Appendix C.2 Physical Habitat

Qualitative Habitat Evaluation Index (QHEI) for sites in the Big Darby Creek basin.

Qualitative Habitat Evaluation Index (QHEI) for sites in the Big Darby Creek basin.

			WWH Attributes											MWH Attributes																				
														High Influence					*Moderate Influence*															
Key QHEI Components			No Channelization or Recovered	Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	**Total WWH Attributes**	Channelized or No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (WD, HW)	**Total H.I. MWH Attributes**	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent and Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	**Total M.I. MWH Attributes**	**(MWH HI+1)/(WWH+1) Ratio**	**(MWH MI+1)/(WWH+1) Ratio**
River Mile	QHEI	Gradient (ft/mile)																																
(02-200) Big Darby Creek																																		
Year: 2002																																		
66.0	74.5	4.35	■	■		■	■	■	■	■	■	■	9						0		•								•	•		3	0.10	0.40
26.1	94.5	7.87	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
15.7	88.5	3.94	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
10.4	85.0	4.15	■	■		■	■	■	■	■	■	■	9						0										•	•		2	0.10	0.30
8.4	69.5	4.74	■	■		■	■	■	■		■		7						0	•	•								•	•		4	0.13	0.63
Year: 2001																																		
82.5	68.0	43.48	■	■		■	■	■		■	■	■	8						0	•			•				•		•	•		5	0.11	0.67
80.8	61.0	19.61	■	■		■	■	■			■		6		♦				1	•	•	•	•				•		•	•		7	0.29	1.29
79.2	64.5	12.20	■	■		■	■	■	■		■		7						0	•			•						•	•		4	0.13	0.63
78.4	63.5	12.50	■	■				■			■		4			♦			1	•			•				•		•	•		5	0.40	1.40
76.6	73.5	6.94	■	■		■	■	■	■		■		7						0			•							•	•		3	0.13	0.50
69.5	70.5	5.92	■	■		■	■	■			■		6						0	•	•			•			•		•	•		6	0.14	1.00
63.8	80.5	8.93	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
62.5	83.5	3.80	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
54.2	83.5	4.76	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
53.9	93.0	4.76	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
52.0	81.0	5.21		■		■	■	■	■	■	■	■	8						0	•												1	0.11	0.22
49.5	76.0	4.69	■	■		■	■	■	■		■	■	8						0				•	•					•	•		4	0.11	0.56
42.0	81.5	7.40	■	■		■	■	■		■	■	■	8						0								•			•		2	0.11	0.33
38.9	82.5	3.97	■	■		■	■	■	■		■		7						0		•								•	•		3	0.13	0.50
34.1	93.5	4.48	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
29.1	86.0	4.52	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
23.8	87.5	6.71	■	■		■	■	■	■	■	■	■	9						0											•		1	0.10	0.20
22.8	84.5	4.10	■	■		■	■	■	■	■	■	■	9						0											•		1	0.10	0.20
18.7	85.0	4.74	■	■		■	■	■	■	■	■	■	9						0											•		1	0.10	0.20
13.4	85.5	4.37	■	■		■	■	■	■	■	■	■	9						0											•		1	0.10	0.20
3.1	82.0	2.86	■	■		■	■	■	■	■	■	■	9						0										•	•		2	0.10	0.30
0.3	71.5	12.20	■	■		■	■	■	■	■	■		8						0		•								•	•		3	0.11	0.44
(02-201) Georges Creek																																		
Year: 2001																																		
0.9	61.0	58.82	■	■		■	■	■		■	■		7						0		•							•	•	•		4	0.13	0.63

Qualitative Habitat Evaluation Index (QHEI) for sites in the Big Darby Creek basin.

