

## **Appendix E. Pictures of Paired Sites**



Figure E1. Site EL4 in summer.

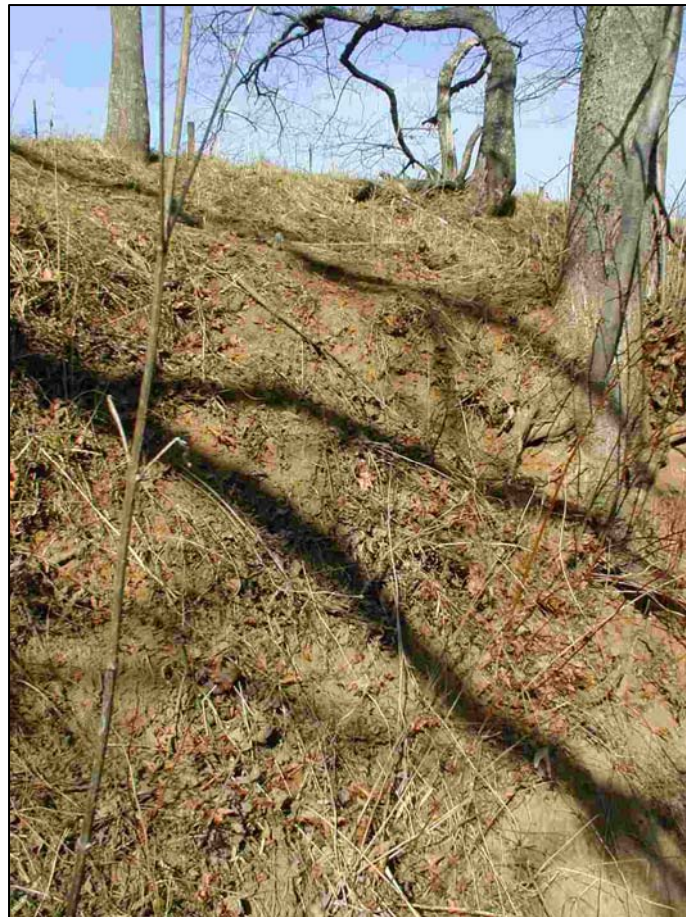


Figure E2. Bank face at EL3 in winter.





Figure E3. Site EL4 in summer.



Figure E4. Site EL4 in winter looking downstream.





Figure E5. Site SC6 in summer.



Figure E6. Site SC6 in winter looking upstream. Site on left.





Figure E7. Site TC1 looking upstream.



Figure E8. Riparian buffer at site TC1. Trees are on opposite bank.





Figure E9. Datalogger enclosure at site TC1 following storm event on 2/22/03.



Figure E10. Site TC2 (on right) looking downstream in winter.





Figure E11. Site TC2 in summer.

## **Appendix F. Freeze-Thaw Regression Analysis Data**



Table F1. Freeze-thaw regression data.

