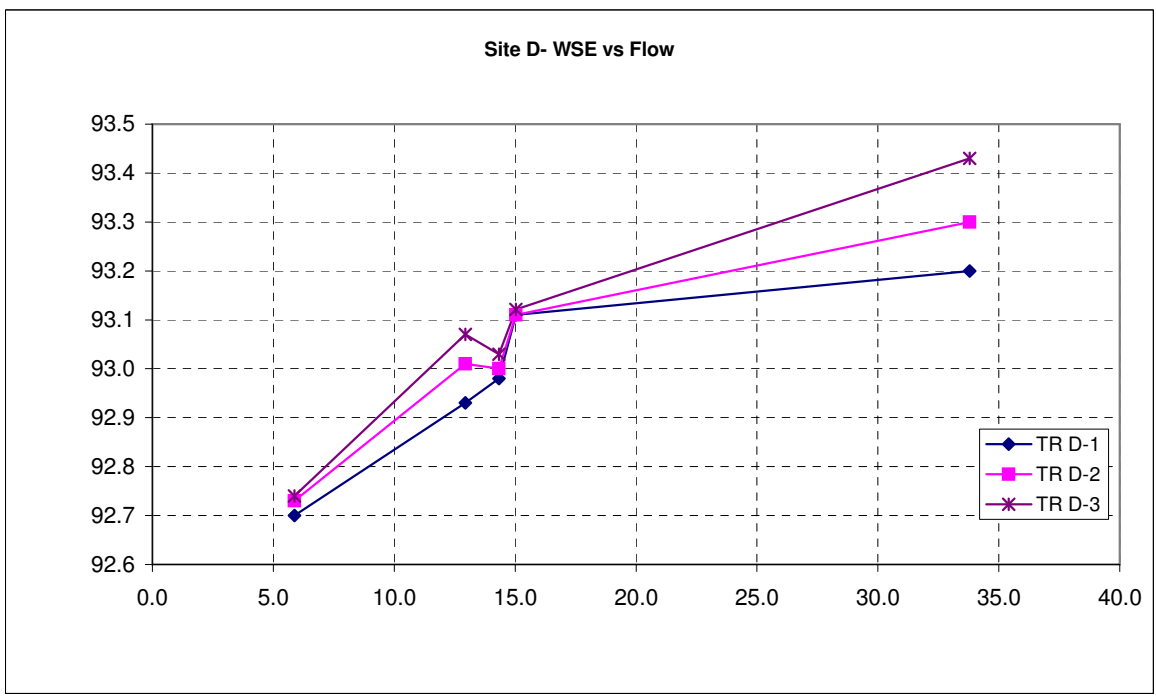
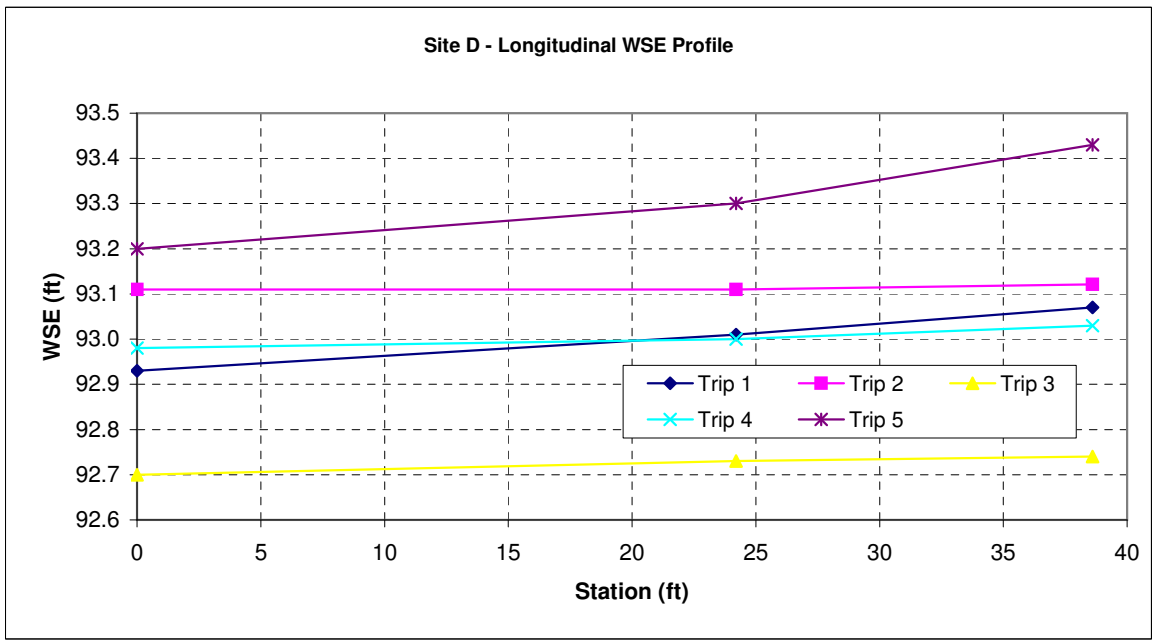


Reach: **Stetson Reach**
 Stream: **Cooper Creek**
 Site: **Site D (Cooper Creek above Stetson Creek)**
 Habitat Type: **Glide**

			5.9	12.9	14.3	15.0	33.8					
			WSE (ft)					Vel-Depth Survey				
TR	length	Sta	Trip 3	Trip 1	Trip 4	Trip 2	Trip 5	Trip 3	Trip 1	Trip 4	Trip 2	Trip 5
TR D-1	-	0.0	92.70	92.93	92.98	93.11	93.20		Y			Y
TR D-2	24.2	24.2	92.73	93.01	93.00	93.11	93.30		Y			Y
TR D-3	14.4	38.6	92.74	93.07	93.03	93.12	93.43		Y			Y
Average WSE slope			0.10%	0.36%	0.13%	0.03%	0.60%					