Key QHEI Components

			WWH Attributes											MWH Attributes																									
														High Influence					*Moderate Influence*																				
River Mile	QHEI	Gradient (ft/mile)	No Channelization or Recovered	Boulder/Cobble/Gravel Substrates	≤ 1 Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	**Total WWH Attributes**	Channelized or No Recovery	≤ 1/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (MD, HM)	**Total HI MWH Attributes**	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent and Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	**Total MI MWH Attributes**	**(MWH HI+1)/(WWH+1) Ratio**	**(MWH MI+1)/(WWH+1) Ratio**
(02-202) Greenbrier Creek																																							
Year: 2001																																							
2.7	57.0	34.48	■	■			■	■		■	■		6						0				●	●				●		●		●	5	0.14	0.86
1.3	74.5	17.86	■	■		■	■	■		■	■	■	8						0				●	●				●		●			4	0.11	0.56
(02-203) Springwater Run																																							
Year: 2001																																							
0.8	48.5	50.00		■		■	■	■					4			♦	♦	♦	3	●	●			●				●		●	●		6	0.80	2.00
(02-204) Hellbranch Run																																							
Year: 2001																																							
10.3	39.5	3.37									■		1		♦		♦		2	●	●			●	●			●		●		●	7	1.50	5.00
7.4	51.0	7.52		■						■	■		3				♦		1	●	●			●	●			●			●		6	0.50	2.00
5.8	65.5	7.30	■	■						■	■	■	5				♦		1		●			●	●			●			●		5	0.33	1.17
3.7	83.5	16.67	■	■		■	■	■	■	■	■	■	9						0														0	0.10	0.10
1.0	84.5	11.36	■	■		■	■	■	■	■	■	■	9						0							●							1	0.10	0.20
0.5	83.5	11.36	■	■		■	■	■	■	■	■	■	9						0														0	0.10	0.10
(02-206) Sugar Run																																							
Year: 2001																																							
7.5	31.0	7.52		■									1		♦		♦	♦	♦	4	●	●			●				●		●		●	6	2.50	5.50
7.0	29.5	7.52											0	♦	♦		♦	♦	♦	5		●			●		●		●		●		●	6	6.00	*.**
5.4	38.5	5.21									■		1	♦	♦		♦	♦		4		●			●				●		●		●	5	2.50	5.00
0.5	65.5	7.69		■		■	■	■	■		■		6						0	●	●									●	●		4	0.14	0.71
(02-207) Robinson Run																																							
Year: 2001																																							
2.1	64.0	9.35	■	■			■	■		■	■	■	7				♦		1	●			●	●				●					4	0.25	0.75
0.7	70.0	15.87	■	■		■	■	■		■	■	■	8				♦		1	●				●				●		●	●		5	0.22	0.78
(02-209) Buck Run																																							
Year: 2001																																							
10.4	40.0	5.99		■									1	♦			♦	♦	♦	4	●	●		●	●				●		●		●	7	2.50	6.00
7.8	55.5	6.58	■	■		■	■	■			■		6				♦		1					●				●		●	●		4	0.29	0.86
0.1	70.5	6.71	■	■			■	■		■	■	■	7						0		●			●				●		●			4	0.13	0.63
(02-210) Little Darby Creek																																							
Year: 2002																																							
41.2	70.0	43.47	■	■		■	■	■	■		■		7						0		●							●		●	●		4	0.13	0.63

Qualitative Habitat Evaluation Index (QHEI) for sites in the Big Darby Creek basin.

Key QHEI Components

WWH Attributes

River Mile	QHEI	Gradient (ft/mile)	No Channelization or Recovered	Boulder/Cobble/Gravel Substrates	≤ 1 Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	Total WWH Attributes
(02-210) Little Darby Creek													
Year: 2002													
26.6	58.0	2.17	■	■		■	■	■	■		■		7
23.1	55.5	2.02		■				■			■		3
20.5	64.5	3.18		■		■		■	■	■	■	■	7
Year: 2001													
41.2	80.5	43.47	■	■		■	■	■	■	■	■	■	9
39.6	69.5	13.33	■	■		■	■	■	■		■		7
38.8	82.0	12.99	■	■		■	■	■	■	■	■	■	9
34.7	82.5	4.72	■	■	■	■	■	■	■	■	■	■	10
29.5	66.5	2.67	■	■		■		■	■	■	■	■	8
24.5	62.5	2.02		■			■	■	■		■		5
15.3	95.5	2.69	■	■	■	■	■	■	■	■	■	■	10
6.5	95.5	8.47	■	■		■	■	■	■	■	■	■	9
4.1	99.0	5.59	■	■	■	■	■	■	■	■	■	■	10
0.7	63.5	7.30	■	■					■		■		4
0.2	77.5	9.90		■		■		■	■	■	■		6
0.2	77.5	9.90		■	■	■	■	■	■	■	■	■	9
(02-211) Spring Fork													
Year: 2002													
10.1	69.0	3.73	■	■		■	■	■	■		■		7
3.3	67.5	8.30		■		■	■	■			■		5
Year: 2001													
15.8	60.5	17.24	■	■				■		■	■	■	6
13.7	62.5	12.99		■		■	■	■		■	■	■	7
13.4	53.0	12.99	■	■					■	■	■		5
7.8	54.5	3.33		■			■	■			■		4
(02-212) Barron Creek													
Year: 2001													
2.1	44.5	5.26		■						■	■		3
(02-213) Treacle Creek													
Year: 2001													
11.8	67.5	15.63	■	■			■	■		■	■	■	7