Site	Location on Bank	Number of FTC	Total Duration Frozen (days)	Median Duration Frozen (hours)	Average Duration Frozen (hours)	Bank Angle (degrees)	Degrees from N	Bank Exposure (m)	Distance from Baseflow (cm)	Average Organic Carbon (%)
EL1	L	7	32.1	15.5	109.9	60	66	1.95	45	1.0
EL2	L	11	68.7	94.0	149.8	40	71	2.01	101	1.2
EL4	L	7	24.8	25.0	85.0	55	178	2.10	110	2.1
NR1	L	10	12.8	10.5	30.7	55	170	1.05	29	1.8
NR2	L	6	37.5	32.8	149.9	90	94	1.26	36	1.2
SC1	L	3	33.3	258.5	266.5	45	47	1.28	12	2.4
SC2	L	9	37.2	21.0	99.2	35	12	0.94	29	1.4
SC3	L	24	38.5	16.0	38.5	55	96	2.16	91	1.1
SC4	L	24	26.1	16.5	26.1	45	103	0.94	9	1.3
SC5	L	12	27.4	11.3	54.8	75	108	0.64	11	2.7
SC6	L	1	7.6	182.5	182.5	35	113	1.52	72	3.1
SR1	L	2	38.2	458.5	458.5	90	30	1.37	2	1.4
SR4	L	34	30.3	15.5	21.4	50	152	2.10	136	2.1
ST1	L	14	21.5	15.0	36.9	40	62	1.04	25	1.9
TC6	L	20	24.4	9.8	29.3	50	175	2.07	107	1.2
TC7	L	22	48.6	20.0	53.0	55	1	2.26	138	0.9
EL1	U	15	68.7	37.5	110.0	90	66	1.95	102	1.5
EL2	U	14	65.3	13.7	111.9	90	71	2.01	168	1.2
EL4	U	13	46.4	14.5	85.7	55	178	2.10	165	1.3
NR1	U	12	21.2	15.5	42.3	55	170	1.05	69	0.9
NR2	U	8	28.9	49.8	86.6	50	94	1.26	74	1.2
SC1	U	4	58.0	186.5	348.3	65	47	1.28	76	2.2
SC2	U	20	63.9	17.0	76.7	35	12	0.94	64	2.2
SC3	U	40	49.4	20.3	29.7	55	96	2.16	176	1.1
SC4	U	9	48.8	43.0	130.2	90	103	0.94	57	2.1
SC5	U	9	38.6	24.5	103.1	75	108	0.64	29	2.3
SC6	U	4	39.1	190.3	234.8	35	113	1.52	122	3.1
SR1	U	25	59.8	19.0	57.4	50	30	1.37	57	1.0
SR3	U	7	36.9	17.5	126.6	35	16	0.82	57	3.6
ST1	U	9	47.4	40.5	126.4	40	62	1.04	74	0.6
ST2	U	28	43.7	20.8	37.4	55	103	0.64	33	1.9
ST3	U	32	45.8	18.3	34.3	88	81	1.07	71	0.9
ST4	U	23	27.8	16.0	29.0	30	99	0.98	68	2.1

Table F1., cont. Freeze-thaw regression data.

Site	Location on Bank	Number of FTC	Total Duration Frozen (days)	Median Duration Frozen (hours)	Average Duration Frozen (hours)	Bank Angle (degrees)	Degrees from N	Bank Exposure (m)	Distance from Baseflow (cm)	Average Organic Carbon (%)
TC1	U	19	36.8	15.0	46.4	90	15	1.28	93	1.0
TC4	U	18	57.8	28.8	77.1	90	176	1.04	63	0.8

Table F2. Freeze-thaw regression equations with field data.

Bank Location	Regression Equation*	Regression p-value	r <sup>2</sup>
Lower	FTC = 29.2 + 0.232 BSA - 0.398 Depth - 5.32 S+C	0.001	0.726
Lower	TDF = 1.37 + 0.00014 Grass - 0.0121 S+C - 0.0016 Degrees + 0.0051 BSA	0.000	0.854
Lower	ADF = 382 + 5.81 Depth - 1.62 Degrees + 0.085 WGC + 82.0 S+C - 0.62 Elev - 2.99 Silt - 1.17 BSA	0.000	0.973
Lower	PCA Axis 1 = -5.25 - 0.076 Depth + 0.025 BSA - 0.071 S+C + 0.020 Degrees + 0.0081 Elev - 0.00093 WGC + 0.037 Silt	0.000	0.969
Upper	TDF = 0.68 + 0.00098 Elev + 0.018 Width + 0.0063 Silt	0.002	0.614

\* FTC = number of freeze-thaw cycles; BSA = tree basal stem area in m<sup>2</sup>/ha; Depth = average stream depth in cm; S+C = combined soil silt and clay content in decimal notation; TDF = total duration frozen in days; Grass = dry grass biomass in kg/ha; Degrees = degrees from true north; ADF = average duration frozen in hours; WGC = dry woody groundcover biomass in kg/ha; Elev = site elevation in m; Silt = soil silt content in decimal notation; PCA Axis 1 = Axis 1 scores from PCA analysis.