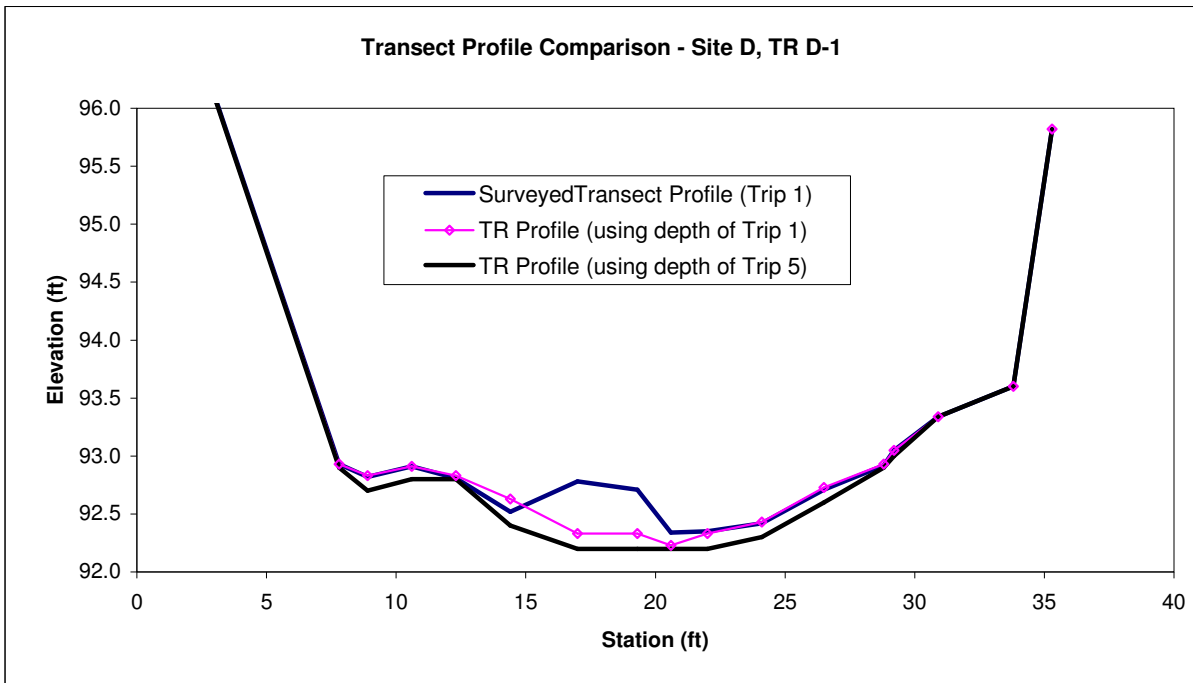


Transect profile Comparison - Site D, TR D-1

Trip 1								Trip 5				subs	code
Sta (ft)	HI (ft)	FS (ft)	Elev (ft)	Depth (ft)	Velocity (ft/s)	q (cfs)	Bed Elev (ft)	Depth (ft)	Velocity (ft/s)	q (cfs)	Bed Elev (ft)		
0	98.38	0.29	98.09				98.09				98.09	org	0
7.8	98.38	5.45	92.93	0.00	0.00	0.00	92.93	0.3	1	0.24	92.90	4	2
8.9	98.38	5.56	92.82	0.10	0.00	0.00	92.83	0.5	0.3	0.21	92.70	3	2
10.6	98.38	5.47	92.91				92.91	0.4	0.7	0.48	92.80	8	2
12.3	98.38	5.57	92.81	0.10	0.50	0.10	92.83	0.4	0.9	0.68	92.80	11	3
14.4	98.38	5.86	92.52	0.30	2.00	1.41	92.63	0.8	1.9	3.57	92.40	11	3
17	98.38	5.6	92.78	0.60	2.00	2.94	92.33	1	3.2	7.84	92.20	45	4
19.3	98.38	5.67	92.71	0.60	2.00	2.16	92.33	1	3.2	5.76	92.20	45	4
20.6	98.38	6.04	92.34	0.70	2.00	1.89	92.23	1	2.8	3.78	92.20	64	4
22	98.38	6.03	92.35	0.60	2.30	2.42	92.33	1	2.4	4.20	92.20	32	3
24.1	98.38	5.96	92.42	0.50	2.10	2.36	92.43	0.9	2.1	4.25	92.30	23	3
26.5	98.38	5.67	92.71	0.20	0.40	0.19	92.73	0.6	1.4	1.97	92.60	128	5
28.8	98.38	5.46	92.92	0.00	0.00	0.00	92.93	0.3	0.7	0.28	92.90	6	2
29.2	98.38	5.33	93.05				93.05	0.2	0.4	0.02	93.00	32	3
30.9	98.38	5.04	93.34				93.34				93.34	org	0
33.8	98.38	4.78	93.6				93.60				93.60	org	0
35.3	98.38	2.56	95.82				95.82				95.82	org	0

