 104.33 RWSE 8.47	38.5	104.33	8.36	0.00	95.97	95.93	

Site representative Q= 14.81
Ave Q= 13.92
Note: WSEs of this survey need to be increased by 0.02ft to compensate for BM movement (See Sheet "data entry notes" for more details)
WSE slope= 0.21%

Note for Discharge:

- High-Q discharge was taken at/near TR1.
- From mid-Q and low-Q discharge survey results, we found measured Qs at TR1 were always lower than the Qs taken at TR2 and/or TR3.
- By plotting all pairs of Q~WSE (X-axis ~ Y-axis) for all three transects, we found the three curves were either straight or concave while in the normal cases the curve should be convex.
- From the previous clues, we may assume that the measured Q=13.9cfs at TR1 for high flow may be under-representative.
- This assumption also allows to change the Q~WSE curve to become convex if high-Q discharge is increased.
- The new high-Q discharge can be estimated with the help of the ratio of ave Q to TR1's Q. For example:
 $Q_a = 13.92 * (13.46 / 12.48) = 15.01 \text{ cfs}$
 $Q_b = 13.92 * (4.84 / 4.61) = 14.61 \text{ cfs}$
 $Q_{high} = (Q_a + Q_b) / 2 = 14.81 \text{ cfs}$
- Q_high=14.8 cfs shall be used in the calibration to represent the high flow discharge of the site.
- The Q~WSE curves are all convex after changing Q_high to 14.8cfs

(2) Water Surface Elevation (WSE) Survey

	L/R WSE (ft)	Sta (ft)	HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
TR1	LWSE 103.89 RWSE 8.69	0	103.89	8.67	0.00	95.22	95.21	4.61
TR2	LWSE 103.89 RWSE 8.69	29.5	103.89	8.67	0.00	95.22	95.21	4.64
TR3	LWSE 103.89 RWSE 8.64	38.5	103.89	8.65	0.00	95.24	95.25	5.27

Site representative Q= 4.84
Ave Q= 4.84

Note:

WSE slope= 0.09%

(2) Water Surface Elevation (WSE) Survey

	L/R WSE (ft)	Sta (ft)	HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
TR1	LWSE 104.31 RWSE 8.49	0	104.31	8.50	0.00	95.81	95.82	12.48
TR2	LWSE 104.31 RWSE 8.52	29.5	104.31	8.44	0.00	95.87	95.83	13.65
TR3	LWSE 104.48 RWSE 8.62	38.5	104.48	8.67	0.00	95.81	95.84	14.25

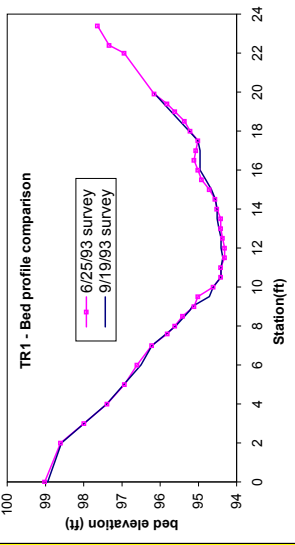
Site representative Q= 13.46
Ave Q= 13.46

Note:

