Large Filing Separator Sheet

Case Number: 10-2865-EL-BGN

File Date: 3/10/11

Section: 4

Number of Pages: 200

Description of Document:

Application

with 954 Kcmil ACSS wire (ISD 12/1/2011). Estimated cost is \$2,159,500. (Network Upgrade# n1575) Increase in Rating = 1792 MVA

TOTAL 2,332,600

Note: Reconductor assumes that FE begins work 7/2010

Total cost for the APS and FE upgrades is \$5,558,600

Queue	MW	Percentage	\$ cost (K) =
	contribution	of cost	\$5,558.600 K
T32	59.61	5.3%	296.962
T33	80.85	7.2%	402.775
T34	80.85	7.2%	402.775
T35	80.85	7.2%	402.775
T92	77.94	7.0%	388.278
T93	77. 9 4	7.0%	388.278
T94	65.97	5.9%	328.651
T105	18.49	1.7%	92.133
T120	13.47	1.2%	67.079
T124	10.34	0.9%	51.531
T125	10.31	0.9%	51.372
T126	10.52	0.9%	52.418
T127	10.52	0.9%	52.418
T130	20.75	1.9%	103.361
T139	162.18	14.5%	807.941
T142	18.74	1.7%	93.333
T143	31.27	2.8%	155.759
T183	10.52	0.9%	52.418
T184	10.52	0.9%	52.418
U1-37	13.42	1.2%	66.843
U1-49	5.39	0.5%	26.832
U1-60	15.92	1.4%	79.306
U1-87	7.78	0.7%	38.768
U1-88	5.19	0.5%	25.845
U2-41	22.24	2.0%	110.804
U2-42	15.92	1.4%	79.306
U2-58	25.24	2.3%	125.715

U4-01	22.87	2.0%	113.943
U3-30	12.80	1.1%	63.785
U3-29	14.29	1.3%	71.202
U3-26	80.85	7.2%	402.775
U2-72	22.24	2.0%	110.804

The U4-001 responsibility for these network upgrades is \$113,943.

Upgrade#2

APS Upgrade:

Reinforcement: Reconductor the AP portion (approximately 2.94 miles) of the existing Sammis-Wylie Ridge 345kV line with twin bundle 795 Drake ACSS-AW HT conductor for emergency ½ hour rating of 3760A and 4 hour rating of 3647A at 225C. Assume only minor steel reinforcement is required. At Wylie Ridge SS, replace the Sammis 345kV line trap with a 4000A rated line trap. (Network Upgrade #n1580). The estimated cost is \$1,901,682.

The estimated project duration for the line reconductor is 18 months after the receipt of an executed Interconnection Service Agreement and Construction Service Agreement. Increase in rating = 2179 MVA

FE Upgrade:

Sammis Sub: Replace backup line relaying and metering on the 345 kV Wylie Ridge line (ISD 12/1/2010). The estimated cost is \$68,200.

Wylie Ridge line: Replace GCX51 backup line relays with an SEL 421. Replace existing metering with digital multimeter. Replace 3000 A wave trap. (Network Upgrade# n1576). Increase in rating = 2166 MVA.

The total estimated cost for the APS and FE upgrades is \$1,969,882.

Queue	MW contribution	Percentage of cost	\$ cost (K) = \$1,969.882 K
T126	2.96	0.6%	10.968
T127	10.52	. 2.0%	38.990
T130	20.75	3.9%	76.883
T139	162.18	30.5%	600.965
T142	18.74	3.5%	69.423
T143	31.27	5.9%	115.858
T183	10.52	2.0%	38.990
T184	10.52	2.0%	38.990

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U1-37	13.42	2.5%	49.719
U1-49	5.39	1.0%	19.958
U1-60	15.92	3.0%	58.989
U1-87	7.78	1.5%	28.837
U1-88	5.19	1.0%	19.224
U2-41	22.24	4.2%	82.419
U2-42	15.92	3.0%	58.989
U2-58	25.24	4.7%	93.509
U2-72	22.24	4.2%	82.419
U3-26	80.85	15.2%	299.593
U3-29	14.29	2.7%	52.961
U3-030	12.80	2.4%	47.445
U4-01	22.87	4.3%	84.753

The U4-001 responsibility for these network upgrades is \$84,753.

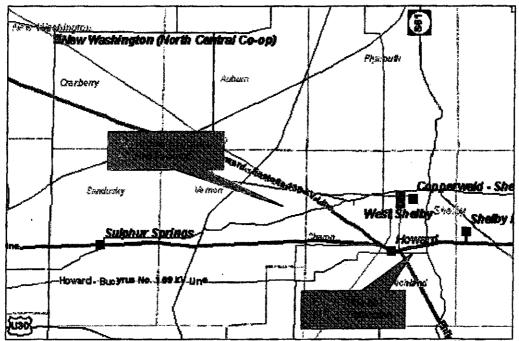
MISO Impacts

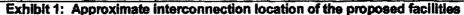
PJM will determine if there are any impacts on MISO facilities in the Facilities study.

<u>Cost</u>

The U4-001 project is responsible for 100% of the direct connection cost of \$1,574,000. The U4-001 project is also responsible for 2% of the cost of network upgrades #n1432, #n1574 and #n1575 (\$113,943) for the Sammis-Wylie Ridge 345kV circuit and the U4-001 project is also responsible for 4.3% of the cost of network upgrades #n1580 & #n1576 (\$84,753) for the Sammis-Wylie Ridge 345kV circuit.

The total cost responsibility for the U4-001 project, assuming no prior queued projects withdraw, is \$1,732,696.





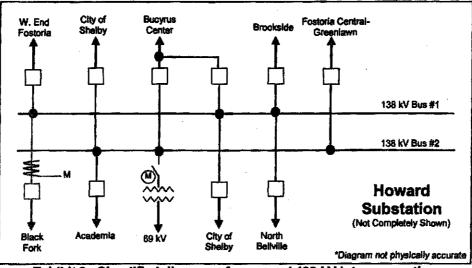


Exhibit 2: Simplified diagram of proposed 138 kV interconnection

Attachment #1 U4-001

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2013 Peak Load Stability Faults

Table 1: BREAKER CLEARING TIMES (CYCLES)

Station	Primary (3ph/slg)	3-ph with unsuccessful Autoreclosure (total)	SLG Fault with Stuck Breaker (total)
138 kV	5	20	18

All cases stable

1a. Line tripping of Howard - Brookside 138 kV without fault

1b. 3ph @ Howard - Brookside 138 kV with unsuccessful autoreclosure

1c. SLG @ Howard - Brookside 138 kV with stuck breaker (D), fault cleared by opening Howard - N. Bellville and Howard - Chatfield - S. Tiffin - Airco - West End Fostoria 138 kV lines

2a. Line tripping of Howard – N. Lexington – Academia 138 kV without fault 2b. 3ph @ Howard – N. Lexington – Academia 138 kV with unsuccessful autoreclosure 2c. SLG @ Howard - Brookside 138 kV with stuck breaker (I), fault cleared by opening Howard – Bucyrus Center and Howard – Fostoria/Greelawn 138 kV lines

3a. Line tripping of Howard – N. Bellville 138 kV without fault
3b. 3ph @ Howard – N. Bellville 138 kV with unsuccessful autoreclosure
3c. SLG @ Howard – N. Bellville 138 kV with stuck breaker (H), fault cleared by
opening Howard – Brookside and Howard – West End Fostoria 138 kV lines [same as contingency 1c]

4a. Line tripping of Howard – Chatfield – S. Tiffin – Airco – West End Fostoria 138 kV without fault

4b. 3ph @ Howard - Chatfield - S. Tiffin - Airco - West End Fostoria 138 kV with unsuccessful autoreclosure

4c. SLG @ Howard – Chatfield – S. Tiffin – Airco – West End Fostoria 138 kV with stuck breaker (B), fault cleared by opening Howard – Brookside and Howard – N. Bellville 138 kV lines [same as contingency 1c]

5a. Line tripping of Howard – Fostoria/Greenlawn 138 kV without fault 5b. 3ph @ Howard – Fostoria/Greenlawn 138 kV with unsuccessful autoreclosure 5c. SLG @ Howard – Fostoria/Greenlawn 138 kV with stuck breaker (A), fault cleared by opening Howard – Bucyrus Center and Howard – N. Lexington – Academia 138 kV lines [same as contingency 2c]

6a. Line tripping of West End Fostoria - Lemoyne 138 kV without fault

6b. 3ph @ West End Fostoria – Lemoyne 138 kV with unsuccessful autoreclosure 6c1. SLG @ West End Fostoria – Lemoyne 138 kV with stuck breaker (D), fault cleared by disconnecting West End Fostoria 138 kV bus

7a. Line tripping of West End Fostoria – Fostoria Central 138 kV without fault
7b. 3ph @ West End Fostoria – Fostoria Central 138 kV with unsuccessful autoreclosure
7c. SLG @ West End Fostoria – Fostoria Central 138 kV with stuck breaker (A), fault
cleared by disconnecting West End Fostoria 138 kV bus [same as contingency 6c]

8a. Line tripping of Fostoria Central – New Liberty/Findlay Center 138 kV without fault 8b. 3ph @ Fostoria Central – New Liberty/Findlay Center 138 kV with unsuccessful autoreclosure

8c1. SLG @ Fostoria Central – New Liberty/Findlay Center 138 kV with stuck breaker (K2), fault cleared by opening Fostoria Central 138/345 kV transformer
8c2. SLG @ Fostoria Central – New Liberty/Findlay Center 138 kV with stuck breaker (J2), fault cleared by opening Fostoria Central – Greenlawn/Howard 138 kV lines

9a. Line tripping of Fostoria Central – N. Findlay without fault 9b. 3ph @ Fostoria Central – N. Findlay 138 kV with unsuccessful autoreclosure 9c1. SLG @ Fostoria Central – N. Findlay 138 kV with stuck breaker (K1), fault cleared by opening Fostoria Central – Buckley Rd 138 kV line 9c2. SLG @ Fostoria Central – N. Findlay 138 kV with stuck breaker (J1), fault cleared by opening Fostoria Central – N. Findlay 138 kV with stuck breaker (J1), fault cleared by opening Fostoria Central – West End Fostoria 138 kV line

10a. Tripping of Fostoria Central 138/345 kV transformer without fault 10c1. SLG @ Fostoria Central 138/345 kV transformer with stuck breaker (K2), fault cleared by opening Fostoria Central – Findlay/New Liberty 138 kV line [same as contingency 8c1]

10c2. SLG @ Fostoria Central 138/345 kV transformer with stuck breaker (K), fault cleared by opening Fostoria Central – Buckley Rd 138 kV line

11a. Line tripping of Brookside - Cloverdale 138 kV without fault 11b. 3ph @ Brookside - Cloverdale 138 kV with unsuccessful autoreclosure 11c. SLG @ Brookside - Cloverdale 138 kV with stuck breaker (30), fault cleared by opening Brookside - Longview, Brookside - Howard, and Brookside - Beaver 138 kV lines

12a. Line tripping of Brookside - Burger 138 kV without fault

12b. 3ph @ Brookside - Burger 138 kV with unsuccessful autoreclosure 12c. SLG @ Brookside - Burger 138 kV with stuck breaker (3), fault cleared by opening Brookside - Wellington, Brookside - Madison - Longview, and Brookside - Leaside 138 kV lines

13a. Line tripping of Brookside - Longview 138 kV without fault 13b. 3ph @ Brookside - Longview 138 kV with unsuccessful autoreclosure

13c. SLG @ Brookside - Longview with stuck breaker (28), fault cleared by opening Brookside - Cloverdale, Brookside - Howard, and Brookside - Beaver 138 kV lines [same as contingency 11c1]

14a. Line tripping of Brookside – Milliron - Leaside 138 kV without fault 14b. 3ph @ Brookside – Milliron - Leaside 138 kV with unsuccessful autoreclosure 14c. SLG @ Brookside – Milliron - Leaside 138 kV with stuck breaker (36), fault cleared by opening Brookside – Burger, Brookside – Wellington, and Brookside- Madison – Longview 138 kV lines [same as contingency 12c1]

15a. Line tripping of Brookside – Troy – Brighton - Beaver 138 kV without fault 15b. 3ph @ Brookside – Troy – Brighton - Beaver 138 kV with unsuccessful autoreclosure

15c. SLG @ Brookside – Troy – Brighton - Beaver 138 kV with stuck breaker (59), fault cleared by opening Brookside – Cloverdale, Brookside – Howard, Brookside – Longview 138 kV lines [same as contingency 11c1]

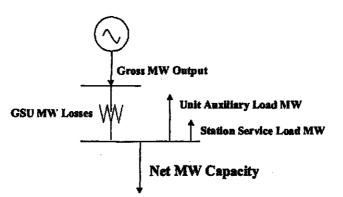
16a. Line tripping of Academia – W. Mt. Vernon 138 kV without fault 16b. 3ph @ Academia – W. Mt. Vernon 138 kV with unsuccessful autoreclosure 16c. SLG @ Academia – W. Mt. Vernon 138 kV with stuck breaker (R), fault cleared by disconnecting Academia 138 kV bus

17a. Line tripping of Academia - Ohio Central 138 kV without fault

17b. 3ph @ Academia – Ohio Central 138 kV with unsuccessful autoreclosure 17c1. SLG @ Academia – Ohio Central 138 kV with stuck breaker (R), fault cleared by disconnecting Academia 138 kV bus [same as contingency 16c1] 17c2. SLG @ Academia – Ohio Central 138 kV with stuck breaker (S), fault cleared by disconnecting Academia 138 kV bus [same as contingency 16c1]

Attachment #2

U4-001Unit Capability Data



Net MW Capacity = (Gross MW Output - GSU MW Losses* – Unit Auxiliary Load MW - Station Service Load MW)

Queue Letter/Position/Unit ID:	U4-001
Primary Fuel Type:	Vestas 100 1.8 MW (Wind)
Maximum Summer (92° F ambient air temp.) Net MW Output	it**:202
Maximum Summer (92° F ambient air temp.) Gross MW Out	put:202
Minimum Summer (92° F ambient air temp.) Gross MW Outp	put:0
Maximum Winter (30° F ambient air temp.) Gross MW Output	ut:202
Minimum Winter (30° F ambient air temp.) Gross MW Output	nt:0
Gross Reactive Power Capability at Maximum Gross MW Ou Reactive Capability Curve (Leading and Lagging):	•
Individual Unit Auxiliary Load at Maximum Summer MW O	utput (MW/MVAR): _ N/A
Individual Unit Auxiliary Load at Minimum Summer MW Ou	utput (MW/MVAR): _ N/A
Individual Unit Auxiliary Load at Maximum Winter MW Out	tput (MW/MVAR): N/A
Individual Unit Auxiliary Load at Minimum Winter MW Out	put (MW/MVAR): N/A
Station Service Load:	N/A

* GSU losses are expected to be minimal.

** Your project's declared MW, as first submitted in Attachment N, and later confirmed or modified by the Impact Study Agreement, should be based on either the 92° F Ambient Air Temperature rating of the unit(s) or, if less, the declared Capacity rating of your project.

U4-001 Unit Generator Dynamics Data

Queue Letter/Position/Unit ID:	U4-0(
MVA Base (upon which all reactances, resistance and inertia are calculated	l): 1.8x11
Nominal Power Factor:	N/
Unsaturated Reactances (on MVA Base)	
Direct Axis Synchronous Reactance, X _{d(i)} :	N/
Direct Axis Transient Reactance, X'd(i):	N/
Direct Axis Sub-transient Reactance, X"d(i):	
Quadrature Axis Synchronous Reactance, Xq(i):	N/
Quadrature Axis Transient Reactance, X'q(i):	N/
Quadrature Axis Sub-transient Reactance, X"q(i):	N/
Stator Leakage Reactance, XI:	N/.
Negative Sequence Reactance, X2(i):	N/.
Zero Sequence Reactance, X0:	N/
Saturated Sub-transient Reactance, X"d(v) (on MVA Base):	N//
Armature Resistance, Ra (on MVA Base):	
Time Constants (seconds)	
Direct Axis Transient Open Circuit, T'do:	N//
Direct Axis Sub-transient Open Circuit, T"do:	N//
Quadrature Axis Transient Open Circuit, T'qo:	
Quadrature Axis Sub-transient Open Circuit, T"qo:	•
Inertia, H (kW-sec/kVA, on KVA Base):	
	N//
Saturation Values at Per-Unit Voltage [S(1.0), S(1.2)]:	N//

Units utilize a Generator model

U4-001 Unit GSU Data

Queue Letter/Position/Unit ID:	U4-001(112 GSU)
Generator Step-up Transformer MVA Base:	2.1x112
Generator Step-up Transformer Impedance (R+jX, or %, on transfor	mer MVA Base):7.8%
Generator Step-up Transformer Reactance-to-Resistance Ration	(X/R):10
Generator Step-up Transformer Rating (MVA):	2.1x112
Generator Step-up Transformer Low-side Voltage (kV):	0.69
Generator Step-up Transformer High-side Voltage (kV):	34.5
Generator Step-up Transformer Off-nominal Turns Ratio:	1.0
Generator Step-up Transformer Number of Taps and Step Size:	5, 2.5%

<u>U4-001 Main Transformer Data</u>

Queue Letter/Position/Unit ID:	U4-001(2 Main Transformers)
Generator Step-up Transformer MVA Base:	100
Generator Step-up Transformer Impedance (R+jX, or	%, on transformer MVA Base): 9%
Generator Step-up Transformer Reactance-to-Resist	ance Ration (X/R): N/A
Generator Step-up Transformer Rating (MVA):	80/100/120
Generator Step-up Transformer H-side Voltage (kV)	:138
Generator Step-up Transformer X-side Voltage (kV)	34.5
Generator Step-up Transformer Off-nominal Turns l	Ratio: 1.0
Generator Step-up Transformer Number of Taps and	Step Size:9, 1.25%

Attachment #3

All the control systems were updated according to the developer's specification; these updates are shown in Dynamic Data Format.

As specified by the developer, the Vestas V90 turbine user model was used.

/ Vestas V90

930884 'USRMDL' '1' 'VWCORE' 1 1 2 20 3 23 1 0 1800.0000 692.8203 899.6269 700.0000 2.6200 0.7620 0.0188 6.0050 8.3264 6.0050 8.3264 100.0000 0.4000 1.2000 0.1000 0.0000 0.0000 0.0000 0.0000 0.0000 / 0 'USRMDL' 0 'VWVARS' 8 0 2 0 0 18 930884 '1' / 0 'USRMDL' 0 'VWLVRT' 8 0 3 21 0 10 930884 '1' 1 0.85 0.001 0.2 12.5 50.0000 0.0000 0.0000 0.5 0.0000 2.6200 0.8079 1.2 0.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 / 0 'USRMDL' 0 'VWPWRC' 8 0 3 21 2 5 930884 '1' 0 1.0000 0.0000 0.0000 1.000 1.000 1.000 1.000 1.0000 1.0000 1.0000 0.0000 0 0 0.1000 0,1000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 / 0 'USRMDL' 0 'VWMECH' 8 0 2 7 3 0 930884 '1' 1800.0000 351.8584 5684.1051 427.0000 65.0000 6358.0000 36.2900 / 0 'USRMDL' 0 'VWMEAS' 8 0 2 3 3 0 930884 '1' 0.1000 0.1000 0.2000 / 0 'USRMDL' 0 'VWVPRT' 0 2 7 20 0 11 930884 '1' 1 1 0 0 0 0.7500 0.0001 0.8500 0.4000 0.9000 60.0000 1.1000 60,0000 1.1350 0.2000 1.2000 0.0800 0.0000 0.2000 0,7000 2.6500 0.8000 11.0000 0.9000 60.0000 / 0 'USRMDL' 0 'VWFPRT' 0 2 3 4 0 1 930884 '1' 0 56,4000 0.2000 61,2000 0.2000 /

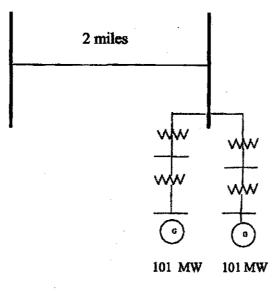
/Vestas V90

930886 'USRMDL' '1' 'VWCORE' 1 1 2 20 3 23 1 0 1800.0000 692.8203 899.6269 700.0000 2.6200 0.7620 0.0188 6.0050 8.3264 6.0050 8.3264 100.0000 0.4000 1.2000 0.1000 0.0000 0.0000 0.0000 0.0000 / 0 'USRMDL' 0 'VWVARS' 8 0 2 0 0 18 930886 '1' / 0 'USRMDL' 0 'VWLVRT' 8 0 3 21 0 10 930886 '1' 1 0.85 0.001 0.2 12.5 50.0000 0.0000 0.0000 0.5 0.0000 2.6200 0.8079 1.2 0.5 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 / 0 'USRMDL' 0 'VWPWRC' 8 0 3 21 2 5 930886 '1' 0 1.0000 0.0000 0.0000 1.000 1.000 1.0000 1.0000 1.0000 1.0000 0.0000 0 0 0.1000 0.1000 0.0000 0.0000 0.0000 0.0000 0.0000 / 0 'USRMDL' 0 'VWMECH' 8 0 2 7 3 0 930886 '1' 1800.0000 351.8584 5684.1051 427.0000 65.0000 6358.0000 36.2900 / 0 'USRMDL' 0 'VWMEAS' 8 0 2 3 3 0 930886 '1' 0.1000 0.1000 0.2000 / 0 'USRMDL' 0 'VWVPRT' 0 2 7 20 0 11 930886 '1' 1 1 0 0 0 0.7500 0.0001 0.8500 0.4000 0.9000 60.0000 1.1000 60.0000 1.1350 0.2000 1.2000 0.0800 0.0000 0.2000 0.7000 2.6500 0.8000 11.0000 0.9000 60.0000 / 0 'USRMDL' 0 'VWFPRT' 0 2 3 4 0 1 930886 '1' 0 56.4000 0.2000 61.2000 0.2000 /

Attachment #4

Howard 138 kV Bus

U4-001 138 kV



U4-001Project

FACILITIES STUDY AGREEMENT

RECITALS

- 1. This Facilities Study Agreement ("Agreement"), dated as of February 18, 2010, is entered into by and between Black Fork Wind, L.L.C. ("New Service Customer") and PJM Interconnection, L.L.C. ("Transmission Provider"), pursuant to Part VI of the PJM Interconnection, L.L.C. Open Access Transmission Tariff ("PJM Tariff").
- 2. Pursuant to Section 36.2 or Section 205 of the PJM Tariff, Transmission Provider has completed a Generation or Transmission Interconnection Feasibility Study or an Initial Study (as applicable) and a System Impact Study and has provided the results of those studies to New Service Customer.
- 3. Transmission Provider has informed New Service Customer that the estimated date for completion of a Facilities Study pursuant to Section 206 of the PJM Tariff is August 15, 2010 and that New Service Customer's estimated cost responsibility for such Facilities Study, subject to revision as provided in this Agreement, is \$100,000.
- 4. New Service Customer desires that Transmission Provider commence a Facilities Study for the New Service Request with Queue Position U4-001 Howard 138kV.

PREVIOUS SUBMISSIONS

5. Except as otherwise specifically set forth in an attachment to this Agreement, New Service Customer represents and warrants that the information provided in section 3 of the Feasibility Study Agreement, dated November 3, 2008, by and between New Service Customer and Transmission Provider, and to the extent supplemented as set forth in section 4 of the System Impact Study Agreement, dated April 24, 2009, by and between New Service Customer and Transmission Provider, is accurate and complete as of the date of execution of this Facilities Study Agreement.

MILESTONES

6. Pursuant to Section 206.1 of the PJM Tariff, the parties agree that New Service Customer must meet the following milestone dates relating to the development of its generation or merchant transmission project(s) or New Service Request, as applicable, in order to retain the assigned Queue Position of its New Service Request(s) (as established pursuant to Section 201 of the PJM Tariff) while Transmission Provider is completing the Facilities Study:

6.1 On or before April 1, 2010, New Service Customer must provide evidence of an ownership interest in, or right to acquire or control the location which shall be on the high voltage side of the Customer Facility generator step-up transformer(s), or in the case of a Customer Facility with a single step-up transformer for multiple generators, the

high voltage side of the facility step-up transformer. The evidence of site control shall be a deed, option agreement, lease, or other similar document acceptable to the Transmission Provider.

6.2 To the extent any new or additional property is required to accommodate required Attachment Facilities, on or before April 1, 2010, New Service Customer must provide evidence of an ownership interest in, or right to acquire or control the location which shall be the location of the network substation which shall be built and subsequently transferred to the Interconnected Transmission Owner. The evidence of site control shall be a deed, option agreement, lease, or other similar document acceptable to the Transmission Provider.

Should New Service Customer fail to achieve any of the foregoing milestones, its New Service Request(s) shall be deemed to be withdrawn and terminated and it will have to resubmit its New Service Request(s) for reassignment of a Queue Position and re-initiation of the New Service Request study process.

PURPOSE AND SCOPE OF THE FACILITIES STUDY

- 7. Transmission Provider, in consultation with the affected Transmission Owner(s), shall commence a Facilities Study pursuant to Section 206 of the PJM Tariff to evaluate the Attachment Facilities, Local Upgrades and/or Network Upgrades necessary to accommodate New Service Customer's New Service Request assigned Queue Position U4-001 Howard 138kV.
 - A. Scope of Facilities Study: The purpose of the Facilities Study is to provide, commensurate with any mutually agreed parameters regarding the scope and degree of specificity described in Schedule A attached to this agreement, conceptual engineering and, as appropriate, detailed design, plus cost estimates and project schedules, to implement the conclusions of the System Impact Study regarding the Attachment Facilities, Local Upgrades and Network Upgrades necessary to accommodate the New Service Customer's New Service Request(s). Cost estimates shall be determined in a manner consistent with Section 217 of the PJM Tariff. The nature and scope of the materials that Transmission Provider shall deliver to the New Service Customer upon completion of the Facilities Study shall be described in the PJM Manuals.
 - B. Facilities Study Cost and Time Estimate: Transmission Provider's estimates of the date for completion of the Facilities Study and of New Service Customer's cost responsibility for the Facilities Study are stated in section 3 of this Agreement. In the event that Transmission Provider determines that it will be unable to complete the Facilities Study by the estimated completion date stated in section 3 of this Agreement, it shall notify New Service Customer and will explain the reasons for the delay. New Service Customer agrees that its estimated cost responsibility stated in section 3 is subject to revision as provided in sections 14, 15 and 16 of this Agreement.

8. The Facilities Study necessarily will employ various assumptions regarding New Service Customer's New Service Request(s), other pending New Service Requests, and PJM's Regional Transmission Expansion Plan at the time of the study. IN NO EVENT SHALL THIS AGREEMENT OR THE FACILITIES STUDY IN ANY WAY BE DEEMED TO OBLIGATE TRANSMISSION PROVIDER OR THE TRANSMISSION OWNERS TO CONSTRUCT ANY FACILITIES OR UPGRADES OR TO PROVIDE ANY TRANSMISSION OR INTERCONNECTION SERVICE TO OR ON BEHALF OF NEW SERVICE CUSTOMER EITHER AT THIS POINT IN TIME OR IN THE FUTURE.

CONFIDENTIALITY

- 9. New Service Customer agrees to provide all information requested by Transmission Provider necessary to complete the Facilities Study. Subject to section 10 of this Agreement and to the extent required by Section 222 of the PJM Tariff, information provided pursuant to this section 9 shall be and remain confidential.
- 10. Until completion of the Facilities Study, Transmission Provider shall keep confidential all information provided to it by the New Service Customer. Upon completion of the Facilities Study, Transmission Provider shall provide a copy of the study to New Service Customer, and to all other New Service Customers whose New Service Requests were evaluated in the Facilities Study, along with (to the extent consistent with Transmission Provider's confidentiality obligations in Section 18.17 of the Operating Agreement) all related work papers. Transmission Provider also shall post on its OASIS the existence of the Facilities Study. New Service Customer acknowledges and consents to such other, additional disclosures of information as may be required under the PJM Tariff or the FERC's rules and regulations.
- 11. New Service Customer acknowledges that, consistent with Part VI of the PJM Tariff, the affected Transmission Owner(s) will participate in the Facilities Study process and that Transmission Provider may disseminate information to the affected Transmission Owner(s) and may consult with them regarding part or all of the Facilities Study.

COST RESPONSIBILITY

- 12. A. New Service Customer shall reimburse Transmission Provider for all, or for an allocated portion of, the actual cost of the Facilities Study in accordance with its cost responsibility as determined under Section 206 of the PJM Tariff.
 - B. Prior to initiating the Facilities Study, Transmission Provider shall bill New Service Customer for New Service Customer's share of the cost of work on the study that is scheduled to be completed during the first three months after work commences. Thereafter, on or before the 5th business day of every third month, Transmission Provider shall bill New Service Customer for New Service Customer's share of the cost of work expected to be completed on the Facilities Study during the ensuing three months. New Service Customer shall pay each bill within twenty (20) days after receipt thereof. In the event New Service Customer fails, other than as provided below regarding billing disputes, to make timely payment of any invoice for work on

the Facilities Study, its New Service Request shall be deemed to be terminated and withdrawn as of the date when payment was due. Notwithstanding the foregoing, in the event that the total estimated cost of the Facilities Study does not exceed the amount of the deposit required under Section 206 of the PJM Tariff, Transmission Provider shall apply the deposit in payment of the invoices for the cost of the Facilities Study. Upon written request by the New Service Customer pursuant to Section 206.4.1.1 of the PJM Tariff. Transmission Provider may provide a quarterly cost reconciliation. Subject to the following sentence regarding the final cost reconciliation upon completion of the Facility Study, such a quarterly cost reconciliation will have a one-quarter lag, e.g., reconciliation of costs for the first calendar quarter of work will be provided at the start of the third calendar quarter of work. Within 120 days after Transmission Provider completes the Facilities Study, Transmission Provider shall provide a final invoice presenting an accounting of, and the appropriate party shall make any payment to the other that is necessary to resolve, any difference between (a) New Service Customer's cost responsibility under this Agreement and the PJM Tariff for the actual cost of the Facilities Study and (b) New Service Customer's aggregate payments hereunder, including its deposits.

- C. In the event of a billing dispute, Transmission Provider shall continue to perform its obligations under this Agreement so long as (1) New Service Customer continues to make all payments not in dispute, and (2) New Service Customer's aggregate deposits held by Transmission Provider under this Agreement while the dispute is pending exceeds the amount in dispute, or (3) New Service Customer pays to Transmission Provider or into an independent escrow account the portion of the invoice in dispute, pending resolution of such dispute. If New Service Customer fails to meet any of these requirements, then its New Service Request shall be deemed to be terminated and withdrawn as of the date when payment was due.
- 13. Concurrent with execution of this Agreement, New Service Customer will pay Transmission Provider a cash deposit, as provided by Section 206 of the PJM Tariff, equal to the greater of \$100,000.00 or New Service Customer's estimated cost responsibility for the first three months of work on the Facilities Study. New Service Customer's quarterly estimated cost responsibility shall equal its estimated cost responsibility for the work on the Facilities Study that is scheduled to be completed during each three-month period after such work commences. If New Service Customer fails timely to provide the deposit required by this section, its New Service Request shall be deemed terminated and withdrawn and this Agreement shall be null and void. New Service Customer acknowledges that it may become obligated to pay one or more additional deposits pursuant to sections 14 and 15 below. Except as otherwise provided in section 12.B above, Transmission Provider shall continue to hold the amounts on deposit under this agreement until settlement of the final invoice.
- 14. If the Facilities Study, as described in section 7.A of this Agreement, is to include evaluation of more than one New Service Request and one or more of those requests is terminated and withdrawn, subject to the terms of section 15 of this Agreement, Transmission Provider will redetermine and reallocate the costs of the Facilities Study among the remaining participating New Service Customers in accord with Section 206 of the PJM Tariff. In that event, and subject to the terms of section 15, within 30 days after the date for execution and return of Facilities Study Agreements as determined under

Section 206 of the PJM Tariff, Transmission Provider will provide the New Service Customer with a written statement of the New Service Customer's revised responsibility for the estimated cost of the Facilities Study, determined in accordance with Section 206 of the PJM Tariff. In the event that New Service Customer's revised cost responsibility exceeds the sum of its previous deposits for the Facilities Study, it shall deliver to Transmission Provider, within 10 days after New Service Customer's receipt of its revised cost responsibility, an additional cash deposit equal to the amount of the excess. If New Service Customer fails timely to provide an additional deposit that is required under this section, its New Service Request shall be deemed terminated and withdrawn as of the date by which its additional deposit was due. In the event that New Service Customer's revised cost responsibility under the notice described in this section is less than the sum of its previous deposits for the Facilities Study, Transmission Provider shall return to New Service Customer, with its notice of the revised cost responsibility, the amount of the difference.

- 15. A. This section shall apply prior to commencement of the Facilities Study (1) if the Facilities Study is to include multiple New Service Requests; and (2) if, in Transmission Provider's reasonable judgment, the termination and withdrawal of one or more of those New Service Requests significantly changes the group of New Service Requests to be included in the Facilities Study from the group that was included in the System Impact Study. For the purposes of this section, a change to the group of New Service Requests to be included in the Facilities Study shall be significant if, in Transmission Provider's reasonable engineering judgment, the change is likely to cause the system constraints relating to, and/or the facilities and upgrades necessary to accommodate, the group of New Service Requests that the System Impact Study to differ Materially from the system constraints relating to, and/or from the facilities and upgrades necessary to accommodate, the group of New Service Requests that the System Impact Study evaluated.
 - B. In the event of a significant change to the group of New Service Requests that the System Impact Study evaluated, within 15 days after the date for execution and return of Facilities Study Agreements as determined under Section 206 of the PJM Tariff, Transmission Provider shall provide New Service Customer with an explanation of the nature and extent of the change in the affected group of New Service Requests and of the extent to which Transmission Provider has determined that it must reassess the results of the System Impact Study. Within 30 days after it provides the explanation described in the preceding sentence, Transmission Provider shall provide New Service Customer with a revised estimate of the time needed, and of the likely cost, to complete the Facilities Study, and, if the study continues to include evaluation of more than one New Service Customer's New Service Request(s), New Service Customer's allocated share of the estimated cost of the revised Facilities Study, determined in accord with Section 206 of the PJM Tariff.
 - C. In the event that New Service Customer's revised cost responsibility exceeds the sum of its previous deposits for the Facilities Study, it shall deliver to Transmission Provider, within 10 days after New Service Customer's receipt of its revised cost responsibility, an additional cash deposit equal to the amount of the excess. If New

Service Customer fails timely to provide an additional deposit that is required under this section, its New Service Request shall be deemed terminated and withdrawn as of the date by which its additional deposit was due. In the event that New Service Customer's revised cost responsibility under the notice described in this section is less than the sum of its previous deposits for the Facilities Study, Transmission Provider shall return to New Service Customer, with its notice of the revised cost responsibility, the amount of the difference.

16. A. If the Facilities Study includes New Service Customer's New Service Request(s) only. New Service Customer may terminate its participation in the study at any time by providing written notice of termination to Transmission Provider. New Service Customer's notice of termination (1) shall be effective as of the end of the business day following the day that Transmission Provider receives such notice and (2) concurrently shall have the effect of terminating and withdrawing New Service Customer's New Service Request(s). New Service Customer will be responsible for all costs of the Facilities Study that Transmission Provider incurred prior to the effective date of the notice of termination. Within thirty (30) days after the effective date of New Service Customer's notice of termination, Transmission Provider will deliver to New Service Customer a statement of New Service Customer's responsibility for the costs of the Facilities Study incurred up to the date of termination. In the event that New Service Customer's cost responsibility as of the date of termination exceeds the sum of its deposits then held by Transmission Provider for the Facilities Study, Transmission Provider's statement will include an invoice in the amount of such excess. New Service Customer will pay that invoice within ten (10) days after it receives it. In the event that New Service Customer does not pay the invoice within ten (10) days after receipt, New Service Customer shall owe the invoice amount plus interest at the applicable rate prescribed in 18 C.F.R. § 35.19a (a)(2)(iii), accrued from the day after the date payment was due until the date of payment. In the event that New Service Customer's cost responsibility as of the date of termination was less than the sum of its deposits for the Facilities Study, Transmission Provider's statement will include a payment to New Service Customer in the amount of the difference.

B. If the Facilities Study includes any New Service Request(s) other than that (those) of New Service Customer, termination and withdrawal of New Service Customer's New Service Request(s) at any time after Transmission Provider has commenced the Facilities Study will not alter New Service Customer's responsibility for the costs of the Facilities Study under this Agreement and the PJM Tariff.

DISCLAIMER OF WARRANTY, LIMITATION OF LIABILITY

17. In analyzing and preparing the Facilities Study, Transmission Provider, the Transmission Owners, and any other subcontractors employed by Transmission Provider shall have to rely on information provided by New Service Customer and possibly by third parties and may not have control over the accuracy of such information. Accordingly, NEITHER THE TRANSMISSION PROVIDER, THE TRANSMISSION OWNERS, NOR ANY OTHER SUBCONTRACTORS EMPLOYED BY TRANSMISSION PROVIDER

MAKES ANY WARRANTIES, EXPRESS OR IMPLIED, WHETHER ARISING BY OPERATION OF LAW, COURSE OF PERFORMANCE OR DEALING, CUSTOM, USAGE IN THE TRADE OR PROFESSION, OR OTHERWISE, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH REGARD TO THE ACCURACY, CONTENT, OR CONCLUSIONS OF THE FACILITIES STUDY. New Service Customer acknowledges that it has not relied on any representations or warranties not specifically set forth herein and that no such representations or warranties have formed the basis of its bargain hereunder.

18. In no event will Transmission Provider, the Transmission Owners or other subcontractors employed by Transmission Provider be liable for indirect, special, incidental, punitive, or consequential damages of any kind including loss of profits, arising under or in connection with this Facilities Study Agreement or the Facilities Study, even if Transmission Provider, the Transmission Owners, or other subcontractors employed by Transmission Provider have been advised of the possibility of such a loss. Nor shall Transmission Provider, the Transmission Owners, or other subcontractors employed by Transmission Provider, the Transmission Owners, or other subcontractors employed by Transmission Provider be liable for any delay in delivery, or for the non-performance or delay in performance, of Transmission Provider's obligations under this Agreement.

Without limitation of the foregoing, New Service Customer further agrees that the Transmission Owners and other subcontractors employed by Transmission Provider to prepare or assist in the preparation of any Facilities Study shall be deemed third party beneficiaries of this provision entitled "Disclaimer of Warranty/Limitation of Liability."

MISCELLANEOUS

19. Any notice or request made to or by either party regarding this Facilities Study Agreement shall be made to the representative of the other party as indicated below.

Transmission Provider

PJM Interconnection, L.L.C. 955 Jefferson Avenue Valley Forge Corporate Center Norristown, PA 19403-2497

<u>New Service Customer</u>

Black Fork Wind, L.L.C. c/o Gary Energetics 1560 Broadway, Suite 2100 Denver, CO 80202 Attn: David Hettich

- 20. No waiver by either party of one or more defaults by the other in performance of any of the provisions of this Agreement shall operate or be construed as a waiver of any other or further default or defaults, whether of a like or different character.
- 21. This Agreement or any part thereof, may not be amended, modified, assigned or waived other than by a writing signed by all parties hereto.
- 22. This Agreement shall be binding upon the parties hereto, their heirs, executors, administrators, successors, and assigns.
- 23. Neither this Agreement nor the Facilities Study performed hereunder shall be construed as an application for service under Part II or Part III of the PJM Tariff.
- 24. The provisions of Part VI of the PJM Tariff are incorporated herein and made a part hereof.
- 25. Capitalized terms used but not otherwise defined herein shall have the meaning ascribed to them in the PJM Tariff.
- 26. This Facilities Study Agreement shall be effective as of the date of the New Service Customer's execution of it and shall remain in effect until the earlier of (a) the date on which the Transmission Provider tenders the completed Facilities Study and, as applicable, a proposed Interconnection Service Agreement or Upgrade Construction Service Agreement to New Service Customer pursuant to Section 212 or Section 213, respectively, of the PJM Tariff, or (b) termination and withdrawal of the New Service Request(s) to which the Facilities Study hereunder relates.

27. No Third-Party Beneficiaries

This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the parties, and the obligations herein assumed are solely for the use and benefit of the parties, their successors in interest and where permitted, their assigns.

28. Multiple Counterparts

This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

29. No Partnership

This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the parties or to impose any partnership obligation or partnership liability upon either party. Neither party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other party.

30. Severability

If any provision or portion of this Agreement shall for any reason be held or adjudged to be invalid or illegal or unenforceable by any court of competent jurisdiction or other Governmental Authority, (1) such portion or provision shall be deemed separate and independent, (2) the parties shall negotiate in good faith to restore insofar as practicable the benefits to each party that were affected by such ruling, and (3) the remainder of this Agreement shall remain in full force and effect.

31. Governing Law, Regulatory Authority, and Rules

For Interconnection Requests, the validity, interpretation and enforcement of this Agreement and each of its provisions shall be governed by the laws of the state of Ohio (where the Point of Interconnection is located), without regard to its conflicts of law principles. This Agreement is subject to all Applicable Laws and Regulations. Each party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, or regulations of a Governmental Authority.

32. Reservation of Rights

The Transmission Provider shall have the right to make a unilateral filing with FERC to modify this Agreement with respect to any rates, terms and conditions, charges, classifications of service, rule or regulation under section 205 or any other applicable provision of the Federal Power Act and FERC's rules and regulations thereunder, and the Interconnection Customer shall have the right to make a unilateral filing with FERC to modify this Agreement under any applicable provision of the Federal Power Act and FERC's rules and regulations; provided that each party shall have the right to protest any such filing by the other party and to participate fully in any proceeding before FERC in which such modifications may be considered. Nothing in this Agreement shall limit the rights of the parties or of FERC under sections 205 or 206 of the Federal Power Act and FERC's rules and regulations, except to the extent that the parties otherwise agree as provided herein.

IN WITNESS WHEREOF, Transmission Provider and the New Service Customer have caused this Facilities Study Agreement to be executed by their respective authorized officials.

Transmission Provider: PJM Interconnection, L.L.C.

By:_

Name

Title

Date

Printed Name

New Service Customer: Black Fork Wind, L.L.C.

By:_

Name

Title

Date

Printed Name

Schedule A Details of Design and Cost Estimates/Quality For the Facilities Study

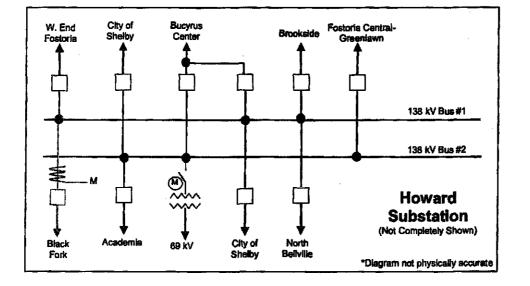
PJM will determine if there are any impacts on MISO facilities

The AEP engineering and design scope for the attachment facilities:

• Install a new 138 kV circuit breaker, disconnect switches, protective relaying, 138kV revenue metering and associated equipment, including 800 feet of underground 138 kV cable, at Howard Station.

Estimated cost for E&D and the evaluation of Impact on MISO facilities \$ 25,000

The minimum security required, per the Tariff, for the Facilities Study is \$100,000.



The APS engineering and design scope for the network upgrade facilities:

Network Upgrade #n1432

Reconductor the Sammis-Wylie Ridge No. 240 345kV line (6.9miles) with 1622 ACSS conductor to exceed 3000A capacity. Assume no structure replacement is required, only minor steel reinforcement. Upgrade the line trap on the Sammis terminal at Wylie Ridge with a 4000A rated trap and replace risers and connectors for 1622 ACSS.

Network Upgrade #n1580

Reconductor the AP portion (approximately 2.94 miles) of the existing Sammis-Wylie Ridge 345kV line with twin bundle 795 Drake ACSS-AW HT conductor for emergency ½ hour rating of 3760A and 4 hour rating of 3647A at 225C. Assume only minor steel reinforcement is required. At Wylie Ridge SS, replace the Sammis 345kV line trap with a 4000A rated line trap.

The FirstEnergy engineering and design scope for the network upgrade facilities:

Network Upgrade #n1574

Sammis Sub: Replace backup line relaying and metering on the 345 kV Wylie Ridge line.

Network Upgrade #n1575

Sammis -Wylie Ridge 345 kV, Reconductor 4.39 Miles: Re-conductor the Sammis-Wylie Ridge 345 kV line (4.39 mile) with 954 Kcmil ACSS wire.

Network Upgrade #n1576

Sammis Sub: Replace backup line relaying and metering on the 345 kV Wylie Ridge line. Replace GCX51 backup line relays with an SEL 421. Replace existing metering with digital multimeter. Replace 3000 Amp wave trap.

G Wetlands Report

003071_ET09_01-B3235

Wetlands and Waterbodies Report for the Black Fork Wind Project

Crawford and Richland Counties Ohio

February 2011

Prepared for:

Black Fork Wind Energy, LLC 400 Preston Ave, Suite 200 Charlottesville, VA 22901

Prepared by:

ECOLOGY AND ENVIRONMENT, INC.

368 Pleasant View Drive Lancaster, New York 14086

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ist of Abbreviations and Acronyms

AA	adjacent area
amsl	above mean sea level
CFR	Code of Federal Regulations
cm	centimeters
CWA	Clean Water Act
E & E	Ecology and Environment, Inc.
GPS	global positioning system
JD	Jurisdictional Determination
kV	kilovolt
MW	megawatt
NWI	National Wetland Inventory
NWP	Nationwide Wetland Permit
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
ORAM	Ohio Rapid Assessment Method
PEM	palustrine emergent wetland
PFO	palustrine forested wetland
PSS	palustrine scrub-shrub wetland
ROW	right-of-way
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

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List of Abbreviations and Acronyms (cont.)

