

8-30-2008

Ex. 277-US-432

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**Stream:** Williamson  
**Site:** 628 (End of Kirk Canyon to Spring Creek)  
**Date:** 9/22/1990  
**Habitat:** Run

**Flow:** Low

(1) Level Loop Survey (BM & HP)

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	5.41	105.41		
HP1			5.36	100.05
HP2			6.40	99.01
HP3			6.00	99.41
TP				
HP3	6.10	105.51		
HP2			6.50	99.01
HP1			5.47	100.04
BM			5.51	100.00

Comment: on the tape is on the LWP (looking upstream)

**Date:** 4/10/1991  
**Habitat:** Run

**Flow:** Mid

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	11.00	111.00		100.00
HP1			10.96	100.04
HP2			12.00	99.00
HP3			11.60	99.40
TP				
HP3	11.26	110.66		
HP2			11.67	98.99
HP1			10.62	100.04
BM			10.66	100.00

Comment:

**Date:** 5/27/1993  
**Habitat:** Run

**Flow:** High

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	8.67	108.67		100.00
HP1			8.64	100.03
HP2			9.68	98.99
HP3			9.26	99.41
TP				
HP3	9.35	108.76		
HP2			9.76	99.00
HP1			8.78	99.98
BM			8.76	100.00

Comment:

(2) Water Surface Elevation (WSE) Survey

	L/R WSE	Sta	HI	FS	Rod	WSE	Ave WSE	Q
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)
TR1	LWSE	66.6	104.56	7.55	0.00	97.01	96.99	22.52
	RWSE			7.60	0.00	96.96		
TR2	LWSE	44.4	102.84	5.83	0.00	97.01	97.01	15.65
	RWSE			5.83	0.00	97.01		
TR3	LWSE	14.8	102.80	5.76	0.00	97.04	97.18	20.85
	RWSE			5.49	0.00	97.31		
							Ave Q=	19.67

Note: WSE slope = 0.367%

(2) Water Surface Elevation (WSE) Survey

	L/R WSE	Sta	HI	FS	Rod	WSE	Ave WSE	Q
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)
TR1	LWSE	66.6	110.66	12.92	0.00	97.74	97.73	173.80
	RWSE			12.94	0.00	97.72		
TR2	LWSE	44.4	110.66	12.83	0.00	97.83	97.80	154.59
	RWSE			12.89	0.00	97.77		
TR3	LWSE	14.8	110.66	12.45	0.00	98.21	98.26	170.07
	RWSE			12.36	0.00	98.30		
							Ave Q=	166.15

Note: WSE slope = 1.014%

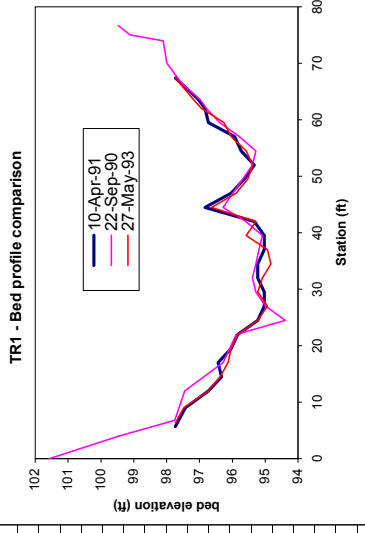
(2) Water Surface Elevation (WSE) Survey

	L/R WSE	Sta	HI	FS	Rod	WSE	Ave WSE	Q
		(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(cfs)
TR1	LWSE	66.6	108.76	11.01	0.00	97.75	97.73	
	RWSE			11.05	0.00	97.71		
TR2	LWSE	44.4	108.76	10.93	0.00	97.83	97.81	151.64
	RWSE			10.98	0.00	97.78		
TR3	LWSE	14.8	108.76	10.55	0.00	98.21	98.27	
	RWSE			10.43	0.00	98.33		
							Ave Q=	151.64