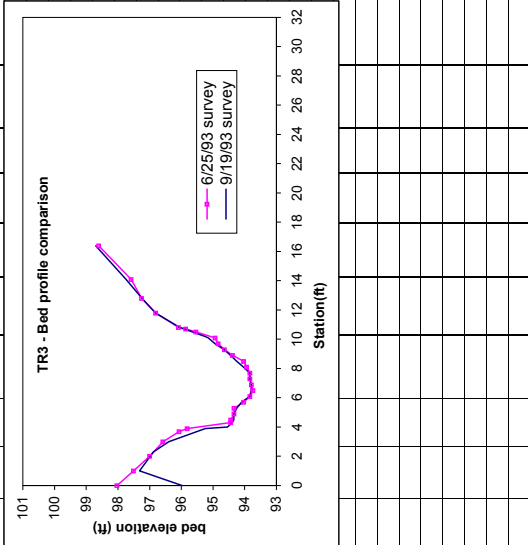
WSE slope= 0.052%

Stream: Williamson River		26-May-93							25-Jun-93							19-Sep-93											
Site: 636	Transact: 1	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s) V _{0.20.6}	Ave Vel (ft/s) V _{0.8}	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s) V _{0.20.6}	Ave Vel (ft/s) V _{0.8}	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s) V _{0.20.6}	Ave Vel (ft/s) V _{0.8}	q (cfs)	substrate		
	Habitat: Run	LWE	7.5			0.00	0.00	0.00		LWP	0.0	5.29	99.02						0.0	4.95	98.94						
	Survey		8.3		0.40	0.11	0.11	0.03			2.0	5.71	98.60						2.0	5.31	98.58					3.3	
	Date		9.0		0.70	0.29	0.29	0.13			3.0	6.32	97.99						4.0	6.49	97.40					3.3	
	5/26/1993		9.6		1.00	0.68	0.68	0.34			4.0	6.92	97.39						6.0	7.39	96.50					3.3	
	6/25/1993		10.0		1.20	1.15	1.15	0.62			5.0	7.38	96.93						7.0	7.68	96.21					3.3	
	9/19/1993		10.5		1.35	1.30	1.30	0.88			6.0	7.71	96.60						8.0	8.30	95.59					1.1	
			11.0		1.40	1.44	1.44	1.01			7.0	8.09	96.22						LWE	8.8	8.67	95.22	0.00	0.00	0.00	0.00	1.1
			11.5		1.40	1.50	1.50	1.05			7.6	8.50	95.81	0.00	0.00	0.00	0.00	0.00	9.0		95.16	0.05	0.20	0.20	0.00	9.9	
			12.0		1.40	1.53	1.53	1.07			8.0		95.42	0.20	-0.02	-0.02	0.00	0.9	9.5		94.71	0.50	0.44	0.44	0.11	3.5	
			12.5		1.40	1.46	1.46	1.02			8.5		95.42	0.40	0.03	0.03	0.01	9.9	10.0		94.61	0.60	0.59	0.59	0.18	3.5	
			13.0		1.40	1.59	1.59	1.11			9.0		95.12	0.70	0.23	0.23	0.08	9.9	10.5		94.41	0.80	0.82	0.82	0.33	3.5	
			13.5		1.45	1.66	1.66	1.20			9.5		95.02	0.80	0.53	0.53	0.21	3.5	11.0		94.41	0.80	1.11	1.11	0.44	3.5	
			14.0		1.45	1.75	1.75	1.27			10.0		94.62	1.20	0.93	0.93	0.56	3.5	11.5		94.36	0.85	1.20	1.20	0.51	3.5	
			14.5		1.40	1.62	1.62	1.13			10.5		94.42	1.40	1.21	1.21	0.85	3.5	12.0		94.41	0.80	1.30	1.30	0.52	3.5	
			15.0		1.30	1.33	1.33	0.86			11.0		94.42	1.40	1.21	1.21	0.85	3.5	12.5		94.41	0.80	1.26	1.26	0.50	3.5	
			15.5		1.20	1.26	1.26	0.76			11.5		94.32	1.50	1.48	1.48	1.11	3.5	13.0		94.46	0.75	1.26	1.26	0.47	3.5	
			16.0		1.15	0.83	0.83	0.48			12.0		94.32	1.50	1.72	1.72	1.29	3.5	13.5		94.51	0.70	1.13	1.13	0.40	3.5	
			16.5		1.20	0.56	0.56	0.34			12.5		94.37	1.45	1.63	1.63	1.18	3.5	14.0		94.51	0.70	1.04	1.04	0.36	3.5	
			17.0		1.10	0.50	0.50	0.22			13.0		94.42	1.40	1.65	1.65	1.16	3.5	14.5		94.56	0.65	0.93	0.93	0.30	3.5	
			17.3		1.00	0.51	0.51	0.26			13.5		94.42	1.40	1.59	1.59	1.11	3.5	15.0		94.66	0.55	0.83	0.83	0.23	3.5	
			18.0		0.75	0.24	0.24	0.13			14.0		94.52	1.30	1.54	1.54	1.00	3.5	15.5		94.81	0.40	0.51	0.51	0.10	3.9	
			18.7		0.40	0.05	0.05	0.02			14.5		94.57	1.25	1.38	1.38	0.86	3.5	16.0		94.96	0.25	0.65	0.65	0.08	3.9	
			19.5		0.00	0.00	0.00	0.00			15.0		94.72	1.10	0.94	0.94	0.52	3.5	16.5		94.96	0.25	0.28	0.28	0.04	3.9	
																			17.0		94.96	0.25	0.14	0.14	0.02	9.3	
																			17.5		95.01	0.20	0.17	0.17	0.02	9.3	
																			RWE	17.9	8.69	95.20	0.00	0.00	0.00	1.1	
																				19.9	7.75	96.14					1.1

Q-Transsect discharge. Probably measurement was taken at TR-1. Field notes stated "TR-1 will be used."