USGS United States Geological Survey

Introduction

This report has been prepared for Black Fork Wind Energy, LLC to assist in the development of the Black Fork Wind Project (the Project) and to support an application to the Ohio Power Siting Board for a Certificate of Environmental Compatibility and Public Need. This delineation report will also be used to support a jurisdictional determination of the wetland and water bodies located near planned Project facilities by the United States Army Corps of Engineers (USACE).

Ecology and Environment, Inc. (E & E) delineated and evaluated wetlands and waterbodies within proximity to the proposed Project facilities that are, or have the potential to be, regulated by the USACE under Section 401 and 404 of the Clean Water Act (CWA) and have the potential to be regulated by the Ohio Environmental Protection Agency (OEPA) under Chapter 6111 of the Ohio Revised Code (ORC), Water Pollution Control (Isolated Wetland Permit). This document is intended to provide the results of those delineations along with related information necessary for the USACE and OEPA to verify wetland delineations and to make a jurisdictional determination of the wetlands within the area surveyed.

Section 1 of this report provides a general Project description; Section 2 outlines the regulatory framework that governs activities in wetlands and waterbodies; Section 3 provides a description of the ecological setting of the Project Area, including the results of a preliminary data review; Section 4 outlines the methodologies used to conduct field surveys; Section 5 provides the results of the wetland delineations field surveys; Section 6 provides the results of the waterbody evaluations; and Section 7 provides the references used in compiling this report. Appendix A provides 8.5- by 11-inch, black and white wetland and waterbody mapping for the Project. Appendices B and C provide datasheets and photo logs for the delineated wetlands and streams included in this report.

Project Description

Black Fork Wind Energy, LLC proposes to construct and operate the Black Fork Wind Energy project, a wind powered electric generation facility to be located in Richland and Crawford counties, Ohio. The Generation Facility will consist of up to 91 wind turbines and will have a maximum nameplate capacity of 200 megawatts (MW). In addition to the turbines, the Generation Facility will also include access roads, electrical collection lines, construction staging areas, a concrete batch plant, one substation and switchyard, and an operation and maintenance (O&M) facility. The substation will collect the wind energy generated by the Generation Facility and deliver the energy to the existing American Electric Power (AEP) transmission line that runs through the Project area, distributing energy to the PJM transmission grid. In total, over 24,000 acres of land have been leased in Auburn, Jackson, Jefferson, Sandusky, and Vernon Townships in Crawford County and Plymouth and Sharon Townships in Richland County (see Figure 1). Project facilities are shown in Figure 2. Wetland and waterbody surveys were not completed for the entire Project Area, only an area surrounding the proposed facilities.

The Project Facilities will consist of the following:

- Installation and operation of up to 91 wind energy turbines to produce a nameplate generating capacity of up to 200 MW of renewable energy;
- Construction and use of approximately 30 miles of access roads that will connect each wind turbine to a town, state or county roadway to allow equipment and vehicle access for construction and subsequent maintenance of the facilities as well as access by emergency services, if needed. The access roads will be gravel-based and will meet the load-bearing requirements of trucks transporting concrete, aggregate, and turbine components to the turbine sites;
- Construction and use of an electrical collection system that will allow delivery of electricity to a new switchyard and substation. The majority of the lines will be installed underground;
- Construction and use of a new switchyard and substation within the Project Area. The substation will enable the Project to deliver power to the existing American Electrical Power (AEP)-owned Howard-Fostoria Substation for distribution to the PJM Interconnection, LLC (PJM) grid;
- Construction of a temporary concrete batch plant, in order to provide the concrete necessary for the construction of the turbine and substation foundations. After construction is complete at the Facility, the temporary concrete batch plant area will be restored to pre-construction conditions; and
- Construction and use of an operations and maintenance (O&M) building that will include administrative offices, house monitoring stations, and storage for parts and other small equipment. The O&M building and an associated parking lot will occupy approximately 3 acres.

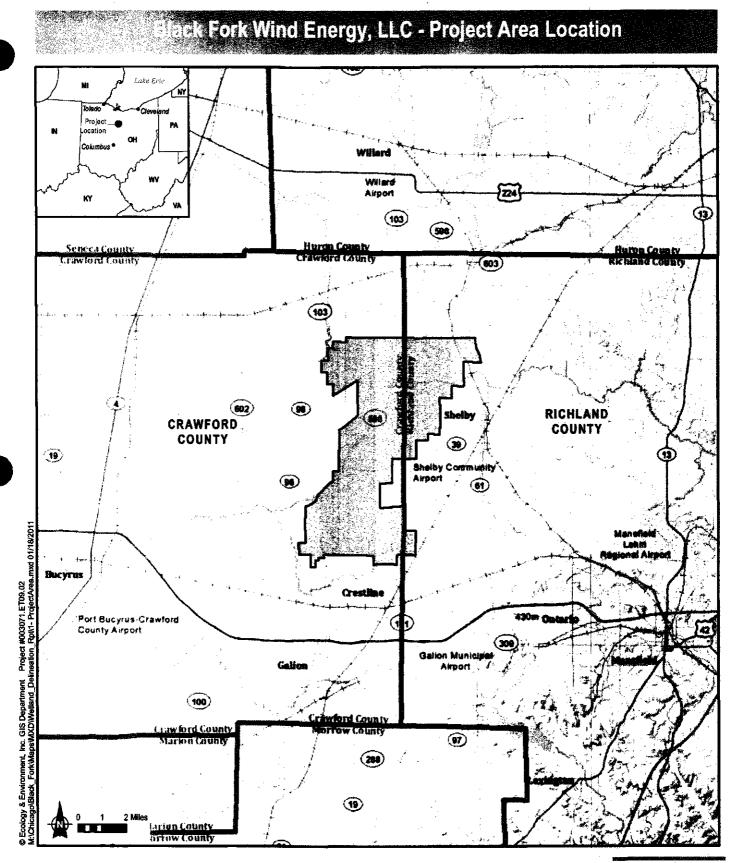
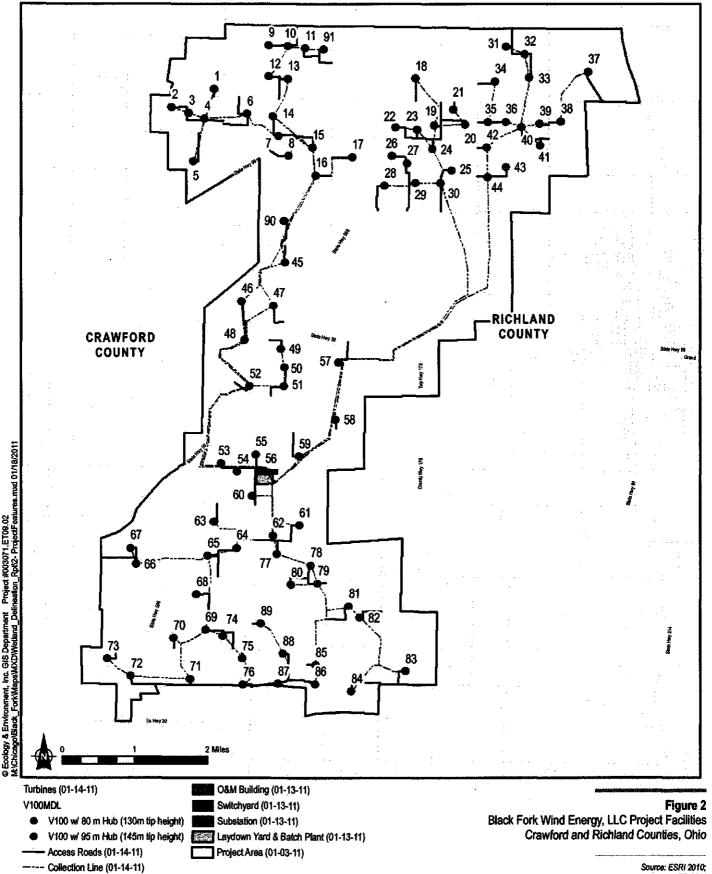


Figure 1 Black Fork Wind Energy, LLC Project Area Location Crawford and Richland Counties, Ohio

Source: ESRI 2010; EP, 2011

Project Area (01-03-11) County Boundary

Black Fork Wind Energy, LLC - Project Facilities



Public Road

EP, 2011

This report documents the boundaries of, and provides a description of, the wetlands and waterbodies delineated within a survey corridor around the proposed facilities.

The following terms are used throughout this document to describe the proposed action.

- Project. "Project" refers to all activities involved in the construction and operation of the wind energy project described above and all components thereof.
- Project Area. The Project Area is denoted by the outer boundary of the geographic area that includes all turbine sites, access roads, and collection system components. The Project Area includes the locations of all Project facilities in Crawford and Richland Counties, Ohio.
- Project Site. The Project Site contains all portions of the Project Area that have the potential to be permanently or temporarily disturbed as a result of the construction or operation of Project facilities (including wind turbines, electrical collection, utility trenches, utility poles, access roads, staging areas, and other related structures).
- Survey Corridor. The limit of the corridor within which wetlands and waterbodies were delineated. It pertains solely to those wetlands and waterbodies identified in the Project and generally includes a 200- to 300-foot corridor centered on linear facilities and a circular area with a 250-foot radius surrounding each turbine. This report pertains only to wetlands and waterbodies delineated in the Survey Corridor.

Regulatory Review and Permit Requirements

This report was prepared to address the requirements of the CWA of 1977; Ohio Revised Code Chapter 6111. Each of these requirements is discussed below.

2.1 Clean Water Act

The CWA was implemented to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under Sections 401 and 404 of the CWA, permits must be issued for certain activities that may impact wetlands and waterways. Section 401 of the CWA requires state approval for any federally permitted action impacting waters of the United States to ensure that the permitted action will not violate the state's water quality standards or impair designated uses. The Ohio State agency responsible for administering the Section 401 program is the Ohio Environmental Protection Agency (OEPA). Section 404 of the CWA requires that a permit be obtained for the discharge of dredged or fill material into waters of the United States, including wetlands and streams. Waters of the United States are defined under 33 Code of Federal Regulations (CFR), and wetlands are specifically defined under 33 CFR Part 328.3(b). The permitting agency responsible for Section 404 permits is the USACE. The Project falls within the jurisdiction of USACE Buffalo and Huntington Districts. Black Fork Wind Energy, LLC has consulted with both USACE Districts and the USACE has determined that the Buffalo District will take the lead on reviewing the Project. The Project is also in the jurisdiction of the Northwest District Office of the OEPA.

Depending on the final design and location of the project facilities, a CWA Section 404 permit may be required. If the permit is needed, the USACE will make a Jurisdictional Determination (JD) for delineated features following a field review of the Project. Based on guidance issued by the USACE in June 2008, the applicant may request either a Preliminary JD or an Approved JD (USACE 2008).

If Black Fork Wind Energy, LLC requests a Preliminary JD, all wetlands and waters delineated during field surveys will be considered federally jurisdictional regardless of surface water connections to waters of the United States or potential impacts on the physical and/or chemical nature of traditional navigable waters. Any permits sought or issued will be based on the assumption that all wetlands

2. Regulatory Review and Permit Requirements

and waters are federally jurisdictional. In the event that Black Fork Wind Energy, LLC later determines that an Approved JD is required, the request for a Preliminary JD may be revised to a request for an Approved JD.

In the case of an Approved JD, the USACE will make a determination for each wetland and waterbody, based on the surface connections and the potential importance of water quality, within traditional navigable waterways (USACE 2007).

2.2 Ohio Revised Code, Title 61, Chapter 6111

Chapter 6111 of the Ohio Revised Code (ORC) is titled Water Pollution Control. This law provides regulation for protection of all waters of the state, including wetlands. The law also provides permitting requirements for projects potentially impacting waterbodies, federal jurisdictional wetlands, and isolated wetlands (i.e., wetlands not subject to regulation under Section 404 of the CWA).

Isolated Wetlands

Ohio EPA takes jurisdiction of all wetlands within the state, even those wetlands without a clear hydrological connection to navigable waterways also referred to as isolated wetlands. By definition, "hydrologically isolated wetlands" are defined as those wetlands which:

- Have no surface water connection to a surface water of the state;
- Are outside of, and not contiguous to, any one hundred-year "floodplain" as that term is defined in this rule; and
- Have no contiguous hydric soil between the wetland and any surface water of the state (OAC 3745-50(T)).

In Ohio, there are two isolated wetland permits, the general isolated wetland permit and the individual isolated wetland permit. The general isolated wetland permit is required for any isolated wetlands that are less than ½ acre in size and classified as Category 1 or Category 2 wetlands. The general wetland permit requires a level one review, which includes:

- Submission of a pre-activity notice that includes an application;
- An acceptable wetland delineation;
- A wetland categorization;
- Description of the project;
- Acreage of the isolated wetland that will be subject to filling;
- Site photographs; and

Mitigation proposal for the impact to the isolated wetland.

An individual isolated wetland permit with a level two review is required for any isolated wetlands that are classified as Category 1 and greater than $\frac{1}{2}$ acre or Category 2 and between $\frac{1}{2}$ and 3 acres. The level 2 review includes:

- All of the information required for the general permit (see above);
- Analysis of practicable on-site alternatives to the proposed filling of the isolated wetland that would have a less adverse impact on the isolated wetland · ecosystem; and
- Information indicating whether high quality waters are to be avoided by the proposed filling of the isolated wetland.

An individual isolated wetland permit with a level three review is required for any isolated wetlands that are classified as Category 2 and greater than 3 acres, or all Category 3 wetlands. The level three review includes:

- The information required for the general permit (see above);
- Full antidegredation review; and
- Information indicating whether high quality waters are to be avoided by the proposed filling of the isolated wetland.

Section 401 Water Quality Certification

Disturbances to wetlands and streams have the potential to degrade water quality, therefore in addition to the federal CWA Section 404 permit for direct impacts to wetlands and streams, a Section 401 Water Quality Certification (Section 401 certification) is also required. The project must comply with Ohio's Water Quality Standards (OAC3745-1) and not potentially result in an adverse long-term or short-term impact on water quality in order for OEPA to issue a Section 401 certification. Ohio's Antidegredation Rule (OAC 3745-1-05), which is included in the Water Quality Standards, establishes the existing uses of surface waters, sets the conditions in which water quality may be lowered in surface waters, and includes additional application requirements for high quality waters and wetlands and the accompanying public participation procedures.

In addition to the routine wetland delineation required for USACE wetland delineation, the OEPA requires that all wetlands be classified within the state according to their size and functions using the Ohio Rapid Assessment Method (ORAM). This method classifies wetlands into three categories with Category 1 wetlands having the lowest ranking and Category 3 having the highest ranking and therefore the highest level of protection. Section 5 provides more details on the

2. Regulatory Review and Permit Requirements

categorization of wetlands using ORAM. OEPA also puts additional restrictions of the issuing of permits under the Section 404 Nationwide Permits Program based on which Category of wetland is impacted. Specifically, temporary or permanent impacts to Category 3 wetlands are prohibited [with the exception of NWP 27, which permits Stream and Wetland Restoration Activities] (OEPA 2007). 3

Project Area Description

3.1 General Project Area Description

The Project facilities are located in Auburn, Jackson, Jefferson, Sandusky, and Vernon Townships in Crawford County and Plymouth and Sharon Townships in Richland County. In total, over 24,000 acres of land have been leased. The Project Area is located in central Ohio, in an agriculturally dominated area approximately 60 miles north of Columbus, OH.

The Project Area is generally dominated by cultivated cropland with small pockets of deciduous forest and pasture (See Figure 3). The predominant crops are corn and soybean (USDA 2008). These crops would constitute the primary vegetative cover to be removed during construction of the Project.

The Project Area is located on the Lake Erie-Ohio River Basin Divide with 64% (approximately 15,495 acres) of the Project Area falling into the Lake Erie Watershed and 36% (approximately 11,203 acres) both major watersheds. No major rivers are present in the Project area; however there are several perennial and intermittent streams draining to three distinct watersheds: the Sandusky River and the Huron-Vermillion River Basins, both of which ultimately drain into Lake Erie and the Mohican River Basin that drains to the Ohio River (ODNR, Division of Water 2009a). These watersheds are identified by USGS eight-digit hydrologic unit codes (HUCs) as 04100011 (Sandusky River), 04100012 (Huron-Vermillion Rivers), and 05040002 (Mohican River) (USGS 2009). These major drainage basins are further divided into sub-watersheds (10-digit HUC): Broken Sword Creek (04100011 03), Sandusky River (04100011 04), Honey Creek (04100011 08), West Branch Huron River (04100012 01), and Black Fork Mohican River (05040002 01) (see Figure 5). The acreage of each watershed, within the Project Area is provided in Table 3-1.

3. Project Area Description

10-digit HUC	Watershed Name	Description	Acreage of Project Area Within Watershed
04100011 03	Broken Sword Creek	Headwaters to below Unnamed Tributary at New Haven Road	854 acres
04100011 04	Sandusky River	Headwaters to Upstream Broken Sword Creek	8,685 acres
04100011 08	Honey Creek	Between Waynesburg Tiro Road and Lydell Road	3,455 acres
04100012 01	West Branch Huron River	Headwaters to above Slate Run	2,502 acres
05040002 01	Black Fork Mohican River	Headwaters to Downstream Whet- stone Creek	8,702 acres

Table 3-1 Watersheds within the Black Fork Project Area

General information about existing surface water quality in the vicinity of the Project Area was obtained from an OEPA document, *Integrated Water Quality Monitoring and Assessment Report (*OEPA, Division of Surface Water 2008), compiled under the Clean Water Act Sections 303(d) and 305(b). This report lists stream segments with impaired ambient water quality in the state of Ohio. All five 10-Digit HUC watersheds within the Project Area are listed as impaired in both the aquatic life use assessment and recreation use assessment. In addition, fish tissue assessments were listed as impaired for the Sandusky River watershed. Highmagnitude causes of impairment include direct habitat alterations, siltation, nutrients, organic enrichment, and flow alterations. High magnitude sources of impairment include major municipal point sources, spills, channelization for agriculture and development, combined sewer overflows, non-irrigated crop production, on-site wastewater systems, flow regulation for agriculture, and urban runoff and storm sewers. Table 3-2 summarizes the causes and sources of impairment by watershed.

Watershed HUC	Causes of Impairment	Sources of Impairment
04100011 03	Siltation	Non-irrigated Crop Production
Broken Sword	Nutrients	Channelization-Agriculture
Creek	Flow Alteration	Flow Regulation/Modification- Agriculture
	Direct Habitat Alterations	Spills
04100011 04	Siltation	Major Municipal Point Source
Sandusky River	Nutrients	Combine Sewer Overflows
-	Organic Enrichment/DO	Non-irrigated Crop Production
	Flow Alteration	On-site Wastewater Systems (Septic Tanks)
		Flow Regulations/Modification-Agriculture

Table 3-2 Watershed Impairment Summary

3. Project Area Description

Watershed HUC	Causes of Impairment	Sources of Impairment
04100011 08	Siltation	Minor Municipal Point Source
Honey Creek	Nutrients	Non-irrigated Crop Production
	Flow Alteration	Channelization-Agriculture
		Flow Regulation/Modification-Agriculture
		Removal of Riparian Vegetation
04100012 01	Siltation	Minor Municipal Point Source
West Branch	Nutrients	Non-irrigated Crop Production
Huron River	Flow Alteration	Upstream Impoundment
	Direct Habitat Alterations	Channelization- Development
		Waste/Storage Tank Leaks
		Irrigated Crop Production
05040002 01	Unknown Toxicity	Major Industrial point Source
Black Fork Mo-	Nutrients	Urban Runoff/Storm Sewers (NPS)
hican River	Siltation	Channelization-Agriculture
	Direct Habitat Alterations	Channelization- Development
******		Removal of Riparian Vegetation-
		Development
		Contaminated Sediments

Table 3-2 Watershed Impairment Summary

3.2 Preliminary Data Review

Prior to performing fieldwork, background information was reviewed to assist in the initial identification of wetlands and waterbodies.

3.2.1 Review of Existing Wetland Information

Information sources used to determine the possible presence of wetlands included current high-resolution aerial photographs of the Project Area (See Figure 3); USGS 7.5-Minute Series topographic maps (See Figure 4); United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) maps and Ohio Wetland Inventory maps (See Figure 5); and Richland County and Crawford County Soil Surveys (See Figure 6).

USGS topographic maps and aerial photos indicate the possible presence of wetlands in the Survey Corridor. The NWI maps are readily available for only half of the project area as such, only the areas covered by the NWI maps were reviewed. These maps depict wetlands occurring throughout the Survey Corridor. Ohio Wetland Inventory Maps are available for the entire Project Area and depict approximately 656 acres of wetlands within the proposed Project Area. Approximately 13.4 acres of wetlands fall within the proposed Project Site and therefore may be impacted. Ohio Wetland Inventory maps were created with the intent to be used for planning purposes only and not as a surrogate for field surveys. The Richland County and Crawford County Soil Surveys indicate the presence of hydric soils and soils with potential hydric inclusions in the Survey Corridor. Based

3. Project Area Description

on the results of the desktop review, it was determined that field verification would be required to determine the presence and extent of wetlands in the Survey Corridor.



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Project Area (01-03-11)

Figure 3 Black Fork Wind Energy, LLC Aerial Photo of Project Area Crawford and Richland Counties, Ohio

Source: ESRI 2010; EP 2011; OSIP 2008;



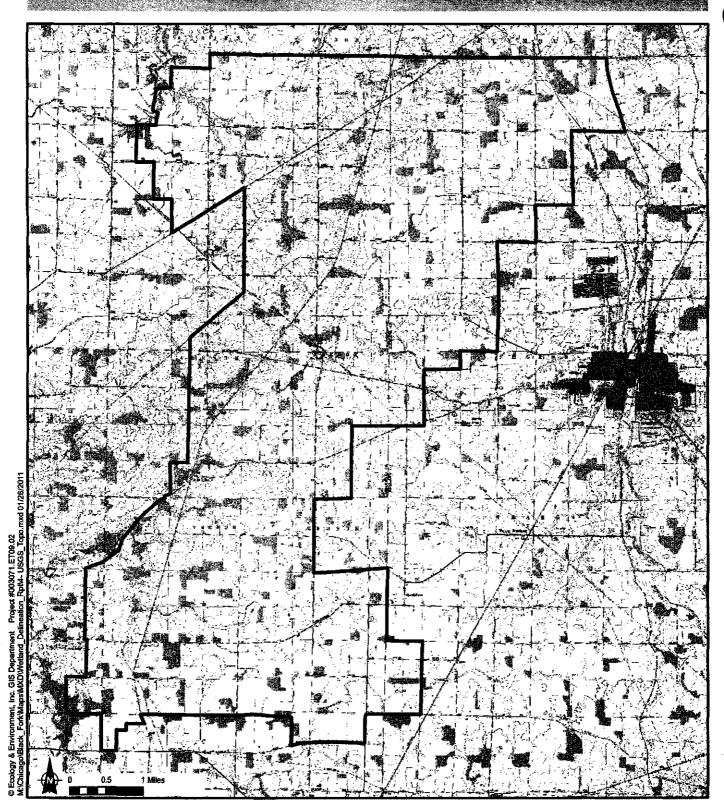
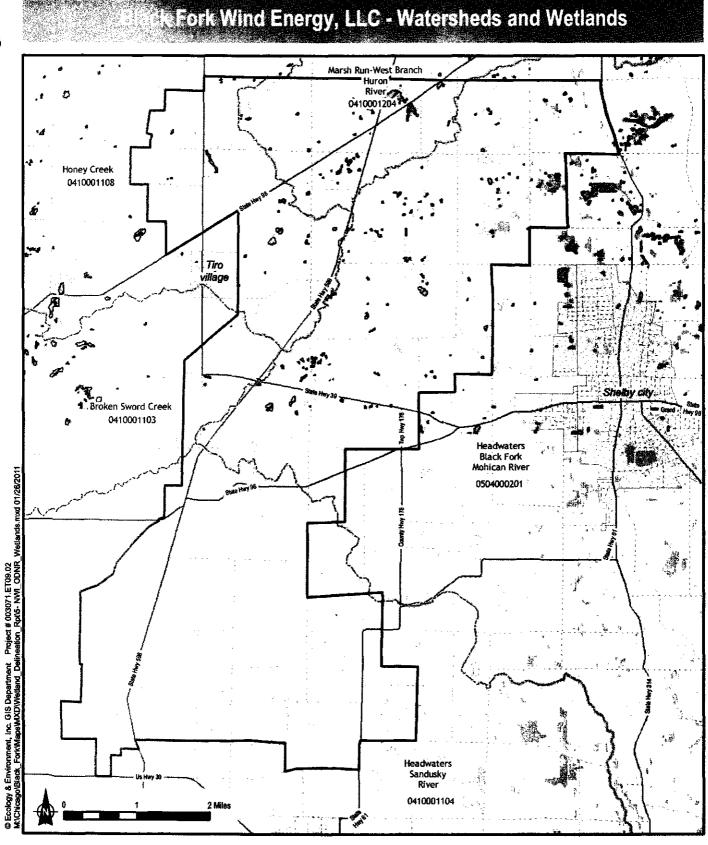


Figure 4

Black Fork Wind Energy, LLC USGS 7.5" x 7.5"; 1:24,000 Topographic Map Crawford and Richland Counties, Ohio Source: ESRI 2010; USGS 2008; EP 2011

Project Area (01-03-11)

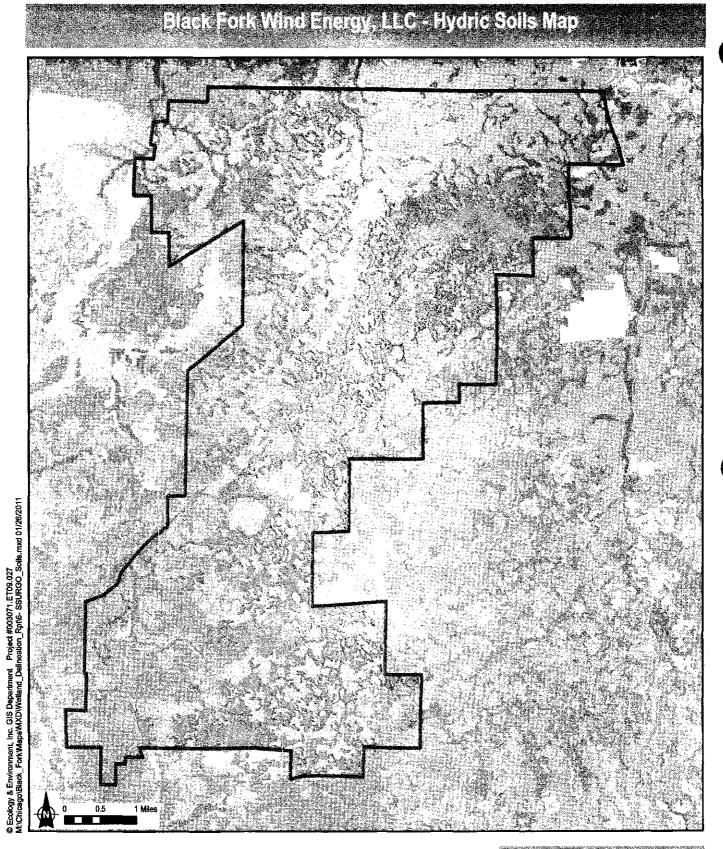


Project Area (01-03-11)
10 Digit Hydrologic Unit Code (HUC)
National Wetland Inventory Wetland

Ohio Wetland Inventory Wetland

Figure 5 Black Fork Wind Energy, LLC Watersheds and Wetlands Crawford and Richland Counties, Ohio

Source: ESRI 2010; USFWS 1993-2000; ODNR 2008; EP 2011



Project Area (01-03-11) Hydric Soils All hydric

Figure 6 Black Fork Wind Energy, LLC Hydric Soils Map Crawford and Richland Counties, Ohio

> Source: ESRI 2010; USDA NRCS 2008; EP 2011



Methodology

Surveys for wetland and waterbody resources were conducted using a 250-foot radius around the proposed location of turbines, a 300-foot-wide corridor centered on the access roads, and a 200-foot-wide corridor centered on the associated electric collection lines connecting the individual turbines, substation and switchyard. In some areas surveys were restricted because of property access or expanded to accommodate site-specific conditions.

Wetland mapping is included in Appendix A (8.5- by 11-inch, black and white mapping) and depicts the Survey Corridor in which the surveys were conducted. The 200- to 300-foot-wide survey area around access roads, collection lines, and 250-foot radius surrounding each turbine allowed for an assessment of adjacent ecological communities and provided flexibility for minor shifts in layout of these facilities.

Field surveys were conducted from September 22 through October 23, 2009 and October 13, 2010 through October 18, 2010 to:

- Delineate wetland boundaries and characterize wetland functions and values to obtain sufficient data about individual wetlands within the Survey Corridor to allow for a complete assessment of potential Project-related impacts;
- Characterize all waterbodies and watercourses that occur within the Survey Corridor.

The surveys conducted in 2009 were conducted using delineation procedures in the USACE *Wetland Delineation Manual* (Environmental Laboratory 1987). This manual is commonly referred to as the "87 Manual." In March 2010, the USACE adopted the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (U.S. Army Engineer Research and Development Center 2009). As a result the surveys conducted in 2010 utilized the new regional supplement. The specific procedures used to evaluate the soils, vegetation, and hydrology at each potential wetland location is described below.

4.1 Soils

Soils were examined by using a tile spade shovel, or "sharpshooter," to a depth of at 14 to 24 inches. Wherever disturbance of the soils, caused by past excavation or fill activity, was evident the soil characterization was performed in adjacent, undisturbed areas within the potential wetland. Soils were characterized in each soil horizon. Soil colors were identified using a Munsell Soil Color Chart (Munsell 2000), and other characteristics such as the presence of redoximorphic features and soil texture were recorded. Hydric soil characteristics, such as organic soil layers, gleying, concentrations, and oxidized rhizospheres were noted where they occurred.

During the 2010 field surveys, hydric soil indicators described in the Field Indicators of Hydric Soils in the United States A Guide for Identifying and Delineating Hydric Soils Version 7.0 (USDA 2010) were used to identify and document hydric soils per the NC/NE Regional Supplement.

4.2 Hydrology

The *Wetlands Delineation Manual* (Environmental Laboratory 1987) provides guidelines for determining the presence of wetland hydrology. In general, the criteria for wetland hydrology are met if the area is inundated or saturated at the soil surface during the growing season for a time sufficient to develop hydric soils and support hydrophytic vegetation. In some instances, it is necessary to use other field characteristics to identify wetland hydrology. These characteristics may include water staining, sediment deposits, drainage patterns, or drift lines. Hydrologic characteristics, as well as the depth of surface water or depth to soil saturation, were recorded for each wetland area.

The Northcentral and Northeast (NC/NE) Regional Supplement allows a variety of hydrology indicators to be used. Examples of indicators that can be used include but not limited to: saturations; surface water; sediment, drift, and iron deposits; surface soil cracks; presence of reduced iron; and stufted or stressed plants. This expanded list of hydrology indicators was used during the 2010 field surveys to observe and document wetland hydrology.

4.3 Vegetation

To determine the presence of hydrophytic vegetation, the dominant species in each major vegetative stratum (e.g., tree, shrub/sapling, herbaceous, and woody vine) were identified and recorded. Each plant was then assigned a wetland indicator status (i.e., obligate wetland, facultative wetland, facultative, facultative upland, or upland) from *National List of Vascular Plant Species that Occur in Wetlands* (Reed 1988). The 2009 surveys followed the 87 Manual in which hydrophytic vegetation was present if the dominant species observed had an indicator status of facultative (FAC), facultative wetland (FACW), or obligate (OBL).

4. Methodology

In 2010, the presence of hydrophytic vegetation was determined using the procedures described in the NC/NE Regional Supplement. Vegetation in each of the strata were sampled in the following plot sizes:

- Tree stratum- 30-ft radius
- Sapling/shrub stratum- 15-ft radius
- Herb stratum- 5-ft radius
- Vine stratum- 30-ft radius

Within each stratum, the abundance of each species within the plot was recorded and determined by using areal cover estimates. The Rapid Field Test was applied and if the majority of the species in each strata had an indicator of FACW or OBL, hydrophytic vegetation was present. If the sampled area did not contain all species with an indicator status of FACW or OBL, the Dominance Test was applied. Most plant communities occurring within areas with hydric soils and indicators of hydrology will meet the qualifications of the Rapid Field Test or the Dominance Test. If a site with hydric soils and indicators of hydrology failed the Rapid Field Test and the Dominance Test, the vegetation was evaluated using the Prevalence Index and if necessary, observing plant morphological adaptations and re-running the Prevalence Index.

4.4 Delineation

If the soils, hydrology, and vegetation at a survey point indicated that it was within a wetland, the boundary of the wetland was determined, and flagged with high visibility wetland delineation tape. The approximate boundary was recorded on site maps, and the boundary was surveyed using a global positioning system (GPS) unit with sub-meter accuracy. The electronic files generated from the GPS survey were then downloaded and integrated into a geographical database on the project that includes the alignment drawings to identify where the delineated wetlands and the proposed Project facilities overlapped or were nearby. Photographs were taken and datasheets completed at each delineated wetland, stream, and water body, and other points of interest within the Survey Corridor. 5

Wetland Delineation Results

Several field investigations were conducted to assist in the development of the layout of the Project. Initial field investigations were conducted from September 22 through October 23, 2009 and resulted in the delineation of 14 wetlands and several streams and ponds (See Section 6 of this report for more information regarding streams). Based on the results of the field investigations some of the Project facilities were re-located to avoid impacting some of these wetlands in early 2010. Further refinement of the layout continued through the summer of 2010 utilizing the results of the fall 2009 field investigations and new constraints information obtained from other environmental and engineering studies concurrently being conducted for the Project. Once these changes were integrated and a new layout was complete, field investigations were conducted within areas not previously surveyed October 13 through October 18, 2010. Four additional wetlands were delineated during these field investigations. Figure 7 depicts all the areas field investigations were conducted within the Project area. The information collected during the previous two surveys was used to evaluate the location of planned facilities once again. Minor shifts were made to project facilities to further avoid and minimize impacts.

The results presented in this report are only those wetlands that are within the survey corridor centered on the current locations of the proposed facilities. This includes the a 250-foot radius of currently proposed turbine locations, a 200-foot buffer area centered on electrical collection lines, a 300-foot buffer area centered on access roads, and within the areas encompassing the proposed substation, switchyards, O&M building, concrete batch plant and laydown yard as depicted on Figure 2. Only two wetlands occur within the survey corridor around the current layout. Facilities are no longer planned near the 12 other wetlands identified during the survey. As such, only information concerning these two wetlands are presented in this report as Black Fork Wind Energy, LLC is requesting a review by USACE and OEPA on wetlands that may potentially be impacted by the Project.

Maps depicting the location of the two delineated wetlands that occur within the survey corridor of the Project are located in Appendix A. Appendices B and C include the wetland datasheets, and the photographic exhibits for the wetlands

identified in the survey corridor. The following sections describe the two wetlands

5.1 Delineated Wetlands Summary

Wetland community types were assigned to each of the delineated wetlands using the Classification of Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979) in the field. In addition, the plant community found within each wetland was also classified according to Plant Communities of the Mid-West Ohio Subset (Faber-Langendoen 2001) to provide a regional approach to describing wetland habitat. The two wetlands occurring nearby planned Project facilities are classified as Palustrine Emergent (PEM) wetlands under the Cowardin et al (1979) system. PEM wetlands are dominated by herbaceous vegetation with little or no woody plant material present. These wetlands contain plant communities with some characteristics of Bulrush - Cattail - Burreed Shallow Marsh as described in Faber-Langendoen. Bulrush-Cattail-Burreed Shallow Marshes have a conservation status rank of G4G5 (Apparently secure or secure) and range broadly over the Midwestern U.S. and Canada, from Ohio and Ontario west to Manitoba, south to Oklahoma, and east to Indiana. The community is highly variable and can serve as an interface between wet meadows and deep marshes or be found alone in small depressional areas. They are dominated by low-lying species (<1 m) to tall emergent species (1-2 m).

Wetland W800

Wetland W800 is an emergent wetland located in an agricultural field and is approximately 0.04 acres in size. The landscape is slightly rolling and the wetland is a small tear-drop shaped depression. There is an approximate 2 ft rise around the wetland boundary and no apparent inlet or outlet indicating that the source of water for this wetland is overland sheet flow. The underlying soils had a silty clay texture in the A horizon and a clay loam texture in the B horizon and is a poorly drained soil. The wetland has sparse aerial coverage of vegetation due to its location in a field used for row crops. Only two species were observed, blue grass (*Poa compressa*) and a species of beggars' ticks (*Bidens sp.*).

Wetland W901

Wetland W901 is a small emergent wetland approximately 0.11 acres in size located in a bowl-shaped depression in an active agricultural field. The hydrology of this wetland was driven by run-off from the surrounding topography that is slightly rolling and the underlying poorly drained soil. The B horizon has a clay texture and a gleyed matrix starting at 12" below the soil surface. The wetland is actively farmed however the crops were stunted and sparse on the outer boundary of the wetland and were absent in the interior of the wetland. As result of the regular ground disturbance from tilling and use of herbicides, the plant community has low diversity and is composed of species adapted to disturbance or are considered agricultural weeds. The dominant hydrophytic plant species observed in this wetland include reed canary grass (*Phalaris arundinacea*), yellow nutsedge (*Cyperus esculentus*), and tearthumb (*Polygonum saggitatum*).

5.2 OEPA Jurisdictional Wetlands

OEPA takes jurisdiction over all wetlands within the state of Ohio, even isolated wetlands. OEPA requires that an evaluation of each impacted wetland be performed using the Ohio Rapid Assessment Method (ORAM). The results of the ORAM assessment are used to determine which ranking a wetland will receive. The ranking system is based on three categories: Category 1, Category 2, and Category 3. Category 1 wetlands have the lowest ranking in terms of quality, while Category 3 wetlands exhibit the highest quality. Category 1 wetlands receive the lowest level of protection whereas impacts to Category 3 wetlands are only permitted under specific circumstances. The delineated wetlands were evaluated using the ORAM assessment method in the field to determine a score for each wetland. The score is based on the wetland's functions and values. The ORAM scores and ranking will ultimately be determined by OEPA during the Section 401 or Isolated Wetland Permitting process.

Category 1 Wetlands

Category 1 wetlands are the lowest value wetland rating. They are defined by OEPA as supporting minimal wildlife habitat, and minimal hydrological and recreational functions. These wetlands do not provide critical habitat for threatened or endangered species, or contain rare, threatened or endangered species (OAC 3745-1-54 (C)(1)(a)).

Wetlands assigned to Category 1 may posses some or all of the following characteristics: hydrologic isolation, low species diversity, a predominance of non-native species (greater than 50% areal cover for vegetative species), no significant wildlife habitat or wildlife use, and limited potential to achieve beneficial wetland functions(OAC 3745-1-54 (C)(1)(b-c)).

Wetlands with ORAM scores between 0 and 29.9 are assigned a Category 1 status. Wetlands with scores between 30.0 and 34.9 fall in a "gray zone" and additional testing is required to determine if they belong in Category 1 or the next higher category (*Mack, 2000*).

Wetlands W800 and W901 had ORAM scores that defined them as Category 1 wetlands. These wetlands were small, isolated wetlands occurring within active agricultural fields. They showed signs of recent or regular disturbance such as mowing, tilling, and herbicide applications. Both wetlands were also dominated by reed canary grass and contained non-native species. Finally, these wetlands offered virtually no wildlife habitat and no recreational opportunities.

6

Waterbodies

The waterbodies found within the survey corridor were assessed by their flow characteristics to determine if they met USACE's definition of a stream. Streams were defined as having a scoured channel, defined bed and banks, and having an ordinary high water mark. The centerline of the stream occurring within the survey corridor was mapped and an assessment was conducted on the stream reach that occurred within the survey corridor. Each stream reach was given an alphanumeric name. Many streams were crossed multiple times therefore some streams were assessed multiple times and have several alphanumeric names. USGS topographic maps and recent aerial photography were used to determine the hydrologic connection to traditional navigable waterways. Fifty (50) stream reaches were mapped and assessed during the field survey efforts conducted in 2009 and 2010. As previously discussed, the location of streams mapped in the field was used to further refine the layout to minimize and avoid impacts. There are 21 stream reaches that occur within the survey corridor of the current location of proposed Project facilities. Only these 21 stream reaches are discussed. Other waterbodies were also noted if encountered. Ponds were the only other waterbodies found. The ponds were observed in yards of residences and were man-made and maintained impoundments. They are mainly used for aesthetics and recreation.

The stream reaches were evaluated using the Ohio Qualitative Habitat Evaluation Index (QHEI) scoring method or the Headwater Habitat Evaluation Index (HHEI) as applicable. The scope of the surveys was limited to the length of stream that fell within the survey corridor therefore the stream reach assessed was defined by the length of stream delineated. Generally, the QHEI evaluation applies to streams whose drainage area is greater than 1 square mile but less than 20 square miles, and whose maximum pool depth is greater than 40 centimeters. These streams are classified as Headwater Habitat (HHW) streams by Ohio EPA. The HHEI evaluation applies to streams whose drainage area is less than 1 square mile and whose maximum pool depth is less than 40 centimeters. These streams are classified as Primary Headwater Habitat (PHWH) streams. Metrics for each method were evaluated and scored to assist in determining an aquatic life use potential for that stream section.

OEPA also assigns beneficial use designations to water bodies in the state. These designations describe existing or potential uses of water bodies. They take into

consideration the use and value of water for public water supplies, protection and propagation of aquatic life, recreation in and on the water, agricultural, industrial and other purposes. There may be more than one use designation assigned to a water body. Examples of beneficial use designations include: public water supply, primary contact recreation, and numerous sub-categories of aquatic life uses *(Ohio 2008 Integrated Report)*. The QHEI and HHEI methods assist in assigning the beneficial use designations.

OEPA also classifies waterbodies into four categories of high quality waters pursuant to division (A)(2) of section 6111.12 of the Revised Code: limited quality waters, general high quality waters, superior high quality waters, outstanding state waters, and outstanding national water resources. High quality waters are protected from loss of water quality by OAC 3745-1-05. All surface waters are classified as general high quality waters unless found in the superior high quality water, outstanding state water due to exceptional values, or outstanding state water due to exceptional ecological values tables in OAC 3745-1-05. This classification system assigns levels of protection to the waterbodies with outstanding national water resources receiving the highest level of protection. There are no waters classified by OEPA as limited quality waters, superior high quality waters, outstanding state waters, or outstanding national water resources within the Project area, therefore by default all the delineated streams are classified as general high quality waters.

6.1 Stream Reach Summary

Table 6-1 provides a description of each perennial, intermittent, or ephemeral stream reach that was identified within the survey corridor. Ten of the 21 stream reaches evaluated are perennial streams. The remaining 11 have either intermittent or ephemeral flow. The vast majority of the stream reaches evaluated are located in agricultural fields. They are well-defined streams that have been channelized and dredged to accommodate flow from drainage tiles and runoff from adjacent agricultural fields. The locations of these streams are depicted in relation to Project facilities on the mapping included in Appendix A. Photographs of the streams and QHEI and HHEI data sheets are included in Appendices B and C.

A total of 10 streams were identified within the Lake Erie watershed and 11 streams were identified within the Ohio River watershed. The streams identified that are located within the Lake Erie watershed are tributaries to Honey Creek, Loss Creek, and Paramour Creek. In turn, these streams are tributary to the Sandusky River. Stream reach S705 is a reach of Loss Creek and stream reaches S801 and S802 are portions of Paramour Creek. The streams identified that are located within the Ohio River watershed are tributaries to Marsh Run. Delineated stream reaches S002 and S1562 are reaches of Marsh Run.

Twenty of the stream reaches evaluated occur in agricultural fields and have been channelized through the fields. These channels appear to be routinely dredged. In some locations during the surveys, field surveyors observed back hoes and exca-

vators actually dredging the streams. It is likely that these streams are a part of County Ditch Programs or used to ensure compliance with Ohio Drainage Law. Under the programs, landowners are provided financial assistance to maintain adequate drainage within agricultural land and developed areas. These channels were historically straightened to prevent flooding and are still maintained to ensure adequate drainage for the extensive tile drain systems located within the Project area. Sediment is periodically removed from the channel as a result the bottom of the channel is typically 6 to 10-feet below the ground surface.

As a result of the channelization and maintenance, these streams have trapezoidal shaped channel cross sections, lack sinuosity, and are incised by an average of 7-10 feet. The streams lack defined pool-riffle-pool regimes and in-stream habitat is lacking. Often the channel has reed canary grass growing out of the bottom. On many of the smaller streams, the scoured channel is visible only if the surveyor pulled back the vegetation. If pool habitat is present, they are often short in length and are less than two feet in depth. Outlets for subsurface drain tile are common within the stream banks. Riparian areas were often lacking as crops were observed up to the top of the banks on most streams. If a riparian area was present it consisted of a narrow strip of mowed cool season grasses used as an access road for farm equipment. The stream banks within the trapezoidal channels are frequently mowed to remove any woody vegetation. The unnatural conditions of the streams limit stream functions and are reflected in the QHEI/HHEI scores. Table 6.1-1 provides a description of the streams as well as their QHEI/HHEI score.

Two of these streams (S803 and S711) exist in their natural state and have not been recently manipulated for agricultural purposes. Stream reach S803 flows through agricultural land and does not contain a high quality riparian area. The stream exhibits past disturbance such as incision however the stream is recovering. Sinuosity in S803 is higher than most of the other stream reaches observed. The riparian area is composed of goldenrods, cool season grasses and other weed species and lacks trees and shrubs. Stream reach S711 is a natural channel that flows through a mature forested area. It too exhibits past disturbance with incision and moderately stable banks. There is an abandoned bridge located within the evaluated reach. Hammond Road historically continued to the east of its present location and has since been abandoned. The bridge abutments are still located on the stream banks however the bridge decking has been removed. Sinuosity of this stream is high. Pool-riffle-pool regimes are present in both of these stream reaches.