Note: WSE slope = 1.042%

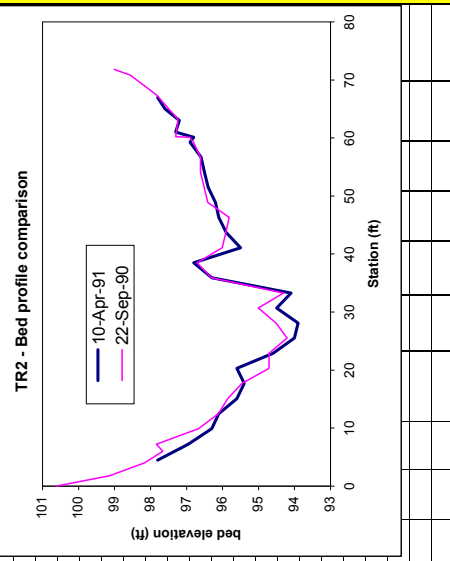
Stream: Williamson			22-Sep-90						10-Apr-91						27-May-93														
Survey Date	HI	Q (cfs)	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)		q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)		q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)		q (cfs)	substrate			
							V <sub>0.206</sub>	V <sub>0.8</sub>							V <sub>0.206</sub>	V <sub>0.8</sub>							V <sub>0.206</sub>	V <sub>0.8</sub>					
9/22/1990	104.56	22.5	LWP 0.0	2.99	101.57	0.50	0.19	0.19	0.24	1.1	LWP 0.0	97.73	97.45	0.50	0.19	0.19	0.24	0.00	6.7	LWP 0.0	97.73	97.73	0.00	0.00	0.00	0.00	6.7	6.7	
4/10/1991	110.66	173.8	LWE 12.0	7.11	97.45	0.70	0.71	0.71	1.86	7.7	LWE 5.7	97.43	96.29	0.30	0.20	0.20	0.19	0.19	0.00	6.7	LWE 5.7	97.43	97.48	0.30	0.20	0.20	0.19	6.7	6.7
5/27/1993	108.76		LWE 12.0	7.11	97.45	0.90	0.55	0.55	1.24	7.5	LWE 12.0	96.73	96.09	1.00	1.20	1.20	3.30	3.30	0.00	7.5	LWE 12.0	96.73	96.73	1.00	1.20	1.20	3.30	7.5	7.5
			LWE 17.0	19.5	96.09	0.90	0.55	0.55	1.24	6.5	LWE 17.0	96.43	96.09	1.30	2.40	2.40	7.80	7.80	0.04	7.5	LWE 17.0	96.43	96.13	1.30	2.40	2.40	7.80	7.5	7.5
			LWE 22.0	19.5	95.89	1.10	0.37	0.37	1.02	6.7	LWE 19.5	96.03	96.03	1.70	2.10	2.10	8.93	8.93	0.04	6.5	LWE 19.5	96.03	96.03	1.70	2.10	2.10	8.93	6.5	6.5
			LWE 24.5	24.5	94.99	2.60	-0.06	0.28	0.11	6.7	LWE 22.0	95.83	95.83	1.90	2.40	2.40	11.40	11.40	0.04	6.7	LWE 22.0	95.83	95.83	1.90	2.40	2.40	11.40	6.7	6.7
			LWE 27.0	29.5	95.29	1.70	0.71	0.71	3.02	6.7	LWE 27.0	95.03	95.03	2.70	2.90	2.90	15.19	15.19	0.04	6.7	LWE 27.0	95.03	94.93	2.70	2.90	2.90	15.19	6.7	6.7
			LWE 32.0	34.5	95.39	1.60	-0.03	-0.03	0.12	7.5	LWE 29.5	95.03	95.03	2.70	2.60	2.60	15.53	15.53	0.04	6.7	LWE 29.5	95.03	95.08	2.70	2.60	2.60	15.53	6.7	6.7
			LWE 34.5	37.0	95.19	1.80	0.45	0.45	2.03	6.7	LWE 34.5	95.23	95.23	2.50	4.20	4.20	19.06	19.06	0.04	7.6	LWE 34.5	95.23	94.83	2.50	4.20	4.20	19.06	7.6	7.6
			LWE 39.5	42.0	95.09	1.90	0.64	0.64	3.04	6.7	LWE 39.5	95.03	95.03	2.70	3.40	3.40	18.56	18.56	0.04	6.7	LWE 39.5	95.03	94.93	2.70	3.40	3.40	18.56	6.7	6.7
			LWE 44.5	44.5	96.29	0.70	0.08	0.08	0.14	7.6	LWE 42.0	95.33	95.33	2.40	2.00	2.00	12.00	12.00	0.04	6.7	LWE 42.0	95.33	95.28	2.40	2.00	2.00	12.00	6.7	6.7
			LWE 47.0	49.5	95.99	1.00	0.20	0.20	0.50	7.4	LWE 47.0	96.83	96.83	0.90	2.00	2.00	4.50	4.50	0.04	7.4	LWE 47.0	96.83	96.63	0.90	2.00	2.00	4.50	7.4	7.4
			LWE 49.5	49.5	95.69	1.30	0.07	0.07	0.23	6.4	LWE 49.5	96.63	96.63	2.10	0.01	0.01	0.05	0.05	0.04	7.4	LWE 49.5	96.63	95.53	2.10	0.01	0.01	0.05	7.4	7.4
			LWE 52.0	54.5	95.39	1.60	0.20	0.20	0.80	6.4	LWE 52.0	95.33	95.33	2.40	0.70	0.70	4.20	4.20	0.04	6.4	LWE 52.0	95.33	95.38	2.40	0.70	0.70	4.20	6.4	6.4
			LWE 54.5	57.0	95.79	1.70	0.19	0.19	0.81	6.1	LWE 54.5	95.73	95.73	2.00	1.10	1.10	5.50	5.50	0.04	6.4	LWE 54.5	95.73	95.58	2.00	1.10	1.10	5.50	6.4	6.4
			LWE 59.5	59.5	96.39	0.60	0.04	0.04	0.06	5.6	LWE 57.0	95.93	95.93	1.80	1.20	1.20	5.40	5.40	0.04	6.1	LWE 57.0	95.93	96.03	1.80	1.20	1.20	5.40	6.1	6.1
			RWE 62.0	62.0	96.79	0.20	-0.04	-0.04	-0.02	5.4	LWE 62.0	96.73	96.73	1.00	0.90	0.90	2.25	2.25	0.04	5.6	LWE 62.0	96.73	96.25	1.00	0.90	0.90	2.25	5.6	5.6
			LWE 66.4	70.3	97.53	0.00	0.00	0.00	0.00	1.5	LWE 63.6	97.03	97.03	0.70	0.35	0.35	0.66	0.66	0.04	5.4	LWE 63.6	97.03	97.18	0.70	0.35	0.35	0.66	5.4	5.4
			LWE 70.0	70.0	97.99	1.1			1.1	1.1	LWE 67.4	97.73	97.73	0.00	0.00	0.00	0.00	0.00	0.04	1.5	LWE 67.4	97.73	97.73	0.00	0.00	0.00	0.00	1.5	1.5
			LWE 74.0	74.0	98.10	1.1			1.1	1.1	RWE 67.4	97.73	97.73	0.00	0.00	0.00	0.00	0.00	0.04	1.1	RWE 67.4	97.73	97.73	0.00	0.00	0.00	0.00	1.1	1.1
			LWE 75.0	75.0	99.11	1.1			1.1	1.1									0.04	1.1							1.1	1.1	
			RWP 76.7	76.7	99.47	1.1			1.1	1.1									0.04	1.1							1.1	1.1	