TR Q (cfs)= **13.5**

TR Q (cfs)= **33.3**

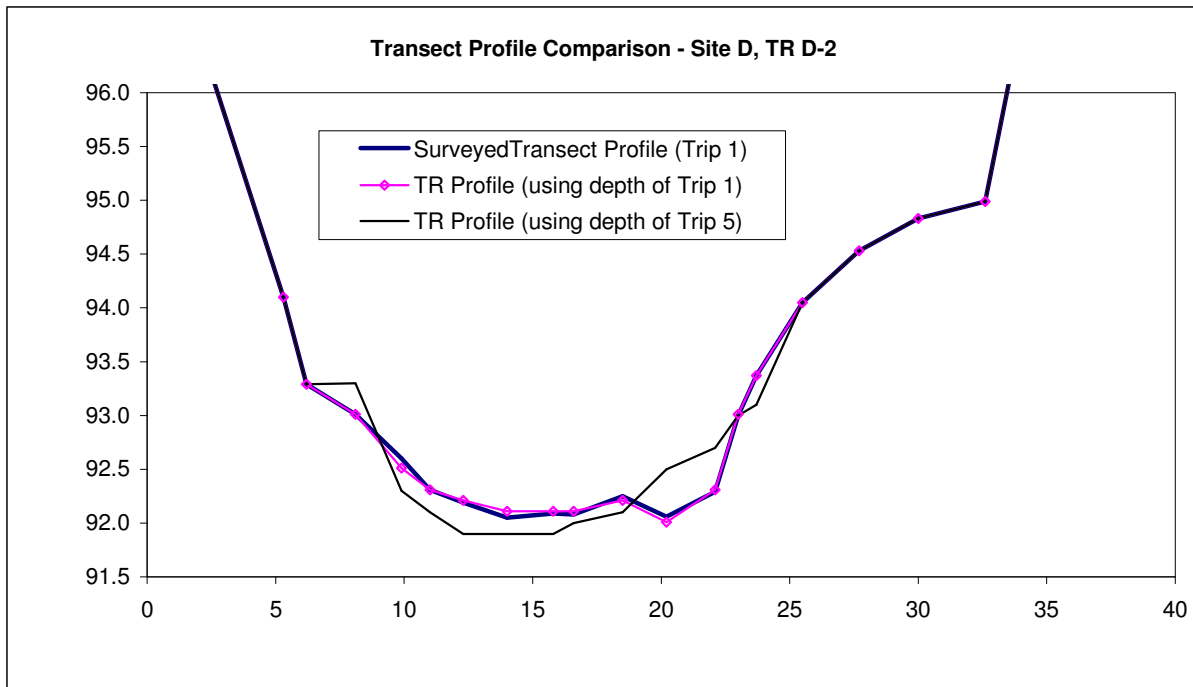


Transect profile Comparison - Site D, TR D-2

Trip 1								Trip 5					
Sta (ft)	HI (ft)	FS (ft)	Elev (ft)	Depth (ft)	Velocity (ft/s)	q (cfs)	Bed Elev (ft)	Depth (ft)	Velocity (ft/s)	q (cfs)	Bed Elev (ft)	subs	code
0	100.19	2.16	98.03				98.03				98.03	org	0
5.3	100.19	6.09	94.1				94.10				94.10	org	0
6.2	100.19	6.9	93.29				93.29				93.29	org	0
8.1	100.19	7.18	93.01	0.00	0.00	0.00	93.01	0.00	0.00	0.00	93.30	2	1
9.9	100.19	7.59	92.6	0.50	1.10	0.80	92.51	1.00	0.60	0.87	92.30	4	2
11	100.19	7.88	92.31	0.70	1.70	1.43	92.31	1.20	2.60	3.74	92.10	6	2
12.3	100.19	8	92.19	0.80	1.90	2.28	92.21	1.40	3.30	6.93	91.90	32	3
14	100.19	8.14	92.05	0.90	1.50	2.36	92.11	1.40	3.00	7.35	91.90	512	7
15.8	100.19	8.1	92.09	0.90	1.80	2.11	92.11	1.40	1.70	3.09	91.90	16	3
16.6	100.19	8.11	92.08	0.90	1.20	1.46	92.11	1.30	1.90	3.33	92.00	16	3
18.5	100.19	7.94	92.25	0.80	1.20	1.73	92.21	1.20	2.20	4.75	92.10	16	3
20.2	100.19	8.13	92.06	1.00	0.80	1.44	92.01	0.80	2.60	3.74	92.50	45	4
22.1	100.19	7.9	92.29	0.70	0.00	0.00	92.31	0.60	0.70	0.59	92.70	bed	8
23	100.19	7.19	93	0.00	0.00	0.00	93.01	0.30	0.20	0.05	93.00	bed	8
23.7	100.19	6.82	93.37				93.37	0.20	0.00	0.00	93.10	org	0
25.5	100.19	6.14	94.05				94.05				94.05	org	0
27.7	100.19	5.66	94.53				94.53				94.53	org	0
30	100.19	5.36	94.83				94.83				94.83	org	0
32.6	100.19	5.2	94.99				94.99				94.99	org	0
36	100.19	1.14	99.05				99.05				99.05	org	0