Surface Water Use

Surface water features mapped within the Survey Corridor are headwater streams with no specific designated use category. It is presumed that they are utilized by wildlife and for agricultural uses and may be used for secondary contact recreation. No perennial streams designated for fishing were found within the Survey Corridor. Public fishing access is not available to any waterbodies within the Project Area. None of the major waterbodies will be traversed by the Project, and

6. Waterbodies

these waterbodies lie primarily outside of the Project Area. Honey Creek is considered a superior high quality water (SHQW) by OEPA. Three stream reaches evaluated (S500, S501 and S711) are tributary to Honey Creek. Stream reach S500 is the beginning of a stream created by a culvert in State Route 98. Road ditched running parallel to State Route 98 outlet into the culvert thus creating enough concentrated flow to create a scoured channel. As a result this stream contains a large amount of sediment. Stream reach S501 is in the typical condition for streams flowing through agricultural fields in the Project area and is maintained. Stream reach S711 is one of the natural stream channels evaluated. Precipitated ferrous iron was observed in the channel indicating groundwater discharge into the channel. This stream is only tributary observed to Honey Creek that would contribute to the maintenance of Honey Creek as a SHQW. Further details on these streams are described in Table 6.1.

All of the streams within the Survey Corridor may be used to some extent by wildlife as a source of drinking water. However, many of the streams are intermittent or ephemeral therefore water availability is intermittent and may be present only during periods of continuous or heavy precipitation or during the snow-melt period in the spring. Furthermore, the conditions in these streams are typically unsuitable for fish most of the year and unsuitable for bi-valves. Amphibians and macro-invertebrates are likely to inhabit intermittent streams when water is present.

Man-made ponds are scattered throughout the Project area. Ponds vary in size, but are typically less than 1 acre with depths ranging from 2 to 10 feet. Man-made ponds are used primarily for recreational purposes are located in open or forested residential areas adjacent to farm fields. Wildlife may also utilize these resources.

6. Waterbodies

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Table 6-1 Summary of Delineated Stream Characteristics. Black Fork Wind Energy Project

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0		(feet)	(feet)	Substrate	Flow Type	Type	Connection	Rating ²	Comments Comments
S002	0.52	11.6	1.58	Silt/Clay	Percnnial	P-RPW	Marsh Run	QHEI - 21	Stream S002 is a small perennial stream that has been manipulated (dredged and deep- ened) for agricultural purposes. The stream channel is narrow and is choked with reed canary grass (See Photos P007 and P008 in Appendix B). The stream flows northwest beyond the survey corridor as an unnamed tributary to Marsh Run.
S013	0.2	7.9	1.42	Gravel, Silt/Clay	Intermittent	S-RPW	Unnamed Tributary to Marsh Run	HHEI – 32 (Modified Class II)	Stream S013 is a narrow, intermittent stream that has been straightened and dredged to accommodate adjacent agricultural activities (See Photo P158 in Appendix B). The de- lineated segment has low canopy coverage and low sinuosity. The stream flows west through a cuivert at Baker Road as an un- named tributary to Marsh Run.
S021	0.21	6.7	1.02	Silt/Clay	Intermittent	S-RPW	Unnamed Tributary to Loss Creek	QHEI - 14 HHEI - 40 (Modified Class II)	Stream S021 is a small unnamed tributary to Loss Creek. The channel has been channel- ized through agricultural fields. It receives water from tile drain outlets along the banks as well as roadside ditches. This reach of the stream flows west through a 6 foot concrete culvert under Nazor Road (See Photo P209 in Appendix B).

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	Table 6-1. Summary of Delineated Stream Chara	

			Comments // Provents	Stream 1550 is a perennial stream flowing north to Paramour Creek. Within the survey corridor the stream flows under a bridge at Hook Rd. The surrounding landscape is dominated by agricultural land. The banks are steep and the channel is incised by ap- proximately 7 feet indicative of recent and intense disturbance. Sinuosity is low and riffle/run quality is poor. The banks are vegetated with reed canary grass. In-stream cover is sparse. Shrub growth has been sup- pressed by recent mowing (See Photo P899 in Annendix A).	Stream 1503 flows perennially through agri- cultural fields (See Photo P903 and P904 in Appendix B). The stream channel was re- cently heavily disturbed and bankful meas- urements could not be taken due to recent dredging activity (occurring within one week of delineation). The scoured channel is lo- cated within a 10ft deep trapezoidal trench. There is no sinuosity to the stream, and chan- nelization is severe. Riffle/run quality is low. Substrate is exclusively silt. A small wooded parcel buffers the stream immediately to the northeast. Vegetative cover is very low due to recent disturbance, and the channel is ex- posed nearly 100%. Fish are present.
ject	QHEI or	нны	Rating	QHEI - 49	QНЕІ - 18
Summary of Delineated Stream Characteristics, Black Fork Wind Energy Project	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Hydrologic	Connection	Unnamed Tributary to Paramour Creek	Unnamed Tributary to Marsh Run
Fork Wil		Flow	Type	P-RPW	P-RPW
stics, Black		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Flow Type	Perennial	Perennial
n Characteri		and the second se	Substrate	Gravel, silt	Silt
ited Stream	Bankful	Depth	// (feet)	2.20	Measured
of Delinea	Bankful	Width	(feet)	12.7	Not Measured
	الموضوع من من المراجع المراجع من من من من الموضوع من من من من م	Baseflow	/(feet)	Not Meas- ured	0.18
Table 6-1	موں سے اندوں سے بنائے مرکب میں مرکب سے میں میں اور موجعہ میں موجعہ موجعہ موجع موجع موجع موجع موجع موجع موجع موجع موجع موجع موجع موجع موجع موجع	Field		S1550	S1553

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Comments ³	Stream 1560 is a primary headwater stream flowing N through a large agricultural field (See Photo P916 in Appendix B). The chan- nel has been dredged and is incised by ap- proximately 6 ft (See Photo P917 in Appen- dix B). The channel lacks sinuosity, is poorly developed, and shows little recovery from recent disturbances. Flow is slow and somewhat turbid. There is poor development of a pool-riffle-pool regime. The banks are dominated by reed canary grass (See Photo P918 in Appendix B).	Stream 1562 is a delineated reach of Marsh Run. The stream is sharply channelized through an agricultural field. Sinuosity is low, and has poorly defined pool-riffle-pool regime. The channel has a trapezoidal cross section and is incised. Reed canary grass chokes the scoured channel. Aquatic macro- phytes are present.	This stream begins at a culvert on Route 98. The culvert outlets on the north side of Route 98 creating a scoured channel (See Photo P1009 in Appendix B). Flow is intermittent as water was observed in the pools during base flow conditions.
ject QHEI or HHEI Rating ²	QHEI - 24 HHEI - 28 (Modified Class I)	QHEI - 28	QHEI - 19 HHEI - 32 (Modified Class II)
ristics, Black Fork Wind Energy Project C Flow Hydrologic Flow Type Type ¹ Connection R	Unnamed Tributary to Marsh Run	Marsh Run	Umnamed Tributary to Honey Creek
Flow Flow Type	P-RPW	P-RPW	S-RPW
istics, Black Flow Type	Perennial	Perenrial	Intermittent
Table 6-1 Summary of Delineated Stream Character Banktul Banktul Banktul Banktul Field Baseflow Width Depth ID (feet) (feet)	Silt, muck	Silt, muck	Silt/Clay
ted Streal Bankful Depth (feet)	1.67	1:90	1.17
/ of Delinear Bankful Width (feet)	6.93	20.24	10.3
Baseflow (feet)	1.67	0.69	0.094
Table 6-1 Field ID	S1560	S1562	S500

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Comments ³	Stream S501 is a small perennial stream lo- cated between 2 agriculture fields. This stream has been straightened and contains tile drain outlets along the banks. The stream is contained within a steep sided channel ap- proximately 4 feet deep (See Photos P1026- P1027 in Appendix A). The north bank of the stream in the survey corridor is buffered from the agriculture field by ~60 feet of for- ested land. The south bank abuts an active agricultural field. The stream flows into a mature block of forest on the western edge of the survey corridor and becomes a natural channel hereafter.	Stream S505 is a narrow ephemeral stream that has been deepened and straightened for agricultural purposes (See Photo P1044 in Appendix B). The channel has heavy silta- tion, low sinuosity, and poor pool/riffle de- velopment. The channel is choked with reed canary grass. It flows southeast beyond the survey corridor as an unmapped tributary to Marsh Run and is mapped as Stream S506 where it re-enters the survey corridor north of Hazelbrush Road.	Steam S506 is a different reach of the same stream as S505. This stream is a headwater stream to Marsh Run and has been straight- ened and deepened to accommodate drain tile inflow from adjacent agriculture fields. Wa- ter was present in this reach suggesting this portion of the stream receives enough groundwater inflow from tile drain outlets to make this section intermittent or perennial (See Photos P1049 and P1050 in Appendix B).
QHEI or QHEI or HHEI Rating ²	QHEI - 22 HHEI - 50 (Modified Class II)	QHEI - 20 HHEI - 27 (Modified Class I)	QHEI - 17.5 HHHEI - 51 (Modified Class II)
Flow Type Type Connection R	Unnamed Tributary to Honey Creek	Unnamed Tributary to Marsh Run	Unnamed Tributary to Marsh Run
Flow	S-RPW	S-RPW	P-RPW
Flow Type	Intermittent	Intermittent	Perennial
Bankful Bankful Bankful Bankful Baseflow Width Depth (feet) (feet) Substrate	Gravel, Silt/Clay, large Cob- bles in sandy clay sub- strate	Silt/Clay	Sand, Silt/Clay
Bankful Depth (feet)	1:35	2.16	2.5
Bankful Width (feet)	9.1	8.6	12
	0.55	0.75	1.27
Field	S501	S505	S506

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	Table 6.1 Summary of Delineated Stroam Chara	
	Table 6.1 Summary of Delineated Stream Chara	

	Comments	The channel has been manipulated for agri- culture purposes; however, banks along this section have not been maintained and shrub growth provides some canopy cover (See Photo P1072 in Appendix B). There velocity of flow is slow in this section, the water ap- pears stagnant and the substrate is silty rnuck.	Stream S700 is an intermittent stream flow- ing through an active agricultural field. The stream is clearly used for drainage to support the drain tile system installed in the field. The habitat is of low quality and lacking structure. This incised channel does not have access to the floodplain. The banks are very steep and the channel was likely dug out in last 5 years.	Stream S705 is a perennial stream that has been modified for agricultural purposes. It has poor pool development, but some point bar development is present. Reed canary grass heavily choking channel. Some algae present in channel and flow is very slow. No fish were observed. The riparian area is mowed.	Stream S706 is an ephemeral stream, with a narrow mowed riparian area, than runs through an agricultural field. There is no water in the channel at the time of survey.	there were pockets of leaf packs to support invertebrates. There are cattails and sedges in the bottom of the channel that also form some of the riffles in the assessed reach.
ject	QHEI or HHEI Rating ²		HHEI - 32 (Modified i Class II) 5 Class II) 5 Class II) 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	HHEI - 37 S (Modified H Class II) H Class II) H H H H H H H H H H H H H H H H H H H	HHEI - 27 S (Modified I Class I)	
Summary of Delineated Stream Characteristics, Black Fork Wind Energy Project	Hydrologic Connection	Unnamed Tributary to Marsh Run	Unnamed Tributary to Marsh Run	Loss Creek	Urmamed tributary to Marsh Run	
Fork Win	Flow Type	P-RPW	S-RPW	P-RPW	Non- RPW	
istics, Black	Flow Type	Perennial	Intermittent	Perennial	Ephemeral	
m Characteri	Substrate	Silt/Clay	Silt	Silv/Leaf pack	Silt/Leaf pack	
ted Streal	Bankful Depth (feet)	5	8	7	1.75	
of Delinea	Bankful Width (feet)	16.4	10.5	11.5	8.33	
	Baseflow (feet)	0.28			0	
Table 6-1	Field D	S508	S700	S705	S706	

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	Comments ³	Stream S707 is an ephemeral stream that runs through an agricultural field and has a narrow mowed riparian area. The scoured channel is small and has a silt substrate with some scat- tered leaf packs. Reed canary grass, sedges, asters and goldenrods are present along the banks and adjacent to the channel. Channel development is poor and lacks pool-riffle sequences. Similar to other streams in the Project that occur in agricultural fields, the stream is incised and can not reach its flood- plain.	Stream S709 is recovering from historic maintenance as an agricultural ditch. Stream dwelling fish and low water quality tolerant invertebrates were observed. There is a large amount of brown algae covering the sub- strate. Some bank failures were observed. The banks are mostly vegetated with reed canary grass, however, other species are colonizing and diversity appears to be in- creasing.	Stream S711 is a perennial stream located in a forested area. Iron and scum were ob- served on the surface of the water. There is a historic road present and the stream was channelized to accommodate the bridge structure and road crossing. The stream is recovered now and the bridge is no longer present. This stream has poor pool-riffle development and it is incised by 3.5-4 feet and can not reach the floodplain.
ject	QHEI or HHEI Rating ²	HHEI - 27 (Modified Class I)	QHBI - 51	QHEI - 53
ristics, Black Fork Wind Energy Project	Hydrologic Connection	Marsh Run	Umamed Tributary to Loss Creek	Umamed Tributary to Honey Creek
k Fork Wine	Flow	RPW	P-RPW	P-RPW
stics, Blacl	Flow Type	Ephemeral	Peremial	Perennial
Summary of Delineated Stream Characteri	Substrate	Silt/Leaf	Cobble, Gravel, Silt	Cobble, Silt
ated Stream	Bankful Depth (feet)	1.5	1.5	2
r of Deline	Bankful Width (feet)	∞	30	01
Summary	Baseflow (feet)	0		
Table 6-1	Field	2707	S709	S711

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	Comments ³	Stream S801 is a perennial stream located in a forested riparian area adjacent to two agri- cultural fields. The stream appears to have been straightened in the past for agricultural purposes and is now recovering, with some pool-riffle and sidebar development. The stream has access to an approximately 2-3 feet wide floodplain on either bank.	Stream S802 is a different, downstream, reach of S801. This reach flows under a bridge over State Route 61. The stream is clearly used to support tile drainage in agri- cultural fields on either side of the road. The stream has low quality habitat and lacks structure. As with other streams in agricul- tural areas, the channel has no access to the floodplain and the channel appears to have been dug out to maintain adequate drainage capacity.	Stream S803 is an intermittent stream flow- ing along the western edge of an active agri- cultural field. The stream flows under Hammond Road to the south of the survey reach. The stream is recovering from straightening from the agricultural usage, with some access to an herbaceous and scrub dominated floodplain along the left bank. Habitat along the right bank, however, is of	grass is growing within the banks and dominates the riparian zone, though other herba- ceous species have begun to colonize the left bank. The channel shows little to no pool- riffle development.
oject	QHEI or HHEI Rating ²	HHEI - 65 (Modified Class II)	HHEI - 65 (Modified Class II)	HHEI - 51 (Modified Class II)	
iristics, Black Fork Wind Energy Project	Hydrologic Connection	Paramour Creek	Paramour Creek	Unnamed Tributary to Honey Creek	
K Fork Win	Flow Type	P-RPW	S-RPW	S-RPW	
istics, Black	Flow Type	Perennial	Perennial	Intermittent	
Summary of Delineated Stream Characteris	Substrate	Cobble, Gravel	Gravel, Silt	Gravel, Silt	
	Bankful Depth (feet)	0.3	0.4	03	
of Deline	Bankful Width (feet)	10.1	12.8	6	
Summary	Baseflow (feet)				
Table 6-1	Field ID	108S	S802	S803	•

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ud euvironment, inc.	Table 6-1 Summary of Delineated Stream Characteristics, Black Fork Wind Energy Project Field Bankful Bankful Bankful Field Baseflow Withh Depth Total Number of 21 Substrate Flow Type Streams Delineated 21 Substrate Flow Type Connection Rating ²	Survey Corridor Corrections are based on the following definitions: Stream flow (P-RPW) - The stream flow is evident throughout the year, in most years. Intermittent Flow (S-RPW) - The stream channel contains flowing water for at least three months but does not flow throughout the year, in most years. Ephemeral Flow (Non-RPW) - The stream channel contains flowing water for less than three months of the year, in most years.	OHEI - Qualitative Habitat Evaluation Index, Ohio Environmental Protection Agency (OEPA) requires this evaluation for a stream reach whose watershed is greater than 1 square mile. DEPA classifies streams with watersheds less than 20 square miles and greater than 1 square mile as Headwater Habitat (HHW) Streams. HHEI - Headwater Habitat Evaluation Index, OEPA requires this evaluation for a stream reache whose fool depth is less than 40cm. DEPA classifies these streams as Primary Headwater Habitat (PHWH) Streams. Scores for both evaluation methods are provided where post-field watershed area calculations warranted a HHEI rating. Modified Class I - Manipulated or otherwise unnatural stream channel whose HHEI index rating is >30, these are considered ephemeral PHWH streams Modified Class I - Manipulated or otherwise unnatural stream channel whose HHEI index rating is >30 and <70, these are considered ephemeral PHWH streams	lsed by Field Teams, See Appendix A.	4. Index mapping showing mapped wetlands, waterbodies, and Project facilities are provided in Appendix D.		
Control and control theory	Table 6-1 Summary of DelineatFieldBaseflowFieldBaseflowWidth(feet)ID(feet)Total Number of21Streams Delineated1	In Survey Corridor Notes: I. Stream flow classifications are based on the following definitions: Perennial Flow (P-RPW) - The stream flow is evident throughout Internittent Flow (S-RPW) - The stream channel contains flowing Ephemeral Flow (Non-RPW) - The stream channel contains flowing	 QHEI - Qualitative Habitat Evaluation In OEPA classifies streams with watersheds HHEI - Headwater Habitat Evaluation In OEPA classifies these streams as Primary HHEI rating. Modified Class I - Manipulated or othery Modified Class II - Manipulated or othery 	3. P## = Photo Numbers Used by Field Teams, Sec Appendix A.	4. Index mapping showing mapped wetland		

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6. References

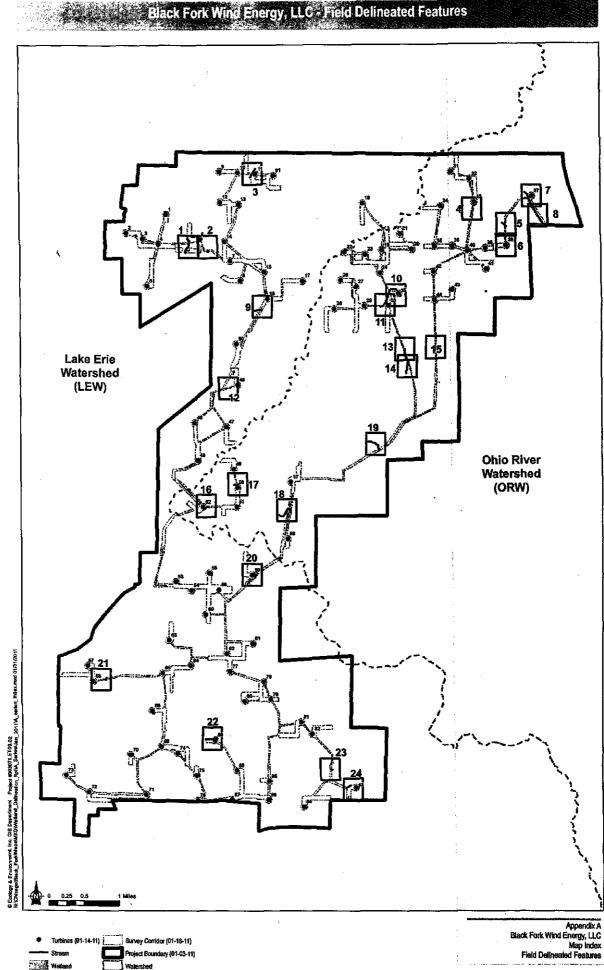
United States Fish and Wildlife Service (USFWS). 1988. National List of Vascular Plant Species that Occur in Wetlands: 1988 National Summary. NWI, United States Department of the Interior.

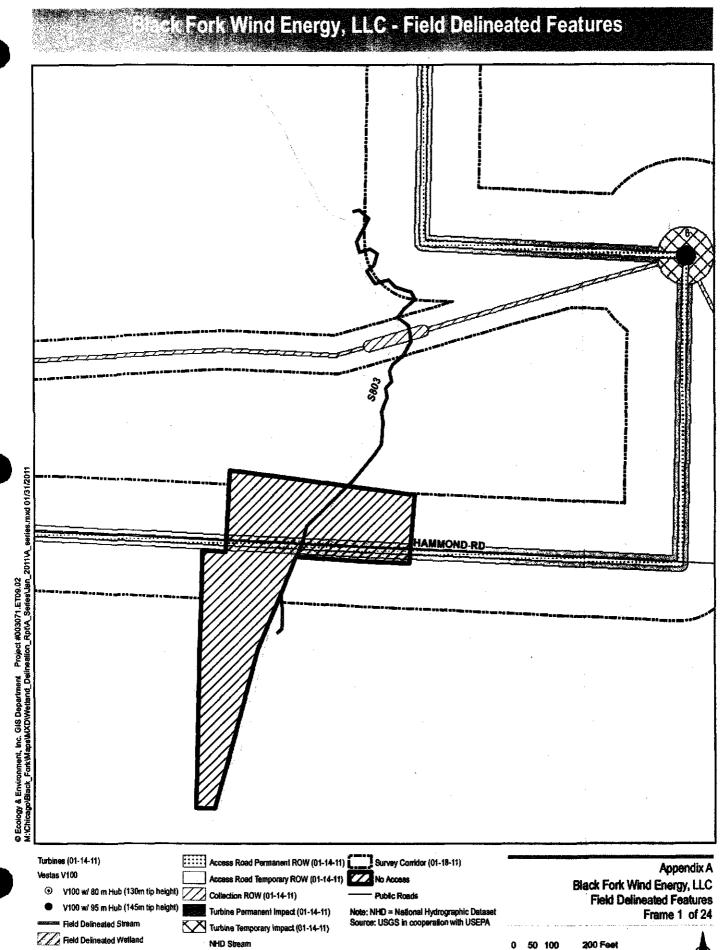
United States Geological Survey, 2009b, *Hydrologic Unit Maps*, available online at http://water.usgs.gov/GIS/huc.html.

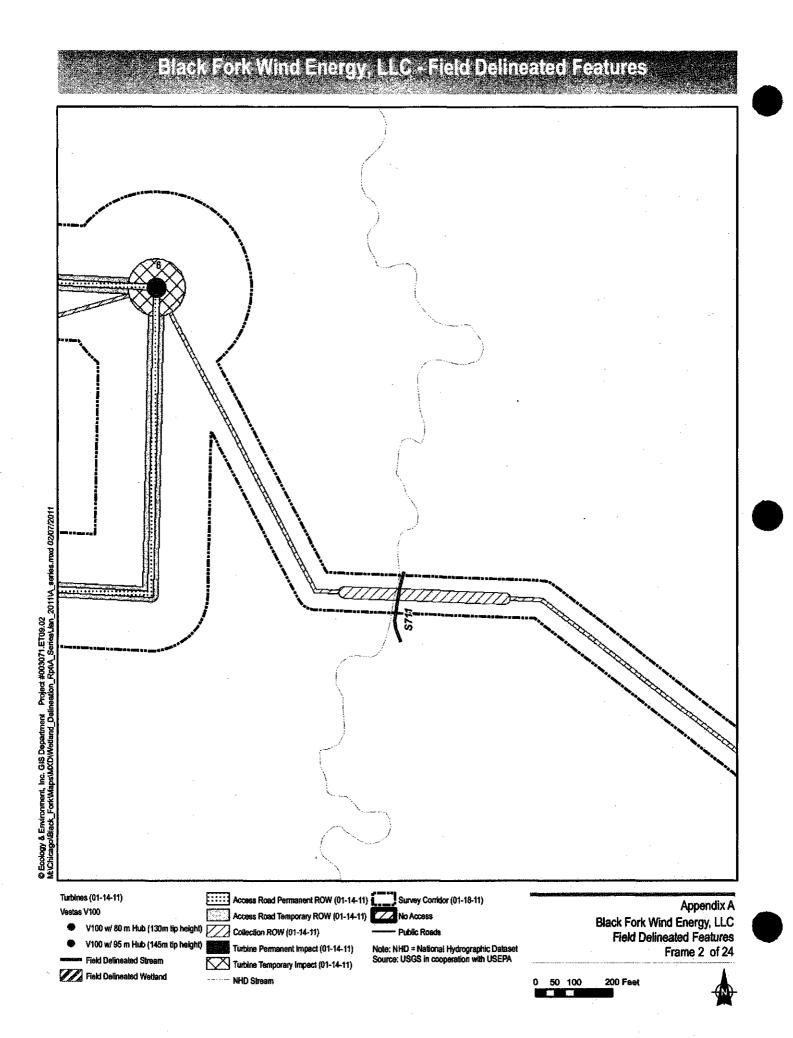


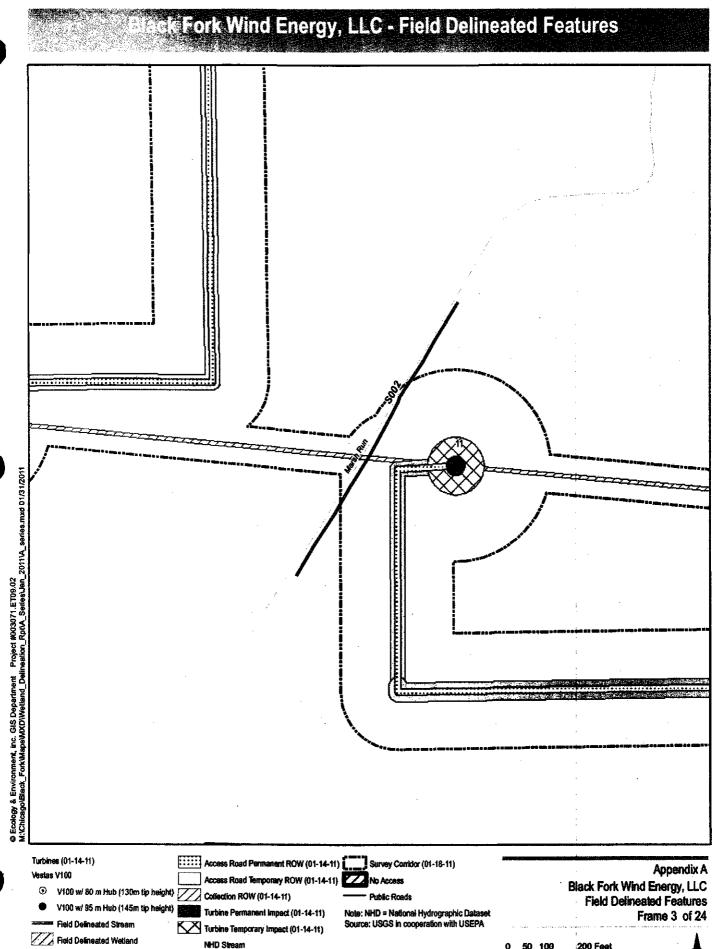
Maps

02:003071_ET09_01-B3235 R_Black Fork Wind Wetland Delineation.doc-



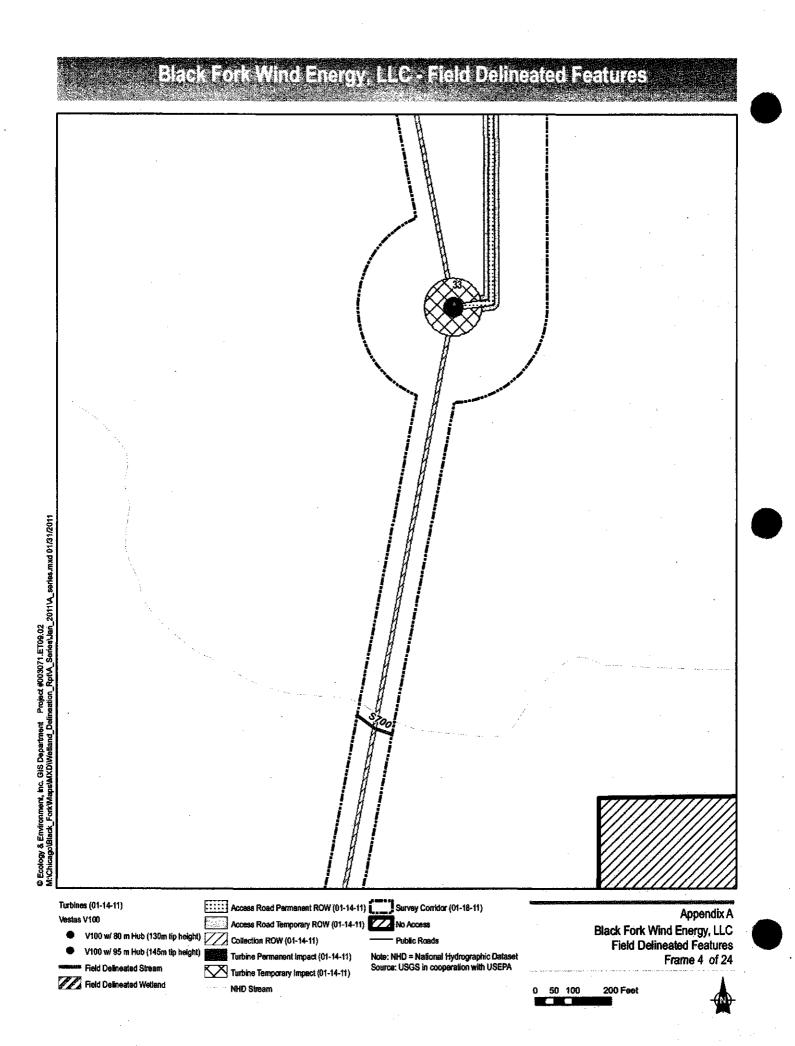


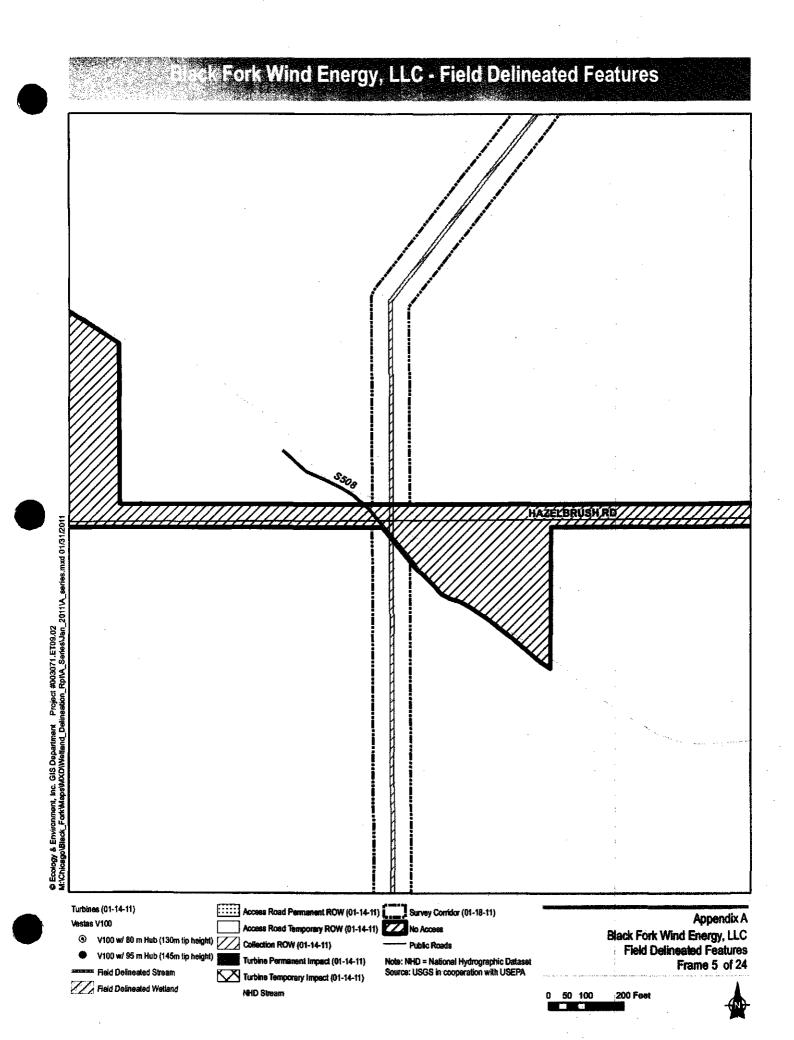


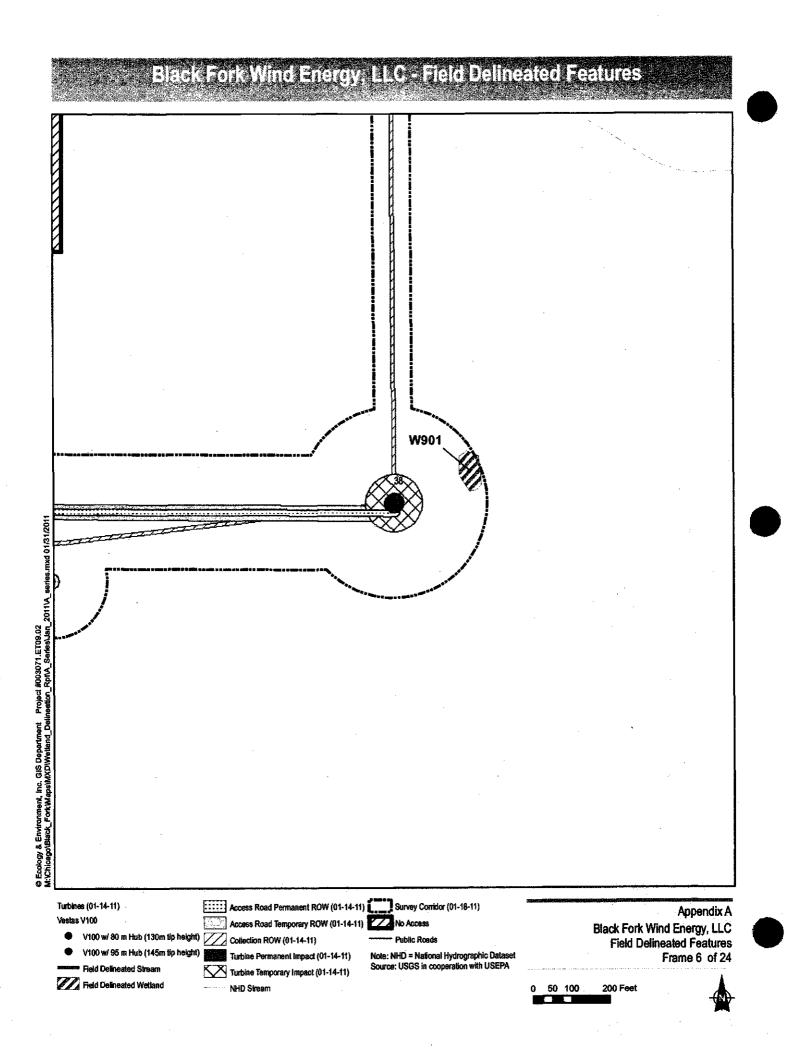


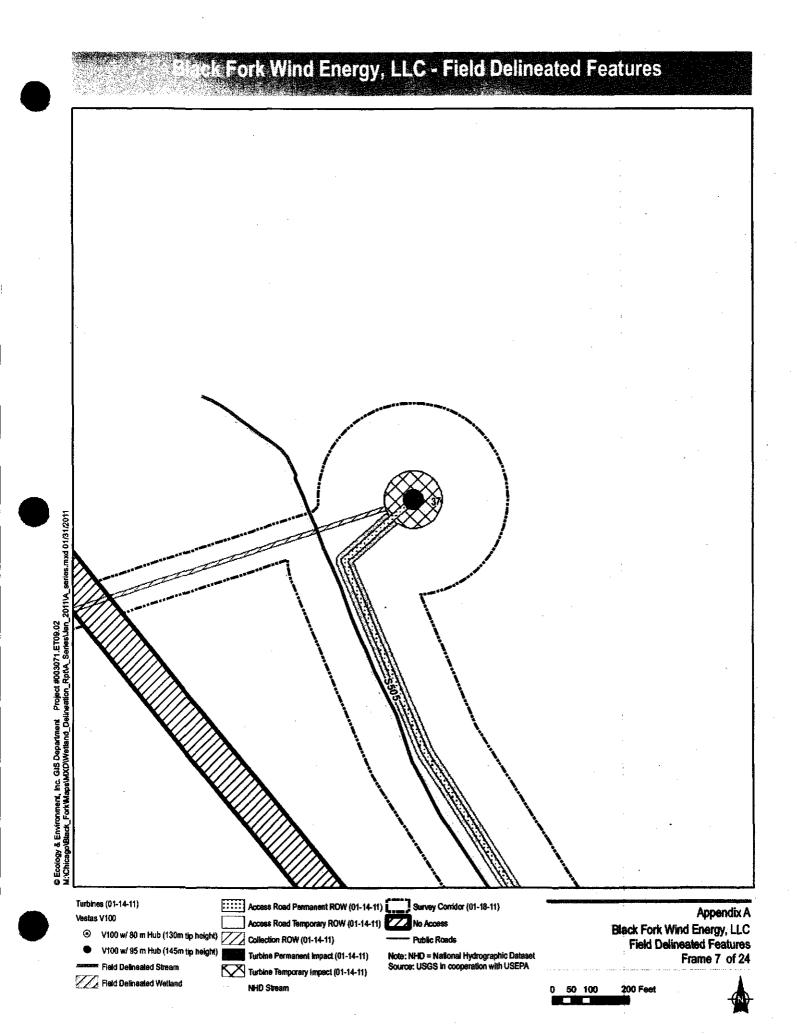
0 50 100 200 Feet

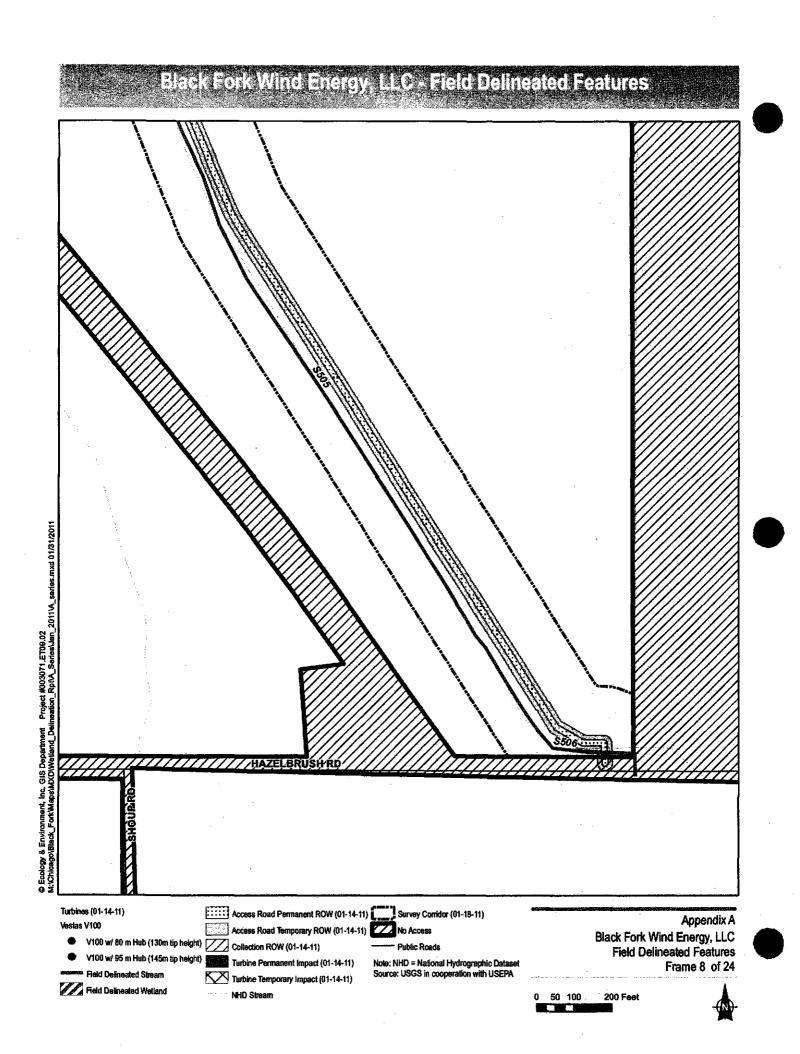
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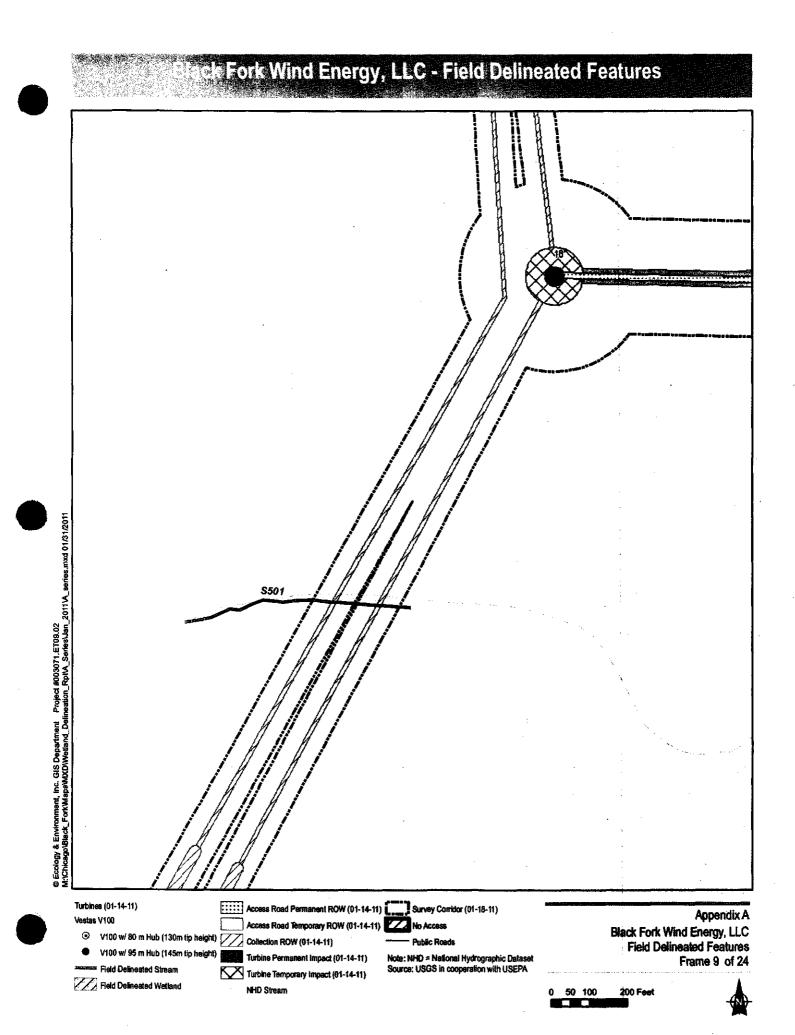