5/27/93 Survey:  
Bed Profile Check only.  
No velocity or depth surveyed

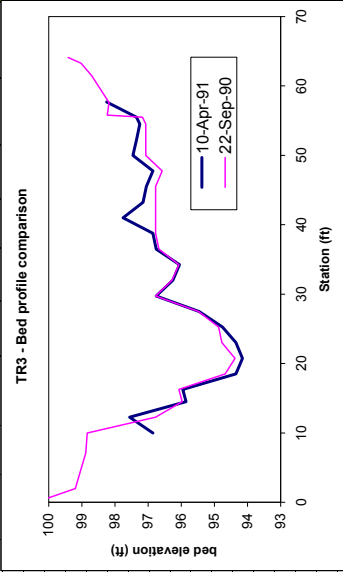


Stream: Williamson		22-Sep-90						10-Apr-91						27-May-93												
Site: 628	Transsect: 2	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)	Ave	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)	Ave	q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)	Ave	q (cfs)	substrate	
Habitat: Run	Survey	HI	Q																							
Date	(ft)	(cfs)																								
9/22/1990	102.84	15.7																								
4/10/1991	110.66	154.6	0.0	2.21	100.63					0.0	4.5															
5/27/1993	108.76	151.6	1.8	3.70	99.14				1.1	9.9	96.95	0.00	0.00													
			4	4.67	98.17				6.1	12.5	96.10	1.70	0.30													
			6	5.18	97.66				6.7	15.1	95.60	2.20	0.40													
			LWE	7.2	97.84				7.7	17.7	95.40	2.40	0.20													
									6.2	20.3	95.60	2.20	0.40													
									6.2	22.9	94.60	3.20	0.80													
									5.2	25.5	94.00	3.80	1.20													
									6.2	28.1	93.90	3.90	2.00													
									6.2	30.7	94.50	3.30	1.60													
									7.2	33.3	94.10	3.70	3.40													
									6.2	35.9	96.30	1.50	4.10													
									6.2	38.5	96.80	1.00	4.50													
									6.2	41.1	95.50	2.30	3.10													
									6.2	43.7	95.90	1.90	2.00													
									7.2	46.3	96.10	1.70	1.80													
									7.7	48.9	96.20	1.60	1.40													
									6.2	51.5	96.40	1.40	1.50													
									6.2	54.1	96.50	1.30	1.90													
									7.6	56.7	96.60	1.20	1.60													
									6.2	59.3	96.90	0.90	1.00													
									6.2	60.1	96.80	1.00	0.85													
									7.2	61.0	97.30	0.50	1.10													
									7.5	63.0	97.20	0.60	0.40													
									6.2	65.0	97.60	0.20	0.01													
									6.4	RWE	67.0	0.00	0.00													
									7.5			0.00	0.00													
									7.7																	
									6.1																	
									7.6																	
									1.1																	

This is discharge measurement at Q-1 transect located just upstream of TR-1 (of Riffle habitat). Surevy was on 5/27/1993.



			22-Sep-90						10-Apr-91						27-May-93																			
Stream: Williamson Site: 628 Transsect: 3 Habitat: Run	Survey	Date	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)			q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)			q (cfs)	substrate	Sta (ft)	FS (ft)	Ground (ft)	Depth (ft)	Vel (ft/s)			q (cfs)	substrate					
							V <sub>0.2m/s</sub>	V <sub>0.8</sub>	Ave							V <sub>0.2m/s</sub>	V <sub>0.8</sub>	Ave							V <sub>0.2m/s</sub>	V <sub>0.8</sub>	Ave							
			0.0	2.41	100.39						LWP	0.00																						
	HI	Q	2.00	3.60	99.20						LWE	10.00	96.86	1.40	-0.10	-0.10																		
			7.10	3.92	98.88							12.25	97.56	0.70	-0.10	-0.10																		
	9/22/1990	102.80	20.8	3.96	98.84	0.30	0.01	0.01	0.00		14.50	95.86	2.40	0.10	0.10																			
	4/10/1991	110.66	170.1		96.78	0.40	0.01	0.01	0.01		16.25	95.96	2.30	0.01	0.01																			
			16.25		95.98	1.2	-0.12	-0.12	-0.29	7.6	18.50	94.36	3.90	0.80	0.20	0.50	4.39	7.7																
	5/27/1993	108.76			96.08	1.10	0.85	0.85	1.87	7.7	20.75	94.16	4.10	2.60	-0.10	1.25	11.53	7.7																
			18.50		94.68	2.50	0.25	0.75	2.81	7.7	23.00	94.36	3.90	4.70	2.60	3.65	32.03	7.6																
			20.75		94.38	2.80	0.50	1.15	0.83	5.20	25.25	94.76	3.50	4.30	3.00	3.65	28.74	6.6																
			23.00	0.6	94.78	2.40	0.6	0.60	3.24	6.7	27.50	95.46	2.80	2.80	2.50	2.65	16.70	7.6																
			25.25		94.88	2.30	0.4	0.40	2.07	6.6	29.75	96.76	1.50	2.80		2.80	9.45	7.6																
			27.50		95.48	1.70	0.65	0.65	2.49	7.6	32.00	96.26	2.00	4.00	4.00	18.00	7.6																	
			29.75		96.78	0.40	1.2	1.20	1.08	7.7	34.25	96.06	2.20	1.80	1.80	8.91	7.7																	
			32.00	0.25	96.28	0.90	0.25	0.25	0.51	7.6	36.50	96.76	1.50	-0.20	-0.20	-0.68	7.7																	
			34.25		96.08	1.10	0.01	0.01	0.02	7.7	38.75	96.86	1.40	1.10	1.10	3.47	7.6																	
			36.50		96.68	0.50	-0.15	-0.15	-0.17	7.7	41.00	97.76	0.50	-0.20	-0.20	-0.23	6.5																	
			38.75		96.78	0.40	0.00	0.00	0.00	7.6	43.25	97.16	1.10	0.01	0.01	0.02	6.5																	
			43.25		96.78	0.40	-0.15	-0.15	-0.20	6.5	45.50	97.06	1.20	3.40	3.40	9.18	7.5																	
			45.50		96.78	0.40	0.42	0.42	0.38	7.5	47.75	96.86	1.40	4.10	4.10	12.92	6.5																	
			47.75		96.58	0.60	1.35	1.35	1.82	6.5	50.00	97.46	0.80	3.80	3.80	6.84	7.5																	
			50.00		97.08	0.10	0.01	0.01	0.00	7.5	52.25	97.36	0.90	2.80	2.80	5.67	5.2																	
			54.50		97.08	0.10	0.01	0.01	0.00	7.5	54.50	97.26	1.00	1.00	1.00	1.63	5.2																	
			55.50		97.18	0.00	0.00	0.00	0.00	7.5	55.50	97.36	0.90	0.90	0.90	1.30	7.5																	
			55.80	4.57	98.23					7.7	RWE	57.70	98.26	0.00	0.00	0.00	0.00																	
			57.60	4.62	98.18					1.1																								
			61.50	4.10	98.70					1.7																								
			63.30	3.77	99.03																													
			64.10	3.39	99.41																													