TR Q (cfs)= 13.6

TR Q (cfs)= 34.5

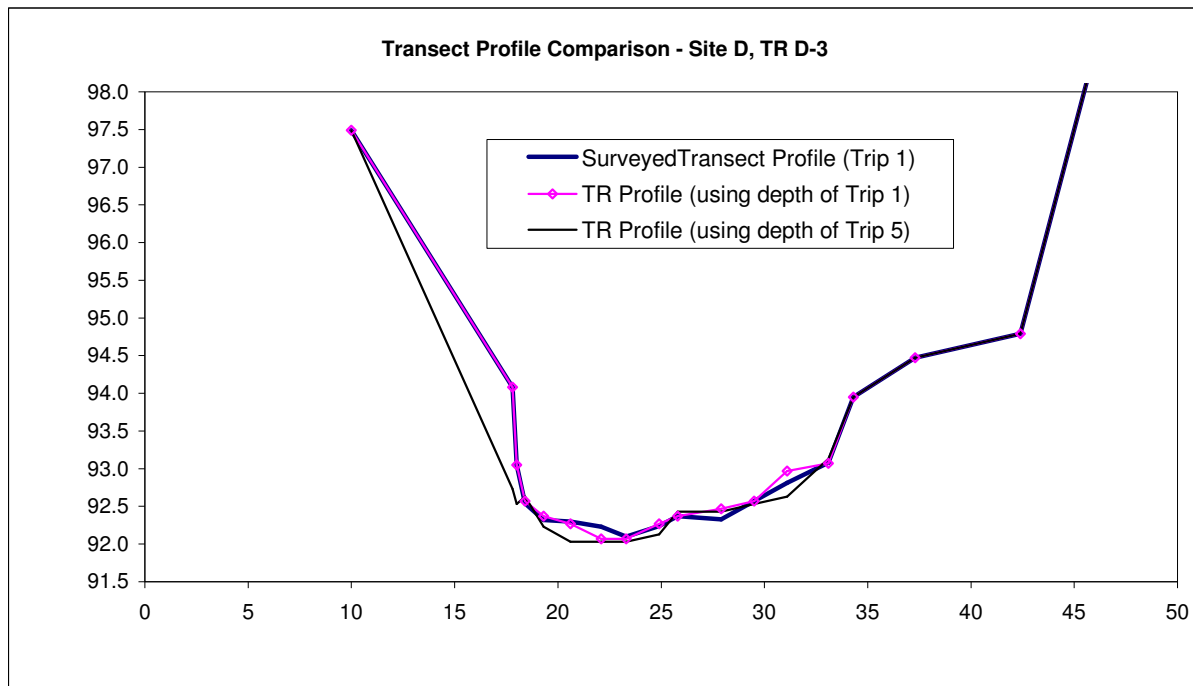


Transect profile Comparison - Site D, TR D-3

Trip 1								Trip 5					
Sta (ft)	HI (ft)	FS (ft)	Elev (ft)	Depth (ft)	Velocity (ft/s)	q (cfs)	Bed Elev (ft)	Depth (ft)	Velocity (ft/s)	q (cfs)	Bed Elev (ft)	subs	code
10	100.19	2.70	97.49				97.49				97.49	org	0
17.8	100.19	6.11	94.08				94.08	0.7	0.1	0.01	92.73	org	0
18.0	100.19	7.14	93.05				93.05	0.9	0.4	0.11	92.53	128	5
18.4	100.19	7.65	92.54	0.50	0.00	0.00	92.57	0.80	0.80	0.42	92.63	sand	1
19.3	100.19	7.87	92.32	0.70	0.60	0.46	92.37	1.20	2.00	2.64	92.23	3	2
20.6	100.19	7.89	92.3	0.80	1.60	1.79	92.27	1.40	2.40	4.70	92.03	3	2
22.1	100.19	7.96	92.23	1.00	2.40	3.24	92.07	1.40	3.20	6.05	92.03	11	3
23.3	100.19	8.09	92.1	1.00	2.30	3.22	92.07	1.40	3.50	6.86	92.03	8	2
24.9	100.19	7.95	92.24	0.80	1.60	1.60	92.27	1.30	3.00	4.88	92.13	bed	8
25.8	100.19	7.82	92.37	0.70	1.20	1.26	92.37	1.00	3.30	4.95	92.43	3	2
27.9	100.19	7.86	92.33	0.60	0.70	0.78	92.47	1.00	0.00	0.00	92.43	sand	1
29.5	100.19	7.62	92.57	0.50	0.10	0.08	92.57	0.90	1.20	1.73	92.53	32	3
31.1	100.19	7.38	92.81	0.10	0.00	0.00	92.97	0.80	0.90	1.30	92.63	16	3
33.1	100.19	7.11	93.08	0.0	0.0	0.00	93.07	0.30	0.00	0.00	93.13	bed	8
34.3	100.19	6.24	93.95				93.95				93.95	bed	8
37.3	100.19	5.72	94.47				94.47				94.47	org	0
42.4	100.19	5.4	94.79				94.79				94.79	bed	8
46.7	100.19	0.92	99.27				99.27				99.27	org	0

TR Q (cfs)= 12.4

TR Q (cfs)= 33.6



Reach: Stetson Reach
Stream: Cooper Creek
Site: Site D (Cooper Creek above Stetson Creek)
Habitat Type: Glide

(1) Field Data

- (a) Field data were collected in five trips between 5/2003 and 5/2004.
- (b) Flow data were only collected in Trip 1 on 5/11/2003 and in Trip 5 on 5/5/2004.
- (c) WSE data were collected in all five trips.
- (d) Because no flows were measured in Trip 2 to Trip 4, flows of these three trips were estimated. The estimated flows and the measured WSEs and flows are plotted together in worksheet "Measured hydraulics". The graph "Site D - WSE vs Flow" showed inconsistent relationships between flows and WSEs, which indicated errors in estimated flows and/or surveyed WSEs.

(2) WSE Calibration

WSE: Average WSE is used as the representative transect WSE.

Discharge: Trip 1 Q = Average discharge of TR D-1 and TR D-3. TR D-2 was considered as outliers.
 Trip 5 Q = Average discharge of TR D-1, TR D-2, and TR D-3. No flows were considered as outliers.

Slope: Use Trip 5's average WSE slope (from TR D-1 to TR D-3) = 0.60%

SZF:

TR	channel Invert (ft)		SZF (ft)
	Trip 1	Trip 5	
TR D-1	95.00	92.20	95.00
TR D-2	92.01	91.90	95.00
TR D-3	92.07	92.03	95.00

Note: Invert is the lowest elevation of the transect.

SZF of upstream transect must be equal or greater than the SZF of downstream transect.

Level Loop and Headpins:

Date	Trip	BM-A	BM-B
5/11/2003	1	100.00	94.81
6/25/2003	2		94.81
9/19/2003	3		94.81
10/10/2003	4	100.00	94.81
5/5/2004	5	100.00	

- (a) There were no level loop surveys performed in 6/25/03, 9/19/03, and 5/5/04 site visits
 BM elevation from the previous survey was used for WSE calculation.
- (b) To ensure the accuracy of WSE survey, it is recommended a headpin installed for each transect when

setting up the transects and a complete level loop be performed during each site visit.

A recommended complete level loop would include moving the level for a distance to a new location after all HP/BM are surveyed. Then reshoot *all* pins to check if pin elevations are consistent.

(c) Control pins between 5/03 and 10/03 should be stable, but it is not able to determine if the pins were still stable in Trip 5.