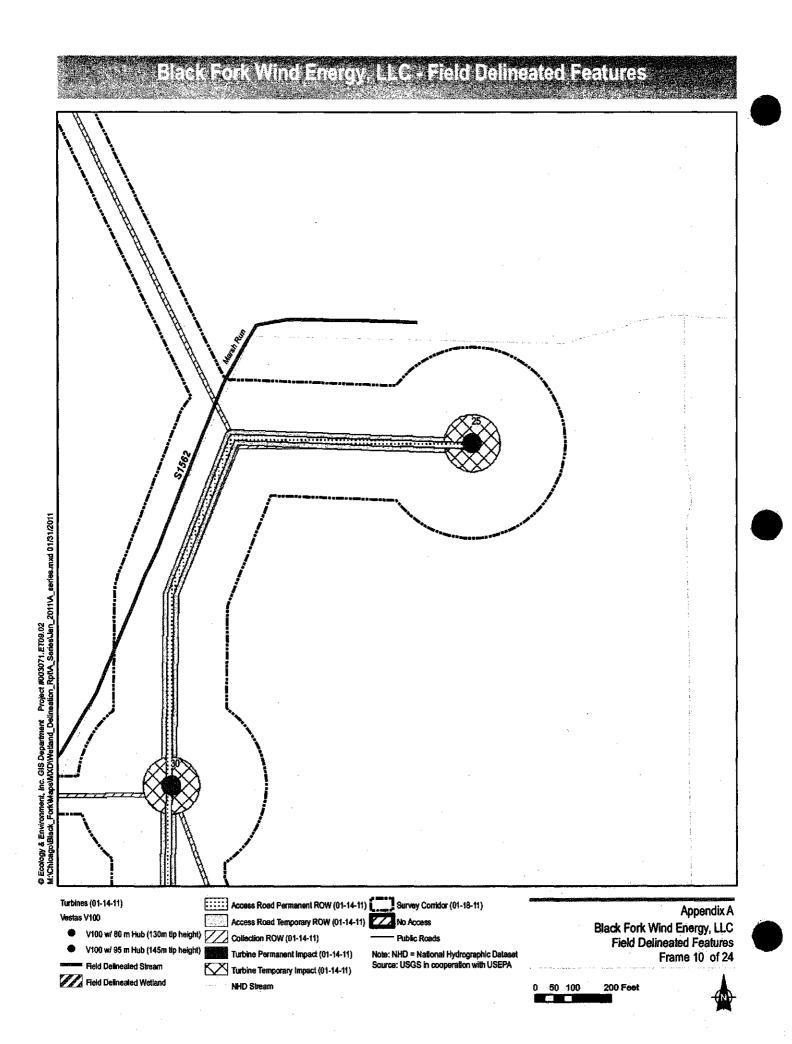


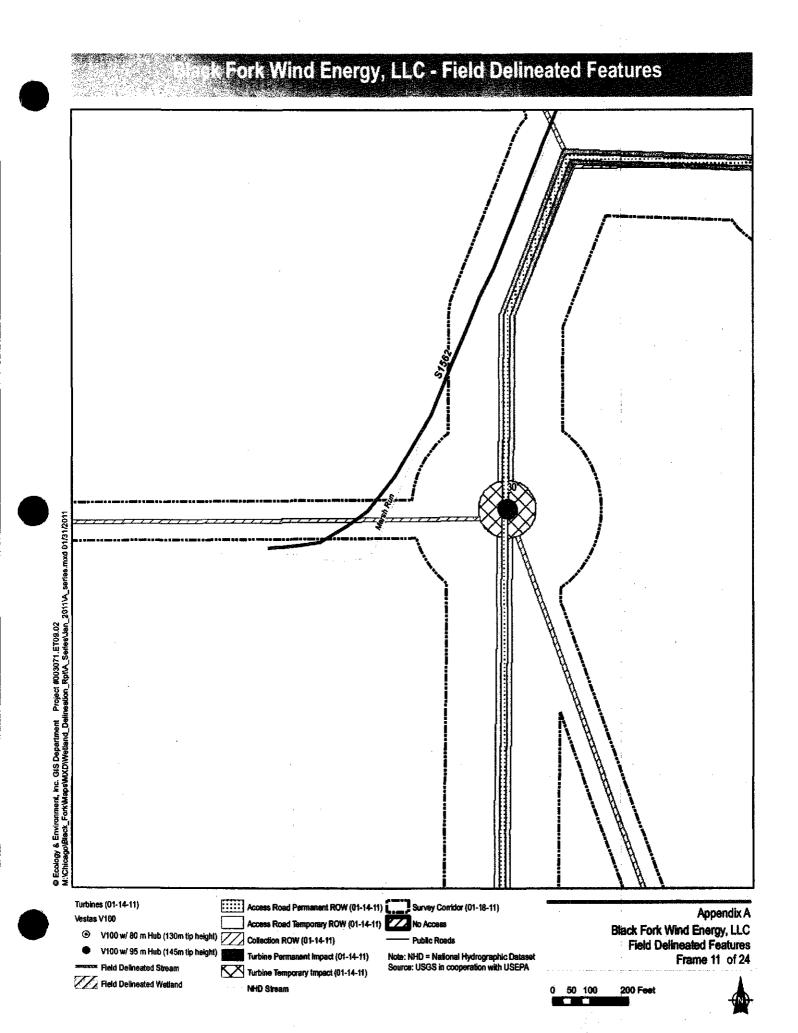


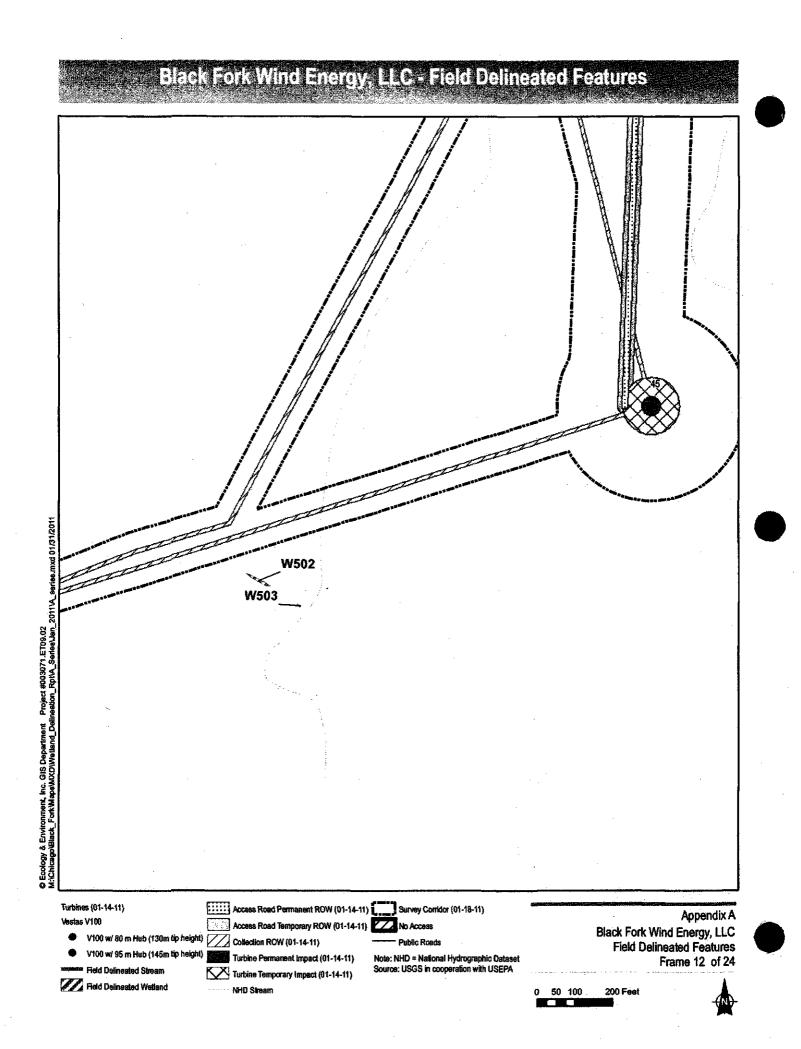


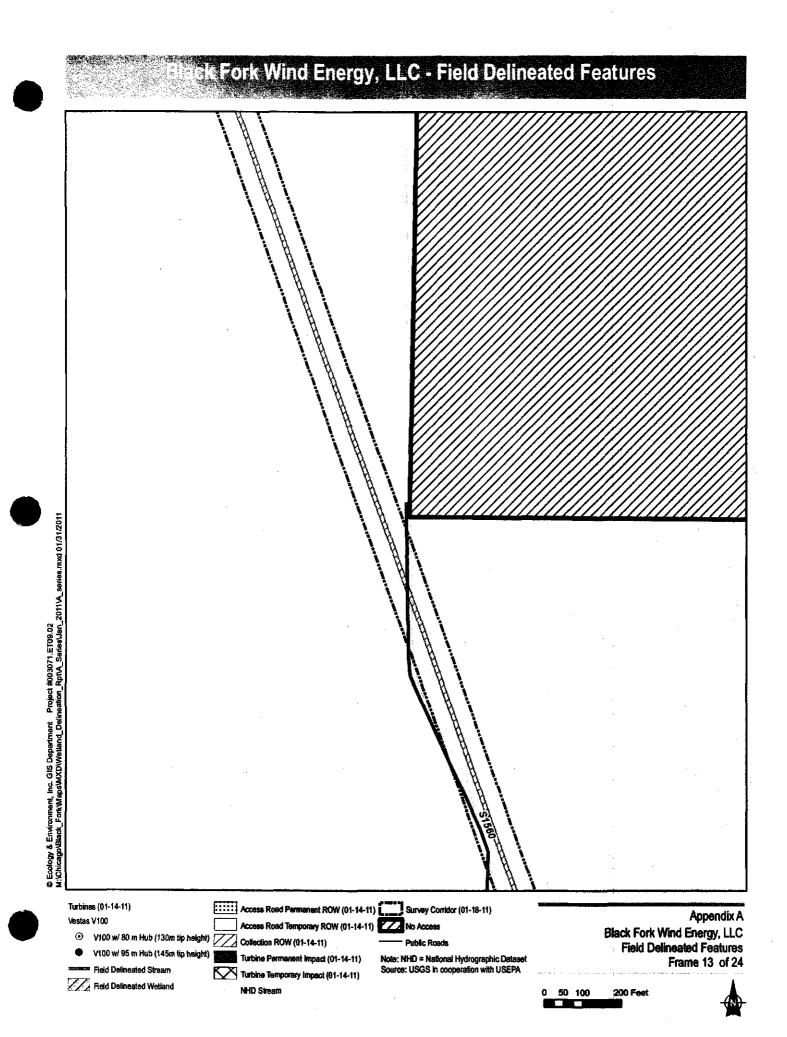


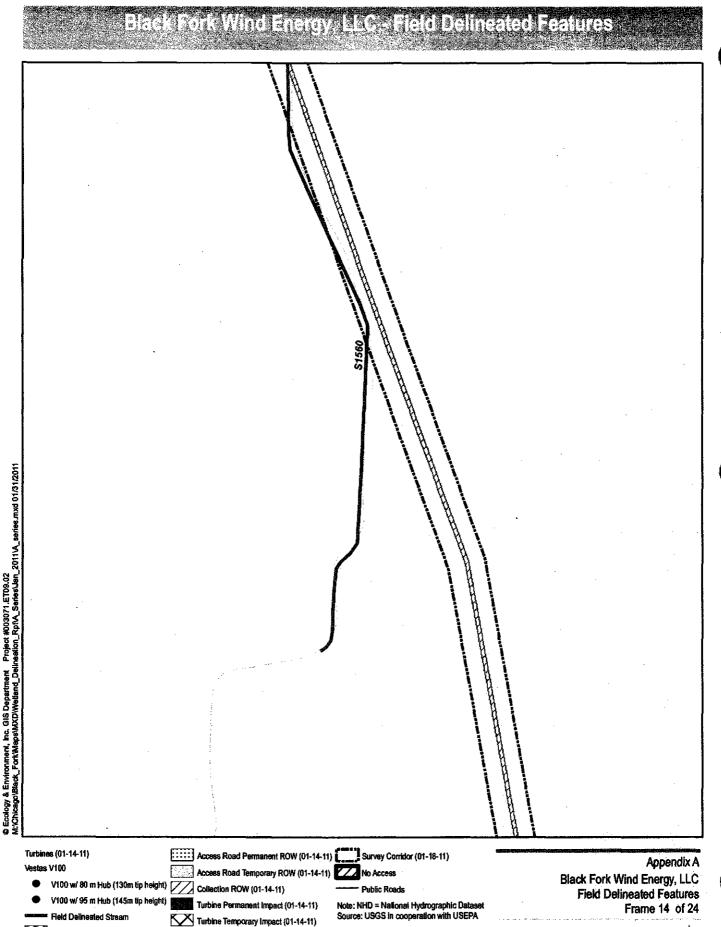












I Field Delineated Wetland

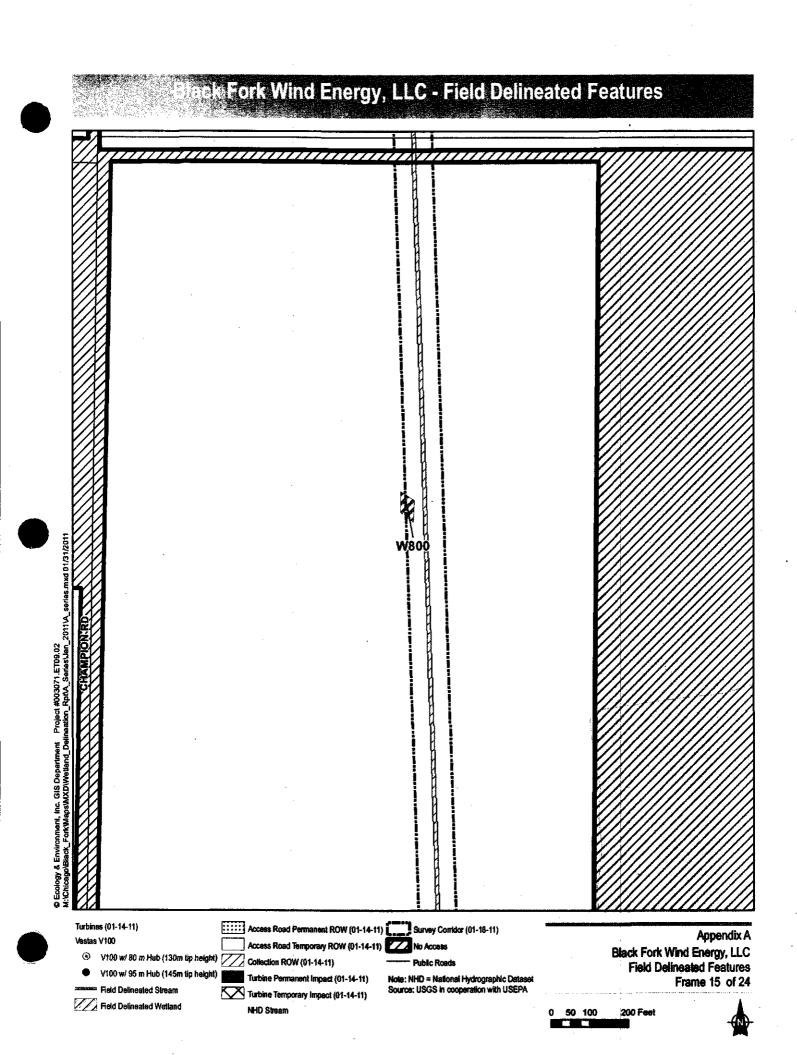
NHD Stream

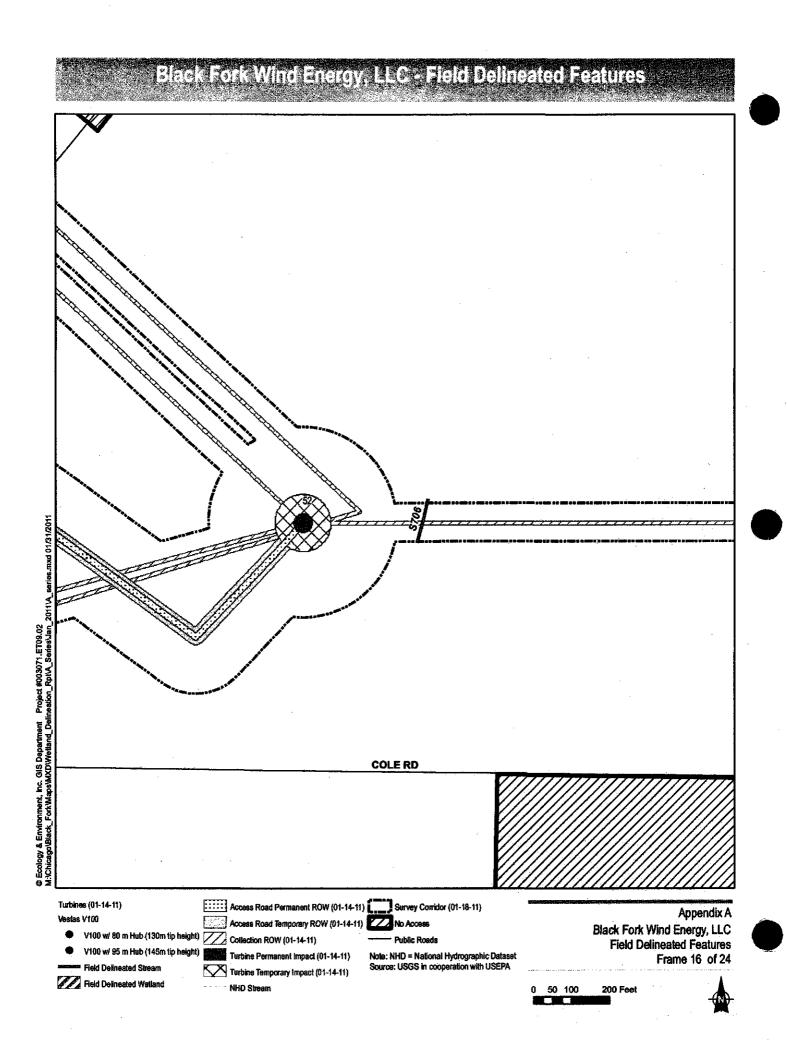
50 100

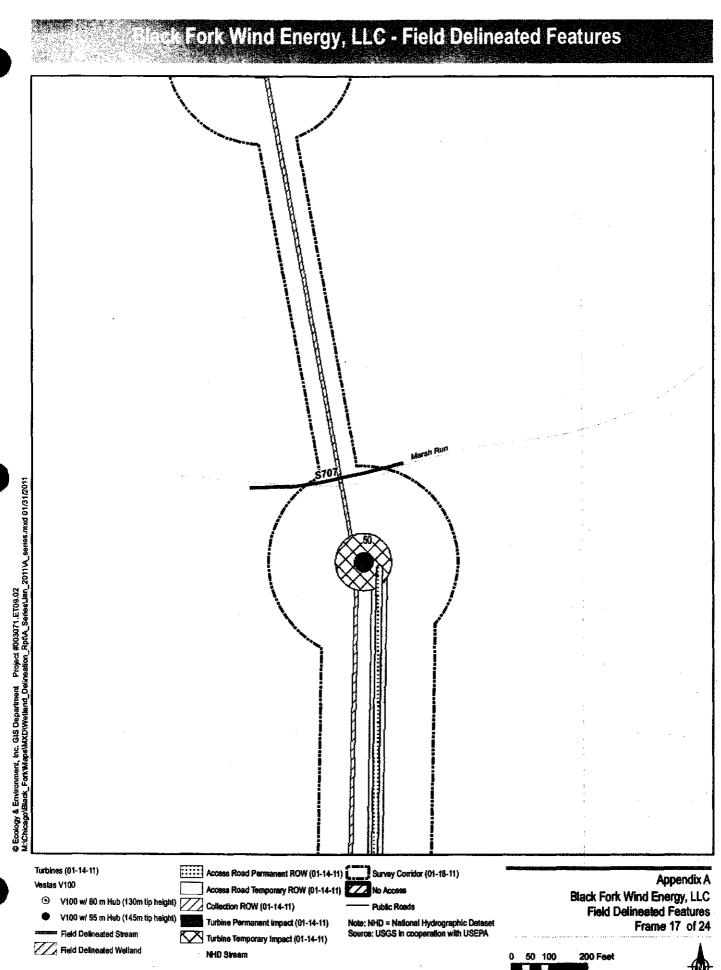
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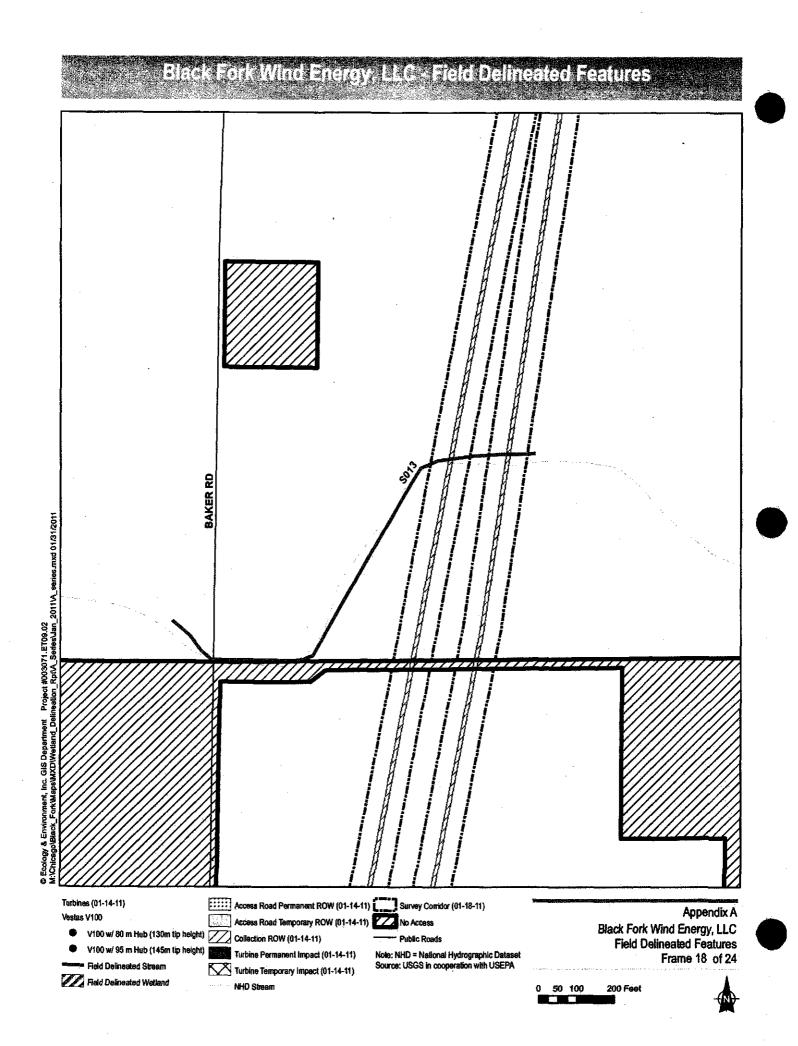
200 Feet

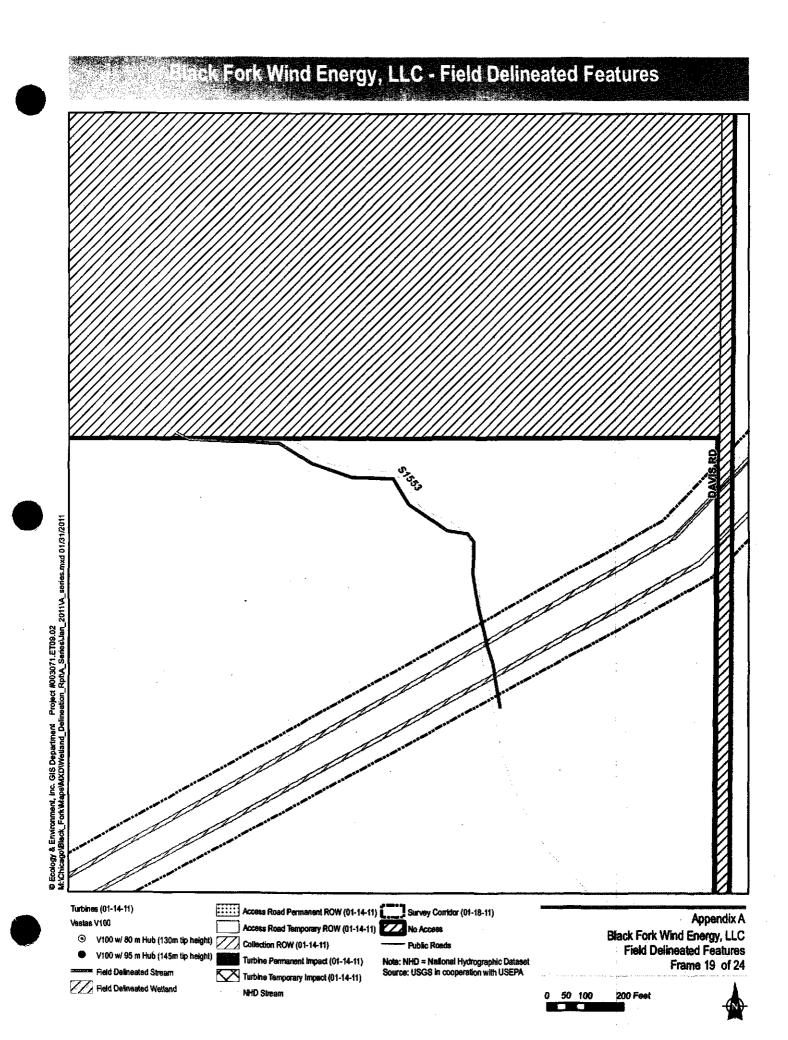


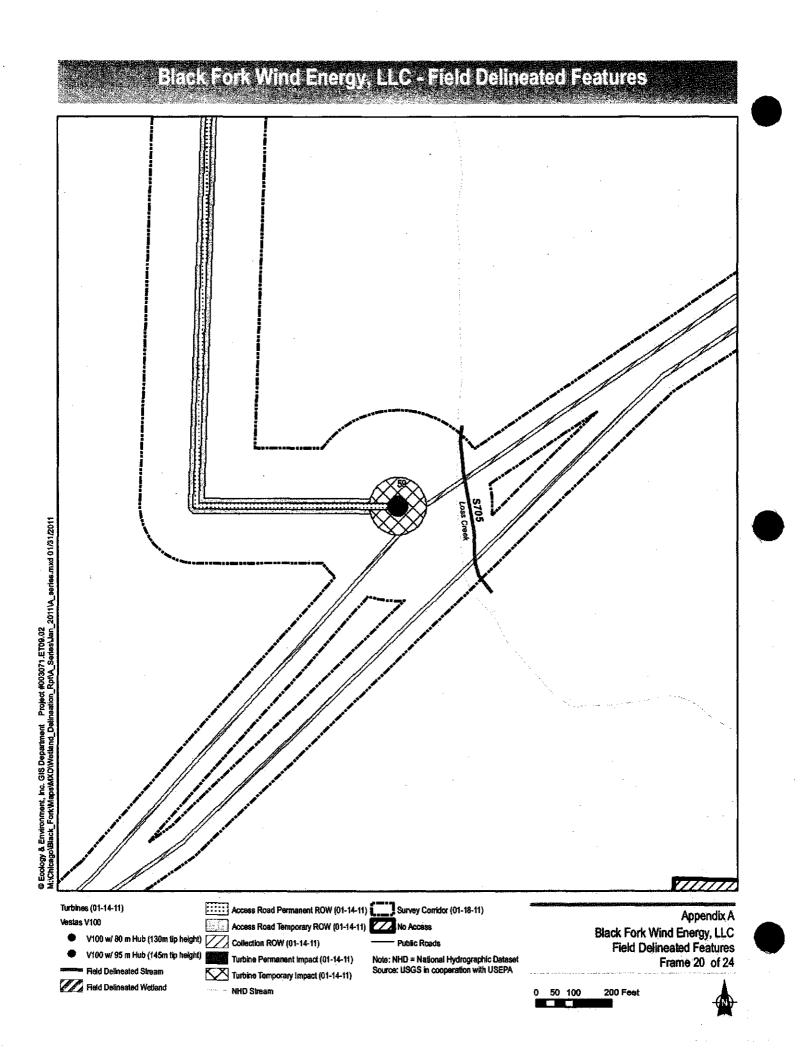


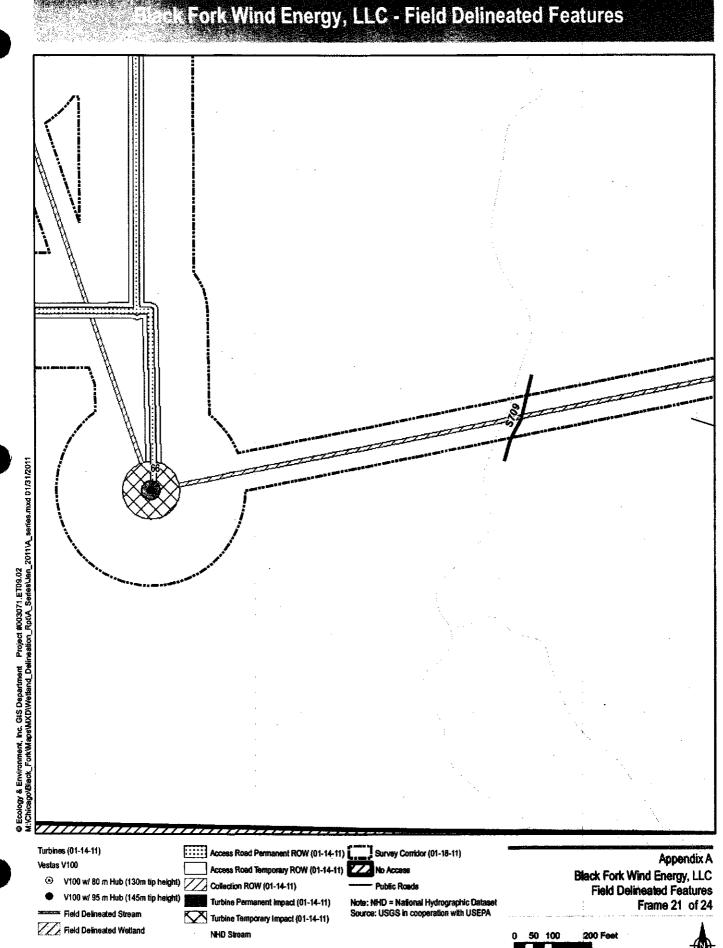


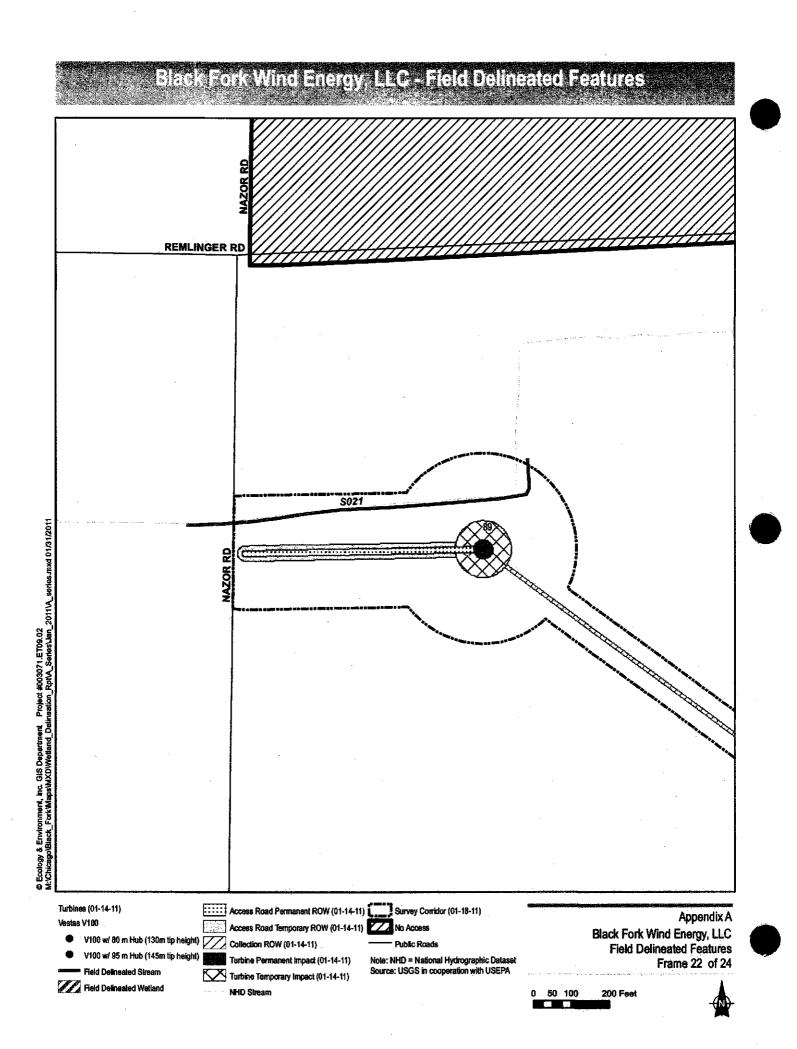


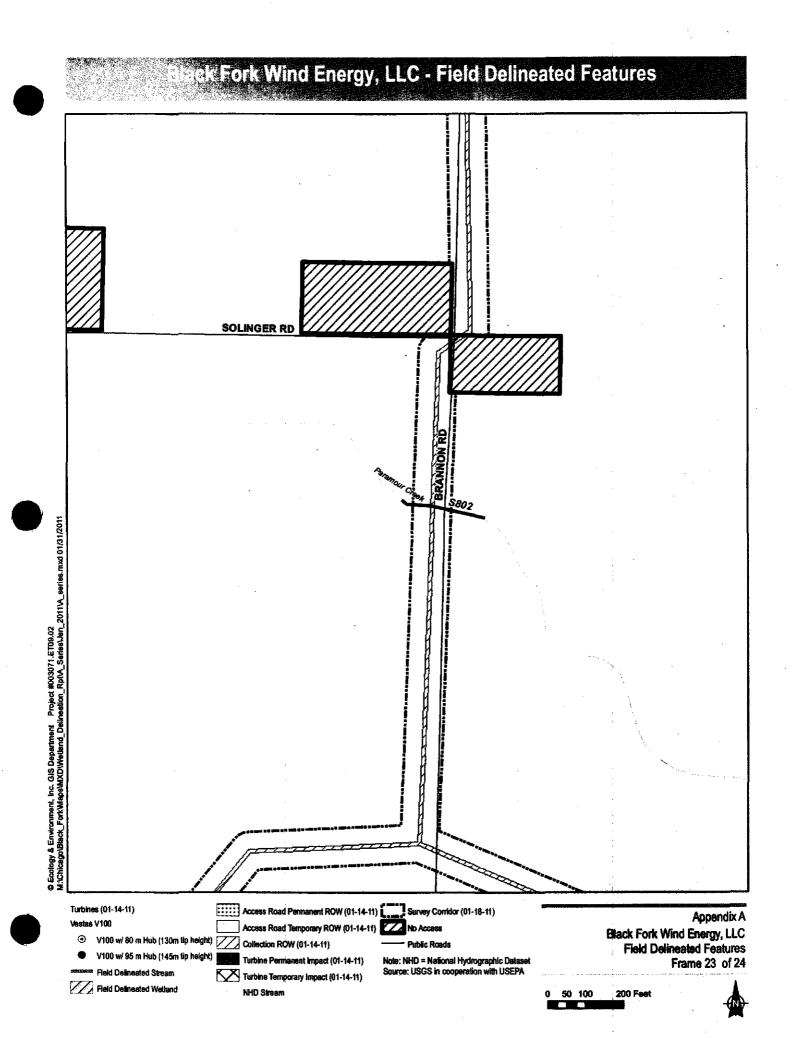


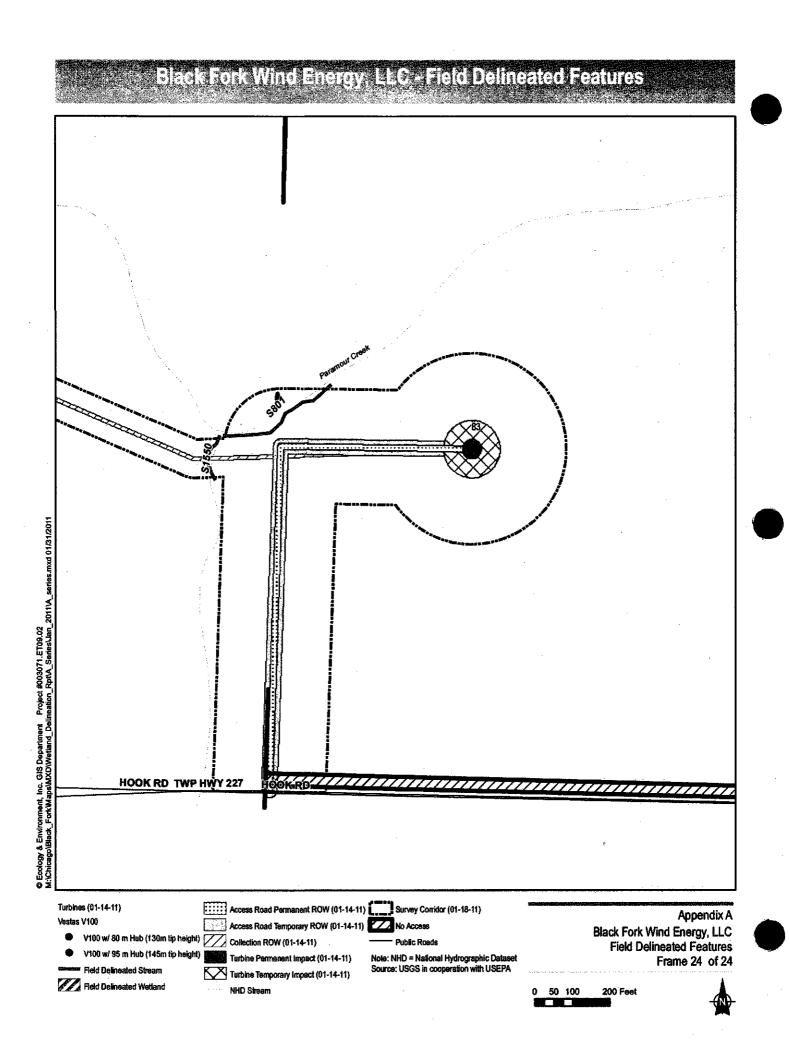








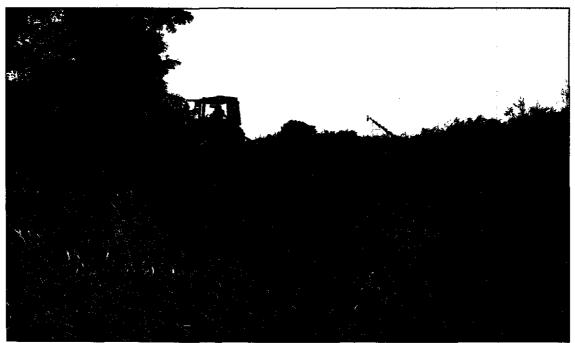






B-1

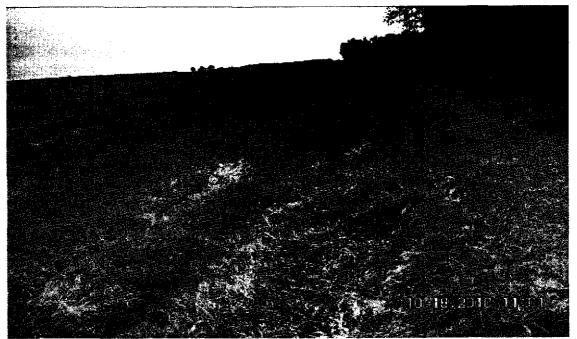
Black Fork Wind Field Survey Photographs



Date: September 22, 2009 Location P007: Looking upstream at S002 Direction of View: Southwest



Date: September 22, 2009 Location P008: Downstream at S002 Direction of View: Northeast



Date: October 18, 2010 Location P49- Stream S013 looking upstream Direction of View: East



Date: October 18, 2010 Location P50: Stream S013, looking downstream Direction of View: West

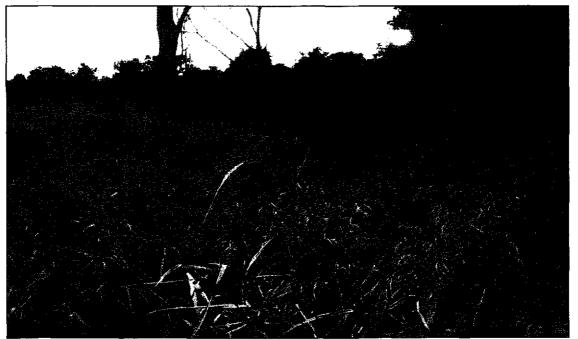
02:002741_BF08_05-B2906 [DUPED - Stoos] Photolog_BlackFork_012111.doc-2/8/2011



Date: October 2, 2009 Location P209: S021 taken from Nazor Road Direction of View: South



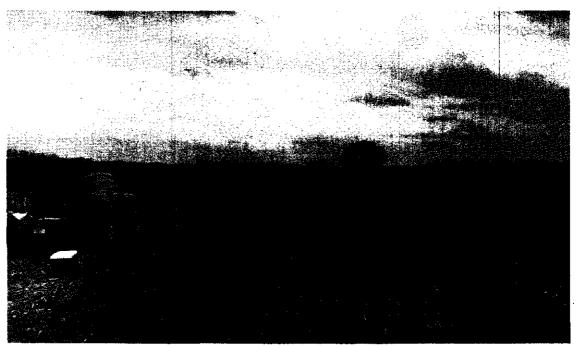
Date: September 22, 2009 Location P1009: Stream S500 from Route 98 Direction of View: West



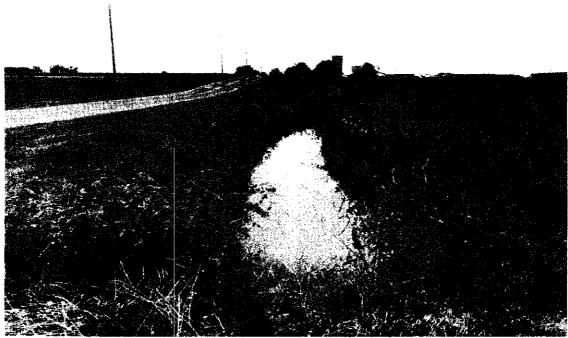
Date: September 22, 2009 Location P1027: Downgradient at Stream S501 Direction of View: West



Date: September 22, 2009 Location P1026: Upstream at Stream S501 Direction of View: East



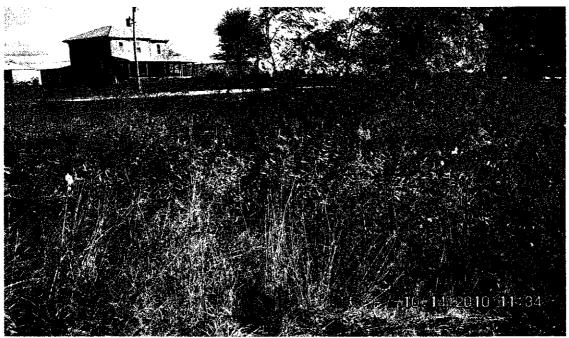
Date: September 24, 2009 Location P1044: Stream S505 Direction of View: South



Date: September 24, 2009 Location P1049: Stream S506, taken from road culvert. Direction of View: East



Date: September 24, 2009 Location P1050: Stream S506 Direction of View: North



Date: October 14, 2010 Location P5: Looking across channel of stream S508 Direction of View: Northeast

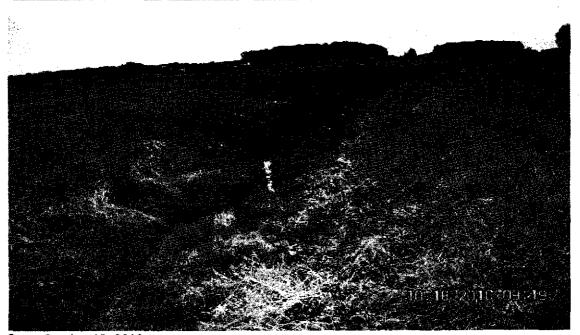
02:002741_BF08_05-B2906 [DUPED - Stoos] Photolog_BlackFork_012111.doc-2/8/2011



Date: October 14, 2010 Location P6: Stream 508 looking downstream Direction of View: South



Date: October 14, 2010 Location P7: Stream S700, looking upstream Direction of View: West

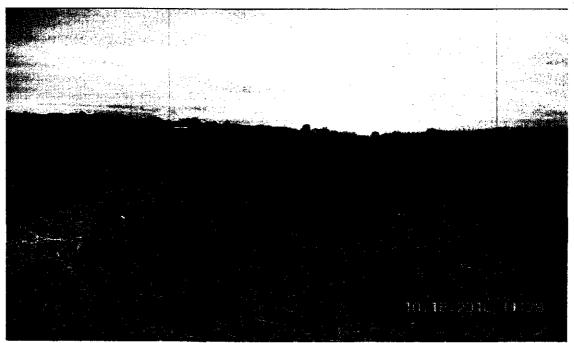


Date: October 18, 2010 LocatioP47: Stream S705, looking upstream Direction of View: North



Date: October 18, 2010 Location P48: Stream S705, looking downstream Direction of View: South

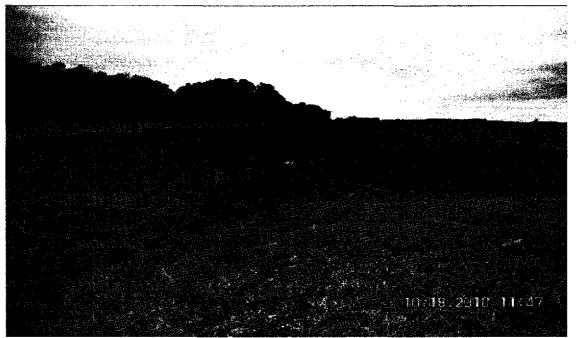
02:002741_BF08_05-B2906 [DUPED - Stoos] Photolog_BlackFork_012111.doc-2/8/2011



Date: October 18, 2010 Location P51: Stream S706, looking upstream Direction of View: North



Date: October 18, 2010 Location P52: Stream S706, looking downstream Direction of View: South



Date: October 18, 2010 Location P53- Stream S707, looking upstream at tractor crossing Direction of View: East



Date: October 18, 2010 Location P54: Stream S707, looking downstream Direction of View: West



Date: October 18, 2010 Location P59: Stream S709, looking upstream Direction of View: South



Date: October 18, 2010 Location P60: Stream S709, looking downstream Direction of View: North



Date: October 19, 2010 Location P66: Stream 711, looking downstream at remains of an old bridge Direction of View: North



Date: October 22, 2009 Location P900: W800, a small isolated wetland within a crop field, notice surrounding rise in topography. Direction of View: South



Date: January 17, 2011 Location P573: Upstream at S801 Direction of View: Northeast



Date: January 17, 2011 Location P574: Downstream at S801 Direction of View: Southwest



Date: January 17, 2011 Location P575: Downstream at S802 Direction of View: East



Date: January 17, 2011 Location P576: Upstream at S802 Direction of View: West



Date: January 17, 2011 Location P578: Upstream at Stream S803 Direction of View: South



Date: January 17, 2011 Location P579: Downstream at Stream S803 Direction of View: North



Date: October 15, 2010 Location P18: Looking north at wetland W901 in an active agricultural field Direction of View: North



Date: October 22, 2009 Location P899: Looking at stream S1550. Direction of View: North



Date: October 15, 2010 Location P32: Looking downstream at stream S1553 Direction of View: Northwest



Date: October 15, 2010 Location P33: Stream S1553 bank erosion near collection line crossing Direction of View: North



Date: October 23, 2009 Location P916: View of stream S1560. Direction of View: North



Date: October 23, 2009 Location P917: Typical view of stream S1560 from inside the banks. Direction of View: North



Date: October 23, 2009 Location P918: Close up view of *Phalaris arundinacea* choked stream S1560 channel. Direction of View: Southwest



Date: October 15, 2010 Location P13: Looking downstream at stream S1562 Direction of View: East



Date: October 15, 2010 Location P14: Looking downstream at stream S1562 Direction of View: Northeast