Stream: Williamson River	26-May-93						25-Jun-93						19-Sep-93																		
	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s) V _{0.20.6}	Vel (ft/s) V _{0.8}	Ave (ft)	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s) V _{0.20.6}	Vel (ft/s) V _{0.8}	Ave (ft)	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s) V _{0.20.6}	Vel (ft/s) V _{0.8}	Ave (ft)	q (cfs)	substrate				
Site: 636																															
Transsect: 3																															
Habitat: Run																															
Survey	HI	Q																													
Date	(ft)	(cfs)																													
5/26/1993	104.33																														
6/25/1993	104.48	14.3																													
9/19/1993	103.89	5.3																													



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RUN                      MID                      TRANSECT 1
IOC      1101100000001000101000
QARD    3.0
QARD    4.0
QARD    4.8
QARD    6.0
QARD    7.0
QARD    8.0
QARD    9.0
QARD   10.0
QARD   11.0
QARD   12.0
QARD   13.0
QARD   13.5
QARD   14.8
QARD   16.0
QARD   17.0
QARD   18.0
QARD   19.0
QARD   20.0
QARD   21.0
QARD   22.0
QARD   23.0
QARD   24.0
QARD   26.0
QARD   28.0
QARD   30.0
QARD   32.0
QARD   34.0
QARD   36.0
QARD   38.0
QARD   40.0
XSEC1000.0      0.00 1.0      94.32  0.00052
      1000.0  0.0 99.0  2.0 98.6  3.0 98.0  4.0 97.4  5.0 96.9  6.0 96.6
      1000.0  7.0 96.2  7.6 95.8  8.0 95.6  8.5 95.4  9.0 95.1  9.5 95.0
      1000.0 10.0 94.6 10.5 94.4 11.0 94.4 11.5 94.3 12.0 94.3 12.5 94.4
      1000.0 13.0 94.4 13.5 94.4 14.0 94.5 14.5 94.6 15.0 94.7 15.5 94.9
      1000.0 16.0 95.0 16.5 95.1 17.0 95.1 17.5 95.0 18.0 95.2 18.5 95.4
      1000.0 19.0 95.6 19.4 95.8 19.9 96.2 22.0 96.9 22.4 97.3 23.4 97.6
NS 1000.0      3.3      3.3      3.3      3.3      3.3      3.3
NS 1000.0      3.3      1.1 0.10  9.9 0.10  9.9 .07  9.9 .042  3.5
NS 1000.0      3.5      3.5      3.5      3.5      3.5      3.5
NS 1000.0      3.5      3.5      3.5      3.5      3.5      3.9
NS 1000.0      3.9      3.9      9.3      9.3      9.9 0.2  9.9
NS 1000.0 0.3  9.9      1.1      1.1      1.1      1.1      1.1
CAL11000.0      95.82      13.5
VEL11000.0                                0.00-0.02 0.03 0.23 0.53
VEL11000.0 0.93 1.21 1.21 1.48 1.72 1.63 1.65 1.59 1.54 1.38 0.94 0.85
VEL11000.0 0.98 1.03 0.85 0.45 0.23-0.020.001 0.00
CAL21000.0      95.87      14.8
VEL21000.0
VEL21000.0
VEL21000.0
CAL31000.0      95.21      4.8
VEL31000.0
VEL31000.0
VEL31000.0
ENDJ