RUN HIGH

TRANSECT 1

IOC 1101100000001000101000

QARD 19.7  
 QARD 30.0  
 QARD 40.0  
 QARD 50.0  
 QARD 60.0  
 QARD 70.0  
 QARD 80.0  
 QARD 90.0  
 QARD 104.0  
 QARD 110.0  
 QARD 120.0  
 QARD 130.0  
 QARD 140.0  
 QARD 151.6  
 QARD 166.2  
 QARD 170.0  
 QARD 180.0  
 QARD 190.0  
 QARD 200.0  
 QARD 210.0  
 QARD 220.0  
 QARD 240.0  
 QARD 260.0  
 QARD 280.0  
 QARD 300.0  
 QARD 320.0  
 QARD 340.0  
 QARD 360.0  
 QARD 380.0  
 QARD 400.0  
 XSEC1000.0 0.00 1.0 94.39 0.01014  
 1000.0 0.0101.6 4.099.46 5.797.73 6.897.75 9.097.43 12.096.73  
 1000.0 14.596.33 17.096.43 19.596.03 22.095.83 24.595.23 27.095.03  
 1000.0 29.595.03 32.095.23 34.595.23 37.095.03 39.595.03 42.095.33  
 1000.0 44.596.83 47.096.03 49.595.63 52.095.33 54.595.73 57.095.93  
 1000.0 59.596.73 62.096.83 63.697.03 66.497.53 67.497.73 70.097.99  
 1000.0 74.098.10 75.099.11 76.799.47  
 NS 1000.0 1.1 7.7 6.7 6.7 6.7 7.5  
 NS 1000.0 0.5 7.5 7.5 6.5 6.7 6.7 6.7  
 NS 1000.0 6.7 .15 7.5 7.6 6.7 6.7 6.7  
 NS 1000.0 7.6 7.4 .5 7.4 6.4 6.4 6.1  
 NS 1000.0 5.6 5.4 5.4 .4 1.5 .4 1.5 1.1  
 NS 1000.0 1.1 1.1 1.1  
 CAL11000.0 97.72 166.2  
 VEL11000.0 0.00 0.07 0.20 1.20 0.01 2.40 2.10 2.40 1.80 2.25  
 VEL11000.0 2.30 1.25 3.05 2.35 2.75 2.00 2.00 0.80 0.01 0.70 1.10 1.20  
 VEL11000.0 0.90 0.50 0.35 0.09 0.00  
 CAL21000.0 96.96 19.7  
 VEL21000.0  
 VEL21000.0  
 VEL21000.0  
 CAL31000.0 97.71 151.6  
 VEL31000.0  
 VEL31000.0  
 VEL31000.0  
 ENDJ

RUN HIGH  
 IOC 1101100000001000101000

TRANSECT 2

QARD 19.7  
 QARD 30.0  
 QARD 40.0  
 QARD 50.0  
 QARD 60.0  
 QARD 70.0  
 QARD 80.0  
 QARD 90.0  
 QARD 104.0  
 QARD 110.0  
 QARD 120.0  
 QARD 130.0  
 QARD 140.0  
 QARD 151.6  
 QARD 166.2  
 QARD 170.0  
 QARD 180.0  
 QARD 190.0  
 QARD 200.0  
 QARD 210.0  
 QARD 220.0  
 QARD 240.0  
 QARD 260.0  
 QARD 280.0  
 QARD 300.0  
 QARD 320.0  
 QARD 340.0  
 QARD 360.0  
 QARD 380.0  
 QARD 400.0  
 XSEC1000.0 0.00 1.0 94.39 0.01014  
 1000.0 0.0100.0 1.899.14 4.098.17 4.597.80 6.097.66 7.296.95  
 1000.0 9.996.30 12.596.10 15.195.60 17.795.40 20.395.60 22.994.60  
 1000.0 25.594.00 28.193.90 30.794.50 33.394.10 35.996.30 38.596.80  
 1000.0 41.195.50 43.795.90 46.396.10 48.996.20 51.596.40 54.196.50  
 1000.0 56.796.60 59.396.90 60.196.80 61.097.30 63.097.20 65.097.60  
 1000.0 67.097.80 70.898.56 71.899.01  
 NS 1000.0 1.1 1.1 6.1 .5 6.1 .5 6.7 .5 7.7  
 NS 1000.0 .5 6.2 6.2 5.2 .7 6.2 6.2 7.2  
 NS 1000.0 6.2 7.2 6.2 7.2 7.7 7.7  
 NS 1000.0 6.2 7.6 7.6 6.2 7.2 7.5  
 NS 1000.0 6.2 6.4 7.5 7.7 6.1 6.1  
 NS 1000.0 7.6 1.1 1.1  
 CAL11000.0 97.77 166.2  
 VEL11000.0 0.00 0.01 0.01 0.01 0.30 0.40 0.20 0.40 0.40  
 VEL11000.0 0.70 1.50 1.50 1.95 4.10 4.50 3.10 2.00 1.80 1.40 1.50 1.90  
 VEL11000.0 1.60 1.00 0.85 1.10 0.40 0.01 0.00  
 CAL21000.0 97.01 19.7  
 VEL21000.0  
 VEL21000.0  
 VEL21000.0  
 CAL31000.0 97.78 151.6  
 VEL31000.0  
 VEL31000.0  
 VEL31000.0  
 ENDJ

RUN HIGH  
 IOC 1101100000001000101000

TRANSECT 4

QARD 19.7  
 QARD 30.0  
 QARD 40.0  
 QARD 50.0  
 QARD 60.0  
 QARD 70.0  
 QARD 80.0  
 QARD 90.0  
 QARD 104.0  
 QARD 110.0  
 QARD 120.0  
 QARD 130.0  
 QARD 140.0  
 QARD 151.6  
 QARD 166.2  
 QARD 170.0  
 QARD 180.0  
 QARD 190.0  
 QARD 200.0  
 QARD 210.0  
 QARD 220.0  
 QARD 240.0  
 QARD 260.0  
 QARD 280.0  
 QARD 300.0  
 QARD 320.0  
 QARD 340.0  
 QARD 360.0  
 QARD 380.0  
 QARD 400.0  
 XSEC1000.0 0.00 1.0 94.39 0.01014  
 1000.0 0.0100.4 2.099.20 7.198.88 10.096.86 12.397.56 14.595.86  
 1000.0 16.395.96 18.594.36 20.894.16 23.094.36 25.394.76 27.595.46  
 1000.0 29.896.76 32.096.26 34.396.06 36.596.76 38.896.86 41.097.76  
 1000.0 43.397.16 45.597.06 47.896.86 50.097.46 52.397.36 54.597.26  
 1000.0 55.597.36 55.898.23 57.798.26 61.598.70 63.399.03 64.199.41  
 NS 1000.0 1.1 1.6 7.7 7.7 7.7 .5 7.7  
 NS 1000.0 .70 7.6 7.7 7.7 7.6 6.6 7.6  
 NS 1000.0 7.6 7.6 7.7 7.7 7.6 6.5  
 NS 1000.0 6.5 7.5 6.5 7.5 5.2 5.2  
 NS 1000.0 .15 7.5 7.7 7.7 1.7 1.7 1.7  
 CAL11000.0 98.30 166.2  
 VEL11000.0 -.10 -.10 0.10 0.01 0.50 1.25 3.65 3.65 2.65  
 VEL11000.0 2.80 4.00 1.80 -.20 1.10 -.20 0.01 3.40 4.10 3.80 2.80 1.00  
 VEL11000.0 0.90 0.00  
 CAL21000.0 97.31 19.7  
 VEL21000.0  
 VEL21000.0  
 VEL21000.0  
 CAL31000.0 98.33 151.6  
 VEL31000.0  
 VEL31000.0  
 VEL31000.0  
 ENDJ