C Dat

Datasheets

02:003071_ET09_01-B3235 R_Black Fork Wind Wetland Delineation.docC-1

Routine Wetland Determination DATA FORM

1987 Corps Wetland Delineation Manual

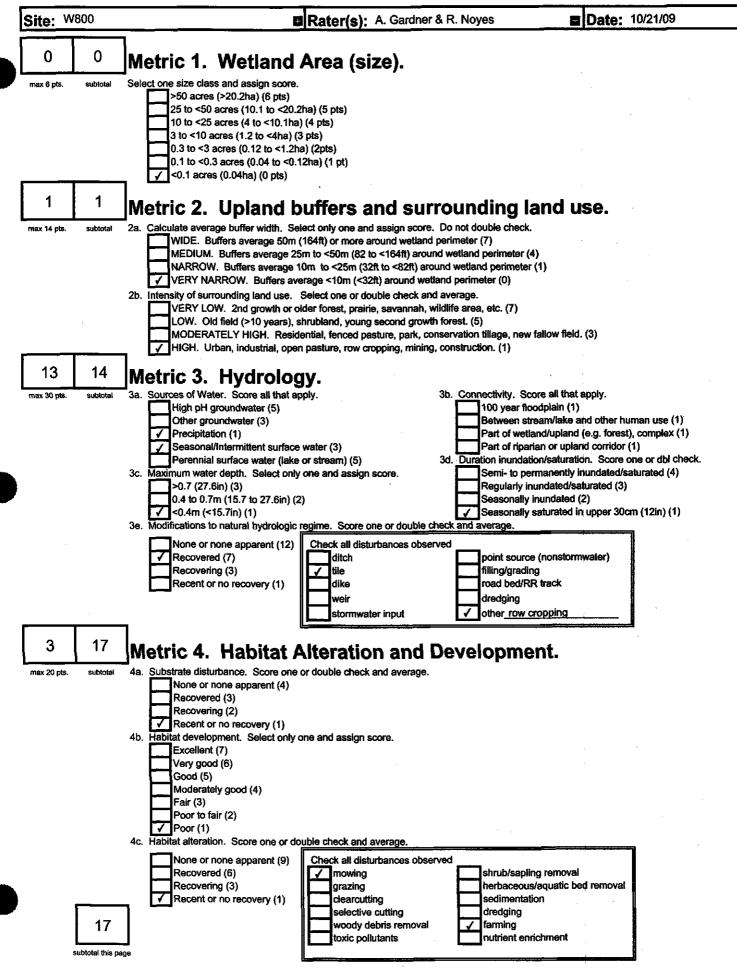
Project/Site: Black Fork Wind	Project					Date: 1	0/21/09		
Applicant/owner: Black Fork	-						: Richland		
						State: (
Investigator(s): A. Gardner &			······	,					
Do normal circumstances exis			⊠ ۱ ا		No		unity ID: PEM		
Is the site significantly disturb	• ••	ituation)				Sector:			
Is the area a potential probler			רם <u>.</u>		No		ct ID: W800		
Explanation of atypical or pro						Status:	Isolated		
VEGETATION (For *strata,				-					
Dominant Plant Species	*Stratum	Indicat	or % <u>Cover</u>	Dominant P	Plant Spec	cies	*Stratum	Indicator	% Cover
Galeopsis tetrahit	н	NI							
Poa compressa	н	FAC	U						
Echinochloa crus-galli	Н	FAC	່ບ						
								-	
<u> </u>		<u> </u>		{					1
<u></u>									
		<u> </u>			<u> </u>				
HYDROPHYTIC VEGETATIC	ON INDICATO	DRS:							
% of dominants OBL, FACW,	& FAC: 66%	6							
Remarks: Sparse vegetation.									
Vegetation in about half of we		en cut by	combine.						
			·						
Hydrophytic vegetation pre Rationale for decision/Reman		Yes] No						
	NƏ						· · · · · · · · · · · · · · · · · · ·		
HYDROLOGY			r			- ,			
Inundated:			Water Marks:			Sedin	nent Deposits:		
			on						
Saturated in upper 12 in:			Drift Lines:			Drain	age Patterns:	\boxtimes	
WQ if sat/inundated:						1			
🔲 Water is clear 🗌 Preser	nce of litter								
Water is turbid Other:		-					1		
Oil Sheen present								<i>ر</i>	
Depth of inundation:	· ```	inches	Oxidized Root	-		Local	Soil Survey:		
Depth to free water in pit:		inches	Channels <12i			Mata	e otoinod I ocu		
Depth to saturated soil:		inches	FAC Neutral:			1 water	r-stained Leav	es:	
Check all that apply & explain	below:	IIIGHES	Other (availate)) Omell dam	oogien in		olling carlo h	ural field	
Check all that apply & explain			Other (explain)	: Small depr	ession in	siignuy f	uning agricult	lich Heid.	
Aerial photographs	ц		1						
							:		
Other		1							
		Yes	□ No	<u> </u>					

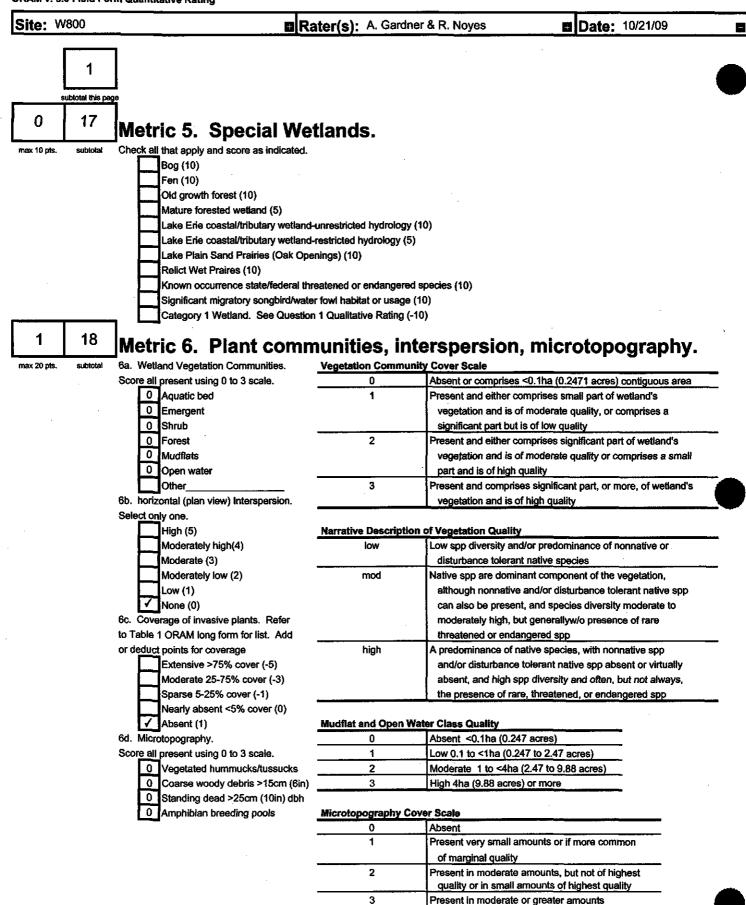
<u>SOILS</u>

Map Unit Name (Series and Phase) : Fitchville-Bennington silt Drainage Class Somewhat poorly drained loam

Field observations confirm mapped type? X Yes No

Taxonomy	(subgroup)							
Profile Des	cription							
Depth (inches)	Horizon	Matrix color (Munsell moist)	Mottie colors (Munsell moist)		e abundance and contrast	Texture, structure	, concretions, 9, etc.	
0 – 10	Ар	10YR 2/1	-	-		Loam		Ap is nice dark loam with high organic
10 14	В	2.5Y 4/1	7.5YR 6/8	5%,	large, distinct	Clay loa	m	matter content.
Hydric Soi	I Indicators:	: (check all that	apply)					
	Histosol	•			Matrix chrom	$a \le 2$ with	mottles	
	Histic Epipe	edon			Mg or Fe Cor			
	Sulfidic Odd	Dr			- •		in Surface Layer o	of Sandy Soils
	Aquic Moist	ture Regime			Organic Strea	aking in Sa	andy Soils	
	Reducing C	Conditions			Listed on Nat	ional/Loca	al Hydric Soils Lis	t
<u></u> [Gleyed or L	ow-Chroma			Other (explain	n in rema	rks)	
Hydric soil	s present?		Yes 🗌 No					
Rationale for	or decision/F	Remarks:						
Wetland D	eterminatio	n ·			What is this base	ed on?		· · · · · · · · · · · · · · · · · · ·
	c vegetation		🛛 Yes 🛛	No	Field review			
Hydric soils	present?		🛛 Yes 📋	No	Stream name (if	known):		
Wetland hy	drology pres	ent?	🛛 Yes 🔲	No			•	
ls the samp	oling point wi	thin a wetland?	🛛 Yes 📋	No	Approximate dis	tance to s	tream:	
Watershed	Relationsh	ip			What watershed	is the del	ineated wetland v	vithin?
Wetland is		outting			Comments: See			
		•	rface connection		Flow relationship			
		ljacent w ithou t	surface connect	tion	intermittent perennial su		ephemeral s no surface f	
Is the asso	ciated stream	n reach delineat	ed? 🗌 Yes 🛛 🗌	No	Flow is:			
Is the asso	ciated stream	n reach: 🗌 TNN 🗌 S-F	W DP-RPW	W	discrete confined dother Explain:	_	rete and confine land sheet flow	d
Rationale/								
Wetland is	clearly isolat	ed. The surroun	ding topography r	ises a	bout 2 feet all arc	ound the w	vetland.	
							_	





18 GRAND TOTAL(max 100 pts)

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories at the following address: http://www.epa.state.oh.us/dsw/401/401.html

and of highest quality

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Black Fork	Ci	ity/County: Richland		Sampling Date: 10/15/2	2010
Applicant/Owner: Element Power			State: OH	Sampling Point: W	D901
Investigator(s): A. Gardner, K. Gua	idagno e	ection, Township, Range:			
Landform (hillslope, terrace, etc.): Flat		· · ·		convex	·
			e, convex, none).	Detune	
Slope (%): <u>1%</u> Lat: <u>Bennington-Fit</u>	Le	ong:		Datum:	
Are climatic / hydrologic conditions on the	•				
Are Vegetation, Soil, or H	ydrology significantly di	sturbed? Are "Normal	Circumstances" p	resent? Yes No	
Are Vegetation, Soil, or H	ydrology naturally prob	lematic? (If needed, e	xplain any answe	rs in Remarks.)	
SUMMARY OF FINDINGS - Att	ach site map showing s	sampling point location	ons, transects	, important features,	, etc.
Hydrophytic Vegetation Present?	Yes 🗸 No	Is the Sampled Area			
Hydric Soil Present?	Yes No Yes No	within a Wetland?	Yes 🖌	No	
Wetland Hydrology Present?	Yes / No	If yes, optional Wetland	Site ID: W901		
Remarks: (Explain alternative procedur)		<u></u>	
Area is problematic because this	is a farmed wetland.				
HYDROLOGY					
Wetland Hydrology Indicators:	····		Secondary Indica	tors (minimum of two requi	red)
Primary Indicators (minimum of one is re	equired: check all that apply)		Surface Soil		
Surface Water (A1)	Water-Stained Le	aves (B9)		ttems (B10)	
High Water Table (A2)	Aquatic Fauna (E		Moss Trim Li		
Saturation (A3)	Marl Deposits (B			Water Table (C2)	
Water Marks (B1)	Hydrogen Sulfide	Odor (C1)	Crayfish Bur	rows (C8)	
Sediment Deposits (B2)	Oxidized Rhizosp	oheres on Living Roots (C3)	Saturation Vi	sible on Aerial Imagery (CS)
Drift Deposits (B3)	Presence of Red			tressed Plants (D1)	
Algal Mat or Crust (B4)		uction in Tilled Soils (C6)		Position (D2)	
Iron Deposits (B5)	Thin Muck Surfac		Shallow Aqui		
Inundation Visible on Aerial Imager	· · · <u> </u>	Remarks)	FAC-Neutral	phic Relief (D4) Test (D5)	
Field Observations:				1661 (00)	
	No Depth (inches):				
	No Depth (inches):				
	No Depth (inches):		lydrology Preser	nt? Yes ✓ No	
(includes capillary fringe)					
Describe Recorded Data (stream gauge	, monitoring well, aerial photos	, previous inspections), if ava	liable:	i	
Remarks:	· · · · · · · · · · · · · · · · · · ·				
Bowl shaped depression within a	active agricultural field. A	djacent forested area is	s wetland.		
			,		
				i t	
				1	

VEGETATION – Use scientific names of plants.

Sampling Point: WD901

· · · · · ·	Absolute	Dominant	Indicator	
Tree Stratum (Plot size:)		Species?		Dominance Test worksheet:
1	i			Number of Dominant Species That Are OBL, FACW, or FAC: (A)
	•			
2				Total Number of Dominant
3				Species Across All Strata: (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:(A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
		= Total Co	ver	OBL species x 1 =
Sapling/Shrub Stratum (Plot size:)				FACW species x 2 =
1				FAC species x 3 =
				FACU species x 4 =
2				UPL species x 5 =
3				Column Totals: (A) (B)
4				
5				Prevalence Index = B/A =
6				Hydrophytic Vegetation Indicators:
				✓ Rapid Test for Hydrophytic Vegetation
7		· <u> </u>		Dominance Test is >50%
		= Total Co	ver	$\underline{\qquad} \text{Prevalence index is } \leq 3.0^1$
Herb Stratum (Plot size: 5' radius)				Morphological Adaptations ¹ (Provide supporting
1. Phalaris arundinacea	50%	Yes	FACW	data in Remarks or on a separate sheet)
2 Cyperus esculentus	50%	Yes	FACW	Problematic Hydrophytic Vegetation ¹ (Explain)
3. Polygonum saggitatum	5%		OBL	
4. Glycin max (soybean)	5%		NI	¹ Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6			·	Tree - Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Santing to have a Weady plants loss than 2 in DDI
9				Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
			·	
10		·	·	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11			·	
12				Woody vines – All woody vines greater than 3.28 ft in
		= Total Co	ver	height.
Woody Vine Stratum (Plot size:)				
······································				
1			·	
2		·		
3				Hydrophytic
4				Vegetation Present? Yes No
	_	= Total Co	ver	Present? Yes <u>V</u> No
Remarks: (Include photo numbers here or on a separate		- 10181-00		
Farmed wetland, however soybean is unable to suc		row and w	vetland pla	ants are out competing and thriving.
•	, ,		•	

~~!	
SOI	L.
	_

Sampling Point: WD901

Depth	Matrix		epth needed to docum Redox	<pre>c Feature</pre>				4	•	
(inches)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	Texture	·	Remarks	
0-12	10YR3/2		7.5YR5/8	7	С	M& PL	silty clay	Ap, lots of	highly decomp	oosed OM, but
							· · · · ·	not enou	gh to be mu	icky mineral
12-20	Gley1 5/N	30	Mg concentration	30	<u> </u>	M	Clay	B horiz		
			Gley 1 3/N							
			Fe concentration		<u> </u>	M	·			
					<u> </u>			······		
	<u></u>		7.5YR4/6				<u></u>			
<u> </u>			<u> </u>			· <u> </u>		:		
			_ <u> </u>							· · · · · · · · · · · · · · · · · · ·
	· · · · · · · · · · · · · · · · · · ·								• • • • •	
				<u></u>						······
	·									
'Type: C≃C	oncentration, D=Der		M=Reduced Matrix, CS	=Covere	d or Coate	ed Sand G	rains. ² Lo	cation: PL=	Pore Lining, N	1=Matrix.
-	Indicators:								matic Hydric	
Histosol Histic F	l (A1) pipedon (A2)		Polyvalue Below MLRA 149B)		∋ (S8) (LR	RR,			(LRR K, L, MI ox (A16) (LRR	
	listic (A3)		Thin Dark Surfa		LRR R, M	LRA 149B			or Peat (S3) (I	-
	en Sulfide (A4)		Loamy Mucky M	lineral (l	1) (LRR M		Dark \$	Surface (S7)	(LRR K, L)	
	d Layers (A5)		🖌 Loamy Gleyed I	•	2)				Surface (S8) (I	-
Deplete	d Below Dark Surfac	ce (A11)	Depleted Matrix	• •					(S9) (LRR K,	, L.)
	ark Surface (A12)		Redox Dark Su	face (Ff	a -		Iron-M	langanese k	Jasses (F12) ((IRRKIR)
Thick D	ark Surface (A12) Mucky Mineral (S1)		Redox Dark Sur Depleted Dark S	-	-				lasses (F12) (ain Soils (F19)	
Thick D Sandy M Sandy (Mucky Mineral (S1) Gleyed Matrix (S4)			Surface (F7)		Piedm Mesic	ont Floodpla Spodic (TA	ain Soils (F19) 6) (MLRA 144) (MLRA 149E
Thick D Sandy M Sandy (Sandy F	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5)		Depleted Dark S	Surface (F7)		Piedm Mesic Red P	ont Floodpla Spodic (TA) arent Mater	ain Soils (F19) 6) (MLRA 144 ial (TF2)) (MLRA 1498 IA, 145, 1498
Thick D Sandy (Sandy (Sandy f Stripped	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6)	MI RA 14	Depleted Dark S	Surface (F7)		Piedm Mesic Red P Very S	nont Floodpla Spodic (TAI arent Materi Shallow Dari	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1) (MLRA 1498 IA, 145, 1498
Thick D Sandy M Sandy (Sandy F Stripped Dark Su	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R,		Depleted Dark S Redox Depress 9B)	Surface (ions (F8	F7)		Piedm Mesic Red P Very S Other	ont Floodpla Spodic (TAI arent Materi Shallow Dari (Explain in I	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1) (MLRA 1498 IA, 145, 1498
Thick D Sandy I Sandy F Sandy F Stripped Dark Su ³ Indicators c	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, pf hydrophytic vegeta	ation and v	Depleted Dark S	Surface (ions (F8	F7)	s disturbec	Piedm Mesic Red P Very S Other	ont Floodpla Spodic (TAI arent Materi Shallow Dari (Explain in I	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1) (MLRA 1498 IA, 145, 1498
Thick D Sandy (Sandy (Sandy (Sandy f Sandy f Stripped Dark Su Dark Su Cartage Restrictive	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed)	ation and v	Depleted Dark S Redox Depress 9B)	Surface (ions (F8	F7)	s disturbed	Piedm Mesic Red P Very S Other	ont Floodpla Spodic (TAI arent Materi Shallow Dari (Explain in I	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1) (MLRA 1498 IA, 145, 1498
Thick D Sandy I Sandy C Sandy C Sandy C Sandy C Stripped Dark Su Dark Su Trictators c Restrictive Type: <u>C</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay	ation and v	Depleted Dark S Redox Depress 9B)	Surface (ions (F8	F7)	s disturbec	Piedm Mesic Red P Very S Other	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c.	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1) (MLRA 1498 IA, 145, 1498
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress PB) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B)	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Stripped Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress PB) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Stripped Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress PB) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress PB) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress PB) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy (Sandy (Sandy f Stripped Dark Su ³ Indicators of Restrictive Type: <u>C</u> Depth (in Remarks:	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B) wettand hydrology mus	Surface (ions (F8	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)
Thick D Sandy I Sandy C Sandy C Sandy F Sandy C Sandy F Dark Su Dark Su Dark Su Type: <u>C Depth (in Remarks:</u>	Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, of hydrophytic vegetz Layer (If observed) lay nches): <u>12</u>	ation and v	Depleted Dark S Redox Depress 9B) wettand hydrology mus	Surface (ions (F8)	F7) sent, unles		Piedm Mesic Red P Very S Other or problemati Hydric Soil	nont Floodpla Spodic (TAI arent Mater Shallow Dari (Explain in I c. I Present?	ain Soils (F19) 6) (MLRA 144 ial (TF2) < Surface (TF1 Remarks)) (MLRA 1498 IA, 145, 1498 12)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Black Fork	City/County: Richland	Sampling Date	e: 10/15/2010
Applicant/Owner: Element Power			ng Point: WD901
Investigator(s): A. Gardner, K. Guadagno	Section, Township, Range:		
Landform (hillslope, terrace, etc.): Flat		a convex nonely CONVEX	
Slope (%): <u>1%</u> Lat:			
Soil Map Unit Name: Bennington-Fitchville silt loams	Long:		
		NWI classification: PEM	
Are climatic / hydrologic conditions on the site typical for this time		f no, explain in Remarks.)	
Are Vegetation, Soil, or Hydrology signifi	cantly disturbed? Are "Normal	Circumstances" present? Yes	No
Are Vegetation, Soil, or Hydrology nature	ally problematic? (If needed, e	xplain any answers in Remarks.))
SUMMARY OF FINDINGS - Attach site map sho	wing sampling point locatio	ns, transects, important	features, etc.
Hydrophytic Vegetation Present? Yes No	is the Sampled Area		
Hydric Soil Present? Yes No	كامده الأماقات والطقادين	Yes 🧹 🛛 No	
Wetland Hydrology Present? Yes ✓ No		Site ID: W901	
Remarks: (Explain alternative procedures here or in a separate			
		. ·	
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indicators (minimum	of two required)
Primary Indicators (minimum of one is required; check all that a	ipply)	Surface Soil Cracks (B6)	
Surface Water (A1) Water-St	ained Leaves (B9)	Drainage Patterns (B10)	
High Water Table (A2) Aquatic F	auna (B13)	Moss Trim Lines (B16)	
Saturation (A3) Marl Dep	osits (B15)	Dry-Season Water Table (C	2)
	n Sulfide Odor (C1)	Crayfish Burrows (C8)	
Sediment Deposits (B2) Oxidized	Rhizospheres on Living Roots (C3)	Saturation Visible on Aerial	Imagery (C9)
	e of Reduced Iron (C4)	Stunted or Stressed Plants	(D1)
· · · · · · · · · · · · · · · · · · ·	on Reduction in Tilled Soils (C6)	Geomorphic Position (D2)	1
	k Surface (C7)	Shallow Aquitard (D3)	.
·	kplain in Remarks)	Microtopographic Relief (D4 EAC Newtool Text (D5)	•)
Sparsely Vegetated Concave Surface (B8)		FAC-Neutral Test (D5)	
Surface Water Present? Yes No Depth (i			
Water Table Present? Yes No Depth (i	•		
Saturation Present? Yes No 🖌 Depth (i		ydrology Present? Yes 🗹	No
(includes capillary fringe) Describe Recorded Data (stream gauge, monitoring well, aeria	hotos previous inspections) if ava	lahle [.]	
Remarks:			
Bowl shaped depression within active agricultural f	ield. Adjacent forested area is	wetland.	
			T

VEGETATION - Use scientific names of plants.

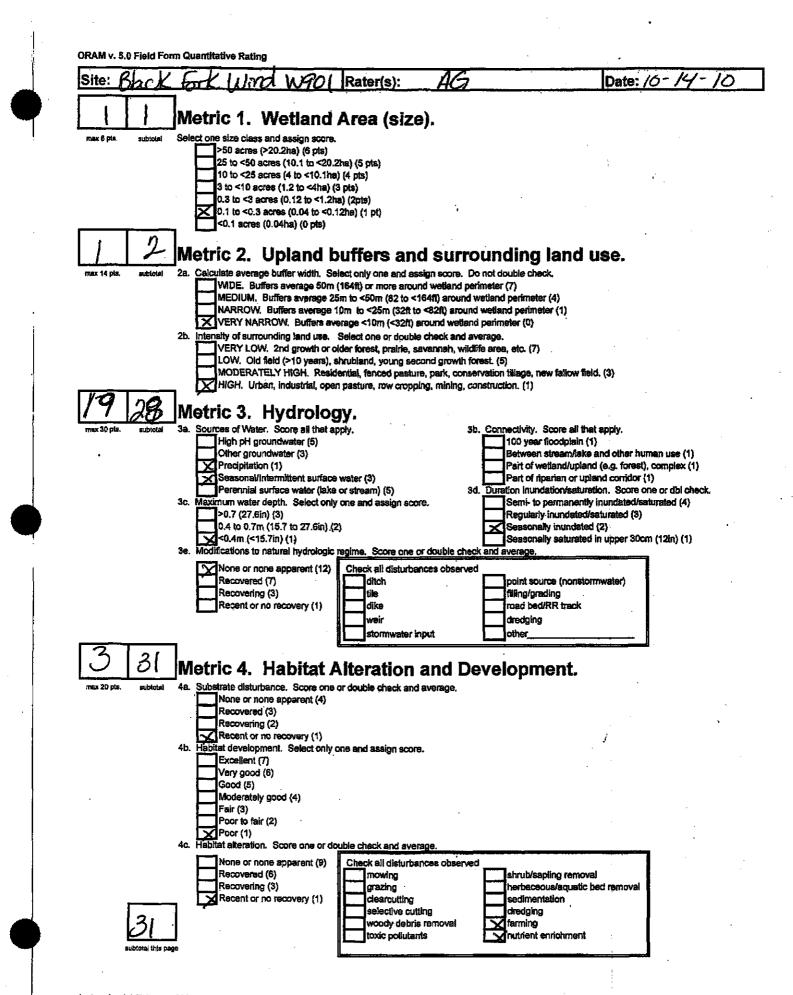
Sampling Point: WD901

•			-
	Absolute	Dominant Indicator Species? Status	
Tree Stratum (Plot size:)			Number of Dominant Species
1			That Are OBL, FACW, or FAC: (A)
2		·	- Total Number of Dominant
3			Species Across All Strata: (B)
4		·	- Percent of Dominant Species
5			That Are OBL, FACW, or FAC:(A/B)
6			Prevalence Index worksheet:
7			Total % Cover of:Multiply by:
	•	= Total Cover	OBL species x 1 =
Sapling/Shrub Stratum (Plot size:)			FACW species x 2 =
1			FAC species x 3 =
2			FACU species x 4 =
			UPL species x 5 =
3			- Column Totals: (A) (B)
4			- Prevalence Index = B/A =
5			
6		• <u></u>	_ Hydrophytic Vegetation Indicators:
7			Rapid Test for Hydrophytic Vegetation
, 1		= Total Cover	Dominance Test is >50%
Herb Stratum (Plot size: 5' radius)			Prevalence Index is ≤3.0 ¹
<u>Hero Stratum</u> (Plot size: <u>5 to to 100</u>)	50%	FACW	Morphological Adaptations ¹ (Provide supporting
		·	_ data in Remarks or on a separate sheet)
2. Cyperus esculentus	50%		Problematic Hydrophytic Vegetation ¹ (Explain)
3. Polygonum saggitatum	5%	OBL	
4. Glycin max (soybean)	5%	NI	 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5			
			Definitions of Vegetation Strata:
6			Tree - Woody plants 3 in. (7.6 cm) or more in diameter
7		· · ·	_ at breast height (DBH), regardless of height.
8			
9			and greater than 3.28 ft (1 m) tall.
10			Herb - All herbaceous (non-woody) plants, regardless
11			of size, and woody plants less than 3.28 ft tall.
12.			 Woody vines – All woody vines greater than 3.28 ft in
12			 height.
		_= Total Cover	
Woody Vine Stratum (Plot size:)			
1			_
2			
3			_ Hydrophytic
			Vegetation
4			Present? Yes No
		_ = Total Cover	
Remarks: (Include photo numbers here or on a separate	•		
Farmed wetland, however soybean is unable to su	iccessfully (grow and wetland p	lants are out competing and thriving.
· · · · ·			
			- · · · · · · · · · · · · · · · · · · ·
			r
1			

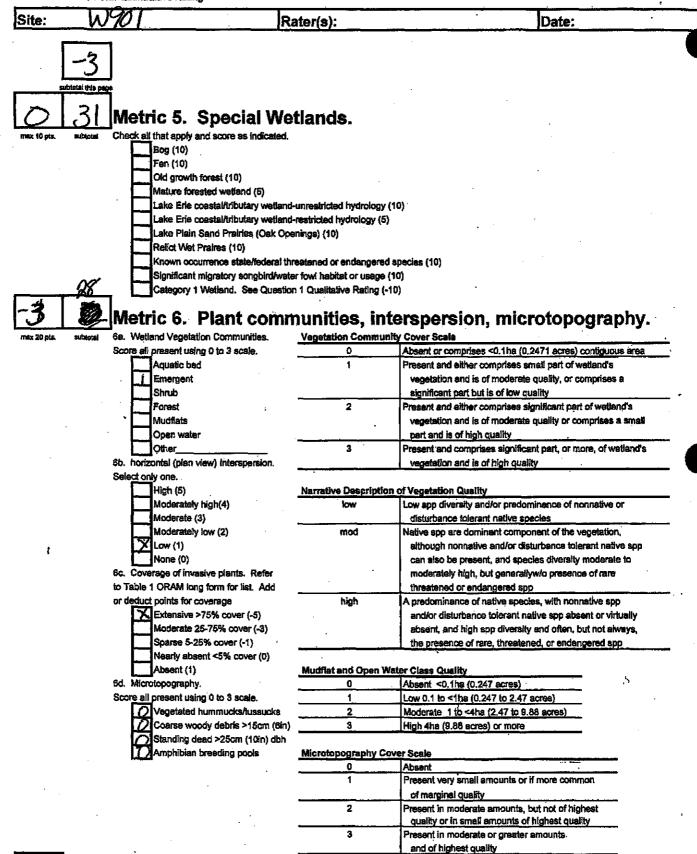
SOIL

Sampling Point: WD901

Depth	Matrix		Redox	(Feature		<u> </u>				
(inches)	Color (moist)	%	Color (moist)	%	<u>Type¹</u>				Remarks	
0-12	10YR3/2		7.5YR5/8	7	<u> </u>	M& PL	silty clay	Ap, lots of	highly decomp	osed OM, but
	. <u></u>							not enou	gh to be mu	cky mineral
12-20	Gley1 5/N	30	Mg concentration	30	С	М	Clay	B horizo	on	
			Gley 1 3/N							
· ····			Fe concentration		c	M	······			
	· · · · · · · · · · · · · · · · · · ·		7.5YR4/6		·		· · · ·			
·	·								• 10 •	
<u>_</u>	·····		· <u> </u>	<u></u>			<u></u>			<u></u>
								· · · · ·		
						<u> </u>				
	- <u></u>					<u>_</u>			<u> </u>	
			, .							
¹ Type: C=C	Concentration, D=De	pletion, RM	A=Reduced Matrix, CS	=Covere	d or Coate	d Sand G			Pore Lining, M	
Hydric Soll									matic Hydric \$	
Histoso	l (A1) pipedon (A2)		Polyvalue Belov MLRA 149B)		(S8) (LR I	RR,			(LRR K, L, ML ox (A16) (LRR	
	listic (A3)		Thin Dark Surfa		LRR R, M	LRA 149B			or Peat (S3) (1	
	en Sulfide (A4)		Loamy Mucky N	<i>f</i> ineral (F	1) (LRR K		Dark \$	Surface (S7)	(LRR K, L)	
	d Layers (A5)		Loamy Gleyed I	•	2)				Surface (S8) (L	
	d Below Dark Surfa	ce (A11)	Depleted Matrix		、				(S9) (LRR K,	
	ark Surface (A12) Mucky Mineral (S1)		Redox Dark Sur Depleted Dark S	•	-			-	Aasses (F12) (ain Soils (F19)	
·	Gleyed Matrix (S4)		Redox Depress					•	6) (MLRA 144	•
	Redox (S5)							Parent Mater		
	d Matrix (S6)						, - -		c Surface (TF1	2)
Dark Su	urface (S7) (LRR R,	MLRA 149	9 B)				Other	(Explain in I	temarks)	
³ Indicators of	of hydrophytic vegeti	ation and v	vetland hydrology mus	t be pres	ent, unles	s disturbed	l or problemati	C.		
	Layer (if observed):								
Type: Cl								. Due a cu 40	Non d	N-
	nches): <u>12</u>						Hydric Soi	I Present?	Yes <u>v</u>	No
Remarks:			•			40				
From 4-6	inches, distinct pro	ominent F	e concentrations =	rð, rem	ainder up	iper 12 wa	as low chroit	ι α .		
		-								
			·							



ORAM v. 5.0 Field Form Quantitative Rating



GRAND TOTAL(max 100 pts)

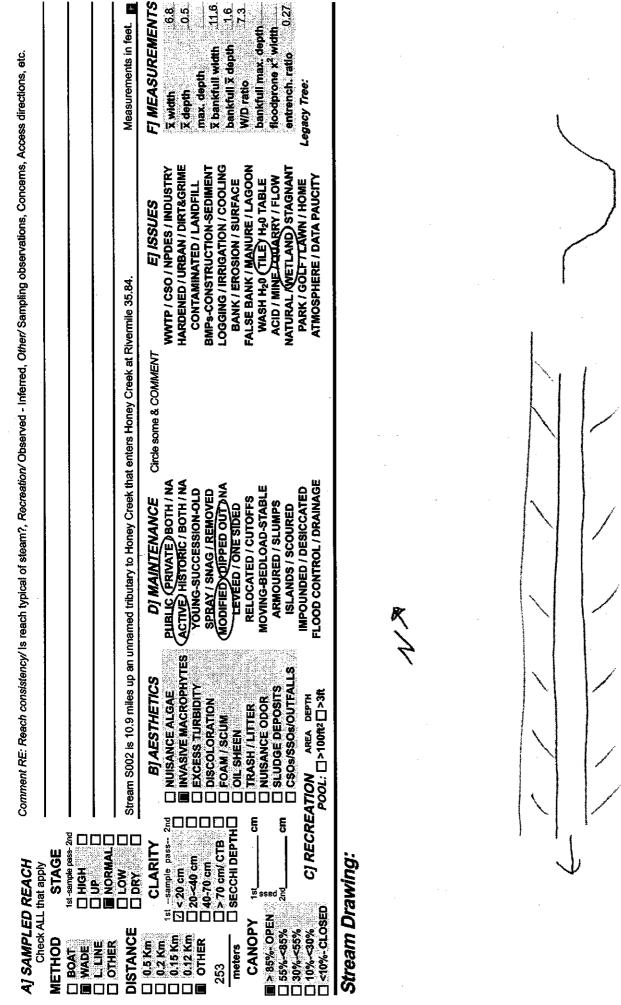
Refer to the most recent ORAM Score Celibration Report for the scoring breakpoints between wegand categories at the following address: http://www.ega.atale.oh.us/dawi401/401.html



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 21

Stream & Location: <u>S</u>	002, Unnamed Tributary to Honey Creek		1 0.9 Date: 0 9/ 2 2/ 09
A. Francisco and R. McGin	nisScorers	Full Name & Affiliation: Ecology and En	
River Code:	STORET #:	Lat./ Long.: 40.9416 /82	.7100 Office verified location
1] SUBSTRATE Check estima BEST TYPES BLDR /SLABS [10] BOULDER [9] COBBLE [8] GRAVEL [7] BEDROCK [5] NUMBER OF BEST T Comments 2] INSTREAM COVER quality; 3-Highest quality in diameter log that is stable,	ONLY Two substrate TYPE BOXES; te % or note every type present OTHER TYPES POOL I OTHER TYPES POOL I Image: Constraint of the present of the presence of the	LIMESTONE [1] TILLS [1] WETLANDS [0] 100 HARDPAN [0] SANDSTONE [0] Signore RIP/RAP [0] SHALE [-1] COAL FINES [-2] Small amounts or if more common of marg nest quality or in small amounts of highes e boulders in deep or fast water, large or deep, well-defined, functional pools.	A average) QUALITY HEAVY [-2] MODERATE [-1] Substrate NORMAL [0] FREE [1] OMODERATE [-1] MODERATE [-1] NORMAL [0] NONE [1] Maximum 20 Maximum 2
0 UNDERCUT BANKS 2 OVERHANGING VE 0 SHALLOWS (IN SLO 0 ROOTMATS [1]	GETATION [1] 0 ROOTWADS [1]	0 OXBOWS, BACKWATERS [1] 0 AQUATIC MACROPHYTES [1] 0 LOGS OR WOODY DEBRIS [1]	□ MODERATE 25-75% [7] ■ SPARSE 5-<25% [3] □ NEARLY ABSENT <5% [1] Cover
Comments			Maximum 5
SINUOSITY DEV HIGH [4] E MODERATE [3] G LOW [2] F/	OLOGY Check ONE in each category (Or 2 ELOPMENT CHANNELIZATION XCELLENT [7] NONE [8] OOD [5] RECOVERED [4] AIR [3] RECOVERING [3] OOR [1] RECENT OR NO RECO	N STABILITY HIGH [3] MODERATE [2] LOW [1]	Channel Maximum 20
4] BANK EROSION A River right looking downstread EROSION INONE / LITTLE [3] INONE / LITTLE [3] INODERATE [2] INODERATE [2] INODERATE [1] Comments	R WIDE > 50m [4] Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system Image: Control of the system <td< td=""><td>FLOOD PLAIN QUALITY REST, SWAMP [3] RUB OR OLD FIELD [2] SIDENTIAL, PARK, NEW FIELD [1]</td><td>Ink & average) CONSERVATION TILLAGE [1] URBAN OR INDUSTRIAL [0] MINING / CONSTRUCTION [0] ate predominant land use(s) 100m riparian. Riparian Maximum 10</td></td<>	FLOOD PLAIN QUALITY REST, SWAMP [3] RUB OR OLD FIELD [2] SIDENTIAL, PARK, NEW FIELD [1]	Ink & average) CONSERVATION TILLAGE [1] URBAN OR INDUSTRIAL [0] MINING / CONSTRUCTION [0] ate predominant land use(s) 100m riparian. Riparian Maximum 10
MAXIMUM DEPTH Check ONE (ONLY!) > 1m [6] 0.7-<1m [4] 0.4-<0.7m [2] 0.2-<0.4m [1] 	☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ VI ☐ POOL WIDTH > RIFFLE WIDTH [0] ☐ F/ ☐ M	CURRENT VELOCITY Check ALL that apply ORRENTIAL [-1] SLOW [1] ERY FAST [1] INTERSTITIAL [-1] AST [1] INTERMITTENT [-2] INDICATE [1] EDDIES [1] Indicate for reach - pools and riffles.	Pool / Current Maximum 12
Indicate for funct of riffle-obligate s RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS > 5-10cm [1] BEST AREAS < 5cm [metric=0] Comments 6] GRADIENT (DRAINAGE AREA	RUN DEPTH RIFFLE / F MAXIMUM > 50cm [2] STABLE (e.g MAXIMUM < 50cm [1]	Dr 2 & average). RUN SUBSTRATE RIFFLE / R g., Cobble, Boulder) [2] [1] [2] LE (e.g., Large Gravel) [1] [2] [2]	UN EMBEDDEDNESS NONE [2] LOW [1] MODERATE [0] EXTENSIVE [-1] Maximum 8 DE: 50 Gradient 4
EPA 4520			06/16/06



OhigEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

13

SITE NAME/LOCATION Black Fork Wind Project				
	RIVER BASIN Ohio R	River	DRAINAGE AREA (m²)	
LENGTH OF STREAM REACH (ft) 163 LAT.	LONG.	RIVER CODE		
DATE 10/18/10 SCORER A. Garder, COMM		auren z. erazionea z. estano a. 1923 a. 1846 a. 1966 a. 1972 a. 2012 a. 1974 a. 1974 a. 1974 a. 1974 a. 1974 a. 1976 a. 1974 - a. 1975 a. 1976		section international distances
NOTE: Complete All Items On This Form - Refer to "F	ield Evaluation Mar	nual for Ohio's PH	WH Streams" for Instr	uctions
STREAM CHANNEL NONE / NATURAL CHANNI MODIFICATIONS:				OVERY
1. SUBSTRATE (Estimate percent of every type of substrate type of substrat	Des found (Max of 8). Fin TYPE SILT [3 pt] LEAF PACK FINE DETR CLAY or HA MUCK [0 pt: ARTIFICIAL	nal metric score is su (/WOODY DEBRIS [3 ITUS [3 pts] ARDPAN [0 pt] s] . [3 pts] 100%	m of boxes A & B. PERCENT 75% 25% 0% 0% 0% 0% (B)	HHEI Metric Points Substrate Max = 40 13 A + B
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES	: 12 TOTAL	NUMBER OF SUBS		
2. Maximum Pool Depth (Measure the maximum pool of evaluation. Avoid plunge pools from road culverts or sto > 30 centimeters [20 pts] > 22.5 - 30 cm [30 pts] > 10 - 22.5 cm [25 pts] COMMENTS Poor pool development	rm water pipes) (Che > 5 cm - 10 < 5 cm [5 r NO WATE	ck ONLY one box): 0 cm [15 pts]	EL [0 pts]	Pool Deptr Max = 30
3. BANK FULL WIDTH (Measured as the average of 3-4 > 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	> 1.0 m - 1	(Check ONLY one 1.5 m (> 3' 3" - 4' 8") [1 =3' 3") [5 pts]	5 pts]	Bankfull Width Max=30
			(IDTH (meters): 2.08	0
RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAI L R (Per Bank) L R (M Wide >10m Moderate 5-10m Immodel Immodel Immodel Narrow <5m Narrow R R	IN QUALITY lost Predominant per Ba ature Forest, Wetland imature Forest, Shrub o eld esidential, Park, New Fi enced Pasture	eft (L) and Right (R) at ank) L R or Old	a looking downstream☆ Conservation Tillage Urban or Industrial Open Pasture, Row Cro Mining or Construction	- -
FLOW REGIME (At Time of Evaluation) (Check Stream Flowing Subsurface flow with isolated pools (Interstitial) COMMENTS_Likely intermittent, water p		y channel, no water (poolş, no flow (Intermittent Ephemeral))
SINUOSITY (Number of bends per 61 m (200 ft) None 1.0 0.5 1.5	of channel) (Check O 2.0 2.5	NLY one box):	3.0 >3	
STREAM GRADIENT ESTIMATE	e (2 ft/100 ft)	Aoderate to Severe	Severe (10 #/1	00 fi)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Complete	ed):
QHEI PERFORMED? - Yes No QHEI Score (If Yes	s, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)	
WWH Name:	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
EWH Name:	Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATER	SHED AREA. CLEARLY MARK THE SITE LOCATION
JSGS Quadrangle Name: NRCS Soil M	Map Page: NRCS Soil Map Stream Order
County: Crawford Township / City:	
MISCELLANEOUS	
Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/14/10	Quantity: 0.06
Photograph Information: P49 - Facing east from collection line crossing, looking	g upstream. P50 - Facing west from collection line
Elevated Turbidity? (Y/N): N Canopy (% open): 100%	
Nere samples collected for water chemistry? (Y/N): (Note lab sample no. o	or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.I	U.) Conductivity (µmhos/cm)
s the sampling reach representative of the stream (Y/N)	n:
Additional comments/description of pollution impacts:	
BIOTIC EVALUATION	
Performed? (Y/N): (If Yes, Record all observations. Voucher collections of ID number. Include appropriate field data sheets from t	ptional. NOTE: all voucher samples must be labeled with the sit the Primary Headwater Habitat Assessment Manual)
ish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/	N) Voucher? (Y/N) N tebrates Observed? (Y/N) Voucher? (Y/N)
rogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinver	replaces Observeds (That N
rogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) N Aquatic Macroinver	

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of Interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

ChicEPA

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

14

Stream & Location: S21, Unnamed tributary to Loss Creek ____<u>0.8</u> Date: 1 0/ 0 1/ 09 RM: J. Zoladz & A. Francisco Scorers Full Name & Affiliation: Ecology & Environment Office verified location Lat./Long.: 40.8266 /82.7639 River Code: STORET #: (NAD 83 - (1] SUBSTRATE Check ONLY Two substrate TYPE BOXES: Check ONE (Or 2 & average) estimate % or note every type present BEST TYPES **OTHER TYPES** ORIGIN QUALITY POOL RIFFLE POOL RIFFLE LIMESTONE [1] BLDR /SLABS [10] HARDPAN [4] HEAVY [-2] MODERATE [-1] TILLS [1] Substrate BOULDER [9] DETRITUS [3] SILT WETLANDS [0] 50 NORMAL [0] ☑ MUCK [2] GRAVEL [7] HARDPAN [0] G FREE (1) SILT [2] 50 2 MODERAL DI SANDSTONE [0] EXTENSIVE [-2] **SAND** [6] ARTIFICIAL [0] (Score natural substrates; ignore RIP/RAP [0] MODERATE [-1] BEDROCK [5] Maximum NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources) LACUSTURINE [0] 20 SHALE [-1] 🔳 3 or less [0] Comments COAL FINES [-2] 2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest AMOUNT Check ONE (Or 2 & average) quality: 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. T EXTENSIVE >75% [11] 0__ UNDERCUT BANKS [1] _0__ OXBOWS, BACKWATERS [1] 0____ POOLS > 70cm [2] ___ MODERATE 25-75% [7] OVERHANGING VEGETATION [1] 1 0 SPARSE 5-<25% [3] 0_ROOTWADS [1] _ AQUATIC MACROPHYTES [1] SHALLOWS (IN SLOW WATER) [1] 0 LOGS OR WOODY DEBRIS [1] NEARLY ABSENT <5% [1] 0 BOULDERS [1] 0 0 ROOTMATS [1] Cover Comments 2 Maximum 20 Some overhanging herbaceous vegetation 3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY **NONE [6]** 🗖 HIGH [3] EXCELLENT [7] HIGH [4] MODERATE [3] GOOD [5] RECOVERED [4] ☐ MODERATE [2] RECOVERING [3] LOW [2] **FAIR** [3] 📕 LOW [1] **NONE** [1] POOR [1] Channel RECENT OR NO RECOVERY [1] Maximum Comments 20 Maintained drainage ditch 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average) River right looking downstream FLOOD PLAIN QUALITY **RIPARIAN WIDTH EROSION** 🔲 🗋 WIDE > 50m [4] G FOREST, SWAMP [3] CONSERVATION TILLAGE [1] 🖄 菌 NONE / LITTLE [3] URBAN OR INDUSTRIAL [0] □ □ MODERATE 10-50m [3] SHRUB OR OLD FIELD [2] MODERATE [2] □ □ NARROW 5-10m [2] CONSTRUCTION [0] HEAVY / SEVERE [1] I EVERY NARROW < 5m [1] FENCED PASTURE [1] Indicate predominant land use(s) I III OPEN PASTURE, ROWCROP [0] past 100m riparian. Riparian Comments Maximum 10 Row crops on either side, low flow, no erosion 5) POOL / GLIDE AND RIFFLE / RUN QUALITY **Recreation Potential** MAXIMUM DEPTH CHANNEL WIDTH CURRENT VELOCITY Check ONE (ONLY!) Primary Contact Check ONE (Or 2 & average) Check ALL that apply TORRENTIAL [-1] SLOW [1] 🗌 > 1m [6] POOL WIDTH > RIFFLE WIDTH [2] Secondary Contac 🗌 0.7-<1m [4] POOL WIDTH = RIFFLE WIDTH [1] VERY FAST [1] □ INTERSTITIAL [-1] (circle one and comment on back) POOL WIDTH > RIFFLE WIDTH [0] 0.4~0.7m [2] □ INTERMITTENT [-2] G FAST [1] 0.2-<0.4m [1] MODERATE [1] EDDIES [1] Pool 🔳 < 0.2m [0] Indicate for reach - pools and riffles. Current 0 Maximum Comments 12 < 0.2m automatic value of 0 Indicate for functional riffles; Best areas must be large enough to support a population NO RIFFLE [metric=0] of riffle-obligate species: Check ONE (Or 2 & average). RIFFLE DEPTH RUN DEPTH RIFFLE / RUN SUBSTRATE RIFFLE / RUN EMBEDDEDNESS BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobble, Boulder) [2] **NONE** [2] BEST AREAS 5-10cm [1] MAXIMUM < 50cm [1] MOD. STABLE (e.g., Large Gravel) [1] LOW [1] Riffle / BEST AREAS < 5cm UNSTABLE (e.g., Fine Gravel, Sand) [0] MODERATE [0] Run [metric=0] O Comments Almost no flow, very flat я 6] GRADIENT ft/mi) VERY LOW - LOW([2)4] %GLIDE: 100 %POOL Gradient MODERATE [6-10] **DRAINAGE AREA** 2 Maximum %RIFFLE %RUN: HIGH - VERY HIGH [10-6] mi²) 10