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RUN                      MID                      TRANSECT 2
IOC      1101100100001000101000
QARD    3.0
QARD    4.0
QARD    4.8
QARD    6.0
QARD    7.0
QARD    8.0
QARD    9.0
QARD   10.0
QARD   11.0
QARD   12.0
QARD   13.0
QARD   13.5
QARD   14.8
QARD   16.0
QARD   17.0
QARD   18.0
QARD   19.0
QARD   20.0
QARD   21.0
QARD   22.0
QARD   23.0
QARD   24.0
QARD   26.0
QARD   28.0
QARD   30.0
QARD   32.0
QARD   34.0
QARD   36.0
QARD   38.0
QARD   40.0
XSEC1000.0      0.00 1.0      94.32  0.00052
  1000.0  0.0 98.5  1.5 97.9  2.5 97.3  3.5 96.7  4.0 96.2  4.2 95.7
  1000.0  4.5 95.0  5.0 94.4  5.5 94.2  6.0 94.0  6.5 93.9  7.0 93.9
  1000.0  7.5 94.0  8.0 94.1  8.5 94.4  9.0 94.6  9.5 94.8 10.0 94.8
  1000.0 10.5 95.0 11.0 95.1 11.5 95.5 11.7 95.8 11.8 96.0 12.8 96.7
  1000.0 13.8 97.2 14.8 97.6 15.8 98.0 16.8 98.3 17.8 98.6 18.8 98.9
  1000.0 23.0100.1 26.0 99.7 31.2 99.8
NS  1000.0      3.3      3.3      3.3      3.3      3.3
NS  1000.0      2.2      3.3      3.3      3.5      3.5      3.5
NS  1000.0      3.5      3.3      3.3      3.3      3.3      3.3
NS  1000.0 .045  3.9      3.9 .022  9.9      1.1      1.1      1.1
NS  1000.0      1.1      1.1      1.1      1.1      1.1      1.1
NS  1000.0      1.1      1.1      1.1
WSL 1000.0      95.07      95.17      95.24      95.34      95.42      95.49
WSL 1000.0      95.56      95.63      95.69      95.75      95.80      95.83
WSL 1000.0      95.90      95.97      96.02      96.07      96.12      96.16
WSL 1000.0      96.21      96.26      96.30      96.35      96.44      96.51
WSL 1000.0      96.60      96.68      96.76      96.84      96.91      96.99
CAL11000.0      95.83      13.5
VEL11000.0                      0.50 1.08 1.72 2.04 2.06 1.91 1.42
VEL11000.0 1.28 1.47 1.01 1.10 1.12 0.85 0.55 0.92 0.91 0.00
VEL11000.0
CAL21000.0      95.89      14.8
VEL21000.0
VEL21000.0
VEL21000.0
CAL31000.0      95.21      4.8
VEL31000.0
VEL31000.0
VEL31000.0
ENDJ

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RUN MID
 IOC 1101100100001000101000
 QARD 3.0
 QARD 4.0
 QARD 4.8
 QARD 6.0
 QARD 7.0
 QARD 8.0
 QARD 9.0
 QARD 10.0
 QARD 11.0
 QARD 12.0
 QARD 13.0
 QARD 13.5
 QARD 14.8
 QARD 16.0
 QARD 17.0
 QARD 18.0
 QARD 19.0
 QARD 20.0
 QARD 21.0
 QARD 22.0
 QARD 23.0
 QARD 24.0
 QARD 26.0
 QARD 28.0
 QARD 30.0
 QARD 32.0
 QARD 34.0
 QARD 36.0
 QARD 38.0
 QARD 40.0

XSEC1000.0 0.00 1.0 94.32 0.00052
 1000.0 0.0 98.0 1.0 97.5 2.0 97.0 3.0 96.6 3.7 96.1 3.9 95.8
 1000.0 4.3 94.4 4.5 94.4 4.9 94.3 5.3 94.3 5.7 94.0 6.1 93.8
 1000.0 6.5 93.7 6.9 93.8 7.3 93.8 7.7 93.8 8.1 93.9 8.5 94.0
 1000.0 8.9 94.4 9.3 94.6 9.7 94.8 10.1 94.9 10.5 95.5 10.7 95.9
 1000.0 10.8 96.1 11.8 96.8 12.8 97.3 14.1 97.6 16.4 98.6
 NS 1000.0 1.1 1.1 1.1 1.1 1.1
 NS 1000.0 .020 3.5 3.5 3.5 3.5 3.5
 NS 1000.0 3.3 .042 3.3 3.3 3.3 3.3
 NS 1000.0 3.3 3.3 2.3 0.08 2.3 0.10 3.3 3.3
 NS 1000.0 3.3 3.3 3.3 3.3 3.3
 WSL 1000.0 95.08 95.18 95.26 95.36 95.44 95.50
 WSL 1000.0 95.57 95.64 95.70 95.76 95.82 95.85
 WSL 1000.0 95.92 95.98 96.03 96.08 96.13 96.18
 WSL 1000.0 96.22 96.27 96.31 96.36 96.45 96.52
 WSL 1000.0 96.61 96.69 96.77 96.85 96.91 96.99
 CAL11000.0 95.84 13.5
 VEL11000.0 0.00 1.88 2.01 2.09 2.20 2.22 1.93
 VEL11000.0 1.49 1.15 1.30 1.16 1.12 1.19 0.76 0.60 0.62 0.15-0.01 0.00
 VEL11000.0
 CAL21000.0 95.95 14.8
 VEL21000.0
 VEL21000.0
 CAL31000.0 95.25 4.8
 VEL31000.0
 VEL31000.0
 VEL31000.0
 ENDJ