Calibration Flow:

This site has five sets of measured WSEs and two sets of velocity-depth surveys.

Flows for Trip 2 to Trip 4 were estimated and plotted along with all measured flows and WSEs in worksheet "Measured Hydraulics"

However, the graph "Site D - WSE vs Flow" show inconsistent flow-WSE relationship.

Due to the inconsistency between flows and WSEs, it was decided to only use flows taken in Trip 1 and Trip 5 for calibration. Estimated flows and measured WSEs of Trip 2 to Trip 4 will not be included for calibration, but will be used for comparison.

WSE Calibration Method:

(1) MANSQ was used to calibrate all three transects.

WSE Calibration Result:

Trip	Survey Date	Q (cfs)	Modeling WSE(ft)			Calibrated WSE(ft)			ΔWSE (ft, measured-calib.)		
			TR-1	TR-2	TR-3	TR-1	TR-2	TR-3	TR-1	TR-2	TR-3
1	5/11/2003	12.9	92.93	93.01	93.07	92.93	93.00	93.09	0.00	0.01	-0.02
2	6/25/2003	15.0	93.11	93.11	93.12	92.96	93.04	93.14			
3	9/19/2003	5.9	92.70	92.73	92.74	92.74	92.83	92.88			
4	10/10/2003	14.3	92.98	93.00	93.03	92.95	93.03	93.12			
5	5/5/2004	33.8	93.20	93.30	93.43	93.20	93.30	93.43	0.00	0.00	0.00

Note: (a) WSEs of Trip 2 to Trip 4 are listed in the table only for comparison, not for calibration error calculation.

(2) Calibrated Hydraulics

- (a) For MANSQ WSE calibration, $\beta_{TR1}=0.22$, $\beta_{TR2}=0.56$, and $\beta_{TR3}=0.35$. Trip 5 flow (33.87cfs) was the calibration flow.
- (b) For velocity calibration, Trip 5 velocity profiles were used as the templates for calibration.
- (c) Hydraulic calibration results are summarized in worksheets cTR D-y, where y=1, 2, 3, and 4.
- (d) WSE Calibration errors for all transects are with acceptable range. The maximum calibration error was only 0.02ft for TR D-3.
- (e) TR D-1, TR D-2, and TR D-3 : WSE, Froude number (Fr), Cross-sectional Manning's n, transect average velocity (V), wetted perimeter, and Velocity Adjustment Factor (VAF) all are acceptable and within reasonable ranges.
- (f) Comparison of modeling and calibrated WSEs are shown in worksheet "SimWSE".
- (g) PHABSIM model did not calculate wetted perimeter and Manning's, both of which were calculated outside the model.

(3) Velocity calibration

TR D-1: Trip 5's velocity profile was used as template for calibration.

Predicted velocity profile was reasonable, and no changes to the Manning's n calculated by PHABSIM were made.

TR D-2: Trip 5's velocity profile was used as template for calibration.

Predicted velocity profile was reasonable, and no changes to the Manning's n calculated by PHABSIM were made.

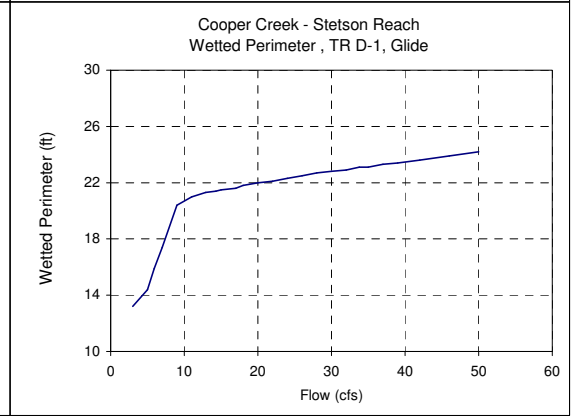
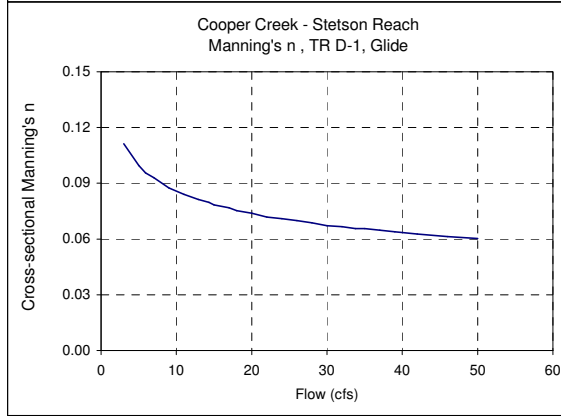
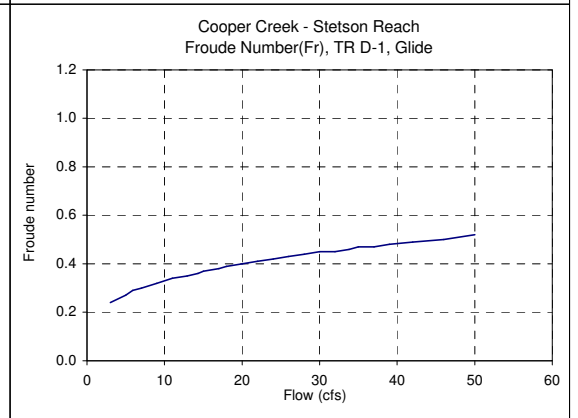
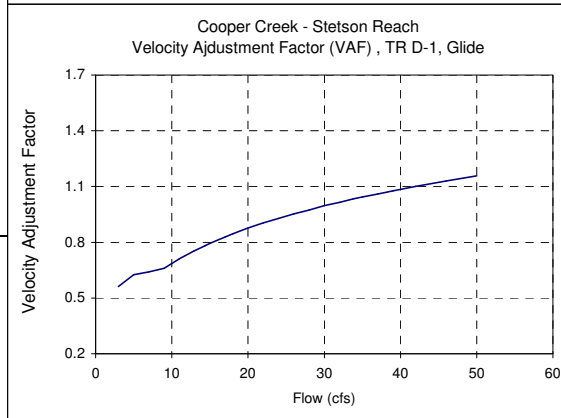
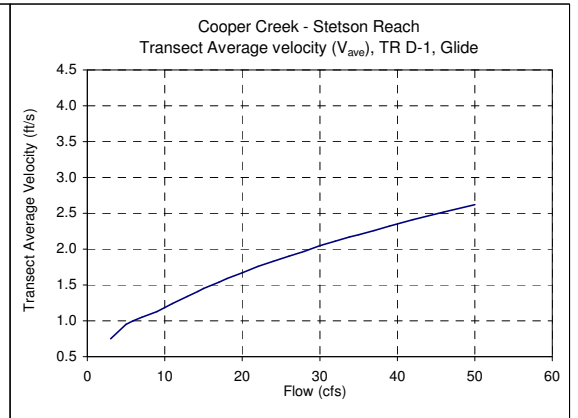
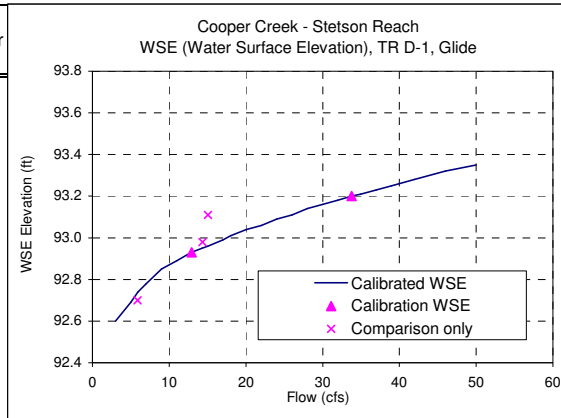
TR D-3: Trip 5's velocity profile was used as template for calibration.