06/16/06

Access directions, etc. Rivermile 2.4, which in turn Measurements in feet. Measurements in feet. FJ MEASUREMENTS FJ MEAS	Legacy Tree:
rip, no recreation. y unnamed tributary to Loss Creek at F y unnamed tributary to Loss Creek at F <i>y</i> Unnamed tributary to Creek at F <i>y</i> Unnamed to Creek at F <i>y</i> Unnam	ATMOSPHERE / DATA PAUCITY
Comment RE: Reach consistency! Is reach typical of steam?, Recreation? Other/ Sampling observations, Concerns, Access directions, etc. Unnamed tributary to Loss Creek. Very narrow, small incised channel. Typical Ohio channelized tip, no recreation. Stream S020 is 0.8 miles up an secondary unnamed tributary to Loss Creek at Rivermile 2.4, which in turn Stream S020 is 0.8 miles up an secondary unnamed tributary to Loss Creek at Rivermile 2.4, which in turn Eltern S020 is 0.8 miles up an secondary unnamed tributary to Loss Creek at Rivermile 2.4, which in turn BIAESTHETICS Dj MAINTENANCE Circle some & COMMENT Measurements in Loss Creek at Rivermile 2.4, which in turn BIAESTHETICS Dj MAINTENANCE Circle some & COMMENT Ej ISSUES Fj MEASUREME BIAESTHETICS Dj MAINTENANCE Circle some & COMMENT Ej ISSUES Fj MEASUREME Instance ALGAE Di MAINTENANCE Circle some & COMMENT Ej ISSUES Fj MEASUREME Instance ALGAE Di MAINTENANCE Circle some & COMMENT Ej ISSUES Fj MEASUREME Instance ALGAE Di MAINTENANCE Circle some & COMMENT Ej ISSUES Fj MEASUREME Instance ALGAE Di MAINTENANCE Circle some & COMMENT Ej ISSUES Fj MEASUREME Instance ALGAE Di MAINTENANCE Di MAINTENANCE	FLOOD CONTROL (PRAINAGE)
I RE: Reach consistency/ Is reach I tributary to Loss Creek. Very nar 020 is 0.8 miles up an secondary ss Creek at Rivermile 2.98. 3/ AESTHETICS BANCE ALGAE ASIVE MACROPHYTES AM / SCUM CCOLORATION SHEEN ASIVE MORTION SHEEN COLORATION SHEEN COLORATION SHEEN COLORATION SHEEN COLORATION SHEEN COLORATION SHEEN COLORATION SPI ACTIN COLORATION SPI ACTIN COLORATION SPI ACTIN COLORATION SPI ACTIN COLORATION SPI ACTIN COLORATION SPI ACTIN COLORATION SPI ACTIN COLORATION SPI ACTIN COLORATION COLORATION COLORATION SPI ACTIN COLORATION COLORATION COLORATION SPI ACTIN COLORATION COLORATICOLORATION COLORATION COLORATION COLORATION COLORATION COLORATION CO	
AJ SAMPLED REACH Check ALL that apply METHOD Check ALL that apply BOAT Check ALL that apply a sample pass 2nd BOAT 14: sample pass	CJ RECRE

OhisEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3): HHEI Score (sum of metrics 1, 2, 3): STE NUMBER [S021 NOTE: Complete All terms On This Form - Refer to "Field Evaluation Manual for Obio's PHWH Streams" for Instruction NOTE: Complete All terms On This Form - Refer to "Field Evaluation Manual for Obio's PHWH Streams" for Instruction MODE: Complete All terms On This Form - Refer to "Field Evaluation Manual for Obio's PHWH Streams" for Instruction NOTE: Complete All terms On This Form - Refer to "Field Evaluation Manual for Obio's PHWH Streams" for Instruction MODE: Complete All terms on This Form - Refer to "Field Evaluation Manual for Obio's PHWH Streams" for Instruction MODE: Complete All terms on This Form - Refer to "Field Evaluation Manual for Obio's PHWH Streams" for Instruction MODE: Complete All terms on This Form - Refer to "Field Evaluation manual for Obio's PHWH Streams" for Instruction MODE: Complete All terms on This Form - Refer to "Field Evaluation manual for Obio's PHWH Streams" for Instruction MODE: Streams of the Mature Physical Colspan="2">Mode: Streams of the Instruction Mode: Colspan (Streams of the Mature Physical Colspan="2">Mode: Colspan="2">Mode: Colspan="2">Mode: Colspan="2">Mode: Colspan="2" Mode: Colspan= 10 Colspan= 10 Colspan: 10 Co	ChieEPA Primary Headwater Habitat Evaluation Form 40	
SITE NUMBER S021 RIVER BASIN Sandusky DRAINAGE AREA (m) [0.39] ENGTH OF STREAM REACH (t) 185 LAT. (40.82660) LONG. (-27.76390) RIVER CODE RIVER MLE [0.8 ATE 10/01/09 SCORER (A.F. & J.Z.) COMMENTS RIVER MLE [0.8 RIVER MLE [0.8 NDEE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio"s PHWH Streams" for Instruction RECOVERED [RECOVERING [2] RECENT OR NO RECOVERY SUBSTRATE [Estimate percent of every type of substrate present. Check OWL Y two prodominant substrate TYPE boxes HH SUBSTRATE [Estimate percent of every type of substrate present. Check OWL Y two prodominant substrate TYPE boxes HH BUD SLARS (16 pis] EECENT YE BUD SLARS (16 pis] EECENT YE BUD SLARS (16 pis] EECENT YE SAND VC. (2-64 mm) (5 pis] G% CLAY or HARDPAN (0 pi GRAVEL (2-64 mm) (5 pis] G% CLAY or HARDPAN (0 pis) G% Total of Parcontages of some road culver's or some status percent (Check OV or box); 5 on: 10 cm (15 pis) G% 220 - 100 MOST REDOMINANE SUBSTRATE TYPES: 3 TOTAL NUMBER OF SUBSTRATE TYPES: 2 Maximum Pool Duppt (Maseaure des towarage of 3-4 measuraments) Check OV (1		
ENGTH OF STREAM REACH (t) 185 LaT. 40.82660 LONG. 427.76390 RyVER CODE RIVER MILE 0.8 NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHNH Streams" for Instruction READ COMPLEX All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHNH Streams" for Instruction WODFICATIONS: Income / NATURAL CHANNEL RECOVERED RECOVERING [] RECENT OR NO RECOVERED SUBSTRATE (Estimate percent of every type of substrate present. Check OM: Ying predominant substrate TV/E boxed HH WMax of 23. Add total number of significant substrate types found (Max of 03). Find metric score is sum of boxed A.8. HH TYPE BURS SLABS (16 pta) PRECENT PRECENT PRECENT BOULDER (>256 mm) [16 pts] PRECENT Stull 3 pta) PRECENT PRECENT COBBLE (65:26 mm) [16 pts] PRECENT Stull 3 pta) PRECENT PRECENT PRECENT BOULDER (>22m) [6 pts] PRECENT TOTAL NUMBER OF SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES: Precent Study A+ Som - 6 on [25 pts] -30 on (16 pts] -5 om 10 m [16 pts] -5 om 10 m [16 pts] -5 om [16 pts] -10 m	ITE NAME/LOCATION Unnamed Tributary to Loss Creek	
ATE 10/01/09 SCORER A.F. & J.Z. COMMENTS NOTE: Complete All items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instruction TREAM CHANNEL NOTE: Complete All items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instruction TREAM CHANNEL NOTE: Complete All items on This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instruction TREAM CHANNEL NOTE: Complete All items on This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instruction TREAM CHANNEL NOTE: Complete All items on This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instruction (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & 8. TYPE SLOR SLASS (16 pta) BEDROCOK (16 pt) BEDR	SITE NUMBER S021 RIVER BASIN Sandusky DRAINAGE AREA (mi²) 0.39	
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohlo's PHWH Streams" for Instruction TTEAM CHANNEL INONE / NATURAL CHANNEL RECOVERING RESOUCHER STATE TYPE boxes RECOVERING RESOUCHER TYPE boxes RECO	ENGTH OF STREAM REACH (ft) 185 LAT. 40.82660 LONG82.76390 RIVER CODE RIVER MILE 0.8	
TREAM CHANNEL INONE / NATURAL CHANNEL RECOVERING <	ATE 10/01/09 SCORER A.F. & J.Z. COMMENTS	nghan minipant triangt
MODIFICATIONS: SUBSTRATE [Estimate percent of every type of substrate present. Check ONLY type predominant substrate TYPE boxes New of 32, Add total number of significant substrate types found (Max of 3). Final metric score is sum of Does A & B. YPE BLDR SLABS (16 pts) BOULDER (255 mm) (16 pts) GYS COBBLER (55256 mm) (12 pts) GYS COBBLER (55256 mm) (12 pts) GYS Did Slabs (16 pts) GYS SAND (<2 mm) (16 pts)	NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instruct	ions
(Mex of 32). Add total number of significant substrate types found (Mex of 8). Final metric score is sum of boxes A & 8. Hereform PE BLDR SLABS (16 pts) 025 124 BCULDER (-286 mm) (16 pts) 025 025 025 BCORDEL (65.286 mm) (12 pts) 025 025 025 COBBLE (65.286 nm) (12 pts) 025 025 025 GRAVEL (2-64 mm) (19 pts) 025 025 025 Total of Percentages of Bidr Stabs, Boulder, Cobble, Bedrock 00% (A) 100% (B) Total of Percentages of Staff Stabs, Boulder, Cobble, Bedrock 0.00% (A) 100% (B) Axtimum Pool Depth (Messure the maximum pool depth within the 61 meter (200 ft) evaluation resoh at the time of evaluation. Avoid plunge pools from read culverts or storm water pipes) (Check ONLY one box): 6 Sale of TVM 00ST REDOMINATE SUBSTRATE TYPES: 3 TOTAL NUMBER OF SUBSTRATE TYPES: 7 Sale of the desize of the maximum pool depth within the 61 meter (200 ft) evaluation resoh at the time of evaluation. Avoid plunge pools from read culverts or storm water pipes) (Check ONLY one box): 6 Sale of the desize of the grade of the substrante types of the desize of the grade of the desize of the grade of the desize of the desiz		:RY
TYPE BLDR SLABS (16 pts) PERCENT TYPE BULD BLOR SLABS (16 pts) 0% 0% 0% 0% 0% 0% BEDROCK (16 pt) 0%		
BLDR SLABS (16 ftel) 0% <td< td=""><td></td><td>let</td></td<>		let
BEDROCK (16 pt] 0% FINE DETRITUS [3 pts] 0% COBBLE (65-256 mm) [12 pts] 0% CLAY or HARDPAN [0 pt] 0% GRAVE (2-44 mm) [9 pts] 0% 0% 0% 0% 0% Total of Parcentages of Bidr Slabs, Boulder, Cobble, Bedrock 0.00% (A) 0% 0% 0% 0% Total of Parcentages of Bidr Slabs, Boulder, Cobble, Bedrock 0.00% (A) 0% (B) 0% 0% Sand (-2 mm) [6 pts] 0% 0.00% (A) 0% (B) 0% 0% Maximum Pool Depth (Messure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check OML Y one box); 20 Commeters (-13) [30 pts] -5 cm -10 cm [15 pts] -5 cm -10	BLDR SLABS [16 pts] 0% SILT [3 pt] 50%	oir
COBBLE (65:26 mm) (12 pts) 0%		ubst
GRAVEL (2-64 mm) (9 pts) 0% 2% ARTIFICIAL [3 pts] 0% <		ax =
Image: State of Percentages of Bid Slass, Boulder, Cobbie, Bedmock, OL00% (A) 100% (B) Particular Cobbie, Bedmock, Outly on the Structure of Percentages of Substrate TYPEs: 3 TOTAL NUMBER OF SUBSTRATE TYPEs: 2 Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 5 cm - 10 cm (15 pb) > 5 cm - 10 cm (15 pb) > 100% Max > 20 centimeters (20 ft) S cm (15 pts) S cm (15 pts) > 5 cm (15 pts) > 6 Max > 20 centimeters (20 ft) S cm (15 pts) S cm (15 pts) > 6 Max > 20 centimeters (20 ft) S cm (15 pts) S cm (15 pts) 6 Max > 20 centimeters (20 ft) S cm (15 pts) S cm (15 pts) 6 Max > 20 centimeters (20 ft) S cm (15 pts) S cm (15 pts) 6 Max S cm (15 pts) S cm (15 pts) S cm (15 pts) 6 Max > 40 meters (> 13) (30 pts) S (10 m (-s3 3°) (5 pts) 2.04 2.04 2.04 COMMENTS Comments Max AVERAGE BANKFULL WIDTH (meters): 2.04 2.04 <		E
Bidr Slabs, Boulder, Cobble, Bedrock 100% 100% 100% CORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 3 TOTAL NUMBER OF SUBSTRATE TYPES: 2 Maximum Pool Depth (Messure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 30 centimeters (20 ft) > 5 cm 10 cm (15 pt) > 30 centimeters (20 ft) > 5 cm 10 cm (15 pt) > 5 cm 10 cm (15 pt) > 5 cm 10 cm (15 pt) > 10 cm (15 pt) > 5 cm 10 cm (15 pt) > 5 cm 10 cm (15 pt) > 10 cm (15 pt	SAND (<2 mm) [6 pts] 0% ARTIFICIAL [3 pts] 0%	J
Bidd Slabs, Boulder, Cobble, Bedrock CORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 3 TOTAL NUMBER OF SUBSTRATE TYPES: 2 Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culvers or storm weter pipes) (Check ONLY one box): > 30 centimeters [20 pts] > 5 cm - 10 cm [15 pts] < 5 cm [5 pts]		A + E
Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 5 cm - 10 cm (15 pts) > 10 cm (15 pts) > 22.5 cm (25 pts) 15 pts) 15 pts) NO WATER OR MOIST CHANNEL [D pts] 15 16 > 20.0 migot pts] > 10 m - 1.5 m (> 3'3' - 4'8') (15 pts) > 1.0 m (-2.3'3) (50 pts) > 1.0 m (-2.3'3) (55 pts) 16 SANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONL Y one box): > 1.0 m (-2.3'3') (5 pts) 2.0 m (-2.3'3') (-2.5's) 2.0 m (-2.0's) 2.0 m	Bidr Slabs, Boulder, Cobble, Bedrock	
evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONL Y one box): > 30 certimeters [20 pts] > 5 cm - 10 cm [15 pts] > 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts] COMMENTS MAXIMUM POOL DEPTH (centimeters): 6 BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONL Y one box): 6 > 4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3'3', -4' 8') [15 pts] 3.0 m - 4.0 m (> 9' 7' - 4' 8') [20 pts] > 3.0 m - 4.0 m (> 9' 7' - 4' 8') [20 pts] AVERAGE BANKFULL WIDTH (meters): 2.04 COMMENTS AVERAGE BANKFULL WIDTH (meters): 2.04 COMMENTS Conservation Tillage Immalture Forest, Wettand Conservation Tillage MAXIMUM Pool Completed RIPARIAN WIDTH ELOODPLAIN QUALITY AVERAGE BANKFULL WIDTH (meters): 2.04 L R (Per Bank) L R Mature Forest, Wettand Conservation Tillage Moderate 5-10m Mature Forest, Shrub or Old Urban or Industrial Moderate 5-10m Residential, Park, New Field Open Pasture, Row Crop None Fenced Pasture Mining or Construction COMMENTS Stream Flowing Moist Channel, isolated pools, no flow (Intermittent) <td></td> <td></td>		
> 30 centimeters [20 pts] > 22.5 - 30 cm [30 pts] > 10 - 22.5 cm [30 pts] > 10 - 22.5 cm [30 pts] > 10 - 22.5 cm [30 pts] NO WATER OR MOIST CHANNEL [0 pts] NO WATER OR MOIST CHANNEL [0 pts] NO WATER OR MOIST CHANNEL [0 pts] BANK FULL WIDTH (Measured as the average of 3-4 measurements) A 0 m (s 9' 7' - 4' 8') [20 pts] > 1.0 m - 1.5 m (> 3' 3'' - 4' 8') [15 pts] > 1.5 m - 3.0 m (> 9' 7' - 4' 8') [20 pts] COMMENTS COMM		
22.5 - 30 cm [30 pis] > 10 - 22.5 cm [25 pis] COMMENTS BANK FULL WIDTH (Measured as the average of 3-4 measurements) A.0 meters (> 13) [30 pis] > 4.0 meters (> 13) [30 pis] > 1.0 m - 4.0 m (> 9' 7' - 13) [25 pis] > 1.0 m - 4.0 m (> 9' 7' - 13) [25 pis] > 1.0 m (> 9' 7' - 13') [25 pis] > 1.0 m (<=3' 3''] [5 pis] > 1.0 m (<=3' 3''] [5 pis] COMMENTS		iax =
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BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box): > 4.0 meters (> 13) [30 pts] > 1.0 m - 1.5 m (> 3' 3' - 4' 8') [15 pts] > 3.0 m - 4.0 m (> 9' 7' - 13') [25 pts] > 1.0 m (<=3' 3') [5 pts]	NO WATER OR MOIST CHANNEL [0 pts]	15
> 4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3' 3' - 4' 8') [15 pts] Wide > 3.0 m - 4.0 m (> 9' 7' - 4' 8') [20 pts] > 1.0 m (<=3' 3'') [5 pts]		a.,
> 4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3' 3' - 4' 8') [15 pts] Wide > 3.0 m - 4.0 m (> 9' 7' - 4' 8') [20 pts] > 1.0 m (<=3' 3'') [5 pts]	BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):	Bank
Image: Stream Flowing Stream Flowing Image: Stream Flowing Image: Stream Flowing	> 4.0 meters (> 13') [30 pts]	Widi
This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY		
This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY ANOTE: River Left (L) and Right (R) as looking downstream A RIPARIAN WIDTH FLOODPLAIN QUALITY Anote: River Left (L) and Right (R) as looking downstream A RIPARIAN WIDTH FLOODPLAIN QUALITY Anote: River Left (L) and Right (R) as looking downstream A RIPARIAN WIDTH FLOODPLAIN QUALITY L R Conservation Tillage Wide >10m Immature Forest, Wetland Immature Forest, Shrub or Old Urban or Industrial Moderate 5-10m Immature Forest, Shrub or Old Urban or Industrial Open Pasture, Row Crop Narrow <5m Residential, Park, New Field Immature Forest, Conservation Open Pasture, Row Crop None Fenced Pasture Mining or Construction Open Pasture, Row Crop SiNUOSITY (Number of bends per 61 m (200 ft) of channel) Check ONLY one box): Moist Channel, isolated pools, no flow (Intermittent) 3.0 None 1.0 2.0 3.0		20
This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN QUALITY L R (Most Predominant per Bank) L Wide >10m Immature Forest, Wetland Immature Forest, Shrub or Old Immature Forest, Shrub or Old Immature Forest, Shrub or Old Moderate 5-10m Immature Forest, Shrub or Old Immature, Row Crop Moderate 5-10m Residential, Park, New Field Immature, Row Crop Narrow <5m		20
RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN QUALITY L R (Per Bank) L Wide >10m Mature Forest, Wetland Moderate 5-10m Immature Forest, Shrub or Old Wide >10m Residential, Park, New Field Narrow <5m	This information must also be completed	1.25.1
L R (Per Bank) L R (Most Predominant per Bank) L R Conservation Tillage Wide >10m Immature Forest, Wetland Immature Forest, Shrub or Old Immature Fores	RIPARIAN ZONE AND FLOODPLAIN QUALITY ANOTE: River Left (L) and Right (R) as looking downstream a	
Wide >10m Mature Forest, Wetland Conservation Tillage Moderate 5-10m Immature Forest, Shrub or Old Urban or Industrial Moderate 5-10m Residential, Park, New Field Open Pasture, Row Crop Narrow <5m		
Image: Stream Flowing Sinuosity (Number of bends per 61 m (200 ft) of channel) Check ONLY one box): Moist Channel, isolated pools, no flow (Intermittent) Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) Check ONLY one box): 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) Check ONLY one box): 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) Check ONLY one box): 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) Check ONLY one box): 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 2.0 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 2.0 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 2.0 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 2.0 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 2.0 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 3.0 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 3.0 3.0 Image: Sinuosity (Number of bends per 61 m (200 ft) of channel) 3.0 3.0 Image: Sinuosity (Sinus (Sinus (Sinus (Sinus (Sinus (Sinus (Sinus (Sinus (Sinus (S		
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None Fenced Pasture Mining or Construction COMMENTS COMMENTS Moist Channel, isolated pools, no flow (Intermittent) Stream Flowing Subsurface flow with isolated pools (Interstitial) Moist Channel, isolated pools, no flow (Intermittent) COMMENTS Sinuositry (Number of bends per 61 m (200 ft) of channel) Check ONLY one box): 3.0 None 1.0 2.0 3.0 >3 0.5 1.5 2.5 3.0 >3		
COMMENTS FLOW REGIME (At Time of Evaluation) (Check ONLY one box): Stream Flowing Subsurface flow with isolated pools (Interstitial) COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 0.5	hand fand to fand to de terreter de terre	
Stream Flowing Moist Channel, isolated pools, no flow (Intermittent) Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral) COMMENTS SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 2.0 3.0 0.5 1.5 2.5 3.0		
Stream Flowing Moist Channel, isolated pools, no flow (Intermittent) Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral) COMMENTS SiNUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 2.0 3.0 0.5 1.5 2.5 3.0	FLOW REGIME (At Time of Evaluation) (Check ONLY one box):	
Subsurface flow with isolated pools (Interstitial) L Dry channel, no water (Ephemeral) COMMENTS	Stream Flowing Moist Channel, isolated pools, no flow (Intermittent)	
SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 2.0 3.0 0.5 1.5 2.5 >3	Subsurface flow with isolated pools (Interstitial) L. Dry channel, no water (Ephemeral)	
✓ None 1.0 2.0 3.0 0.5 1.5 2.5 >3		
0.5 1.5 2.5 >3		
STREAM GRADIENT ESTIMATE		
	STREAM GRADIENT ESTIMATE	
Flat (0.5 ft/100 ft) Flat to Moderate (2 ft/100 ft) Moderate to Severe (10 ft/100 ft)		I

DOWNSTREAM DESIGNATED USE(S) WWH Name: Dis CWH Name: Dis EWH Name: Dis MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED ARE USGS Quadrangle Name: North Robinson NRCS Soil Map Page: County: Crawford MISCELLANEOUS Base Flow Conditions? (Y/N): N Date of last precipitation: 10/01/09 Photograph Information: Photo P209 East on 10/01/09 Elevated Turbidity? (Y/N): Y Canopy (% open): 100% Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and all Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts:	Quantity: 0.82
WWH Name: Dis CWH Name: Dis EWH Name: Dis WSGS Quadrangle Name: North Robinson NRCS Soil Map Page: County: County: Crawford NBSCELLANEOUS Township / City: Base Flow Conditions? (Y/N): N Date of last precipitation: 10/01/09 Photo P209 East on 10/01/09 Elevated Turbidity? (Y/N): Y Canopy (% open): 100% Were samples collected for water chemistry? (Y/N): N Is the sampling reach representative of the stream (Y/N) If not, please explain: State sampling reach representative of pollution impacts:	tance from Evaluated Stream tance from Evaluated Stream A. CLEARLY MARK THE SITE LOCATION NRCS Soil Map Stream Order NRCS Soil Map Stream Order
CWH Name: Dis Dis Dis MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED ARE USGS Quadrangle Name: North Robinson NRCS Soil Map Page: County: Crawford Township / City: Vernon MISCELLANEOUS Base Flow Conditions? (Y/N): N Date of last precipitation: 10/01/09 Photograph Information: Photo P209 East on 10/01/09 Elevated Turbidity? (Y/N): Y Canopy (% open): 100% Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and all Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts:	tance from Evaluated Stream tance from Evaluated Stream A. CLEARLY MARK THE SITE LOCATION NRCS Soil Map Stream Order NRCS Soil Map Stream Order
EWH Name: Dis MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED ARE USGS Quadrangle Name: North Robinson NRCS Soil Map Page: County: Crawford MISCELLANEOUS Base Flow Conditions? (Y/N): N Date of last precipitation: 10/01/09 Photograph Information: Photo P209 East on 10/01/09 Elevated Turbidity? (Y/N): Y Canopy (% open): 100% Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and all Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts:	tance from Evaluated Stream
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USGS Quadrangle Name: North Robinson NRCS Soil Map Page: County: Crawford Township / City: Vernon MISCELLANEOUS Base Flow Conditions? (Y/N): N Date of last precipitation: 10/01/09 Photograph Information: Photo P209 East on 10/01/09 Elevated Turbidity? (Y/N): Y Canopy (% open): 100% Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and all Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: <u>BIOTIC EVALUATION</u>	Quantity: 0.82
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Biotic Evaluation Photo P209 East on 10/01/09 Elevated Turbidity? (Y/N): Y Canopy (% open): 100% Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and all Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts:	ttach results) Lab Number:
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Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and at Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts:	
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: BIOTIC EVALUATION	
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Is the sampling reach representative of the stream (Y/N) If not, please explain: Additional comments/description of pollution impacts: BIOTIC EVALUATION	Conductivity (µmhos/cm)
Additional comments/description of pollution impacts:	
BIOTIC EVALUATION	
BIOTIC EVALUATION	
	n na na mana na Na na mana na ma
ID number. Include appropriate field data sheets from the Primary	/oucher? (Y/N)
DRAWING AND NARRATIVE DESCRIPTION OF STREAM READ	H (This must be completed):
Include important landmarks and other features of interest for site evaluation and a n	·
FLOW FL	y A'zz wetlad @ bettim.



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 49

Stream & Location: S1550 - Unnamed tributary to Paramour Creek	RM:	0.2 Date: 1	<u>o/ <u>a</u> o/ 09</u>
A. Gardner & R. Noyes Scorers Full Name & Affiliation:			
River Code: STORET #: Lat./Long.: 40.814	7 /82.	7262	Office verified location
BEST TYPES POOL RIFFLE OTHER TYPES POOL RIFFLE ORIGIN	ONE (<i>Or 2</i> &		Construction Sectors of the Sector
BOULDER [9] DETRITUS [3] Intills [1] COBBLE [8] Intills [1] WETLANDS [0] GRAVEL [7] 50 90 Silt [2] 50 10 HARDPAN [0] SAND [6] Intills [1] ARTIFICIAL [0] SANDSTONE [0]	SILT	MODERATI	
Image: Bedrock [5] (Score natural substrates; ignore Image: Bedrock [5] NUMBER OF BEST TYPES: Image: Bedrock [2] 4 or more [2] Studge from point-sources Image: Bedrock [6]	N N		[-1] Maximum] 20
Comments 3 or less [0] U SHALE [-1] COAL FINES [-2] COAL FINES [-2]			
2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common quality; 2-Moderate amounts, but not of highest quality or in small amounts quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, deep or fast water, or deep, well-defined, functional 0 UNDERCUT BANKS [1] 0 UNDERCUT BANKS [1] 1 POOLS > 70 cm [2] 0 OXBOWS, BACKWATE 1 OVERHANGING VEGETATION [1] 0 ROOTWADS [1] 0 AQUATIC MACROPHY 2 SHALLOWS (IN SLOW WATER) [1] 0 BOULDERS [1] 2 LOGS OR WOODY DE	of highest r, large pools. [:RS [1] [TES [1]]	AMOU Check ONE (Or 2) EXTENSIVE > MODERATE 2: SPARSE 5-<21 NEARLY ABSI	2 & average) 75% [11] 5-75% [7] 3% [3] ENT <5% [1]
Comments		Ma	Cover aximum 20
Sparce overhanging shrubs, mostly overhanging Phalaris arundinacea,			20
3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY HIGH [4] EXCELLENT [7] NONE [6]			
Image: Moderate [3] Good [5] Image: Recovered [4] Image: Moderate [2] Image: Moderate [3] Image: Recovering [3] Image: Low [1] Image: Low [1] Image: Low [1] Image: Moderate [3] Image: Recovering [3] Image: Low [1] Image: Low [1] Image: Low [1] Image: Moderate [3] Image: Low [1] Image: Recovering [3] Image: Low [1] Image: Low [1] Image: Moderate [3] Image: Low [1] Image: Recovering [3] Image: Low [1] Image: Low [1] Image: Moderate [3] Image: Low [1] Image: Low [1] Image: L	· ·	Ċ	Shannel
Comments		Ма	aximum 11
Few vegatated point bars, low sinuosity in plan form. 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (C River right looking downstream L R RIPARIAN WIDTH L R FLOOD PLAIN QUALI	TYLR		
EROSION I WIDE > 50m [4] Generate 10-50m [3] Generate 10-50m		ONSERVATION IRBAN OR INDU IINING / CONST predominant land Om riparian.	STRIAL [0] RUCTION [0] d use(s)
Comments	and past to		Riparlan aximum 10
Stream is incised by about 7 feet. 5] POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH CHANNEL WIDTH CURRENT VELOCITY	,	Recreation	
Check ONE (ONLY!) Check ONE (Or 2 & average) Check ALL that apply > 1m [6] POOL WIDTH > RIFFLE WIDTH [2] TORRENTIAL [-1] SLOW [1]		Primary C Secondary	11
0.7-<1m [4]	TENT [-2]	(circle one and com	Pool /
□ < 0.2m [0] Indicate for reach - pools and ri Comments	mes.		Current aximum 12
Indicate for functional riffles; Best areas must be large enough to support of riffle-obligate species: Check ONE (Or 2 & average).	a populat	tion	FFLE [metric=0]
RIFFLE DEPTH RUN DEPTH RIFFLE / RUN SUBSTRATE RIF BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobble, Boulder) [2]		N EMBEDDE	DNESS
BEST AREAS 5-10cm [1] MAXIMUM < 50cm [1]		OW [1] ODERATE [0]	Riffle /
Comments	u₽ 	(TENSIVE [-1] _M	aximum 3
6] GRADIENT (ft/mi) [] VERY LOW - LOW [2-4] %POOL: 40	%GLIDE		Gradient 6
ORAINAGE AREA MODERATE [0-10] (4.468 mi ²) HIGH - VERY HIGH [10-6] %RUN: 20	%RIFFLE	10 ^M	aximum 10
EPA 4520		,	06/16/06

	Stream S1550 is 0.16 miles up an unnamed BJAESTHETICS D DINUSANCE ALGAE PUBLI		tributary to Paramour Creek that enters Paramour Creek at Rivermile 5.15 MAINTENANCE Circle some & COMMENT EJ A C / PRIVATE / BOTH / NA	teek at Rivermile 5.15. <i>Ej ISSUES</i> WWTP / CSO / MPDES / INDUSTRY	Measurements in feet. F] MEASUREMENTS
	CSSS TURBIDITY DISCOLORATION FOAM / SCUM COL SHEEN COL SHEEN COL SHEEN COL STASH / LITTER NUISANCE ODOR CSOS/SSOS/OUTFALLS ATION AREA DEPTH POOL: C)>100ft2 >3ft	YOUNG-SUCCESSION OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDL OAD-STABLE ARMOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE		HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H20 / TILE / H20 TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	X depth 0.4 max. depth 2.2 T bankfull width 12.7 bankfull x depth 2.2 WID ratio 5.8 bankfull max. depth 5.8 floodprone x ² width 0.35 entrench. ratio 0.35 Legacy Tree:
Stream Drawing:		<i>v</i> ∕	whise Rd	el culur 1	
		2			
		S.	4		
		A L			



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 18

06/16/06

Stream & Location: S1553, Unnamed tributary to Marsh Run	RM:	<u>1.5</u> Date: <u>1</u> 0/ <u>2</u> 2/ 09
A. Gardner & R. Noves Scorers Full	Name & Affiliation: Ecology & Env	ronment, Inc.
River Code:	/Long.: 40,8861 /82	2.7178 Office verified location
1] SUBSTRATE Check ONLY Two substrate TYPE BOXES;	Check ONE (Or ;	_
BEST TYPES DOL DIFFUE OTHER TYPES DOL DIFFUE		QUALITY
BEST TYPES POOL RIFFLE OTHER TYPES POOL RIFFL		HEAVY [-2]
		MODERATE [-1] Substrate
□ □ COBBLE [8] □ □ MUCK [2] □ □ GRAVEL [7] □ □ SILT [2]	_ UWETLANDS [0]	
□ □ SAND [6] □ □ ARTIFICIAL [0]		
BEDROCK [5] (Score natural substrates; igno	re 🛛 RIP/RAP [0]	MODERATE [-1] Maximum
NUMBER OF BEST TYPES: 4 or more [2] sludge from point-source	s) □ LACUSTURINE [0] 10 □ SHALE [-1]	MODERATE [-2] MODERATE [-1] MAXIMUM MAXIMUM 20 MAXIMUM 20
Comments D 3 of less [v]	COAL FINES [-2]	and states of the second states and the second
Stream was recently dredged, all run.		
2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small a quality; 2-Moderate amounts, but not of highest q quality; 3-Highest quality in moderate or greater amounts (e.g., very large boul diameter log that is stable, well developed rootwad in deep / fast water, or dee 0 UNDERCUT BANKS [1] 0 POOLS > 70cm [2] 0 OVERHANGING VEGETATION [1] 0 ROOTWADS [1] 0 SHALLOWS (IN SLOW WATER) [1] 0 BOULDERS [1] 0 COMMENTS [1] 0 ROOTMATS [1] 0 COMMENTS [1] C	uality or in small amounts of highe ders in deep or fast water, large	Junal AMOUNT St Check ONE (Or 2 & average) EXTENSIVE >75% [11] MODERATE 25-75% [7] SPARSE 5-<25% [3]
3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & aw	auto i	
SINUOSITY DEVELOPMENT CHANNELIZATION	STABILITY	
HIGH [4]	🔲 HIGH [3]	
MODERATE [3] GOOD [5] RECOVERED [4] LOW [2] FAIR [3] RECOVERING [3]		
LOW [2] FAIR [3] RECOVERING [3] NONE [1] POOR [1] RECENT OR NO RECOVERY	(1] LOW [1]	Channel
Comments	· • :-	Maximum 1
Recently (last week) dredged.		
4] BANK EROSION AND RIPARIAN ZONE Check ONE in each cat River right looking downstream RIPARIAN WIDTH	egory for EACH BANK (Or 2 per ba OOD PLAIN QUALITY	ank & average)
		CONSERVATION TILLAGE [1]
NONE / LITTLE [3]		URBAN OR INDUSTRIAL [0]
		MINING / CONSTRUCTION [0]
		cate predominant land use(s) 100m riparian. Riparian
Comments	ವರ್ಷ ಕೆ. ಹಿನ್ನೆಂದ ಕೆ. ಕೆ. ಸಂಪುರ್ಧ ಕ್ರಮಗಳನ್ನು ಕೆ. ಮೊದಲಿಗೆ ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ. ಕೆ	Maximum 3
		10
5] POOL / GLIDE AND RIFFLE / RUN QUALITY		Recreation Potential
MAXIMUM DEPTH CHANNEL WIDTH CL Check ONE (ONLY!) Check ONE (Or 2 & average)	JRRENT VELOCITY Check ALL that apply	Primary Contact
	NTIAL [-1] SLOW [1]	Secondary Contact
0.7-<1m [4] POOL WIDTH = RIFFLE WIDTH [1] VERY [AST [1] INTERSTITIAL [-1]	(circle one and comment on back)
0.4-<0.7m [2] POOL WIDTH > RIFFLE WIDTH [0] FAST [0.2-<0.4m [1] MODE	1] □ INTERMITTENT [-2 RATE [1] □ EDDIES [1]	Pool /
	te for reach - pools and riffles.	Current 7
Comments		Maximum 12
Indicate for functional riffles; Best areas must be large	enough to support a popu	lation
of riffle-obligate species: Check ONE (Or 2 &		NO RIFFLE [metric=0]
RIFFLE DEPTH RUN DEPTH RIFFLE / RUN		
□ BEST AREAS > 10cm [2] □ MAXIMUM > 50cm [2] □ STABLE (e.g., Co □ BEST AREAS 5-10cm [1] □ MAXIMUM < 50cm [1] □ MOD, STABLE (e.g., Co	bble, Boulder) [2] L	NONE [2]
□ BEST AREAS < 5cm □ UNSTABLE (e.g.,)		MODERATE (0) Riffle /
[metric=0] Comments		EXTENSIVE [-1] Run 0
<u>All run,</u>		8
6] GRADIENT (ft/mi) VERY LOW - LOW [2-4]	%P00L: %GLI	DE: Gradient
DRAINAGE AREA I MODERATE [6-10] (mi²) I HIGH - VERY HIGH [10-6]	%RUN: 100 %RIFF	

	METHOD STAGE BOAL 1st -ample pass- 2nd WADE HIGH 1 LLUNE UP				
T BIAESTHETICS DI MAINTENANCE CREASONES DI MAINTENANCE EISSUES T BIAESTHETICS DI MAINTENANCE CREASONE BIAESTHETICS DI MAINTENANCE EISSUES T BIAESTHETICS DI MAINTENANCE Remer LIFENANTE ROWINGARDENTER ROWINGARDENTER <t< th=""><th></th><th>Stream S155307 is 1.5 miles up a</th><th>in unnamed tributary to Marsh Run that enters M</th><th>Aarsh Run at Rivermile 4.87.</th><th>Measurement in feet.</th></t<>		Stream S155307 is 1.5 miles up a	in unnamed tributary to Marsh Run that enters M	Aarsh Run at Rivermile 4.87.	Measurement in feet.
annel width - 8.8' arent water depth - G. 18' were activities chennel 5 activities chennel 5 activities chennel 5		BJAESTHETICS BJAESTHETICS NUISANCE ALGAE NVASIVE MACROPHYTES NVASIVE MACROPHYTES EXCESS TURBIDITY EXCESS TURBIDITY DISCOLORATION EXCOMA SCUM DISCOLORATION ECCESS TURBIDITY DISCOLORATION EXCOLORATION EXCOLORATION DISCOLORATION ECCESS TURBIDITY DISCOLORATION ECCESS TURBIDITY ECCESS TURBIDITY ECCESS TURBIDITY DISCOLORATION ECCESS TURBIDITY DISCOLORATION ECCESS TURBIDITY ECCESS TURBIDITY DISCOLORATION ECCESS TURBIDITY ECCESS TURBITY ECCESS TURBIDITY ECCESS T	Dj MAINTENANCE DJ MAINTENANCE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SUCCESSION-OLD SPRAY / SUCCESSION-OLD SPRAY / SUCCESSION-OLD SPRAY / SUCCESSION-OLD SPRAY / SUCCESSION-OLD SPRAY / SUCCESSION-OLD ACTIVE / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / DESICCATED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE		F] MEASUREMENTS X width 8.8 X depth 0.1B max. depth 0.1B max. depth 0.1 Y bankfull X depth 0.1 bankfull max. depth 0.1 bankfull max. depth 0.1 floodprone X ² width 0.1 entrench. ratio 0.1 Legacy Tree:
A water depth - G. 18' automated not be measured a activities: Channel 5	Stream Drawing:				
activities. Chennel 15 doil treuch	Chan Curre	- 3	- 8:8! depth - 0.18'		
	dradin	and act	not be measu channel is	med due to recent inside ~ 10' deep	+
	•	•			



Stream & Location: S 1560, Unnamed tributary to Marsh Run RM: 0,9 Date: 1 0/ 2 3/ 09 A. Gardner, R. Noves Scorers Full Name & Affiliation: Ecology and Environment Office verified location Lat./Long.: 40.9010 /82.7097 River Code: STORET #: (NAD 83 - d 1] SUBSTRATE Check ONLY Two substrate TYPE BOXES: Check ONE (Or 2 & average) estimate % or note every type present OTHER TYPES POOL RIFFLE BEST TYPES ORIGIN QUALITY POOL RIFFLE HEAVY [-2] LIMESTONE [1] BLDR /SLABS [10] HARDPAN [4] MODERATE [-1] BOULDER [9] TILLS [1] Substrate SILT WETLANDS [0] 20 NORMAL [0] MUCK [2] 20 HARDPAN [0] GRAVEL [7] 🗹 🔳 SILT [2] 80 80 6 BODEON INODERA SANDSTONE [0] SAND [6] BEDROCK [5] (Score natural substrates; ignore RIP/RAP [0] MODERATE [-1] Maximum NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources) LACUSTURINE [0] 20 SHALE [-1] **NONE** [1] 3 or less [0] Comments COAL FINES [-2] 2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal AMOUNT quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. Check ONE (Or 2 & average) EXTENSIVE >75% [11] Ω UNDERCUT BANKS [1] 0____ POOLS > 70cm [2] _____ OXBOWS, BACKWATERS [1] MODERATE 25-75% [7] ROOTWADS [1] **OVERHANGING VEGETATION [1]** 0 1 AQUATIC MACROPHYTES [1] Ď SPARSE 5-<25% [3] SHALLOWS (IN SLOW WATER) [1] NEARLY ABSENT <5% [1]</p> 0 BOULDERS [1] 0 LOGS OR WOODY DEBRIS [1] ROOTMATS [1] 0 Cover Comments Maximum 20 3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) SINUOSITY **CHANNELIZATION** STABILITY DEVELOPMENT EXCELLENT [7] **NONE [6]** 🖬 HIGH [3] MODERATE [3] GOOD [5] RECOVERED [4] MODERATE [2] G FAIR [3] RECOVERING [3] LOW [2] LOW [1] Channel **NONE** [1] POOR [1] RECENT OR NO RECOVERY [1] Maximum 6 Comments 20 Lacks defined pool-riffle-pool regime 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average) River right looking downstream FLOOD PLAIN QUALITY **RIPARIAN WIDTH** L R NIFARIAN W **EROSION** CONSERVATION TILLAGE [1] NONE / LITTLE [3] ً MODERATE 10-50m [3]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or old field [2]

 Image: Shrub or old field [2]
 Image: Shrub or old field [2]

 Image: Shrub or old field [2]
 Image: Shrub or old field [2]

 Image: Shrub or old field [2]
 Image: Shrub or old field [2]

 Image: Shrub or old field or old field [2]
 Image: Shrub or old field [2]

 Image: Shrub or old field or old fi MODERATE [2] □ □ NARROW 5-10m [2] HEAVY / SEVERE [1] U VERY NARROW < 5m [1] FENCED PASTURE [1] Indicate predominant land use(s) past 100m riparian. Riparian 🗹 🔳 NONE [0] Den Pasture, Rowcrop [0] Riparian Comments Maximum 10 Vegetation mowed on banks 5) POOL / GLIDE AND RIFFLE / RUN QUALITY **Recreation Potential** MAXIMUM DEPTH **CHANNEL WIDTH CURRENT VELOCITY** Check ONE (ONLY!) Check ONE (Or 2 & average) Check ALL that apply **Primary Contact** □ POOL WIDTH > RIFFLE WIDTH [2] 🗋 > 1m [6] TORRENTIAL [-1] SLOW [1] Secondary Contact POOL WIDTH = RIFFLE WIDTH [1] 🗍 0.7-<1m [4] U VERY FAST [1] INTERSTITIAL [-1] (circle one and comment on bac 0.4-<0.7m [2] □ POOL WIDTH > RIFFLE WIDTH (0) FAST [1] INTERMITTENT [-2] 0.2-<0.4m [1] MODERATE [1] DEDDIES [1] Pool / **[** < 0.2m [0] Current Indicate for reach - pools and riffles. Maximum Comments 12 Lacks defined pool-riffle regime Indicate for functional riffles; Best areas must be large enough to support a population NO RIFFLE [metric=0] of riffle-obligate species: Check ONE (Or 2 & average). **RIFFLE DEPTH RUN DEPTH** RIFFLE / RUN SUBSTRATE RIFFLE / RUN EMBEDDEDNESS BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobble, Boulder) [2] **NONE** [2] BEST AREAS 5-10cm [1] MAXIMUM < 50cm [1] MOD. STABLE (e.g., Large Gravel) [1] LOW [1] BEST AREAS < 5cm Riffle . UNSTABLE (e.g., Fine Gravel, Sand) [0] MODERATE [0] [metric=0] 0 Comments 61 GRADIENT E VERY LOW - LOW [24]) ft/mi) %POOL %GLIDE Gradient DRAINAGE AREA MODERATE [6-10] Maximum %RUN: 100 %RIFFLE HIGH - VERY HIGH [10-6] (0.4755 mi²) 10 EPA 4520