## **Appendix G. Submerged Jet Test Device**

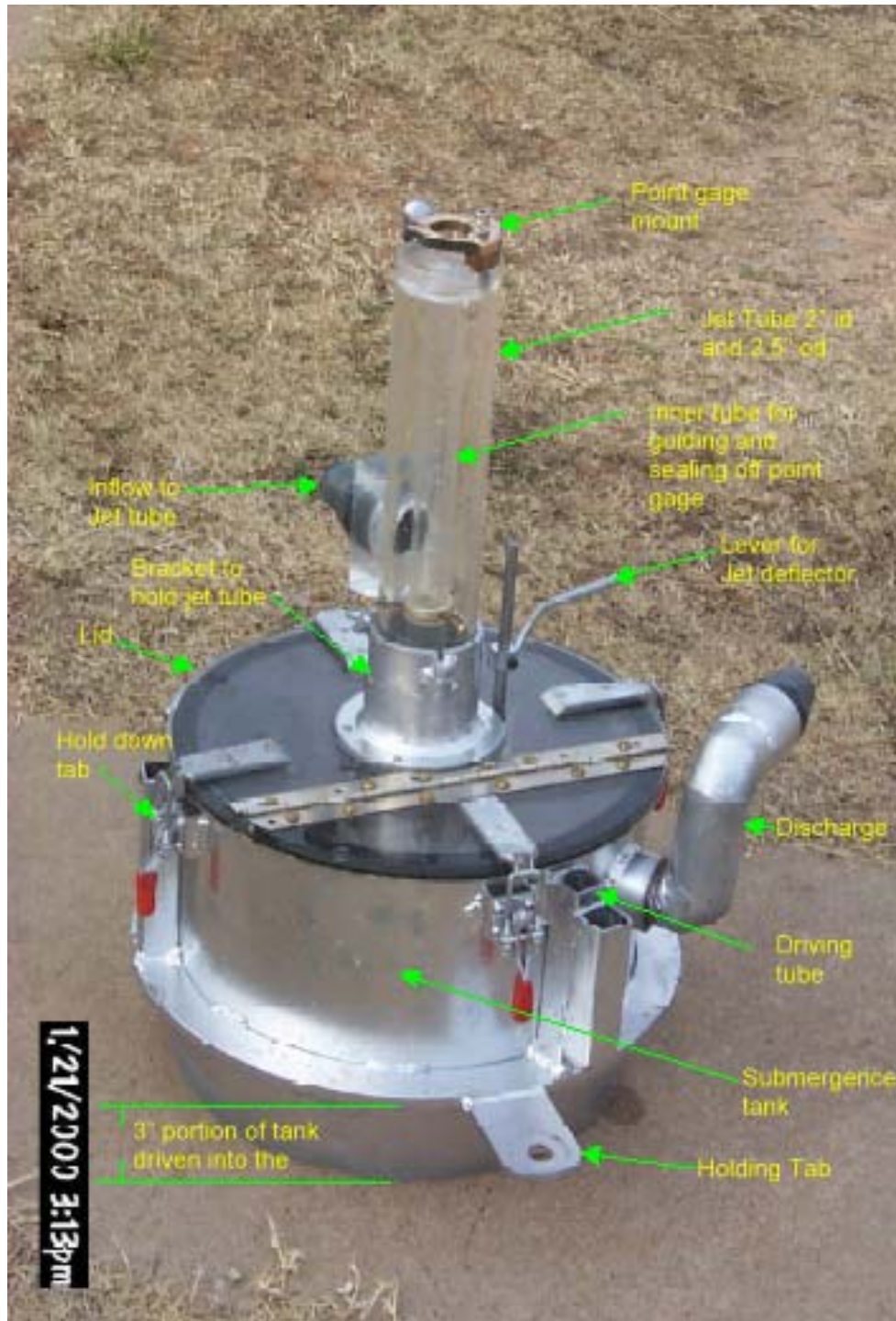


Figure G1. Multiangle submerged jet testing device (picture courtesy of Dr. Greg Hanson, Research Hydraulic Engineer, USDA-ARS Hydraulics Engineering Research Unit, Stillwater, OK).





Figure G2. Placing submergence tank (picture courtesy of Dr. Greg Hanson, Research Hydraulic Engineer, USDA-ARS Hydraulics Engineering Research Unit, Stillwater, OK).



Figure G3. Jet test setup at site EL1.



Figure G4. Filling tank with water prior to start of jet test (picture courtesy of Dr. Greg Hanson, Research Hydraulic Engineer, USDA-ARS Hydraulics Engineering Research Unit, Stillwater, OK).



Figure G5. Taking point gage reading on bank. (picture courtesy of Dr. Greg Hanson, Research Hydraulic Engineer, USDA-ARS Hydraulics Engineering Research Unit, Stillwater, OK).