Slightly adjusted Manning's n values calculated by PHABSIM to make the simulated velocity near the water edge more reasonable.

The comparison of simulated and measured velocity profiles are included in worksheet "VelComp", which shows the simulated profiles resemble the measured ones.

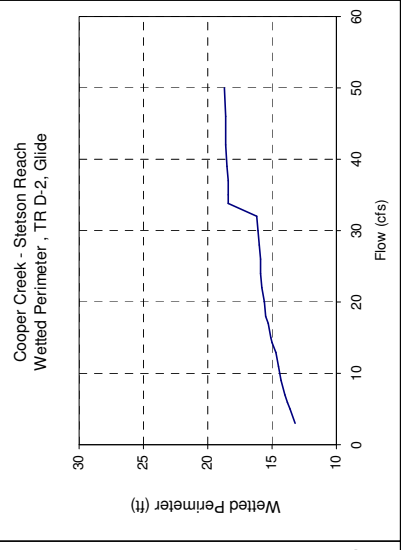
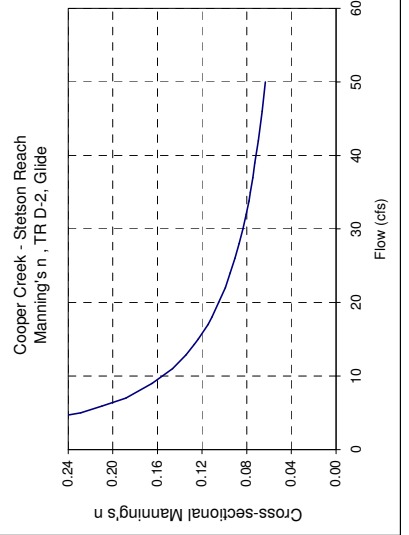
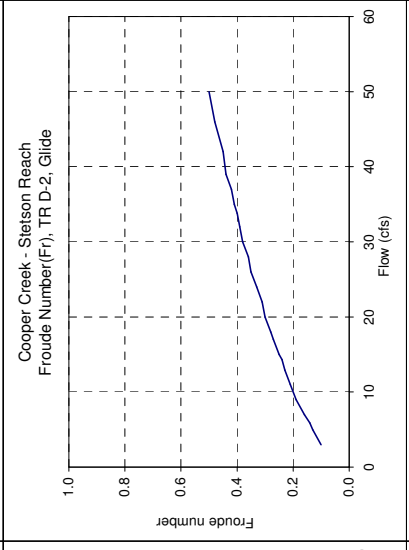
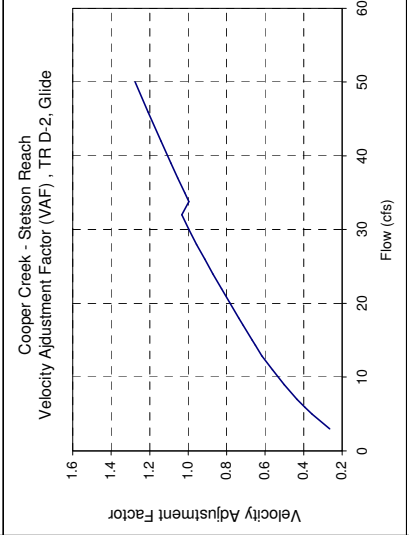
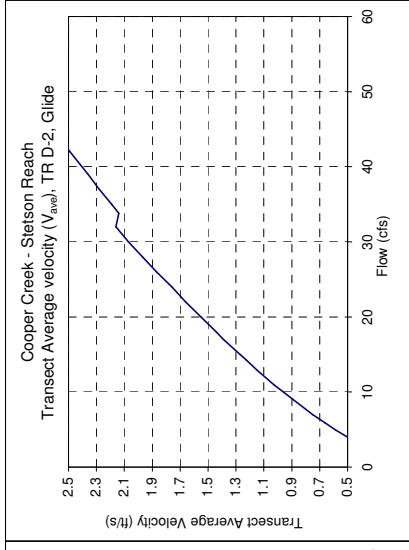
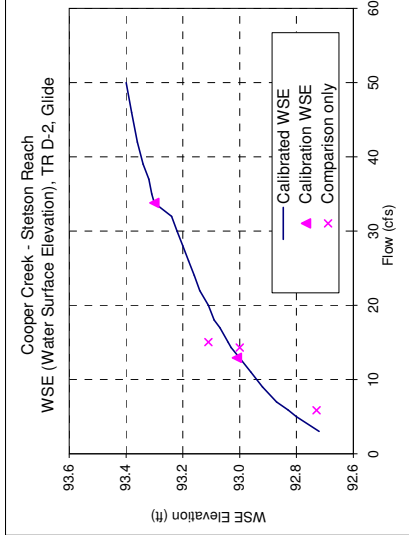
Reach: **Stetson Reach**
 Stream: **Cooper Creek**
 Transect: **B-1**
 Habitat: **Glide**