24

QHEI Score:

AJ SAMPLED REACH	Comment RE: Reach consistency/ I	Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.	d, Other/ Sampling observations, Concerns, A	cess directions, etc.
METHOD STAGE				
	Stream S1560 is 0.9 miles up an ur	Stream S1560 is 0.9 miles up an unnamed tributary to Marsh Run that enters Marsh Run at Rivermile 3.44	Rivermile 3.44.	Measurements in feet.
0.5 Km 0.2 Km 0.15 Km 0.15 Km 0.12 Km 0.15 Km	BJ AESTHETICS NUISANCE AL GAE NVASIVE MACROPHYTES EXCESS TURBIDITY EXCESS TURBIDITY	DJ MAINTENANCE Circle some & COMMENT PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD	ENT EJ ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL	
121 0 2 20 cm/ CTB 0 meters 0 SECCHI DEPTH0 CANOPY 1st cm cm		SFRAT / SNAU / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS	ENERGY INDUSTION-SEDIMENT LOGGING / IRRIGATION / SOURFACE BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON MAASU JO / THE F / JO TABI	x bankfull width 6.9 bankfull X depth 17 W/D ratio 4.2 bankfull max depth 1
S5%-OPEN 2nd 1000 55%-05N 2nd 000 30%-55% 2nd 000 10%-55% CJ CS 10%-55% CJ CS 10%-55% CJ CS		MOVING-DEULOAD-STABLE RANOURED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	floodprone x ² width entrench: ratio Legacy Tree:
Stream Drawing:				

Channel depth 22 Channel width ?? bankful width 6 bankful depth 6

of bank deph-re Top J

OhisEPA Primary Headwater Habitat Evaluation Form

ITE NAME/LOCATION Unnamed Tributary to Marsh	HHEI Score (sum of metrics 1, 2, 3) :	
	RIVER BASIN Mohican DRAINAGE AREA (m²)	.48
ENGTH OF STREAM REACH (ft) 397 LAT. 40.901	00 LONG82.70970 RIVER CODE RIVER MILE	
ATE 10/23/09 SCORER A.G. COMM		
	Field Evaluation Manual for Ohio's PHWH Streams" for Instr	uctions
MODIFICATIONS:		VENI
. SUBSTRATE (Estimate percent of every type of subs	strate present. Check ONLY two predominant substrate TYPE boxes	
(Max of 32). Add total number of significant substrate type	pes found (Max of 8). Final metric score is sum of boxes A & B.	HH Met
TYPE PERCENT BLDR SLABS [16 pts] 0%	PERCENT Image: Silt [3 pt]	Poi
BOULDER (>256 mm) [16 pts]	LEAF PACK/WOODY DEBRIS [3 pts]	Crahad
BEDROCK [16 pt]	FINE DETRITUS [3 pts]	Subst Max •
COBBLE (65-256 mm) [12 pts] 0%	CLAY or HARDPAN [0 pt] 0%	
GRAVEL (2-64 mm) [9 pts] 0% SAND (<2 mm) [6 pts] 0%	MUCK [0 pts] 20% ARTIFICIAL [3 pts] 0%	8
Total of Percentages of Bldr Slabs, Bouider, Cobble, Bedrock	But strate Percentage (B)	A+
CORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:	: 6 TOTAL NUMBER OF SUBSTRATE TYPES: 2	
Maximum Pool Depth (Measure the maximum pool d	lepth within the 61 meter (200 ft) evaluation reach at the time of	Pool (
evaluation. Avoid plunge pools from road culverts or sto	rm water pipes) (Check ONLY one box):	Max
> 30 centimeters [20 pts] > 22.5 - 30 cm [30 pts]	> 5 cm - 10 cm [15 pts] < 5 cm [5 pts]	
> 10 - 22.5 cm [25 pts]	NO WATER OR MOIST CHANNEL [0 pts]	0
	MAXIMUM POOL DEPTH (centimeters):	
DANK CITLE MIDTH Measured on the surgery of 2.4		
BANK FULL WIDTH (Measured as the average of 3-4 > 4.0 meters (> 13') [30 pts]	measurements) (Check ONLY one box): > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]	
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]		Bani Wid Max®
> 4.0 meters (> 13') [30 pts]	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts]	Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	■ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]	Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] COMMENTS	 > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 	Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] COMMENTS	 > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 average bankfull width (meters): 2.10 	Wid
 > 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH 	 > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 average bankfull width (meters): 2.10 	Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY <u>RIPARIAN WIDTH</u> <u>L R</u> (Per Bank) <u>L R</u> (M	 > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 average bankfull width (meters): 2.10 average bankfull width (meters): 1.0 average bankfull width (meters): 1.0 average bankfull width (meters): 1.0 	Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH L R (Per Bank) Wide >10m Moderate 5-10m	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts]	Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This is COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAI L R (Per Bank) L R (Mage > 10m) Moderate 5-10m Im Im Field Field	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 Information must also be completed ★NOTE: River Left (L) and Right (R) as looking downstream ★ IN QUALITY Nost Predominant per Bank) ature Forest, Wetland mature Forest, Wetland Imature Forest, Shrub or Old eld Open Pasture Row Ct	Wid Max 20
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This in RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH RIPARIAN WIDTH FLOODPLAIN QUALITY RIPARIAN WIDTH L R (Per Bank) L Wide >10m Im Moderate 5-10m Im Narrow <5m	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts]	
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This in RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH RIPARIAN WIDTH FLOODPLAIN QUALITY RIPARIAN WIDTH L R (Per Bank) L Wide >10m Im Moderate 5-10m Im Narrow <5m	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 Information must also be completed ★NOTE: River Left (L) and Right (R) as looking downstream ★ IN QUALITY Nost Predominant per Bank) ature Forest, Wetland mature Forest, Wetland Imature Forest, Shrub or Old eld Open Pasture Row Ct	Wid Max 20
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This in RiPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH L R (Per Bank) L R (M Wide >10m Mathematical Mathmatematical Mathematical Mathmatical Mathemat	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts]	Wid Max 20
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This is COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN Quality L R (M Wide >10m L R Matrix Moderate 5-10m Im Im Narrow <5m	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts]	op Wid Max 20
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This is COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN L R (Per Bank) L R (Mage 200) Moderate 5-10m Im Matrix Field Narrow <5m	 > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 average BankkFULL WIDTH (meters): 2.10 by average BankkFULL WIDTH (meters): 2.10 average BankkFULL WIDTH (meters): 2.10 by average BankKFULL WIDTH (meters): 2.1	op Wid Max 20
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This is COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN Quality L R (Per Bank) L R Wide >10m Material Moderate 5-10m Im Narrow <5m	 > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 AVERAGE BANKFULL WIDTH (meters): 2.10 anformation must also be completed ☆ NOTE: River Left (L) and Right (R) as looking downstream ☆ IN QUALITY Autres Forest, Wetland Conservation Tillage Urban or Industrial Open Pasture, Row Created And Construction Average Pasture Moist Channel, isolated pools, no flow (Intermittention) 	op Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This is COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN Quality L R (Per Bank) L R (M Wide >10m Im Material Moderate 5-10m Im Field Narrow <5m	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 Information must also be completed INOTE: River Left (L) and Right (R) as looking downstream A IN QUALITY Nost Predominant per Bank) ature Forest, Wetland Interference forest, Shrub or Old Imature Forest, Shrub or Old Imature Forest, Shrub or Old Imature Forest, New Field Imature Pasture Imatu	op Wid
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This is COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN Quality L R (M Wide >10m L R M Moderate 5-10m Im M Narrow <5m	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 Information must also be completed ★ NOTE: River Left (L) and Right (R) as looking downstream ★ IN QUALITY Iost Predominant per Bank) ature Forest, Wetland Imature Forest, Shrub or Old Imature Forest, Shrub or Old Imature Forest, Shrub or Old Imature Forest, New Field Open Pasture, Row Created Average Mining or Construction K ONLY one box): Moist Channel, isolated pools, no flow (Intermittent Dry channel, no water (Ephemeral)	wid Max 20
> 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] This is COMMENTS This is RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN Quality L R (Per Bank) L R (M Wide >10m Im Material Moderate 5-10m Im Field Narrow <5m	> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts] AVERAGE BANKFULL WIDTH (meters): 2.10 Information must also be completed ★ NOTE: River Left (L) and Right (R) as looking downstream ★ IN QUALITY Iost Predominant per Bank) ature Forest, Wetland Imature Forest, Shrub or Old Urban or Industrial Open Pasture, Row Created Seidential, Park, New Field Moist Channel, isolated pools, no flow (Intermittent Dry channel, no water (Ephemeral) of channel) (Check ONLY one box): 2.0 3.0	op Wid

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):
QHEI PERFORMED? - Yes No QHEI Score 24.0 (If Yes, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)
WWH Name: Distance from Evaluated Stream
CWH Name: Distance from Evaluated Stream
EWH Name: Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name: Shelby NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Richland Township / City: Plymouth & Sharon
MISCELLANEOUS
Base Flow Conditions? (Y/N): N Date of last precipitation: 10/23/09 Quantity: 0.42
Photograph Information: Photos P916 & P917 both North on 10/22/09
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:
Additional comments/description of pollution impacts:
-
BIOTIC EVALUATION
Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site
ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) Voucher? (Y/N) N Voucher? (Y/N) N Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology:
DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):
Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location
FLOW -> Channel depth - 20" Channel width - 6.93'
bankland width - 6.93'
partited deptin 20.
bankful width- 6.75 bankful depth- 20" Top of bank deph-~6'

.

PHWH Form Page - 2



QHEI Score: 28

Stream & Location: <u>St</u>	562, Marsh Run	RM:	<u>3.8</u> Date: <u>1</u> 0/ <u>2</u> 3/ 09
A. Gardner, R. Noyes		& Affiliation: Ecology and Enviro	
River Code:	STORET #: Lat./ Long.	<u>40.9153</u> /82.	. <u>7152</u> Office verified location
1] SUBSTRATE Check (estimat BEST TYPES BLDR /SLABS [10] BDULDER [9] COBBLE [8] GRAVEL [7] BEDROCK [5] NUMBER OF BEST TY Comments 2] INSTREAM COVER quality; 3-Highest quality in diameter log that is stable, to	DNLY Two substrate TYPE BOXES; e % or note every type present DOL RIFFLE OTHER TYPES POOL RIFFLE Image: Im	Check ONE (Or 2 & ORIGIN MESTONE [1] LS [1] ETLANDS [0] NDSTONE [0] P/RAP [0] CUSTURINE [0] ALE [-1] PAL FINES [-2] or if more common of margin o small amounts of highest sep or fast water, large fined, functional pools.	Average) QUALITY HEAVY [-2] MODERATE [-1] FREE [1] FREE [1] MODERATE [-1] MODERATE [-1] MODERATE [-1] MODERATE [-1] MONE [1] Aximum 20 A
0 UNDERCUT BANKS 1 OVERHANGING VEC 1 SHALLOWS (IN SLO 0 ROOTMATS [1] Comments	SETATION [1] ROOTWADS [1] AQUAT	VS, BACKWATERS [1] IC MACROPHYTES [1] DR WOODY DEBRIS [1]	MODERATE 25-75% [7] SPARSE 5-<25% [3] NEARLY ABSENT <5% [1] Cover Maximum 20
SINUOSITY DEVE HIGH [4] EX MODERATE [3] GC LOW [2] FA	CELLENT [7] NONE [6] DOD [5] RECOVERED [4] IR [3] RECOVERING [3] DOR [1] RECENT OR NO RECOVERY [1]	TABILITY HIGH [3] MODERATE [2] LOW [1]	Channel 6 Meximum 20
4] BANK EROSION A: River right looking downstream EROSION [] I NONE / LITTLE [3] [] MODERATE [2]	ND RIPARIAN ZONE Check ONE in each category for	LAIN QUALITY [3] [] FIELD [2] [] [] [] RK, NEW FIELD [1] [] [] RE [1] Indicat	CONSERVATION TILLAGE [1] URBAN OR INDUSTRIAL [0] MINING / CONSTRUCTION [0] e predominant land use(s) Dom riparian. Riparlan
Mowed arass strip ~25' on b	oth sides		Maximum 10
5] <i>POOL / GLIDE ANL</i> MAXIMUM DEPTH Check ONE (<i>ONLY</i> !) □ > 1m [6] □ 0.7-<1m [4]	PRIFFLE / RUN QUALITY CHANNEL WIDTH CURREN Check ONE (Or 2 & average) Check AI POOL WIDTH > RIFFLE WIDTH [2] TORRENTIAL [-1] POOL WIDTH = RIFFLE WIDTH [1] VERY FAST [1] POOL WIDTH > RIFFLE WIDTH [0] FAST [1] POOL WIDTH > RIFFLE WIDTH [0] MODERATE [1]	INTERSTITIAL [-1]	Recreation Potential Primary Contact Secondary Contact (chrole one and comment on back) (chrole one and comment on back)
	RUN DEPTH RIFFLE / RUN SUBST	RATE RIFFLE / RU ulder) [2] Gravel) [1] vel, Sand) [0]	N EMBEDDEDNESS NEMBEDDEDNESS IONE [2] OW [1] NODERATE [0] Run Maximum 8
6] GRADIENT (DRAINAGE AREA (7.926	ft/mi) ■ VERY LOW - LOW [24] %PC □ MODERATE [6-10] mi ²) □ HIGH - VERY HIGH [10-6] %RU		

06/16/06

FI MEASUREMENTS 0.69 entrench, ratio 0.19 20.4 1.9 10.8 Measurements in feet bankfull max. depth floodprone x² width bankfull X dept Comment RE: Reach consistency/ Is reach typical of steam?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc. Z bankfull w W/D ratio max. depth Legacy Tree: X depth Xwidth HARDENED / URBAN / DIRT&GRIME LOGGING / IRRIGATION / COOLING FALSE BANK / MANURE / LAGOON **BMPs-CONSTRUCTION-SEDIMENT** VATURAL / WETLAND / STAGNANT WWTP / CSO / NPDES / INDUSTRY ATMOSPHERE / DATA PAUCITY ACID / MINE / QUARRY / FLOW **BANK / EROSION / SURFACE** WASH H20 / TILE / H20 TABLE PARK / GOLF / LAWN / HOME CONTAMINATED / LANDFILL E] ISSUES Circle some & COMMENT FLOOD CONTROL / DRAINAGE PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA MODIFIED / DIPPED OUT / NA AOVING-BEDLOAD-STABLE YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED IMPOUNDED / DESICCATED **RELOCATED / CUTOFFS** D] MAINTENANCE **ARMOURED / SLUMPS** LEVEED / ONE SIDED **ISLANDS / SCOURED** INVASIVE MACROPHYTES **BIAESTHETICS** EXCESS TURBIDITY SLUDGE DEPOSITS POOL: 0>100f20>3ft AREA DEPTH NUISANCE ODOR DISCOLORATION TRASH / LITTER EOAM / SCUM **OIL SHEEN CJ RECREATION** Ê 1st --sample pass-- 2nd Ê 1st -sample pass- 2nd CLARITY STAGE □ 20~40 cm Stream Drawing. AJ SAMPLED REACH □ 40-70 cm Check ALL that apply □ < 20 cm đ > 85%- OPEN <10%-CLOSED CANOPY DISTANCE 55%-<85% 30%-<55% 10%-<30% 0.15 Km 0.12 Km METHOD 0.5 Km OTHER L LINE OTHER 0.2 Km WADE meters D BOAT 115 m

depth - 6.691 = (0.21m) Width 20.4 dupth - 1. 20" CHONNEL WICHA - G. CONA -Top of Bank-10 bankar Chanky base flow benetical. V JUGO

ChicEPA

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

19

06/16/06

Stream & Location: S500, Unnamed tributary to Honey Creek RM: 0.3 Date: 0 9/ 2 2/ 09 J. Zoladz & J.T. Lavne Scorers Full Name & Affiliation: Ecology & Environment Office verified location Lat./Long.: 40.9206/82.7598 River Code: STORET #: 1] SUBSTRATE Check ONLY Two substrate TYPE BOXES: Check ONE (Or 2 & average) estimate % or note every type present OTHER TYPES POOL RIFFLE BEST TYPES ORIGIN QUALITY POOL RIFFLE LIMESTONE [1] BLDR /SLABS [10] HARDPAN [4] HEAVY [-2] BOULDER [9] MODERATE [-1] DETRITUS [3] Substrate SILT WETLANDS [0] _____ MUCK [2] INORMAL [0] FREE [1] 100 HARDPAN [0] GRAVEL [7] 🔽 🔚 SILT [2] 2 MODERAL DI MODERAL SANDSTONE [0] SAND [6] ARTIFICIAL [0] (Score natural substrates; ignore RIP/RAP [0] BEDROCK [5] MODERATE [-1] Maximum NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources) LACUSTURINE [0] 20 SHALE [-1] 3 or less [0] Comments COAL FINES [-2] Silt/clay bottom. No gravel 2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest AMOUNT Check ONE (Or 2 & average) quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. EXTENSIVE >75% [11] Ω UNDERCUT BANKS [1] _ POOLS > 70cm [2] ____ OXBOWS, BACKWATERS [1] 0 MODERATE 25-75% [7] **OVERHANGING VEGETATION [1]** 0 ROOTWADS [1] 0 **AQUATIC MACROPHYTES [1]** SPARSE 5-<25% [3] SHALLOWS (IN SLOW WATER) [1] T NEARLY ABSENT <5% [1] 0 0 BOULDERS [1] 0 LOGS OR WOODY DEBRIS [1] 0 ROOTMATS [1] Сочег Comments Maximum 20 Only some small Salix brush. Other vegetation is all herbaceous. 3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) **CHANNELIZATION** SINUOSITY DEVELOPMENT STABILITY 🗋 HIGH [4] EXCELLENT [7] **NONE [6]** 🔲 HIGH [3] MODERATE [3] MODERATE [2] GOOD [5] RECOVERED [4] RECOVERING [3] LOW [2] **FAIR [3]** 🔲 LOW [1] Channe **NONE** [1] **POOR** [1] RECENT OR NO RECOVERY [1] act è. Maximum 6 Comments Only small curves within incised channel, typical deepened and straightened channel 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average) River right looking downstream FLOOD PLAIN QUALITY **RIPARIAN WIDTH** L RIPARIAN WI EROSION NONE / LITTLE [3] I MODERATE 10-50m [3] URBAN OR INDUSTRIAL IOI SHRUB OR OLD FIELD [2] 🖸 🔳 MODERATE [2] CONSTRUCTION [0] □ □ NARROW 5-10m [2] HEAVY / SEVERE [1] I WERY NARROW < 5m [1] FENCED PASTURE [1] Indicate predominant land use(s) past 100m riparian. Riparian OPEN PASTURE, ROWCROP [0] Riparian 3 Comments Maximum 10 Only a few willows within banks. Almost no riparian zone. 5) POOL / GLIDE AND RIFFLE / RUN QUALITY **Recreation Potential** MAXIMUM DEPTH **CHANNEL WIDTH CURRENT VELOCITY** Check ONE (ONLY!) Check ONE (Or 2 & average) Primary Contact Check ALL that apply 2 > 1m [6] □ POOL WIDTH > RIFFLE WIDTH [2] TORRENTIAL [-1] SLOW [1] Secondary Contact POOL WIDTH = RIFFLE WIDTH [1] 0.7-<1m [4] VERY FAST [1] INTERSTITIAL [-1] (circle one and some ment on DeCk) G FAST [1] INTERMITTENT [-2] 0.4-<0.7m [2] □ POOL WIDTH > RIFFLE WIDTH IOT 0.2-<0.4m [1] MODERATE [1] DEDDIES [1] Pool. 🔳 < 0.2m [0] Indicate for reach - pools and riffles. Current 0 Maximum Comments 12 Intermitent stream. All glide < 20 cm. Indicate for functional riffles: Best areas must be large enough to support a population NO RIFFLE [metric=0] of riffle-obligate species: Check ONE (Or 2 & average). RIFFLE DEPTH **RUN DEPTH** RIFFLE / RUN SUBSTRATE RIFFLE / RUN EMBEDDEDNESS BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobble, Boulder) [2] **NONE [2]** BEST AREAS 5-10cm [1] MAXIMUM < 50cm [1] MOD, STABLE (e.g., Large Gravel) [1] LOW [1] Riffie . BEST AREAS < 5cm UNSTABLE (e.g., Fine Gravel, Sand) [0] **MODERATE** [0] [metric=0] 0 Comments No water present. Low slope, appears as all glide 61 GRADIENT ft/mi) VERY LOW - LOW [2(4) %POOL %GLIDE: 100 Gradien **DRAINAGE AREA** MODERATE [6-10] Maximum %RUN: %RIFFLE (0.2744 ml²) HIGH - VERY HIGH [10-6] 10

ية <u>ال</u> الأ	Small seasoned tributary to Honey Creek. On the north side of the road additional tile		Stream begins at rt so where overland now or Ag news and a broad swale are curverted under ure road, and roadside ditches add to the volume of water and a defined bed and bank are present.	ure road.
	Stream S500 is 0.3 miles up an secondary		unnamed tributary to Honey Creek that enters the primary unnamed tributary to Honey Creek at Rivermile 2.4, which in turn	t Rivermile 2.4, which in turn
	enters Honey Creek at Rivermile 41.75.	11.75.		Measurements in feet.
0.5 Km 0.2 Km 0.15 Km 0.15 Km 0.15 Km 0.15 Km 1.10 0.12 Km 1.10 0.12 Km 1.10 0.12 Km 1.10 0.12 Km 1.20-400 cm 0.12 Km 1.00 0.12 Km 0.12 Km 0.10 CTB 0.10 CTB 0.00 0.00 0.12 Km 0.00 CTB 0.00 0	BJAESTHETICS BJAESTHETICS NUISANCE ALGAE NUISANCE ALGAE INVASINE MACROPHYTES EXCESS TURBIDITY EXCESS TURBIDITY EXCENSE DISCOLORATION EXCENSE OL SHEEN I TRASH / LITTER OL SHEEN I TRASH / LITTER I TRASH / LITTER I TRASH / LITTER I SLUDGE DEPOSITS I CSOS/SSOS/OUTFALLS ATTON AREA DEFTH POOL: []>100f2 []>3ft	D) MAINTENANCE Circle some & COMMENT PUBLIC / PRIVATE (BOTH) NA ACTIVE / HISTORIQ (BOTH) NA ACTIVE / HISTORIQ (BOTH) NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE RELOCATED / SLUMPS ROUNDED / DESICCATED IMPOUNDED / DESICCATED FLOOD CONTROL (DRAINAGE	OMMENT EJ ISSUES WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ 0 (TILE)H ₂ 0 TABLE ACID / MINE / <u>OUARRY</u> / FLOW NATURALQWET LAND STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	FJ MEASUREMENTS X width 0.51 X depth 0.09 T banktull width 10.3 Danktull max.depth 12 MID ratio 8.8 Danktull max.depth 12 Icoodprone x² width 0.23 entrench. ratio 0.23 Legacy Tree: 0.23
Stream Drawing:				
•		1' Ag (cor)		
*	and the here			
	45 (con) 54	Contraction the	Book, nowed swale	
•		pro 2 8 ty	le de la contraction de la con	r fright of the second
			A	A' Indavis)
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ChieEPA Primary Headwater Habitat Evaluation Form

ChieEPA Primary Headwater Ha	bitat Evaluation Form	32
	HHEI Score (sum of metrics 1, 2, 3) :	
SITE NAME/LOCATION Unnamed tributary to Honey Creek		
	SIN Sandusky DRAINAGE AREA (mi²)	L
and a second a secon	IG82.75980 RIVER CODE RIVER MILE	0.3
DATE 09/22/09 SCORER J.Z. & J.T.L. COMMENTS		
NOTE: Complete All Items On This Form - Refer to "Field Eva	luation Manual for Ohio's PHWH Streams" for Ins	tructions
STREAM CHANNEL INONE / NATURAL CHANNEL R MODIFICATIONS:	ECOVERED 📝 RECOVERING: 🔲 RECENT OR NO RE	COVERY
1. SUBSTRATE (Estimate percent of every type of substrate pres (Max of 32). Add total number of significant substrate types found		HHE
TYPE PERCENT TYPE	PERCENT	Metric Points
BULDER (>256 mm) [16 pts] 0%	SILT [3 pt]	FUILS
BEDROCK [16 pt]	FINE DETRITUS [3 pts]	Substrate Max = 40
COBBLE (65-256 mm) [12 pts]	CLAY or HARDPAN [0 pt] 0%	
GRAVEL (2-64 mm) [9 pts]	MUCK [0 pts]	7
	Structure Percentage	L BREAK
Bidr Slabs, Boulder, Cobble, Bedrock		A+B
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:	TOTAL NUMBER OF SUBSTRATE TYPES: 1	
2. Maximum Pool Depth (Measure the maximum pool depth with evaluation. Avoid plunge pools from road culverts or storm water p		Pool Depth Max = 30
> 30 centimeters [20 pts]	> 5 cm - 10 cm [15 pts]	max - Ju
> 22.5 - 30 cm [30 pts] > 10 - 22.5 cm [25 pts]	< 5 cm [5 pts] NO WATER OR MOIST CHANNEL [0 pts]	0
al a service of the second		
3. BANK FULL WIDTH (Measured as the average of 3-4 measured as	ments) (Check ONLY one box): > 1.0 m - 1.5 m (> 3:3" - 4' 8") [15 pts]	Bankfull Width
> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	≤ 1.0 m (<=3' 3") [5 pts]	Max=30
> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]		
	AVERAGE BANKFULL WIDTH (meters): 3.14	25
This information	n must also be completed	and the second s
RIPARIAN ZONE AND FLOODPLAIN QUALITY	DTE: River Left (L) and Right (R) as looking downstream 🕸	
RIPARIAN WIDTH FLOODPLAIN QUALIT L R (Per Bank) L R (Most Predo	<u>FY</u> minant per Bank) <u>L R</u>	
Wide >10m Mature Fore:	st, Wetland Conservation Tillage	
Moderate 5-10m	orest, Shrub or Old Urban or Industrial	
Narrow <5m Residential,	Park, New Field Open Pasture, Row 0	Crop
None Fenced Past	ture Mining or Construction	n
FLOW REGIME (At Time of Evaluation) (Check ONLY or Stream Flowing	ae box): Moist Channel, isolated pools, no flow (Intermitted)	
Subsurface flow with isolated pools (Interstitial)	Dry channel, no water (Ephemeral)	
COMMENTS		<u> </u>
SINUOSITY (Number of bends per 61 m (200 ft) of channe None 1.0	al) (Check ONLY one box):	
0.5	2.5	
STREAM GRADIENT ESTIMATE		
Flat (0.5 ft/100 t) Flat to Moderate Moderate (2 ft/100 ft)	Moderate to Severe Severe (10	ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):
QHEI PERFORMED? - Yes No QHEI Score 17.0 (If Yes, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)
WWH Name: Distance from Evaluated Stream
CWH Name: Distance from Evaluated Stream
EWH Name: Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name: New Washington NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Crawford Township / City: Auburn
MISCELLANEOUS
Base Flow Conditions? (Y/N): Y Date of last precipitation: 09/21/09 Quantity: 0.08
Photograph Information: Photo number P1009 west, looking at stream channel, taken October 22, 2009 •
Elevated Turbidity? (Y/N): N Canopy (% open): 100%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:
Additional comments/description of pollution impacts:
Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology:
DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):
Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location
All KH98 X. 1
FLOW
YET I'M



0

0

0

Stream & Location: 5501, Unnamed tributary to Honey Creek

Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

OHEI Score:

RM:

0.5 Date: 0 9/ 2 2/ 09

22

Scorers Full Name & Affiliation: Ecology & Environment J. Zoladz, J. Layne Office verified location Lat./Long.: 40.9133 /82.7504 River Code: STORET #: INAD 83 1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; Check ONE (Or 2 & average) estimate % or note every type present OTHER TYPES POOL RIFFLE BEST TYPES ORIGIN QUALITY POOL RIFFLE LIMESTONE [1] HEAVY [-2] BLDR /SLABS [10] HARDPAN [4] MODERATE [-1] TILLS [1] Substrate BOULDER [9] DETRITUS [3] SILT WETLANDS [0] INORMAL [0] **MUCK** [2] GRAVEL [7] 🗋 📄 SILT [2] 50 HARDPAN [0] □ FREE (1) 7 50 MODERAL [0] EXTENSIVE [-2] SANDSTONE [0] **SAND** [6] ARTIFICIAL [0]

 Image: BedRock [5]
 (Score natural substrates; ignore Image: Best Types: Image: Be MODERATE [-1] Maximum 20 SHALE [-1] 3 or less [0] Comments COAL FINES [-2] Small intermittent stream (UNT to Honey Creek) with some gravel over silt/clay bottom. 2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal AMOUNT quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. Check ONE (Or 2 & average) EXTENSIVE >75% [11] 0 POOLS > 70cm [2] _ 0____ OXBOWS, BACKWATERS [1] UNDERCUT BANKS [1] MODERATE 25-75% [7] **OVERHANGING VEGETATION [1]** 0 0 Ξ SPARSE 5-<25% [3] **ROOTWADS** [1] AQUATIC MACROPHYTES [1] SHALLOWS (IN SLOW WATER) [1] BOULDERS [1] LOGS OR WOODY DEBRIS [1] NEARLY ABSENT <5% [1]</p> 0 **n** 0 ROOTMATS [1] Cover Comments Maximum 20 Only overhanging vegetation is herbatious. No other cover. 3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) SINUOSITY DEVELOPMENT **CHANNELIZATION** STABILITY NONE (61 MODERATE [3] GOOD [5] RECOVERED [4] MODERATE [2] 🖬 LOW [2] **FAIR [3] _**`` **RECOVERING** [3] LOW [1] Channei POOR [1] RECENT OR NO RECOVERY [1] Maximum Comments 20 Typical straightened and deepened channel. Two small pools present some sinuosity within ditch. 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average) River right looking downstream FLOOD PLAIN QUALITY **RIPARIAN WIDTH** EROSION 🗋 🗋 WIDE > 50m [4]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or industrial [0]

 Image: Shrub or old field [2]
 Image: Shrub or old field [2]

 Image: Shrub or old field or old field [2]
 Image: Shrub or old field [2]

 Image: Shrub or old field [2]

 Image: Shrub or old field or old **MODERATE 10-50m [3]** 🗹 🔳 MODERATE [2] □ □ NARROW 5-10m [2] HEAVY / SEVERE [1] 🛛 🖬 VERY NARROW < 5m [1] 🗆 🖬 FENCED PASTURE [1] Indicate predominant land use(s) OPEN PASTURE, ROWCROP [0] past 100m riparian. Riparian Comments Maximum 10 Some scour, some trees on either bank 5) POOL / GLIDE AND RIFFLE / RUN QUALITY **Recreation Potential** MAXIMUM DEPTH **CURRENT VELOCITY CHANNEL WIDTH** Check ONE (ONLY!) Check ONE (Or 2 & average) Check ALL that apply Primary Contact 🗌 > 1m [6] POOL WIDTH > RIFFLE WIDTH [2] TORRENTIAL [-1] SLOW [1] Secondary Contact 🗌 0.7-<1m [4] POOL WIDTH = RIFFLE WIDTH [1] VERY FAST [1] INTERSTITIAL [-1] (circle one and comment on Dack) 🗌 0.4-<0.7m [2] POOL WIDTH > RIFFLE WIDTH [0] FAST [1] INTERMITTENT [-2] 🔳 0.2-<0.4m [1] MODERATE [1] EDDIES [1] Pool / Current □ < 0.2m [0] Indicate for reach - pools and riffles. 0 Maximum Comments 12 Only small pools with water. Intermittent stream. Indicate for functional riffles; Best areas must be large enough to support a population NO RIFFLE [metric=0] of riffle-obligate species: Check ONE (Or 2 & average). RIFFLE DEPTH RUN DEPTH RIFFLE / RUN SUBSTRATE RIFFLE / RUN EMBEDDEDNESS BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobble, Boulder) [2] **NONE** [2] MAXIMUM < 50cm [1] MOD. STABLE (e.g., Large Gravel) [1] BEST AREAS 5-10cm [1] LOW [1] BEST AREAS < 5cm Riffle . UNSTABLE (e.g., Fine Gravel, Sand) [0] MODERATE [0] [metric=0] Run 0 Comments Verv low gradient 8 6] GRADIENT E VERY LOW - LOW [2(4]) ft/mi) %POOL %GLIDE: 70 30 Gradient **DRAINAGE AREA** MODERATE [6-10] Δ Maximum %RUN: %RIFFLE: HIGH - VERY HIGH [10-6]

mi²)

ter. Some evidence	at Rivermile 3.2, which in turn Measurements in feet.	FJ MEASUREMENTS X width 7.3 X depth 7.3 X depth 0.55 max. depth 9.1 Dankfull width 9.1 Dankfull width 1.2 WD ratio 8.8 Dankfull max. depth 1.2 Dankfull max. depth 1.2 Denkfull max. depth 2.3 Itoodprona x2 width 0.23 entrench. ratio 0.23 Legacy Tree: 0.23	× 45
Small, seasoned UNT to Honey Creek. No recreation potential. Some trees on either bank. Typical deepened and straightened headwater. Some evidence of recovery with trees and shrubs.	Stream S501 is 0.5 miles up an secondary unnamed tributary to Honey Creek that enters the primary unnamed tributary to Honey Creek at Rivermile 3.2, which in turn enters Honey Creek at Rivermile 41.75.	Circle some & COMMENT WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ O (TILE)H ₂ O TABLE ACID / MINE / QUARRY / FLOW NATURAL (WETLAND) STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	0 (2 4 5 6 7 1 1 6 7 1 1 6 7 1 6 7 1 1 6 7 1 1 6 7 1 1 6 7 1 1 6 7 1 1 1 1
reek. No recreation potential. Some trees on ei	econdary unnamed tributary to Honey Creek that 41.75.	DJ MAINTENANCE DJ MAINTENANCE PUBLIC (PRIVATE) BOTH / NA ACTIVE (<u>HISTORIC</u>) BOTH / NA VOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED RELOCATED / ONE SIDED RELOCATED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMOURED / SCOURED IMPOUNDED / DESICCATED IMPOUNDED / DESICCATED FLOOD CONTROL (DRAINAGE)	49 Hold Hold Hold Hold Hold Hold Hold Hold
	NORMAL Stream S501 is 0.5 miles up an se LOW enters Honey Creek at Rivermile 4	Main Lange ARITY ARITY Commune passes Commune passes Commune passes Ab com Commune passes Com Commune passes Com Commune passes Com Com Com Com Com Com Com Com Com Com Com Com	ing:
K ALL		0.5 Km 0.2 Km 0.15 Km	Stream Drawing:

.

ChisEPA Primary Headwater Habitat Evaluation Form

HHEI Score	sum of metrics 1, 2, 3):

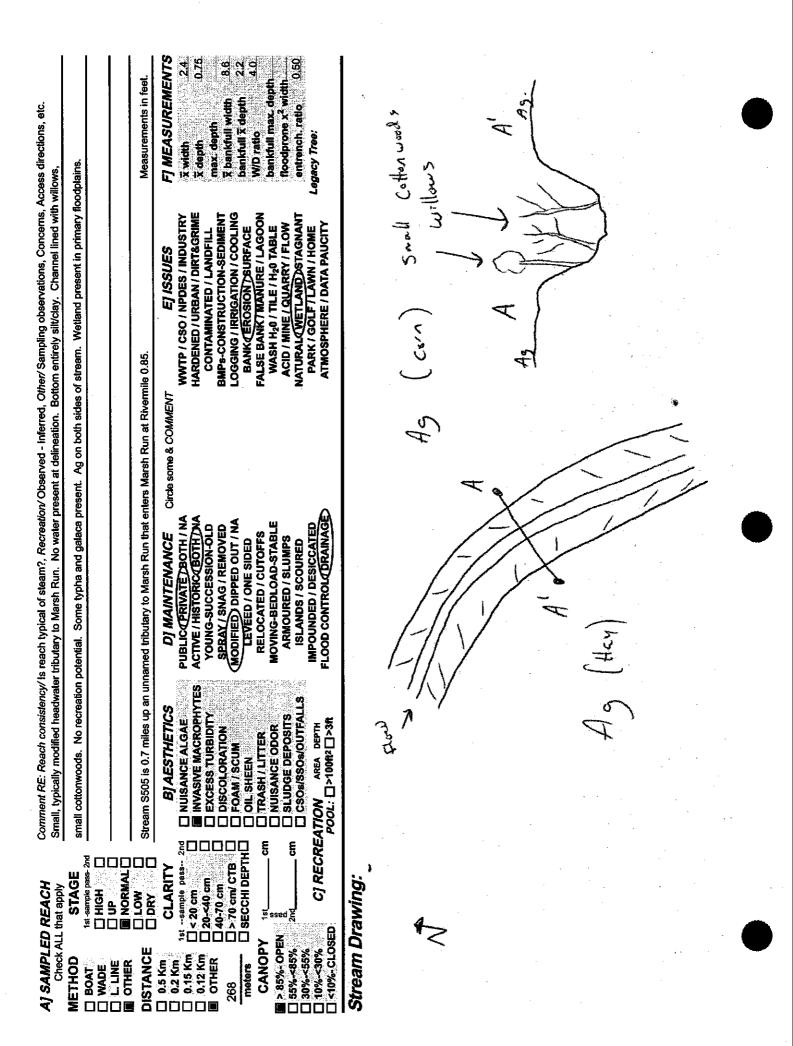
MODIFICATIONS: SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B. TYPE BLDR SLABS [16 pts] BUD SLABS [16 pts] BUD SLABS [16 pts] O% Image: BLDR SLABS [16 pts] BUD SLABS [16 pts] O% Image: BLDR SLABS [16 pts] O% Image: Comparison of the state types	SITE NAME/LOCATION	nnamed tributary	to Honey Creek	01.0 2.01 947 27 5.2 2.2 4 7 0000 0 000000000000000000000000000		
MATE 09/22/09 SOORER U.Z. & J.T.L COMMENTS NOTE: Complete All Hems On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions STREAM CHANNEL INONE / NATURAL CHANNEL RECOVERED RECOVERING HECENT OR NO RECOVERY SUBSTRATE (Estimate parcent of every type of substrate present. Check OAL Y two predominant substrate TYPE boxes (Marci 32). Add total number of significant substrate types found (Marci 43). Final metric score is sum of boxes A & B. PERCENT Type BLDR SLABS [16 pis] PERCENT PERCENT PERCENT Description 100 yrs 0 yrs 0 yrs 0 yrs Description 100 yrs 0 yrs 0 yrs 0 yrs 0 yrs Description 0 yrs 0 yrs <td></td> <td>SITE NUMBER S50</td> <td>1 RIVER BA</td> <td>SIN Sandusky</td> <td>DRAINAGE AREA (mi²)</td> <td>0.48</td>		SITE NUMBER S50	1 RIVER BA	SIN Sandusky	DRAINAGE AREA (mi²)	0.48
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions STREAM CHANNEL NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY MODIFICATIONS: NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO RECOVERY SUBSTRATE (Estimate percent of every type of substrate present. Check OM/.Y two predominant substrate TVPE boxes (Max 03). Add total number of significant usdrate types found (Max of 8). Final metric score is sum of boxes A & 8. FINE DETRITUS (3 pts) PERCENT PERCENT PERCENT PERCENT PERCENT PERCENT PERCENT PUE BLD SLASS (16 pt) 00% 00% 00% 00% 00% BEDROOK (16 pt) 00% 00% 00% 00% 00% 00% 00% 00% 00% Nax = 4 BEDROOK (16 pt) 00% 00% 00% 00% 00% 00% 00% 00% 00% 00% Nax = 4 15 OCOBBLE (65-26 mm) (12 pts) 05% 000 (16 pts) 00% 00% 00% 00% 00% 00% 00% 00% 00% 00% 00% 00% 00% 00% <td>Constitution for all and the second second second second second</td> <td></td> <td>17%.mm</td> <td>IG82.75043 RIVER (</td> <td></td> <td>0.45</td>	Constitution for all and the second second second second second		17%.mm	IG82.75043 RIVER (0.45
STREAM CHANNEL NONE / NATURAL CHANNEL RECOVERING RECOVERING RECENT OR NO RECOVERY SUBSTRATE (Estimate percent of every type of substrate present. Check OML Y two predominant substrate 77PE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A 8. B. Image: Construction of boxes A 8. B. Image: Construction of boxes A 8. B. TYPE BLDR SLABS [16 pts] 0%	DATE 09/22/09 SC	ORER J.Z. & J.T.!		an manufation and a start of the		
MODIFICATIONS: WBSTRATE (Estimate parcent of every type of substrate present. Check ONL Y two predominent substrate 77PE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Find metric score is sum of boxes A 8. WM of 32). Add total number of significant substrate types found (Max of 8). Find metric score is sum of boxes A 8. WM of 12). BUDR SLABS (16 pts] COBEL (642:56 mm) (12 pts) Cobel pts] Total of Porcentages of Did Slabs. Boulder, Cobbe, Bedrock So centimeters (20 pts]	NOTE: Complete All Ite	ms On This Form -	Refer to "Field Eva	luation Manual for Ohio	o's PHWH Streams" for Ins	tructions
(Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & 8. Final metric score is sum of boxes A & 8. YPE BLDR SLABS [16 pts] PERCENT YPE BULLDER (-226 mm) [16 pts] 0% 10% 0% COBBLE (65-256 mm) [17 pts] 0% 0% 0% 0% COBBLE (65-266 mm) [17 pts] 0% 0% 0% 0% SAND (-22 mm) [6 pts] 0% 0% 0% 0% 0% SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 3 Maximum Pool Depth (Measure the maximum pool depth within the 6f meter (200 ft) evaluation reach at the time of evaluation reach at the time of sold evaluation reach at the time of	STREAM CHANNEL MODIFICATIONS:		RAL CHANNEL		RING 🔲 RECENT OR NO RI	COVERY
TYPE BLDR SLABS [16 pta] PERCENT TYPE Sill [3 pt] PERCENT TYPE BULDER (>256 mm) [16 pta] 0% 0% 0% 0% 0% 0% COBBLE (65-265 mm) [17 pta] 0% 0% 0% 0% 0% 0% 0% COBBLE (65-265 mm) [10 pta] 0%						
BLDR SLABS (16 pts) 0% SiLT (3 pt) 0% 100% 0% 100% 0% 15 0% 0% 15 0% 0% 15 0% 0% 0% 15 0% 0% 15 0% 0% 15 0% 0% 0% 15 0% 0% 15 0% 0% 0% 15 0% 0% 15 0% 0% 0% 15 0% 0% 15 0% 0% 0% 0% 15 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% <td></td> <td>-</td> <td></td> <td>(Max of 8). Final metric sco</td> <td></td> <td>Metri</td>		-		(Max of 8). Final metric sco		Metri
BEDROCK [16 pt] 0% </td <td>BLDR SLABS [1</td> <td>16 pts] 0</td> <td><u>%</u></td> <td></td> <td>45%</td> <td>Point</td>	BLDR SLABS [1	16 pts] 0	<u>%</u>		45%	Point
COBBLE (65-26 mm) [12 pts] 10% CLAY or HARDPAN [0 pt] 0% 0% GRAVEL (244 mm) [9 pts] 43% CLAY or HARDPAN [0 pt] 0% 0% SAND (<2 mm) [6 pts]	minimum Valuese	(minamidinali	anti-cardinal data			Substra
GRAVEL (2-64 mm) [9 pts] 45% Image: Conservation of the server set of the ser			10 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			Max = 4
Image: Sand (22 mm) [6 pts]		(AM WEIGHTS, A W	<u>%</u>		0%	15
Bidr Slabs, Boulder, Cobble, Bedrock 10,00% 100% 100% 100% SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 3 Aximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plange pools from road culverts or storm water pipes) > 5 cm 10 cm [15 pts] > 5 cm 10 cm [15 pts] > 5 cm 5 pts] 10 > 30 centimeters [20 pts] > 5 cm 10 cm [15 pts] > 5 cm 5 pts] 10 10 10 > 22.5 - 30 cm [25 pts] MAXIMUM POOL DEPTH (centimeters): 17 17 15 BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box): > 10 m (<=3'3') (5 pts]	SAND (<2 mm)	[6 pts]		ARTIFICIAL [3 pts]		
Dub sabs, Boulder, Cobie, Berleck 12 TOTAL NUMBER OF SUBSTRATE TYPES: 3 Imaximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > > 30 centimeters [20 pts] > 5 cm - 10 cm [15 pts] > > > > 20 contimeters [20 pts] > 5 cm - 10 cm [15 pts] > > > > 20 contimeters [20 pts] > 5 cm - 10 cm [15 pts] > > > > 20 contimeters [20 pts] > 5 cm - 10 cm [15 pts] > > > > > > 20 contimeters [20 pts] > 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts] 15 COMMENTS Maximum Pool bepth (Measured as the average of 3-4 measurements) (Check ONLY one box): > 15 > 4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3' 3' - 4' 5') [15 pts] > 10 m (<=3' 3') [5 pts]			00% ^(A)		(8)	A+B
Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 5 cm - 10 cm (15 pts) > 5 cm - 10 cm (15 pts) > 22.5 - 30 cm (30 pts) > 10 m - 1.5 m (> 3'' - 4' 8'') (15 pts) > 10 m - 1.5 m (> 3'' - 4' 8'') (15 pts) > 10 m - 1.5 m (> 3'' - 4' 8'') (15 pts) > 4.0 m (> 9' 7' - 13') (25 pts) > 10 m (<=3' 3') (5 pts)				TOTAL NUMBER OF	SUBSTRATE TYPES: 3	
evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONL Y one box): > 30 cantimeters [20 pts] > 5 cm - 10 cm [15 pts] > 22.5 - 30 cm [30 pts] > 5 cm - 10 cm [15 pts] > 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts] D - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts] BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONL Y one box): > 4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3' 3' - 4' 6') [15 pts] > 3.0 m - 4.0 m (> 9' 7' - 13') [25 pts] > 1.0 m (<=3' 3') [5 pts]	2 Maximum Deal De					
> 22.5 - 30 cm [30 pts] < 5 cm [5 pts] NO WATER OR MOIST CHANNEL [0 pts] 15 > 10 - 22.5 cm [25 pts] MAXIMUM POOL DEPTH (centimeters): 17 17 BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box): > 1.0 m < 1.5 m (> 3' 3' - 4' 8') [15 pts] 17 > 4.0 meters (> 13') [30 pts] > 1.0 m < 1.5 m (> 3' 3' - 4' 8') [15 pts] > 1.0 m (< 3' 3' - 4' 8') [15 pts]	evaluation. Avoid plu	unge pools from road c				Max = 3
> 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts] 15 COMMENTS MAXIMUM POOL DEPTH (centimeters): 17 BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box): >4.0 meters (> 13) [30 pts] > 4.0 meters (> 13) [30 pts] >1.0 m (> 5' 7' - 13) [25 pts] >1.0 m (<=3' 3') [5 pts]	> 30 centimeters [20	pts]				I
BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONL Y one box): Image: State of Sta					CHANNEL [0 pts]	15
BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONL Y one box): Image: State of Sta	COMMENTS		an Maran Barna Maran Anna an		DEPTH (centimeters): 17	
>4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] Width Max=34 >3.0 m - 4.0 m (> 9' 7" - 4' 8") [20 pts] > 1.0 m (<=3' 3") [5 pts]]
Image: Second state sta			erage of 3-4 measure			Width
COMMENTS AVERAGE BANKFULL WIDTH (meters): 2.77 20 This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY \$NOTE: River Left (L) and Right (R) as looking downstream \$ RIPARIAN WIDTH FLOODPLAIN QUALITY \$NOTE: River Left (L) and Right (R) as looking downstream \$ Wide >10m L R (Most Predominant per Bank) L R Wide >10m Mature Forest, Wetland Conservation Tillage Urban or Industrial Moderate 5-10m Immature Forest, Shrub or Old Urban or Industrial More Field Open Pasture, Row Crop Narrow <5m	> 3.0 m - 4.0 m (> 9'	7" - 13') [25 pts]	- · · ·	≤ 1.0 m (<=3' 3") [5 pts]		Max=30
This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY INOTE: River Left (L) and Right (R) as looking downstream in FLOODPLAIN QUALITY L R (Per Bank) L R FLOODPLAIN QUALITY Image: Residential per Bank) L R Conservation Tillage Wide >10m Image: Residential per Bank) L R Conservation Tillage Urban or Industrial Moderate 5-10m Image: Residential park, New Field Image: Residential per Bank, None Image: Residential		7 - 4 6) [20 pts]				
RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN QUALITY L R Wide >10m L Wide >10m Mature Forest, Wetland Moderate 5-10m Immature Forest, Shrub or Old Narrow <5m		autoritada 1979-1971 area departe departe no Odor 2.7 des areadore	Na na filozofi da filozofi na sina mana na mana na mana mana mana mana	AVERAGE BANK	FULL WIDTH (meters): 2.77	20
RIPARIAN ZONE AND FLOODPLAIN QUALITY RIPARIAN WIDTH FLOODPLAIN QUALITY L R Wide >10m L Wide >10m Mature Forest, Wetland Moderate 5-10m Immature Forest, Shrub or Old Narrow <5m						an san ang ang
L R (Per Bank) L R (Most Predominant per Bank) L R Conservation Tillage Wide >10m Immature Forest, Wetland Immature Forest, Shrub or Old Immature Forest, Shrub or Old Urban or Industrial Moderate 5-10m Immature Forest, Shrub or Old Immature Forest, Shrub or Old Immature Forest, Shrub or Old Urban or Industrial Moderate 5-10m Immature Forest, Shrub or Old Immature Forest, Shrub or Old Immature Forest, Shrub or Old Urban or Industrial Mone Immature Forest, New Field Immature Forest, Shrub or Old Immature Forest, Shrub or Old Open Pasture, Row Crop None Fenced Pasture Immature Forest, New Field Immature Forest, Shrub or Construction Open Pasture, Row Crop None Fenced Pasture Immature Forest, Shrub or Construction Mining or Construction COMMENTS	RIPARIAN 2	ONE AND FLOODPLA				
Wide >10m Mature Forest, Wetland Conservation Tillage Moderate 5-10m Immature Forest, Shrub or Old Urban or Industrial Narrow <5m						·
Moderate 5-10m Immature Forest, Shrub or Old Urban or Industrial Marrow <5m	Conversion Second	,	********************************		in the second seco	
Image: Narrow <5m	Moderate	∋ 5-10m		prest, Shrub or Old	Urban or Industrial	
None Fenced Pasture Mining or Construction COMMENTS FLOW REGIME (At Time of Evaluation) (Check ONLY one box): Mining or Construction Stream Flowing Mining or Construction Mining or Construction Subsurface flow with isolated pools (Interstitial) Moist Channel, isolated pools, no flow (Intermittent) COMMENTS COMMENTS		:5m	أتسبعنا أعبعها	Park New Field	Open Pasture, Row	Crop
FLOW REGIME (At Time of Evaluation) (Check ONLY one box): Stream Flowing Moist Channel, isolated pools, no flow (Intermittent) Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral) COMMENTS Image: Commentation of the second sec			لتهبيا لسنا			NA
Stream Flowing Subsurface flow with isolated pools (Interstitial) COMMENTS						1
Stream Flowing Subsurface flow with isolated pools (Interstitial) COMMENTS	FLOW REG	ME (At Time of Evalua	ation) (Check ONLY or	ie b <u>ox):</u>		
COMMENTS	Stream Flowi	ing	, ,	Moist Channel, is		ent)
					warer (Ehneuse)	1
				el) (Check ONLY one box):		
None 1.0 2.0 3.0	🖌 None		1.0	2.0	3.0	
0.5 1.5 2.5 >3	U.5		1.5	2.5	>3	
STREAM GRADIENT ESTIMATE						A/100 #1
			E		vere La Sevele (10	RUTUUTQ