MWH Attributes

River Mile	Channelized or No Recovery	≤ 1/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (MD, HW)	Total HL MWH Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent and Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	Total ML MWH Attributes	(MWH HL+1)/(WWH+1) Ratio	(MWH ML+1)/(WWH+1) Ratio
(02-210) Little Darby Creek																					
Year: 2002																					
26.6						0		●								●	●		3	0.13	0.50
23.1		♦				1	●	●			●	●			●	●	●		7	0.50	2.25
20.5						0	●	●			●	●				●	●		6	0.13	0.88
Year: 2001																					
41.2						0													0	0.10	0.10
39.6				♦		1	●	●			●				●	●	●		6	0.25	1.00
38.8						0		●			●				●	●			4	0.10	0.50
34.7						0													0	0.09	0.09
29.5						0	●	●				●				●			4	0.11	0.56
24.5						0	●	●			●	●			●	●	●		7	0.17	1.33
15.3						0													0	0.09	0.09
6.5						0													0	0.10	0.10
4.1						0													0	0.09	0.09
0.7				♦		1					●	●				●	●		4	0.40	1.20
0.2						0	●	●			●	●				●	●		6	0.14	1.00
0.2						0	●				●	●			●	●			5	0.10	0.60
(02-211) Spring Fork																					
Year: 2002																					
10.1						0		●								●	●		3	0.13	0.50
3.3						0	●	●			●				●	●		●	6	0.17	1.17
Year: 2001																					
15.8				♦		1	●				●				●				3	0.29	0.71
13.7				♦		1	●	●			●				●	●	●		6	0.25	1.00
13.4				♦	♦	2		●			●						●		3	0.50	1.00
7.8				♦	♦	2	●	●			●				●	●	●		6	0.60	1.80
(02-212) Barron Creek																					
Year: 2001																					
2.1				♦	♦	2	●				●				●	●	●		5	0.75	2.00
(02-213) Treacle Creek																					
Year: 2001																					
11.8				♦		1		●			●				●	●	●		5	0.25	0.88

Qualitative Habitat Evaluation Index (QHEI) for sites in the Big Darby Creek basin.

			WWH Attributes											MWH Attributes																				
														High Influence					*Moderate Influence*															
Key QHEI Components			No Channelization or Recovered	Boulder/Cobble/Gravel Substrates	5 1 Fine Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness		Channelized or No Recovery	5 1/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (MD, HW)		Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent and Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle			
River Mile	QHEI	Gradient (ft/mile)											**Total WWH Attributes**						**Total HL MWH Attributes**													**Total ML MWH Attributes**	**(MWH HL+1)/(WWH+1) Ratio**	**(MWH ML+1)/(WWH+1) Ratio**
(02-222) Spain Creek																																		
Year: 2001																																		
5.7	66.0	22.22	■	■		■	■	■		■	■	■	8						0				●				●			●		3	0.11	0.44
3.7	72.0	21.74	■	■		■	■	■	■	■	■	■	9						0										●			1	0.10	0.20
0.1	76.0	11.36	■	■		■	■	■	■	■	■		8						0										●	●		2	0.11	0.33
(02-223) Flat Branch																																		
Year: 2001																																		
3.2	25.5	9.09											0	♦	♦		♦	♦	♦ 5		●		●	●				●	●		●	6	6.00	*.**
0.8	36.5	4.93										■	1		♦		♦	♦	3	●	●		●	●				●	●	●		7	2.00	5.50
(02-245) Clover Groff Ditch																																		
Year: 2001																																		
4.7	22.0	3.39											0	♦	♦		♦	♦	♦ 5		●			●				●	●	●		5	6.00	*.**
0.8	61.5	9.90	■	■		■	■	■	■	■	■		8				♦		1	●				●					●	●		4	0.22	0.67
(02-251) Little Darby Creek (B. Darby headwaters)																																		
Year: 2002																																		
3.5	32.0	31.25								■		■	■ 3	♦	♦		♦	♦	4		●			●		●			●			4	1.25	2.25
Year: 2001																																		
3.5	71.5	31.25	■	■		■	■	■	■	■	■	■	9						0													0	0.10	0.10
0.4	68.0	26.32	■	■		■	■	■		■	■	■	8						0									●				1	0.11	0.22
(02-259) Hamilton Ditch																																		
Year: 2001																																		
3.4	21.0	4.44											0	♦	♦		♦	♦	♦ 5		●		●					●	●	●		5	6.00	*.**
0.5	36.5	7.41											0	♦	♦		♦	♦	♦ 5	●	●		●					●	●	●		6	6.00	*.**
(02-270) Trib. to Big Darby Creek (RM 20.20)																																		
Year: 2001																																		
0.8	77.5	25.64	■	■		■	■	■	■	■	■		8						0		●								●	●		3	0.11	0.44
(02-272) Fitzgerald Ditch																																		
Year: 2001																																		
0.5	56.5	33.33		■		■	■	■					4				♦		♦ 2	●	●		●					●	●	●		6	0.60	1.80
(02-298) Gay Run																																		
Year: 2001																																		
2.2	66.5	55.56	■	■		■	■	■	■		■		7						0										●	●		2	0.13	0.38
(02-352) Trib. to Big Darby Creek (RM 23.77)																																		
Year: 2001																																		

Qualitative Habitat Evaluation Index (QHEI) for sites in the Big Darby Creek basin.