Modeling		Simul. Q (cfs)	Cal'd				wettered		
Q (cfs)	WSE (ft)		WSE (ft)	VAF	Froude Number	Velocity (ft/s)	Manning's n	perimeter (ft)	
12.9	92.93	3	92.60	0.56	0.24	0.75	0.111	13.2	
15.0	93.11	5	92.69	0.63	0.27	0.95	0.100	14.4	
5.9	92.70	5.9	92.74	0.63	0.29	1.00	0.096	15.9	
14.3	92.98	7	92.78	0.64	0.30	1.05	0.093	17.4	
33.8	93.20	9	92.85	0.66	0.32	1.13	0.087	20.4	
		11	92.89	0.71	0.34	1.24	0.084	21	
		12.9	92.93	0.75	0.35	1.34	0.081	21.3	
		14.3	92.95	0.78	0.36	1.41	0.080	21.4	
		15	92.96	0.79	0.37	1.45	0.078	21.5	
		17	92.99	0.83	0.38	1.54	0.077	21.6	
		18	93.01	0.85	0.39	1.59	0.075	21.8	
		20	93.04	0.88	0.40	1.67	0.074	22	
		22	93.06	0.90	0.41	1.76	0.072	22.1	
		24	93.09	0.93	0.42	1.83	0.071	22.3	
		26	93.11	0.95	0.43	1.90	0.070	22.5	
		28	93.14	0.97	0.44	1.97	0.069	22.7	
		30	93.16	1.00	0.45	2.05	0.067	22.8	
		32	93.18	1.02	0.45	2.11	0.067	22.9	
		33.8	93.20	1.03	0.46	2.17	0.066	23.1	
		35	93.21	1.04	0.47	2.20	0.066	23.1	
		37	93.23	1.06	0.47	2.26	0.065	23.3	
		39	93.25	1.08	0.48	2.32	0.064	23.4	
		42	93.28	1.10	0.49	2.41	0.063	23.6	
		46	93.32	1.13	0.50	2.52	0.061	23.9	
		50	93.35	1.16	0.52	2.62	0.060	24.2	



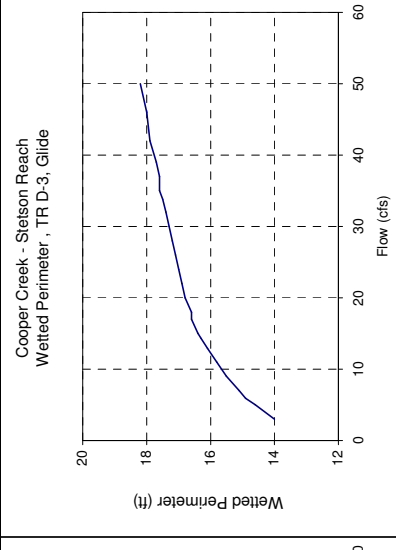
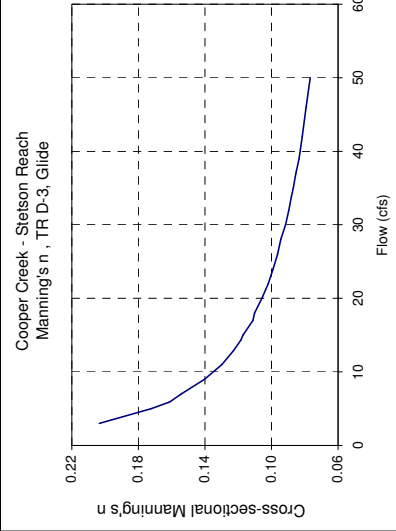
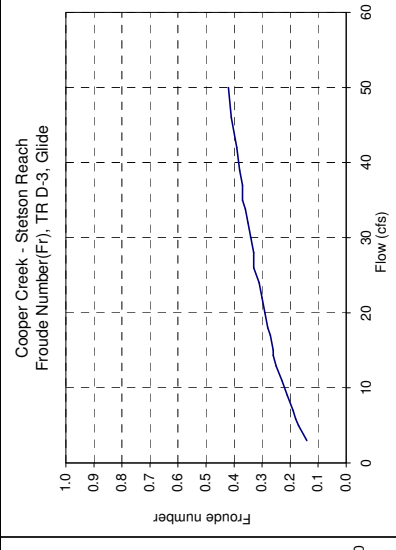
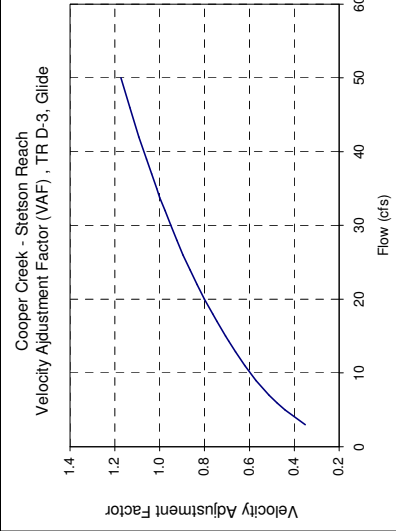
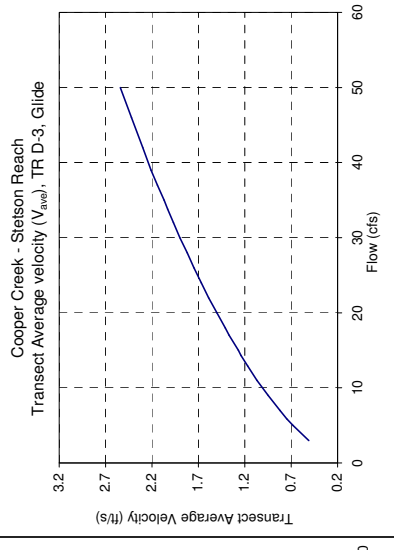
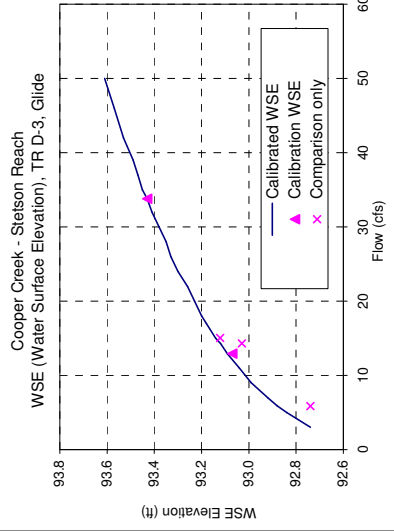
Reach Stetson Reach
Stream Cooper Creek
Transsect : B-2
Habitat: Glide