**Stream:** Williamson River  
**Site:** 628 (End of Kirk Canyon to Spring Creek)  
**Date:** 9/22/1990  
**Habitat:** Rifle

**Flow:** Low

(1) Level Loop Survey (BM & HP)

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	11.38	111.38		100.00
HP1			14.35	97.03
HP2			11.37	100.01
HP3			11.45	99.93
TP				
HP3	11.52	111.45		100.00
HP2			11.45	100.00
HP1			14.43	97.02
BM			11.45	100.00

Comment: Head pins on right bank, but zero on the tape is on the LWP (looking upstream)

**Date:** 4/10/1991  
**Habitat:** Rifle

**Flow:** High

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	14.19	114.19		100.00
HP1			17.18	97.01
HP2			14.19	100.00
HP3			14.25	99.94
TP				
HP3	14.30	114.24		100.00
HP2			14.24	100.00
HP1			17.23	97.01
BM			14.24	100.00

Comment:

**Date:** 5/27/1993  
**Habitat:** Rifle

**Flow:** Mid

(1) Level Loop Survey

BM/HP (ft)	BS (ft)	HI (ft)	FS (ft)	Elev (ft)
BM	13.70	113.70		100.00
HP1			16.69	97.01
HP2			13.70	100.00
HP3			13.75	99.95
TP				
HP3	14.03	113.98		100.00
HP2			13.98	100.00
HP1			16.98	97.00
BM			13.98	100.00

Comment:

(2) Water Surface Elevation (WSE) Survey

	Sta		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
	L/R	WSE						
TR1	LWSE	243	103.98	9.06	0.00	94.92	94.90	25.65
	RWSE			9.11	0.00	94.87		
TR2	LWSE	162	111.45	15.51	0.00	95.94	95.86	25.81
	RWSE			15.68	0.00	95.77		
TR3	LWSE	54	111.45	14.24	0.00	97.21	97.24	20.24
	RWSE			14.18	0.00	97.27		

Note: WSE slope = 1.241%

Ave Q= 23.90

(2) Water Surface Elevation (WSE) Survey

	Sta		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
	L/R	WSE						
TR1	LWSE	243	114.24	18.44	0.00	95.80	95.85	154.50
	RWSE			18.35	0.00	95.89		
TR2	LWSE	162	114.24	17.50	0.00	96.74	96.69	176.97
	RWSE			17.61	0.00	96.63		
TR3	LWSE	54	114.24	15.95	0.00	98.29	98.24	153.25
	RWSE			16.06	0.00	98.18		

Note: WSE slope = 1.265%

Ave Q= 161.57

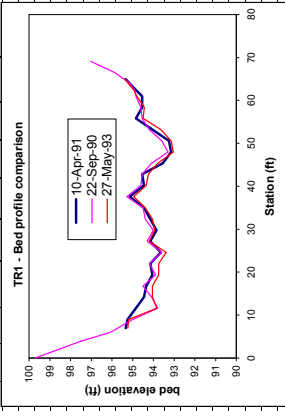
(2) Water Surface Elevation (WSE) Survey

	Sta		HI (ft)	FS (ft)	Rod (ft)	WSE (ft)	Ave WSE (ft)	Q (cfs)
	L/R	WSE						
TR1	LWSE	243	113.98	18.06	0.00	95.92	95.94	151.64
	RWSE			18.02	0.00	95.96		
TR2	LWSE	162	113.98	17.21	0.00	96.77	96.72	
	RWSE			17.32	0.00	96.66		
TR3	LWSE	54	113.98	15.71	0.00	98.27	98.22	
	RWSE			15.82	0.00	98.16		