Key QHEI Components

River Mile	QHEI	Gradient (ft/mile)	WWH Attributes: No Channelization or Recovered	Boulder/Cobble/Gravel Substrates	5 1 Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	Total WWH Attributes	MWH Attributes, High Influence: Channelized or No Recovery	5 1/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (WD, HW)	Total H.I. MWH Attributes	MWH Attributes, Moderate Influence: Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent and Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	Total M.I. MWH Attributes	(MWH H.I.+1)/(WWH+1) Ratio	(MWH M.I.+1)/(WWH+1) Ratio
(02-363) Wamp Ditch																																		
Year: 2001																																		
0.1	45.5	12.50		■						■		■	3	♦		♦	♦	♦	4	●				●				●	●	●		5	1.25	2.50
(02-365) Trib. to Flat Branch (RM 1.50)																																		
Year: 2001																																		
0.1	36.5	4.42									■		1		♦	♦	♦		3	●	●			●				●	●	●		6	2.00	5.00
(02-366) Trib. to Big Darby Creek (RM 18.41)																																		
Year: 2002																																		
0.1	52.5	27.78								■		■	2			♦	♦	♦	3	●	●			●				●	●	●		6	1.33	3.33

Qualitative Habitat Evaluation Index (QHEI) for sites in the Big Darby Creek basin.

Key QHEI Components

River Mile	QHEI	Gradient (ft/mile)	WWH Attributes: No Channelization or Recovered	Boulder/Cobble/Gravel Substrates	5 1 Free Substrates	Good/Excellent Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low-Normal Overall Embeddedness	Max Depth > 40 cm	Low-Normal Riffle Embeddedness	Total WWH Attributes	MWH Attributes, High Influence: Channelized or No Recovery	5 1/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth < 40 cm (WD, HW)	Total H.I. MWH Attributes	MWH Attributes, Moderate Influence: Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1-2 Cover Types	Intermittent and Poor Pools	No Fast Current	High/Mod. Overall Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	Total M.I. MWH Attributes	(MWH H.I.+1)/(WWH+1) Ratio	(MWH M.I.+1)/(WWH+1) Ratio
(02-352) Trib. to Big Darby Creek (RM 23.77)																																		
Year: 2001																																		
0.1	61.5	111.1	■	■		■	■	■		■			6			♦		♦	2					●				●			●	3	0.43	0.86
(02-353) Smith Ditch																																		
Year: 2001																																		
2.1	77.5	40.00	■	■		■	■	■			■		6						0									●	●	●		3	0.14	0.57
0.3	73.0	35.71	■	■		■	■	■		■	■		7						0									●			●	2	0.13	0.38
(02-354) Trib. to Smith Ditch																																		
Year: 2001																																		
0.2	67.0	76.92	■	■		■	■	■		■	■	■	8				♦		1		●							●	●			3	0.22	0.56
(02-355) Ballenger-Jones Ditch																																		
Year: 2001																																		
0.4	69.0	15.15	■	■		■	■	■	■		■		7						0		●								●	●		3	0.13	0.50
(02-356) Worthington Ditch																																		
Year: 2001																																		
0.2	46.5	20.83		■							■		2	♦		♦	♦		3		●			●		●		●	●	●		6	1.33	3.33
(02-357) Sweeny Run																																		
Year: 2001																																		
0.1	58.0	31.25		■			■	■	■		■		5			♦	♦		2	●	●			●					●	●		5	0.50	1.33
(02-358) Trib. to Sugar Run (RM 7.39)																																		
Year: 2001																																		
0.1	27.0	3.73											0	♦	♦	♦	♦	♦	5	●	●			●				●	●		●	6	6.00	*.**
(02-360) Trib. to Big Darby Creek (RM 69.40)																																		
Year: 2002																																		
0.3	30.5	17.86											0	♦	♦	♦	♦	♦	5		●			●				●	●	●	●	6	6.00	*.**
Year: 2001																																		
0.3	33.5	17.86											0		♦	♦	♦	♦	4	●	●			●				●	●	●		6	5.00	*.**
(02-361) Trib. to Big Darby Creek (RM 74.91)																																		
Year: 2001																																		
0.2	62.5	13.51	■	■		■	■	■	■		■		7						0		●		●						●	●		4	0.13	0.63
(02-362) Bales Ditch																																		
Year: 2001																																		
0.4	70.0	17.86	■	■		■	■	■		■	■	■	8						0		●			●				●				3	0.11	0.44