Modeling Q (cfs)	WSE (ft)	Simul. Q (cfs)	Cal'd WSE (ft)	VAF	Froude Number	Velocity (ft/s)	Manning's n	wetted perimeter (ft)
12.9	93.01	3	92.72	0.27	0.10	0.41	0.304	13.2
15.0	93.11	5	92.80	0.36	0.13	0.59	0.229	13.6
5.9	92.73	5.9	92.83	0.39	0.14	0.66	0.210	13.8
14.3	93.00	7	92.87	0.43	0.16	0.75	0.188	14
33.8	93.30	9	92.92	0.50	0.19	0.89	0.165	14.3
		11	92.96	0.56	0.21	1.03	0.146	14.5
		12.9	93.00	0.62	0.23	1.15	0.134	14.7
		14.3	93.03	0.65	0.24	1.23	0.127	15
		15	93.04	0.67	0.25	1.27	0.124	15.1
		17	93.07	0.71	0.27	1.39	0.115	15.3
		18	93.09	0.74	0.28	1.44	0.111	15.5
		20	93.11	0.78	0.30	1.55	0.105	15.6
		22	93.14	0.83	0.31	1.66	0.099	15.8
		24	93.16	0.87	0.33	1.76	0.095	15.9
		26	93.18	0.91	0.35	1.87	0.090	15.9
		28	93.20	0.96	0.36	1.97	0.087	16
		30	93.22	1.00	0.38	2.07	0.083	16.1
		32	93.24	1.03	0.39	2.16	0.081	16.2
		33.8	93.30	1.00	0.40	2.14	0.078	18.4
		35	93.31	1.02	0.41	2.19	0.077	18.4
		37	93.32	1.05	0.42	2.28	0.075	18.4
		39	93.34	1.09	0.44	2.36	0.073	18.5
		42	93.36	1.14	0.45	2.49	0.070	18.6
		46	93.38	1.21	0.48	2.66	0.066	18.6
		50	93.40	1.28	0.50	2.82	0.063	18.7



Reach: Stetson Reach
 Stream: Cooper Creek
 Transect: B-3
 Habitat: Glide

Modeling		Simul. Q (cfs)	Cal'd WSE (ft)	VAF	Froude Number	Velocity (ft/s)	Manning's n	wetted perimeter (ft)
Q (cfs)	WSE (ft)							
12.9	93.07	3	92.74	0.35	0.14	0.51	0.203	14
15.0	93.12	5	92.84	0.44	0.17	0.68	0.172	14.6
5.9	92.74	7	92.88	0.48	0.18	0.75	0.161	14.9
14.3	93.03	9	92.92	0.51	0.19	0.82	0.154	15.1
33.8	93.43	11	92.99	0.57	0.21	0.95	0.140	15.5
		12.9	93.04	0.62	0.23	1.07	0.130	15.8
		14.3	93.09	0.66	0.25	1.17	0.123	16.1
		15	93.12	0.69	0.26	1.24	0.118	16.3
		17	93.14	0.71	0.26	1.27	0.117	16.4
		18	93.18	0.75	0.27	1.37	0.111	16.6
		20	93.20	0.76	0.28	1.41	0.110	16.6
		22	93.23	0.80	0.29	1.50	0.106	16.8
		24	93.26	0.83	0.30	1.59	0.102	16.9
		26	93.30	0.86	0.31	1.67	0.099	17
		28	93.33	0.90	0.33	1.75	0.096	17.1
		30	93.35	0.92	0.33	1.82	0.094	17.2
		32	93.38	0.95	0.34	1.90	0.092	17.3
		33.8	93.41	0.98	0.35	1.97	0.090	17.4
		35	93.43	1.00	0.36	2.03	0.088	17.5
		37	93.45	1.01	0.37	2.07	0.087	17.6
		39	93.47	1.04	0.37	2.14	0.085	17.6
		42	93.49	1.06	0.38	2.21	0.084	17.7
		46	93.53	1.09	0.39	2.30	0.082	17.9
		50	93.57	1.13	0.41	2.42	0.079	18
			93.61	1.17	0.42	2.54	0.077	18.2



Cooper Creek - Stetson Reach, Site D Comparison of Modeling and Simulated WSEs