Note: WSE slope = 1.204%

Ave Q= 151.64

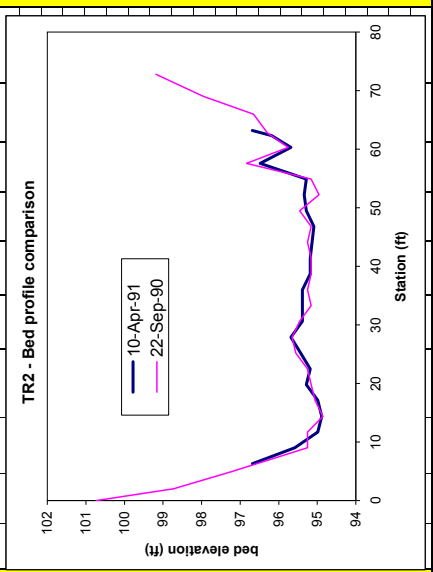
22-Sep-90										10-Apr-91										27-May-93										27-May-93									
Sta	FS	Ground	Depth	Vel (ft/s)	q	substrate	Sta	FS	Ground	Depth	Vel (ft/s)	q	substrate	Sta	FS	Ground	Depth	Vel (ft/s)	q	substrate	Sta	FS	Ground	Depth	Vel (ft/s)	q	substrate												
(ft)	(ft)	(ft)	(ft)	V <sub>0.20d</sub>	V <sub>0.8</sub>	Ave	(ft)	(ft)	(ft)	(ft)	V <sub>0.20d</sub>	V <sub>0.8</sub>	Ave	(ft)	(ft)	(ft)	(ft)	V <sub>0.20d</sub>	V <sub>0.8</sub>	Ave	(ft)	(ft)	(ft)	(ft)	V <sub>0.20d</sub>	V <sub>0.8</sub>	Ave												
LWP	0.0	4.26	99.72			1.1	LWP	7.0	95.35	0.50	0.00	0.00	0.00	1.1	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00														
HI	Q						LWE	7.0	95.25	0.60	0.01	0.01	0.01	0.01	1.1	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
Date	(ft)	(cfs)					11.6	9.0	94.85	1.40	0.50	0.50	0.50	0.50	1.1	0.0	0.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00													
9/23/1990	114.24	154.5					14.2	11.6	94.45	1.40	-0.10	-0.10	-0.10	-0.10	7.7	11.6	14.2	94.04	1.90	1.90	2.82	2.82	2.82	2.82	2.82	2.82													
4/10/1991	114.24	154.5					16.8	16.8	94.35	1.50	0.80	0.80	0.80	0.80	7.7	16.8	16.8	94.04	1.90	1.90	2.82	2.82	2.82	2.82	2.82	2.82													
5/27/1993	113.98	151.6					19.4	19.4	94.05	1.80	4.20	4.20	4.20	4.20	6.5	19.4	19.4	93.74	2.20	2.20	3.37	3.37	3.37	3.37	3.37	3.37													
							22.0	22.0	94.15	1.70	4.10	4.10	4.10	4.10	6.5	22.0	22.0	93.74	2.20	2.20	3.37	3.37	3.37	3.37	3.37	3.37													
							24.6	24.6	93.65	2.20	3.70	3.70	3.70	3.70	6.5	24.6	24.6	93.39	2.20	2.20	3.37	3.37	3.37	3.37	3.37	3.37													
							27.2	27.2	94.15	1.70	2.10	2.10	2.10	2.10	6.5	27.2	27.2	94.19	1.75	1.75	2.26	2.26	2.26	2.26	2.26	2.26													
							29.8	29.8	93.85	2.00	3.40	3.40	3.40	3.40	6.5	29.8	29.8	93.94	1.90	1.90	2.35	2.35	2.35	2.35	2.35	2.35													
							32.4	32.4	94.15	1.70	2.50	2.50	2.50	2.50	6.5	32.4	32.4	94.04	1.90	1.90	2.35	2.35	2.35	2.35	2.35	2.35													
							35.0	35.0	94.45	1.40	1.00	1.00	1.00	1.00	6.5	35.0	35.0	94.39	1.55	1.55	2.07	2.07	2.07	2.07	2.07	2.07													
							37.6	37.6	95.15	0.70	2.50	2.50	2.50	2.50	6.5	37.6	37.6	94.94	1.00	1.00	2.62	2.62	2.62	2.62	2.62	2.62													
							40.2	40.2	94.45	1.40	2.30	2.30	2.30	2.30	6.5	40.2	40.2	94.34	1.60	1.60	2.62	2.62	2.62	2.62	2.62	2.62													
							42.8	42.8	93.55	2.30	3.70	3.70	3.70	3.70	6.5	42.8	42.8	93.74	2.20	2.20	3.37	3.37	3.37	3.37	3.37	3.37													
							45.4	45.4	93.15	2.70	1.60	1.60	1.60	1.60	6.5	45.4	45.4	93.14	2.90	2.90	3.37	3.37	3.37	3.37	3.37	3.37													
							48.0	48.0	93.35	2.60	1.60	1.60	1.60	1.60	6.5	48.0	48.0	93.14	2.90	2.90	3.37	3.37	3.37	3.37	3.37	3.37													
							50.6	50.6	94.05	1.80	1.60	1.60	1.60	1.60	6.5	50.6	50.6	93.14	2.90	2.90	3.37	3.37	3.37	3.37	3.37	3.37													
							53.2	53.2	94.85	1.00	2.30	2.30	2.30	2.30	6.5	53.2	53.2	94.49	1.45	1.45	2.07	2.07	2.07	2.07	2.07	2.07													
							55.8	55.8	94.53	1.30	0.30	0.30	0.30	0.30	6.5	55.8	55.8	94.49	1.45	1.45	2.07	2.07	2.07	2.07	2.07	2.07													
							58.4	58.4	94.53	1.30	0.30	0.30	0.30	0.30	6.5	58.4	58.4	94.49	1.45	1.45	2.07	2.07	2.07	2.07	2.07	2.07													
							61.0	61.0	94.85	1.60	0.01	0.01	0.01	0.01	6.5	61.0	61.0	94.79	1.15	1.15	2.15	2.15	2.15	2.15	2.15	2.15													
							63.6	63.6	94.85	1.60	0.01	0.01	0.01	0.01	6.5	63.6	63.6	94.94	1.00	1.00	3.34	3.34	3.34	3.34	3.34	3.34													
							66.2	66.2	95.35	0.30	0.00	0.00	0.00	0.00	6.5	66.2	66.2	95.39	0.35	0.35	1.67	1.67	1.67	1.67	1.67	1.67													
							68.8	68.8	97.01						6.5	68.8	68.8	97.01			0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							71.4	71.4	17.23						6.5	71.4	71.4	17.23			0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							74.0	74.0							6.5	74.0	74.0				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							76.6	76.6							6.5	76.6	76.6				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							79.2	79.2							6.5	79.2	79.2				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							81.8	81.8							6.5	81.8	81.8				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							84.4	84.4							6.5	84.4	84.4				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							87.0	87.0							6.5	87.0	87.0				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							89.6	89.6							6.5	89.6	89.6				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							92.2	92.2							6.5	92.2	92.2				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							94.8	94.8							6.5	94.8	94.8				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							97.4	97.4							6.5	97.4	97.4				0.00	0.00	0.00	0.00	0.00	0.00	0.00												
							100.0	100.0							6.5	100.0	100.0				0.00	0.00	0.00	0.00	0.00	0.00	0.00												



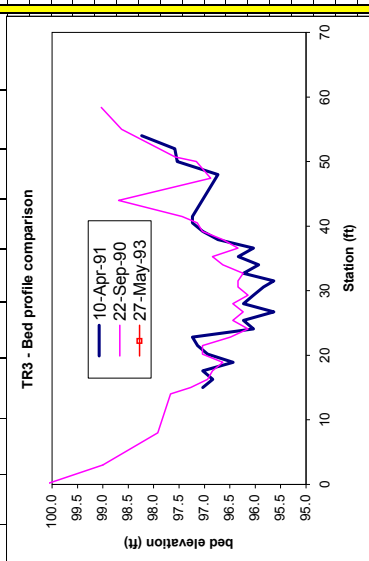
Bed profile Check for Riffle  
No velocity or depth surveyed

Q-Transect  
Just upstream of TR-1

Stream: Williamson River		22-Sep-90										10-Apr-91										27-May-93									
Site:	628	Sta	FS	Ground	Depth	Vel (ft/s)	q	substrate	Sta	FS	Ground	Depth	Vel (ft/s)	q	substrate	Sta	FS	Ground	Depth	Vel (ft/s)	q	substrate									
Transsect:	2	(ft)	(ft)	(ft)	(ft)	V <sub>0.20,6</sub>	Ave		(ft)	(ft)	(ft)	(ft)	V <sub>0.20,6</sub>	Ave		(ft)	(ft)	(ft)	(ft)	V <sub>0.20,6</sub>	Ave										
Habitat:	Riffle																														
Survey	HI Q																														
Date	(ft) (cfs)																														
9/22/1990	111.45 25.8	LWP	0	10.72	100.73			1.1																							
4/10/1991	114.24 177.0		2	12.72	98.73			1.1																							
5/27/1993	113.98		5	14.26	97.19			1.1																							
			9		95.26	0.60	0.00	0.00																							
			11.7		95.26	0.60	1.40	1.40																							
			14.4		94.86	1.00	0.79	1.33																							
			17.1		95.06	0.80	1.53	3.30																							
			19.8		95.16	0.70	1.61	3.04																							
			22.5		95.26	0.60	0.59	0.96																							
			25.2		95.56	0.30	1.02	0.83																							
			27.9		95.66	0.20	0.68	0.37																							
			30.6		95.46	0.40	0.27	0.29																							
			33.3		95.16	0.70	0.21	0.40																							
			36		95.26	0.60	0.01	0.02																							
			38.7		95.16	0.70	0.36	0.68																							
			41.4		95.16	0.70	0.54	1.02																							
			44.1		95.26	0.60	0.29	0.47																							
			46.8		95.16	0.70	0.89	1.68																							
			49.5		95.46	0.40	1.97	1.97																							
			52.2		94.96	0.90	2.55	6.20																							
			54.9		95.16	0.70	0.03	0.03																							
			57.6		14.62	96.83		6.5																							
			60.3		95.76	0.10	0.00	0.00																							
			62.8		15.16	96.29		7.7																							
			66.0		14.80	96.65		7.7																							
			69.0		13.50	97.95		1.1																							
			72.8		12.27	99.18		1.1																							
			RHP		11.46	99.99		1.1																							



Stream: Williamson River			22-Sep-90						10-Apr-91						27-May-93														
Site:	628		Sta	FS	Ground	Depth	Vel (ft/s)			q	substrate	Sta	FS	Ground	Depth	Vel (ft/s)			q	substrate	Sta	FS	Ground	Depth	Vel (ft/s)			q	substrate
Transsect:	3		(ft)	(ft)	(ft)	(ft)	V <sub>0.2/0.6</sub>	V <sub>0.8</sub>	Ave	(cfs)		(ft)	(ft)	(ft)	(ft)	V <sub>0.2/0.6</sub>	V <sub>0.8</sub>	Ave	(cfs)		(ft)	(ft)	(ft)	(ft)	V <sub>0.2/0.6</sub>	V <sub>0.8</sub>	Ave	(cfs)	
Habitat:	Riffle																												
Survey	HI	Q																											
Date	(ft)	(cfs)																											
9/22/1990	111.45	20.2																											
4/10/1991	114.24	153.3																											
5/27/1993	113.98																												
			LWP	0.0	11.31	100.14																							
				3	12.45	99.00																							
				8	13.53	97.92																							
				14	13.78	97.67																							
			LWE	15	14.18	97.27																							
				16.3		96.94	0.30	0.01																					
				17.6		96.84	0.40	0.01																					
				18.9		96.64	0.60	1.00																					
				20.2		97.04	0.20	1.10																					
				21.5		97.04	0.20	0.6																					
				22.8		96.49	0.75	1.7																					
				24.1		96.14	1.10	1.02																					
				25.4		96.44	0.80	1.89																					
				26.7		96.24	1.00	3.10																					
				28		96.44	0.80	2.75																					
				29.3		96.14	1.10	1.35																					
				30.6		96.34	0.90	1.35																					
				31.5		96.34	0.90	0.20																					
				32.7		96.24	1.00	0.30																					
				34		96.64	0.60	1.31																					
				35.3		96.84	0.40	1.65																					
				36.6		96.34	0.90	0.85																					
				37.9		96.64	0.60	0.42																					
				39.2		97.04	0.20	0.01																					
				40.5		97.14	0.10	0.01																					
			RWE	41.5	14.01	97.44	0.20	0.00																					
				44.0	12.76	98.69																							
				47.4	14.57	96.88																							
				50.0	14.29	97.16																							
				50.7	13.87	97.58																							
			RWS	58.4	12.82	98.63																							
			RHP		11.52	99.93																							



Riffle HIGH TRANSECT 1  
 IOC 1101100100001000101000  
 QARD 23.9  
 QARD 30.0  
 QARD 40.0  
 QARD 50.0  
 QARD 60.0  
 QARD 70.0  
 QARD 80.0  
 QARD 90.0  
 QARD 104.0  
 QARD 110.0  
 QARD 120.0  
 QARD 130.0  
 QARD 140.0  
 QARD 151.6  
 QARD 161.6  
 QARD 170.0  
 QARD 180.0  
 QARD 190.0  
 QARD 200.0  
 QARD 210.0  
 QARD 220.0  
 QARD 240.0  
 QARD 260.0  
 QARD 280.0  
 QARD 300.0  
 QARD 320.0  
 QARD 340.0  
 QARD 360.0  
 QARD 380.0  
 QARD 400.0  
 XSEC1000.0 0.00 1.0 93.15 0.01265  
 1000.0 0.099.72 3.997.51 6.096.06 7.095.35 9.095.25 11.694.85  
 1000.0 14.294.45 16.894.35 19.494.05 22.094.15 24.693.65 27.294.15  
 1000.0 29.893.85 32.494.15 35.094.45 37.695.15 40.294.45 42.894.55  
 1000.0 45.493.55 48.093.15 50.693.25 53.294.05 55.894.85 58.494.55  
 1000.0 61.094.55 62.494.85 64.095.14 65.095.35 66.595.86 69.197.02  
 NS 1000.0 1.1 6.1 1.7 1.7 .4 7.7 7.7  
 NS 1000.0 7.7 6.5 6.5 6.5 6.5 6.5  
 NS 1000.0 5.6 5.6 5.8 8.8 8.6 7.6  
 NS 1000.0 7.5 8.5 8.5 7.5 7.7 5.2  
 NS 1000.0 5.2 .6 2.5 .6 2.6 2.6 1.1 1.1  
 WSL 1000.0 94.90 94.98 95.10 95.20 95.29 95.38  
 WSL 1000.0 95.44 95.50 95.58 95.61 95.66 95.71  
 WSL 1000.0 95.76 95.81 95.85 95.88 95.92 95.96  
 WSL 1000.0 96.00 96.04 96.07 96.14 96.20 96.26  
 WSL 1000.0 96.32 96.38 96.44 96.49 96.54 96.59  
 CAL11000.0 95.85 161.6  
 VEL11000.0 0.00 0.01 0.50 -.10 0.80 4.20 4.10 3.70 2.10  
 VEL11000.0 3.40 2.50 1.00 2.50 2.30 3.70 0.20 0.60 0.25 1.60 2.30 0.90  
 VEL11000.0 0.30 0.01 0.01 0.00  
 CAL21000.0 94.90 23.9  
 VEL21000.0  
 VEL21000.0  
 VEL21000.0  
 CAL31000.0 95.94 151.6  
 VEL31000.0  
 VEL31000.0  
 VEL31000.0  
 ENDJ

Riffle

HIGH

TRANSECT 2

IOC 1101100000001000101000

QARD 23.9  
 QARD 30.0  
 QARD 40.0  
 QARD 50.0  
 QARD 60.0  
 QARD 70.0  
 QARD 80.0  
 QARD 90.0  
 QARD 104.0  
 QARD 110.0  
 QARD 120.0  
 QARD 130.0  
 QARD 140.0  
 QARD 151.6  
 QARD 161.6  
 QARD 170.0  
 QARD 180.0  
 QARD 190.0  
 QARD 200.0  
 QARD 210.0  
 QARD 220.0  
 QARD 240.0  
 QARD 260.0  
 QARD 280.0  
 QARD 300.0  
 QARD 320.0  
 QARD 340.0  
 QARD 360.0  
 QARD 380.0  
 QARD 400.0

XSEC1000.0 0.00 1.0 94.86 0.01265  
 1000.0 0.0100.7 2.098.73 5.097.19 6.396.69 9.095.59 11.794.99  
 1000.0 14.494.89 17.194.99 19.895.29 22.595.19 25.295.44 27.995.69  
 1000.0 30.695.39 33.395.39 36.095.39 38.795.19 41.495.19 44.195.26  
 1000.0 46.895.09 49.595.29 52.295.34 54.995.29 57.696.49 60.395.69  
 1000.0 62.396.19 63.296.69 66.096.65 69.097.95 72.899.18  
 NS 1000.0 1.1 1.1 1.1 1.1 6.7 6.5  
 NS 1000.0 6.6 6.6 6.5 6.5 6.5 6.5  
 NS 1000.0 6.5 6.7 6.7 6.7 6.5 6.6  
 NS 1000.0 .4 6.5 7.5 5.7 7.6 0.2 6.5 6.5  
 NS 1000.0 .2 7.7 7.7 7.7 1.1 1.1  
 CAL11000.0 96.69 161.6  
 VEL11000.0 0.00 2.40 3.10 2.50 3.20 3.10 1.70 2.40 2.50  
 VEL11000.0 1.00 1.10 1.20 1.50 4.20 2.30 0.40 2.70 4.40 4.20 0.01 3.10  
 VEL11000.0 0.20 0.00  
 CAL21000.0 95.86 23.9  
 VEL21000.0  
 VEL21000.0  
 VEL21000.0  
 CAL31000.0 96.72 151.6  
 VEL31000.0  
 VEL31000.0  
 VEL31000.0  
 ENDJ

IOC 1101100000001000101000

QARD 23.9  
 QARD 30.0  
 QARD 40.0  
 QARD 50.0  
 QARD 60.0  
 QARD 70.0  
 QARD 80.0  
 QARD 90.0  
 QARD 104.0  
 QARD 110.0  
 QARD 120.0  
 QARD 130.0  
 QARD 140.0  
 QARD 151.6  
 QARD 161.6  
 QARD 170.0  
 QARD 180.0  
 QARD 190.0  
 QARD 200.0  
 QARD 210.0  
 QARD 220.0  
 QARD 240.0  
 QARD 260.0  
 QARD 280.0  
 QARD 300.0  
 QARD 320.0  
 QARD 340.0  
 QARD 360.0  
 QARD 380.0  
 QARD 400.0

XSEC1000.0 0.00 1.0 96.64 0.01265  
 1000.0 0.0100.1 3.099.00 8.097.92 14.097.67 15.097.04 16.396.84  
 1000.0 17.697.04 18.996.44 20.296.94 21.597.14 22.897.24 24.196.04  
 1000.0 25.496.24 26.795.64 28.096.24 29.396.04 30.695.84 31.595.64  
 1000.0 32.796.24 34.095.94 35.396.34 36.696.04 37.996.74 39.297.04  
 1000.0 40.597.24 41.597.24 44.098.69 48.096.74 50.097.54 50.797.58  
 1000.0 52.097.59 54.098.24 55.098.63 58.499.03  
 NS 1000.0 1.1 7.1 7.7 7.7 0.50 7.6 .30 6.6  
 NS 1000.0 6.6 7.7 7.7 7.7 7.7 6.5  
 NS 1000.0 6.5 6.5 6.5 6.5 6.5 6.5  
 NS 1000.0 6.5 7.6 7.6 7.6 7.6 7.6  
 NS 1000.0 6.5 6.5 7.7 7.7 7.7 6.6  
 NS 1000.0 6.6 7.1 7.1 1.1  
 CAL11000.0 98.24 161.6  
 VEL11000.0 0.10 0.60 3.30 2.40 4.10 4.50 2.50 3.90  
 VEL11000.0 5.90 4.05 6.00 2.70 3.00 2.90 2.50 2.10 3.80 2.70 2.60 1.40  
 VEL11000.0 1.80 0.90 0.63 0.20 0.60 0.64 0.70 0.00  
 CAL21000.0 97.24 23.9  
 VEL21000.0  
 VEL21000.0  
 VEL21000.0  
 CAL31000.0 98.22 151.6  
 VEL31000.0  
 VEL31000.0  
 VEL31000.0  
 ENDJ