ADDITIONAL STREAM INFORMATION (This information Must Also be Completed):
QHEI PERFORMED? - Ves No QHEI Score 22.0 (If Yes, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)
WWH Name: Distance from Evaluated Stream
CWH Name: Distance from Evaluated Stream EWH Name: Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name: New Washington NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Crawford Township / City: Auburn
MISCELLANEOUS
Base Flow Conditions? (Y/N): Y Date of last precipitation: 09/21/09 Quantity: 0.08
Photograph Information: Photo numbers P1026 looking east and P1027 looking west at stream channel, taken September 22, 2009
Elevated Turbidity? (Y/N): N Canopy (% open): 30%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mq/l) pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Y If not, please explain:
Additional comments/description of pollution impacts:
BIOTIC EVALUATION
Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site
ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) N Voucher? (Y/N) Salamanders Observed? (Y/N) Voucher? (Y/N) N Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This <u>must</u> be completed):
Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location
As.
N*
FLOW
Jorde the
= 1 deal Pools
Isdated Poils AS.



QHEI Score: 20

Stream & Location: S505,	Unnamed tributary to Marsh Run		RM:	0.7 Date:	<u>9/ 2 4</u> / 09
J. Zoladz & J. T. Layne	Scol	rers Full Name & Affiliation:			
River Code:	STORET #:	Lat./ Long.: 40, 936	<u>4</u> /8 <u>2</u> .	<u>6767</u>	Office verified location
1] SUBSTRATE Check ONL estimate %	YTwo substrate TYPE BOXES; or note every type present	Check C	NE (Or 2 &	average)	
				QUALI	ТҮ
BLDR /SLABS [10]	[] [] HARDPAN [4]			HEAVY [-2	
	[] [] DETRITUS [3] _ [] [] MUCK [2] _	TILLS [1]	SILT		
GRAVEL [7]		100 HARDPAN [0]		G FREE [1]	2
	🛛 🗆 ARTIFICIAL [0] _	strates: ionore CRIP/RAP [0]	SEDDEON.		
	(Score natural sub S: 4 or more [2] sludge from p	point-sources)			[0] Maximum
Comments	3 or less [0]	L_ SHALE [-1]		NONE [1]	
100% silt/clay bottom.		COAL FINES [-2]			
21 INSTREAM COVER Ind	icate presence 0 to 3: 0-Absent; 1-	Very small amounts or if more commo	n of margina	al AMOL	JNT
- qua	ality; 2-Moderate amounts, but not (of highest quality or in small amounts y large boulders in deep or fast water.	of highest	Check ONE (Or	
diameter log that is stable, well	developed rootwad in deep / fast w	ater, or deep, well-defined, functional	pools. [] EXTENSIVE ;	
0 UNDERCUT BANKS [1] 2 OVERHANGING VEGETA	POOLS > 70cm ATION [1] ROOTWADS [1	1 [2] <u>0</u> OXBOWS, BACKWATE		SPARSE 5-	
0 SHALLOWS (IN SLOW W		• A second se] NEARLY ABS	
0 ROOTMATS [1]					Cover
Comments			(٨	laximum 6
Some typha wihtin stream channel	<u>iel, willows present.</u> DGY Check ONE in each category	· (Or 2. f. augrage)			
SINUOSITY DEVELO					
				·	
LOW [2] FAIR [3 NONE [1] POOR	•	• • • • • • • • •			Channel
Comments				- A	laximum 5
	channel. Some scour in subsoil ba				
4] BANK EROSION AND River right looking downstream		in each category for EACH BANK (O		& average)	
	RIPARIAN WIDTH	FLOOD PLAIN QUALI	. T K.	CONSERVATIO	
	🔲 MODERATE 10-50m [3] 🛛 🗍	SHRUB OR OLD FIELD [2]		URBAN OR IND	
		RESIDENTIAL, PARK, NEW FIELD	55	MINING / CONS	· · · · · · ·
	■ VERY NARROW < 5m [1] □ [□ NONE [0]	FENCED PASTURE [1]		ə prədominant laı Om riparian.	nd use(s) Riparian
Comments				•	laximum 3
	Some willows and shrubs on banks				10
5] POOL / GLIDE AND RI				Recreation	Potential
MAXIMUM DEPTH Check ONE (ON/LY!)	CHANNEL WIDTH Check ONE (Or 2 & average)	CURRENT VELOCITY Check ALL that apply		Primary	· · · · · · · · · · · · · · · · · · ·
🗋 > 1m [6] 👘 🗋 P	OOL WIDTH > RIFFLE WIDTH [2]	TORRENTIAL [-1] SLOW [1]		Secondary	
	OOL WIDTH = RIFFLE WIDTH [1] OOL WIDTH > RIFFLE WIDTH [0]	U VERY FAST [1] INTERSTI		(circle one and cor	mment on back)
0.2-<0.4m [1]					Pool /
a < 0.2m [0]		Indicate for reach - pools and ri	fles.	· .	Current 0
Comments Seasonal tributary to Marsh Run					12
		be large enough to support	a popula	tion 🔳 NO B	NFFLE [metric=0]
of riffle-obligate spec RIFFLE DEPTH		NE (Or 2 & average). E / RUN SUBSTRATE RIFI	IE/RH		
BEST AREAS > 10cm [2]	MAXIMUM > 50cm [2] STABL	E (e.g., Cobble, Boulder) [2]		ONE [2]	
BEST AREAS 5-10cm [1]	MAXIMUM < 50cm [1] [] MOD. 8	STABLE (e.g., Large Gravel) [1]		OW [1]	Riffie /
BEST AREAS < 5cm [metric=0]	LJUNSTA	BLE (e.g., Fine Gravel, Sand) [0]		ODERATE [0] XTENSIVE [-1]	
Comments 100% alide. Currently dry.					Maximum 8
6] GRADIENT (ft/m	ni) VERY LOW - LOW [2]	%POOL:	%GLIDE		Gradient
DRAINAGE AREA	MODERATE [6-10]			\sim .	Gradient Maximum 4
(0.5338 mi	2) 🔲 HIGH - VERY HIGH [10-6]	%RUN: ()	%RIFFLE	<u></u> ،	10



ChieEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

	DCATION Unnamed				
		ABER S505	RIVER BASIN Mohican	DRAINAGE AREA (mi²)	0.53
2.2.14 Committee Provide Acceleration	TREAM REACH (ft)		0.93639 LONG82.67672 RIVE		0.7
DATE 09/24	V09 SCORER J.	. Z. & J.T.L. ' (COMMENTS	Xet MAX (2014) Symposium (2014) Sector (201 Sector (2014) Sector (201	an an Usan Indonesia (Mala Mala Mala Mala Mala Mala Mala Ma
NOTE: Con	nplete All Items On Ti	his Form - Refe	r to "Field Evaluation Manual for O	hio's PHWH Streams" for Ins	truction
STREAM CH MODIFICAT		NE / NATURAL C		VERING 🔲 RECENT OR NO RE	COVERY
			of substrate present. Check ONLY two prate types found (Max of 8). Final metric s		(ĤH
TYPE		PERCENT	•••	PERCENT	Met
	LDR SLABS [16 pts] OULDER (>256 mm) [16	pts] 0%	I SILT [3 pt]	DEBRIS [3 pts] 0%	Poi
	EDROCK [16 pt]	0%	FINE DETRITUS [3 pt	A DESCRIPTION OF A DESC	Subs Max
and the strength of the streng	OBBLE (65-256 mm) [12	Entretre and an and a second s	CLAY or HARDPAN [C) pt]0%	
	RAVEL (2-64 mm) [9 pts] AND (<2 mm) [6 pts]	0%	MUCK [0 pts]		7
	Total of Percentages of		(A) Subarrato Percentege	ali subi sedici della (B)	
	Slabs, Boulder, Cobble, B				A+
CORE OF T	WO MOST PREDOMINA	TE SUBSTRATE T	TYPES: 6 TOTAL NUMBER	OF SUBSTRATE TYPES: 1	
			pool depth within the 61 meter (200 ft)		Pool I Max
	entimeters [20 pts]	nom road cuivens	s or storm water pipes) (Check ONLY o		
Land Area and Land	- 30 cm [30 pts]			이 집에서는 것 같은 것을 많이 가지 않는다.	
			<pre>< 5 cm [5 pts] </pre>	ST CHANNEL IO pts1	<u> </u>
	22.5 cm [25 pts]			_	0
				ST CHANNEL [0 pts] DL DEPTH (centimeters): 23	
	22.5 cm [25 pts] MENTS < FULL WIDTH (Measure	H as the average	MAXIMUM PO	OL DEPTH (centimeters): 23 ONLY one box):	Ban
COMI 3. BANY > 4.0 n > 3.0 n	22.5 cm [25 pts] MENTS CFULL WIDTH (Measure neters (> 13') [30 pts] n - 4.0 m (> 9' 7" - 13') [25	ipts]		OL DEPTH (centimeters): 23 ONLY one box):	Bani Wid Max
COMI 3. BANY > 4.0 n > 3.0 n	22.5 cm [25 pts] MENTS CFULL WIDTH (Measure neters (> 13') [30 pts]	ipts]	NO WATER OR MOI MAXIMUM PO of 3-4 measurements) (Check > 1.0 m - 1.5 m (> 3' 3	OL DEPTH (centimeters): 23 ONLY one box): " - 4' 6") [15 pts] s]	Bani Wid Max
COMI 3. BANY > 4.0 m > 3.0 m > 1.5 m	22.5 cm [25 pts] MENTS CFULL WIDTH (Measure neters (> 13') [30 pts] n - 4.0 m (> 9' 7" - 13') [25	ipts]	NO WATER OR MOI MAXIMUM PO of 3-4 measurements) (Check > 1.0 m - 1.5 m (> 3' 3	OL DEPTH (centimeters): 23 ONLY one box):	Bani Wid Max
COM 3 BAN > 4.0 m > 3.0 m > 1.5 m COM	22.5 cm [25 pts] MENTS (FULL WIDTH (Measuremeters (> 13') [30 pts]) n - 4.0 m (> 9' 7" - 13') [25 n - 3.0 m (> 9' 7" - 4' 8") [2 MENTS RIPARIAN ZONE AND RIPARIAN WIDTH (Per Bank) Wide >10m Moderate 5-10m Narrow <5m	FLOODPLAIN QU FLOODPLAIN QU FLOO L R C C C C C C C C C C C C C C C C C C C	✓ NO WATER OR MOIN MAXIMUM POO a of 3-4 measurements) (Check > 1.0 m - 1.5 m (> 3' 3') ≤ 1.0 m (<=3' 3")	OL DEPTH (centimeters): 23 ONL Y one box): * - 4' 6") [15 pts] * - 4' 6") [15 pts] s] NKFULL WIDTH (meters): 2.62 ted Right (R) as looking downstream A L R Conservation Tillage Urban or Industrial Virban or Industrial Open Pasture, Row (Intermitten water (Ephemeral) ox):	Bani Wid Max 2(
COM BAN > 4.0 m > 3.0 m > 1.5 m COM	22.5 cm [25 pts] MENTS	FLOODPLAIN QL FLOODPLAIN QL FLOO L R L R C C C C C C C C C C C C C	✓ NO WATER OR MOI! MAXIMUM POO of 3-4 measurements) (Check > 1.0 m - 1.5 m (> 3' 3 ≤ 1.0 m (<=3' 3") [5 pt]	OL DEPTH (centimeters): 23 ONL Y one box): ** - 4' 6") [15 pts] ** - 4' 6") [15 pts] s] NKFULL WIDTH (meters): 2.62 ted Right (R) as looking downstream 1 L R Conservation Tillage Urban or Industrial Virban or Industrial Open Pasture, Row (Intermitter no water (Ephemeral)	Bani Wid Max 2(

ADDITIONAL STREAM	INFORMATION (This Information Mu	st Also be Completed):		
QHEI PERFOI	RMED? - Yes No QHEI Scon	e 18.0 (If Yes, Atta	ch Completed QHEI Form	n)
DOWNSTREA	AM DESIGNATED USE(S)		i i	
WWH Name:			Distance from Evaluat	
CWH Name: EWH Name:	ĸĸĸĸĸĸĸĸġĸĸġĸĸġĸĸġĸĸġĸĸġĸĸġĸĸġĸĸġĸĸġĸĸġ	annan an a	Distance from Evaluate Distance from Evaluate	1
	ITACH COPIES OF MAPS, INCLUDING	THE ENTIRE WATERSHED		 Backs in side works in column discretion of contrainty of the side of the sid
USGS Quadrangle Nam		NRCS Soil Map P		Map Stream Order
County: Richland		Township / City: Plymo		
MISCELLANE		rounding / Ony		an a
Base Flow Conditions? (09/21/09	Quantity: 0.08	
	Photo numbers P1043 west and P1			1999-1999
	N	100%		
Elevated Turbidity? (Y/N				
-		Note lab sample no. or id. a		
	np (°C) Dissolved Oxygen (mg		Conductivity (µm	hos/cm)
Is the sampling reach re	presentative of the stream (Y/N)	If not, please explain:		
	1997 yana arawanya yang manananya anta ana ana ana ana ana ana ana ana a	n da kana ang kana kana kana kana kana kana	ningan manga kang anan ang ang ang ang ang ang ang ang	
Additional comments/de	escription of pollution impacts:		a a sua a sua a sua a sua da sua d	
and the strength of the set by set the set to set to both the Dorod House Wildow (Wildow) which is to				
Performed? (Y/N): N Fish Observed? (Y/N) Frogs or Tadpoles Obse Comments Regarding B	arved? (1/N) N Voucher? (1/N) N	•	mary Headwater Habitat A	
		a la transmission de la constantina de		
	······································			
DRAWIN	IG AND NARRATIVE DESCRIP	TION OF STREAM R	REACH (This <u>must</u> i	be completed):
Include importan	t landmarks and other features of inte	rest for site evaluation an	d a narrative description	of the stream's location
	K.			
	4			·
		-		
FLOW -		Constant of the second se	_	
			and the second sec	\sim
		PHWH Form Page - 2		
October 24, 2002 Revision		····· · · · · · · · · ·		



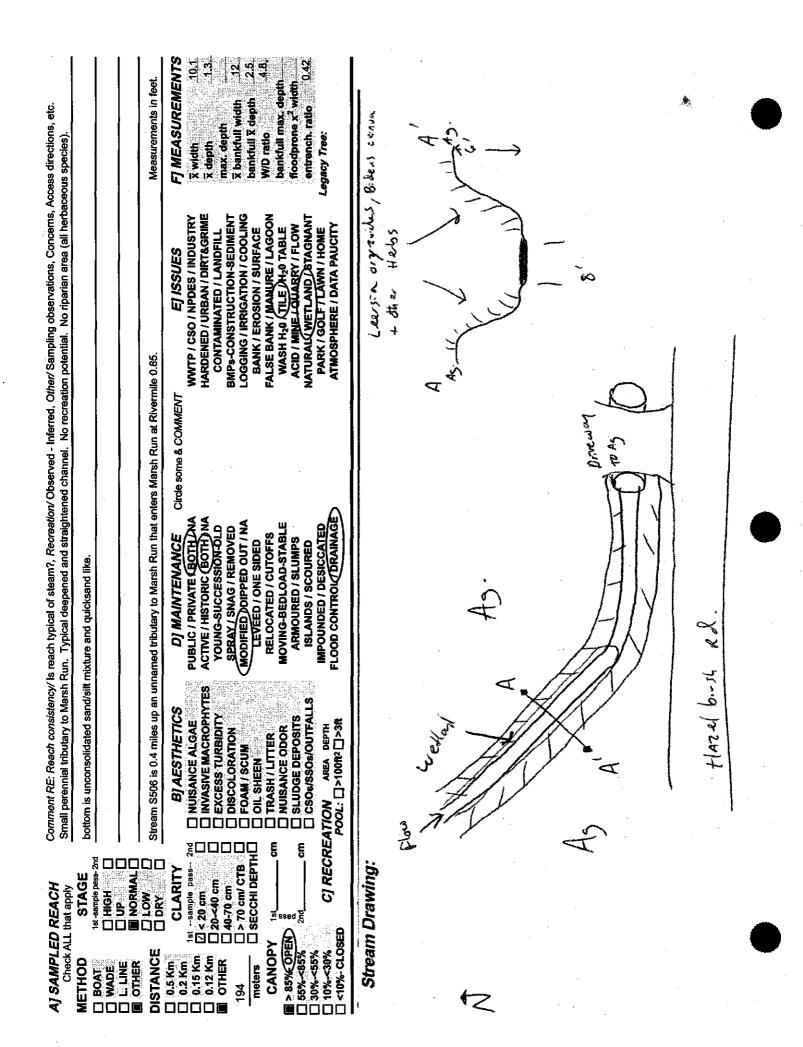
QHEI Score:

17.5

Stream & Location: S506, UNT to Marsh Run RM: 0.4 Date: 0 9/ 2 4/ 09 J. Zoladz, J. Layne Scorers Full Name & Affiliation: Ecology & Environment Lat./Long.: 40.9308/82.6726 Office verified location River Code: STORET #: (NAD 83 - decim 1] SUBSTRATE Check ONLY Two substrate TYPE BOXES: Check ONE (Or 2 & average) estimate % or note every type present OTHER TYPES POOL RIFFLE BEST TYPES ORIGIN QUALITY POOL RIFFLE HARDPAN [4] BLDR /SLABS [10] LIMESTONE [1] HEAVY [-2] MODERATE [-1] BOULDER [9] TILLS [1] Substrate SILT WETLANDS [0] NORMAL [0] □ □ MUCK [2] GRAVEL [7] HARDPAN [0] FREE [1] 50 🔲 🛄 SILT [2] 6.5 MODERAL [0] SANDSTONE [0] 2 SAND [6] 50 ARTIFICIAL [0] **MODERATE** [-1] RIP/RAP [0] BEDROCK [5] (Score natural substrates; ignore Maximum NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources) LACUSTURINE [0] 20 SHALE [-1] 🔳 3 or less [0] Comments COAL FINES [-2] Silty sand bottom fully embedded. Quicksand like. 2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest AMOUNT Check ONE (Or 2 & average) quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. EXTENSIVE >75% [11] 0__ UNDERCUT BANKS [1] MODERATE 25-75% [7] 0____ POOLS > 70cm [2] _____ OXBOWS, BACKWATERS [1] 0 _ OVERHANGING VEGETATION [1] 0 _ ROOTWADS [1] 0 AQUATIC MACROPHYTES [1] SPARSE 5-<25% [3] SHALLOWS (IN SLOW WATER) [1] Ô. NEARLY ABSENT <5% [1] 0 BOULDERS [1] LOGS OR WOODY DEBRIS [1] 0 0 ROOTMATS [1] Cover Comments Maximum 20 Straight glide, overhanging Bidens ceving and leersig orvzoides. 31 CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) SINUOSITY DEVELOPMENT **CHANNELIZATION** STABILITY 🗆 HIGH [4] EXCELLENT [7] **NONE [6]** HIGH [3] GOOD [5] RECOVERED [4] ☐ MODERATE [3] MODERATE [2] LOW [2] **FAIR** [3] RECOVERING [3] 📕 LOW [1] Channel NONE [1] POOR [1] **RECENT OR NO RECOVERY [1]** Maximum Comments Straightened and deepened channel for Ag. Banks topsoil/subsoil. 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average) **River right looking downstrea** FLOOD PLAIN QUALITY **RIPARIAN WIDTH** EROSION WIDE > 50m [4] D FOREST, SWAMP [3] CONSERVATION TILLAGE [1] MODERATE 10-50m [3] SHRUB OR OLD FIELD [2] URBAN OR INDUSTRIAL [0] 🗹 🎬 MODERATE [2] CONSTRUCTION [0] □ □ NARROW 5-10m [2] HEAVY / SEVERE [1] VERY NARROW < 5m [1] FENCED PASTURE [1] Indicate predominant land use(s) I OPEN PASTURE, ROWCROP [0] 🗹 🔳 NONE [0] past 100m riparian. Riparian Comments Maximum 10 Some scour on banks. Riparian only herbs. Row cap either side. 5] POOL / GLIDE AND RIFFLE / RUN QUALITY **Recreation Potential** MAXIMUM DEPTH CURRENT VELOCITY CHANNEL WIDTH Check ONE (ONLY!) Check ONE (Or 2 & average) Check ALL that apply Primary Contact POOL WIDTH > RIFFLE WIDTH [2] □ > 1m [6] TORRENTIAL [-1] SLOW [1] Secondary Contact 0.7-<1m [4] VERY FAST [1] INTERSTITIAL [-1] POOL WIDTH = RIFFLE WIDTH [1] (circle one and comment on back) INTERMITTENT [-2] 0.4-<0.7m [2] POOL WIDTH > RIFFLE WIDTH [0] FAST [1] 0.2-<0.4m [1] MODERATE [1] EDDIES [1] Pool / **m** < 0.2m [0] Indicate for reach - pools and riffles. Current 0 Maximum Comments alid <20 cm = 0 12 Indicate for functional riffles; Best areas must be large enough to support a population NO RIFFLE [metric=0] of riffle-obligate species: Check ONE (Or 2 & average). **RIFFLE DEPTH** RUN DEPTH RIFFLE / RUN SUBSTRATE RIFFLE / RUN EMBEDDEDNESS BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobble, Boulder) [2] **NONE** [2] LOW [1] BEST AREAS 5-10cm [1] MAXIMUM < 50cm [1] MOD. STABLE (e.g., Large Gravel) [1] Riffle BEST AREAS < 5cm UNSTABLE (e.g., Fine Gravel, Sand) [0] MODERATE [0] [metric=0] n Comments 100% alide 8 6] GRADIENT VERY LOW - LOW [2-4] ft/mi) %POOL %GLIDE: 100% Gradient **DRAINAGE AREA** MODERATE [6-10] Maximum %RIFFLE %RUN: HIGH - VERY HIGH [10-6]

mi²)

(0.5889



OhieEPA Primary Headwater Habitat Evaluation Form

SITE NAME/LOCATION Unnamed tributary to Marsh Run SITE NUMBER \$506 RIVER BASIN LENGTH OF STREAM REACH (ft) 716 LAT. 40.93078 LONG. DATE 09/24/09 SCORER J.Z. & J.T.L. COMMENTS NOTE: Complete All Items On This Form - Refer to "Field Evaluation STREAM CHANNEL INONE / NATURAL CHANNEL RECOVER MODIFICATIONS: INONE / NATURAL CHANNEL RECOVER 1. SUBSTRATE (Estimate percent of every type of substrate present. (Max of 32). Add total number of significant substrate types found (Max TYPE BLDR SLABS [16 pts] 0% Image: Site Site Site Site Site Site Site Site	82.67263 RIVER CODE RIVER MILE 0.4 ion Manual for Ohio's PHWH Streams" for Instructio vered Image: Recovering image: Recent or No Recovering image: Recovering
SITE NUMBER \$506 RIVER BASIN LENGTH OF STREAM REACH (ft) 716 LAT. 40.93078 LONG. DATE 09/24/09 SCORER J.Z. & J.T.L. COMMENTS NOTE: Complete All Items On This Form - Refer to "Field Evaluation STREAM CHANNEL INONE / NATURAL CHANNEL RECOMMENTS MODIFICATIONS: INONE / NATURAL CHANNEL RECOMMENTS 1. SUBSTRATE (Estimate percent of every type of substrate present. (Max of 32). Add total number of significant substrate types found (Max TYPE BLOR SLABS [16 pts] 0% Image: Stress of the stres	-82.67263 RIVER CODE RIVER MILE 0.4 ion Manual for Ohio's PHWH Streams" for Instruction VERED ☑ RECOVERING RECENT OR NO RECOVER Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes H Check ONLY two predominant substrate TYPE boxes H Check ONLY two predominant substrate TYPE boxes Substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes H Main T [3 pt] PO AF PACK/WOODY DEBRIS [3 pts] 0% Main T [3 pts] 0% AY or HARDPAN [0 pt] 0% ICK [0 pts] 0%
LENGTH OF STREAM REACH (ft) 716 LAT. 40.93078 LONG DATE 09/24/09 SCORER J.Z. & J.T.L. COMMENTS NOTE: Complete All Items On This Form - Refer to "Field Evaluation STREAM CHANNEL NONE / NATURAL CHANNEL RECOMMODIFICATIONS: 1. SUBSTRATE (Estimate percent of every type of substrate present. (Max of 32). Add total number of significant substrate types found (Max TYPE BLDR SLABS [16 pts] BOULDER (>256 mm) [16 pts] 0% BEDROCK [16 pt] 0% COBBLE (65-256 mm) [12 pts] 0% GRAVEL (2-64 mm) [9 pts] 5% CALL	-82.67263 RIVER CODE RIVER MILE 0.4 ion Manual for Ohio's PHWH Streams" for Instruction VERED ☑ RECOVERING RECENT OR NO RECOVER Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes H Check ONLY two predominant substrate TYPE boxes H Check ONLY two predominant substrate TYPE boxes Substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes H Main T [3 pt] PO AF PACK/WOODY DEBRIS [3 pts] 0% Main T [3 pts] 0% AY or HARDPAN [0 pt] 0% ICK [0 pts] 0%
DATE 09/24/09 SCORER J.Z. & J.T.L. COMMENTS NOTE: Complete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream	Ion Manual for Ohio's PHWH Streams" for Instruction VERED ☑ RECOVERING ☐ RECENT OR NO RECOVER Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes H Main transformed to the tr
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On This Form - Refer to "Field Evaluation Stream Channel Incomplete All Items On The Provide All Incomplete All Items On The Provide All Incomplete All Items On Stream Channel Items On Stream Chan	VERED ☑ RECOVERING □ RECENT OR NO RECOVER Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes H T [3 pt] PERCENT AF PACK/WOODY DEBRIS [3 pts] 0% IE DETRITUS [3 pts] 0% AY or HARDPAN [0 pt] 0% ICK [0 pts] 0%
STREAM CHANNEL MODIFICATIONS: NONE / NATURAL CHANNEL RECOM 1. SUBSTRATE (Estimate percent of every type of substrate present. (Max of 32). Add total number of significant substrate types found (Max TYPE BLOR SLABS [16 pts] BOULDER (>256 mm) [16 pts] 0% 1 BEDROCK [16 pt] 0% 1 E COBBLE (65-256 mm) [12 pts] 0% 1 CL/ GRAVEL (2-64 mm) [9 pts] 0% 1 MU SAND (<2 mm) [6 pts]	VERED ☑ RECOVERING □ RECENT OR NO RECOVER Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes Check ONLY two predominant substrate TYPE boxes H T [3 pt] PERCENT AF PACK/WOODY DEBRIS [3 pts] 0% IE DETRITUS [3 pts] 0% AY or HARDPAN [0 pt] 0% ICK [0 pts] 0%
MODIFICATIONS: 1. SUBSTRATE (Estimate percent of every type of substrate present. (Max of 32). Add total number of significant substrate types found (Max TYPE 1. BLOR SLABS [16 pts] 1. BLOR SLABS [16 pts] 1. BUDR SLABS [16 pts] 1. GRAVEL (2-64 mm) [9 pts] 1. SAND (<2 mm) [6 pts]	Check ONLY two predominant substrate TYPE boxes (of 8). Final metric score is sum of boxes A & B. T [3 pt] AF PACK/WOODY DEBRIS [3 pts] DY IE DETRITUS [3 pts] AY or HARDPAN [0 pt] ICK [0 pts]
1. SUBSTRATE (Estimate percent of every type of substrate present. (Max of 32). Add total number of significant substrate types found (Max TYPE 1. BLDR SLABS [16 pts] 1. BLDR SLABS [16 pts] 1. BUDR SLABS [16 pts] 1. GRAVEL (2-64 mm) [9 pts] 1. SAND (<2 mm) [6 pts]	AF PACK/WOODY DEBRIS [3 pts] 0% IE DETRITUS [3 pts] 0% AY or HARDPAN [0 pt] 0%
(Max of 32). Add total number of significant substrate types found (Max TYPE PERCENT TYPE BLDR SLABS [16 pts] 0% If SIL BOULDER (>256 mm) [16 pts] 0% If SIL BEDROCK [16 pt] 0% If SIL COBBLE (65-256 mm) [12 pts] 0% If SIL GRAVEL (2-64 mm) [9 pts] 0% If MU SAND (<2 mm) [6 pts]	AF PACK/WOODY DEBRIS [3 pts] 0% IE DETRITUS [3 pts] 0% AY or HARDPAN [0 pt] 0%
TYPE BLDR SLABS [16 pts] PERCENT TYPE BOULDER (>256 mm) [16 pts] 0% Image: Comparison of the state of the st	T [3 pt] AF PACK/WOODY DEBRIS [3 pts] IE DETRITUS [3 pts] AY or HARDPAN [0 pt] ICK [0 pts]
BLDR SLABS [16 pts] 0% 1 SIL BOULDER (>256 mm) [16 pts] 0% 1 LEA BEDROCK [16 pt] 0% 1 LEA BEDROCK [16 pt] 0% 1 CLA GRAVEL (2-64 mm) [9 pts] 0% 1 MU SAND (<2 mm) [6 pts]	AF PACK/WOODY DEBRIS [3 pts] 0% IE DETRITUS [3 pts] 0% AY or HARDPAN [0 pt] 0% ICK [0 pts] 0%
BEDROCK [16 pt] 0% Image: Comparison of the state of the stat	IE DETRITUS [3 pts] 0% Suit AY or HARDPAN [0 pt] 0% Mail ICK [0 pts] 0% 4
COBBLE (65-256 mm) [12 pts] 0% 0% 0 CL/ GRAVEL (2-64 mm) [9 pts] 0% 0% 0 MU SAND (<2 mm) [6 pts]	AY or HARDPAN [0 pt] 0% 0%
GRAVEL (2-64 mm) [9 pts] 0% 0% 0W MU SAND (<2 mm) [6 pts] 5% 0W AR	CK [0 pts]
	TIFICIAL [3 pts]
Total of Percentaces of a cont (A)	
	Atrate Percentage (B) A
Bidr Skabs, Boulder, Cobble, Bedrock	TOTAL NUMBER OF SUBSTRATE TYPES: 2
 Maximum Pool Depth (Measure the maximum pool depth within the evaluation. Avoid plunge pools from road culverts or storm water pipes) 	
> 30 centimeters [20 pts]	5 cm - 10 cm [15 pts]
	5 cm [5 pts] O WATER OR MOIST CHANNEL [0 pts]
COMMENTS	MAXIMUM POOL DEPTH (centimeters): 39
BANK FULL WIDTH (Measured as the average of 3-4 measurement	
	1.0 m - 1.5 m (> 3' 3" - 4' 6") [15 pts] W 1.0 m (<=3' 3") [5 pts] Ma
> 1.5 m - 3.0 m (> 9' 7" + 4' 8") [20 pts]	the million of the best sector of the foregring the sector of the best sector of the s
COMMENTS	AVERAGE BANKFULL WIDTH (meters): 3.66
This information mu	ust also be completed
RIPARIAN ZONE AND FLOODPLAIN QUALITY ANOTE:	River Left (L) and Right (R) as looking downstream
<u>RIPARIAN, WIDTH</u> <u>L R</u> (Per Bank) <u>L R</u> (Most Predominal	unt per Bank) L R
Wide >10m Mature Forest, W	
Moderate 5-10m Immature Forest,	, Shrub or Old Urban or Industrial
	New Field Open Pasture, Row Crop
Narrow <5m III Residential, Park III None III Fenced Pasture	line in the second s
COMMENTS Fenced Pasture	Mining or Construction
•	
FLOW REGIME (At Time of Evaluation) (Check ONLY one bo	x): Moist Channel, isolated pools, no flow (Intermittent)
Subsurface flow with isolated pools (Interstitial)	Dry channel, no water (Ephemeral)
COMMENTS	
SINUOSITY (Number of bends per 61 m (200 ft) of channel)	
None 1.0 2 0.5 1.5	2.0 3.0 2.5 >3
STREAM GRADIENT ESTIMATE	Moderate to Severe

ADDITIONAL STREAM INFORMATION (This Information Must Also be C	ompleted):
	(If Yes, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)	
WWH Name:	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
	Canada a far a Canada a far a f
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE	real contraction of the second s
	S Soil Map Page: NRCS Soil Map Stream Order
County: Township / C	/IV:_1
ase Flow Conditions? (Y/N): Y Date of last precipitation: Date of last precipitation:	Quantity: 1
N AD	
and the second	ble no. or id. and attach results) Lab Number:
ield Measures: Temp (°C) Dissolved Oxygen (mg/l)	pH (S.U.) Conductivity (µmhos/cm)
the sampling reach representative of the stream (Y/N) ¹ If not, please	e explain:
dditional comments/description of pollution impacts:	·
BIOTIC EVALUATION	
Performed? (Y/N): (If Yes, Record all observations. Voucher collect	ctions optional. NOTE: all voucher samples must be labeled with the site
ID number. Include appropriate field data sheet	is from the Primary Headwater Habitat Assessment Manual)
ish Observed? (Y/N) <mark>N</mark> Vou <u>cher? (Y/N)</u> N Salamanders Observer rogs or Tadpoles Observed? (Y/N) _N Voucher? (Y/N) _N Aquatic Mar	ed? (Y/N) N Voucher? (Y/N) N Croinvertebrates Observed? (Y/N) Voucher? (Y/N)
comments Regarding Biology:	
	l
· · · · · · · · · · · · · · · · · · ·	·
DRAWING AND NARRATIVE DESCRIPTION OF S	STREAM REACH (This must be completed):
Include important landmarks and other features of interest for site	
Stream Drawing:	Learston argotations, Bibens stern + other Hebs
for the	A / A'
A ALA AN	survey of high
N AA.	
A.	nnew B'
A' AITT	TRANK B
	ZY Y
+lazed bsh R.R.	and the second
PLATA OFTA RA.	

PHWH Form Page - 2



QHEI Score:

16

Stream & Location: S508, UNT to Marsh Run RM: 0.7 Date: 0 9/ 2 5/ 09 J. Zoladz, J.T. Layne Scorers Full Name & Affiliation: Ecology & Environment Office verified location Lat./Long.: 40.9305/82.6831 River Code: STORET #: 1] SUBSTRATE Check ONLY Two substrate TYPE BOXES: estimate % or note every type present Check ONE (Or 2 & average) OTHER TYPES POOL RIFFLE BEST TYPES ORIGIN QUALITY POOL RIFFLE LIMESTONE [1] BLDR /SLABS [10] HARDPAN [4] HEAVY 1-21 MODERATE [-1] BOULDER [9] DETRITUS [3] Substrate SILT WETLANDS [0] NORMAL [0] 🗹 🗃 MUCK [2] 100% FREE [1]
 EXTENSIVE [-2] HARDPAN [0] GRAVEL [7] SILT [2] 2 MODERAL [0] SAND [6] ARTIFICIAL [0] (Score natural substrates; ignore RIP/RAP [0] MODERATE [-1] BEDROCK (51 Maximum NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources) LACUSTURINE [0] 20 SHALE [-1] **NONE** [1] □ 3 or less [0] Comments COAL FINES [-2] 100% muck 2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest AMOUNT Check ONE (Or 2 & average) quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. ☐ EXTENSIVE >75% [11] 0 ... UNDERCUT BANKS [1] 0 POOLS > 70cm [2] ____ OXBOWS, BACKWATERS [1] MODERATE 25-75% [7] OVERHANGING VEGETATION [1] 0 ROOTWADS [1] 0 AQUATIC MACROPHYTES [1] SPARSE 5-<25% [3] SHALLOWS (IN SLOW WATER) [1] 0 Û. ■ NEARLY ABSENT <5% [1] BOULDERS [1] ۵ LOGS OR WOODY DEBRIS [1] 0 ROOTMATS [1] Cover Comments Maximum 3 20 Some shrubs coming in along banks CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average) SINUOSITY DEVELOPMENT **CHANNELIZATION** STABILITY HIGH [4] EXCELLENT [7] HIGH [3] MODERATE [3] GOOD [5] RECOVERED [4] MODERATE [2] LOW [2] **RECOVERING** [3] 🖬 LOW [1] **FAIR [3]** Channei **NONE** [1] POOR [1] RECENT OR NO RECOVERY [1] Maximum Comments 20 Deepened and straightened for Agricultural purposes. 4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average) **River right looking downstream** FLOOD PLAIN QUALITY **RIPARIAN WIDTH** □ □ WIDE > 50m [4] **EROSION** CONSERVATION TILLAGE [1] 🗹 🗰 NONE / LITTLE [3] URBAN OR INDUSTRIAL [0] **MODERATE 10-50m [3]** SHRUB OR OLD FIELD 121 MODERATE [2] C RESIDENTIAL, PARK, NEW FIELD [1] MINING / CONSTRUCTION [0] □ □ NARROW 5-10m [2] HEAVY / SEVERE [1] VERY NARROW < 5m [1] FENCED PASTURE [1] Indicate predominant land use(s) Den Pasture, Rowcrop [0] past 100m riparian. Riparian 3 Comments Maximum 10 5] POOL / GLIDE AND RIFFLE / RUN QUALITY **Recreation Potential** MAXIMUM DEPTH CURRENT VELOCITY CHANNEL WIDTH Check ONE (Or 2 & average) Check ONE (ONLY!) Check ALL that apply Primary Contact 🔲 > 1m [6] □ POOL WIDTH > RIFFLE WIDTH [2] TORRENTIAL [-1] SLOW [1] Secondary Contact POOL WIDTH = RIFFLE WIDTH [1] 0.7-<1m [4] VERY FAST [1] INTERSTITIAL [-1] (circle one and com nant on back POOL WIDTH > RIFFLE WIDTH [0] G FAST [1] 0.4~0.7m [2] □ INTERMITTENT [-2] 0.2-<0.4m [1] MODERATE [1] DEDDIES [1] Pool **a** < 0.2m [0] Indicate for reach - pools and riffles. Current n Maximum Comments 12 100% slide with depths < 20cm Indicate for functional riffles; Best areas must be large enough to support a population NO RIFFLE [metric=0] of riffle-obligate species: Check ONE (Or 2 & average). **RUN DEPTH RIFFLE DEPTH** RIFFLE / RUN SUBSTRATE RIFFLE / RUN EMBEDDEDNESS BEST AREAS > 10cm [2] MAXIMUM > 50cm [2] STABLE (e.g., Cobble, Boulder) [2] **NONE** [2] BEST AREAS 5-10cm [1] MAXIMUM < 50cm [1] MOD. STABLE (e.g., Large Gravel) [1] LOW [1] Riffle / BEST AREAS < 5cm UNSTABLE (e.g., Fine Gravel, Sand) [0] **MODERATE 101** [metric=0] 0 Comments All alide 6] GRADIENT VERY LOW - LOW [24] ft/mi) %POOL %GLIDE: 100 Gradient MODERATE [6-10] DRAINAGE AREA Maximum %RIFFLE HIGH - VERY HIGH [10-6] %RUN: (0.8665 mi²) 10

adults, curcents, rucess unections, etc. 3 weeds. Flows SE under Hazelbrush Rd.	to Marsh Run at Rivermile 0.2, which in turn	Measurements in feet.	E] /SSUESF] MEASUREMENTSWPDES / INDUSTRYX width3.3WPDES / INDUSTRYX width3.3WDTED / LANDFILLTED / LANDFILL0.28UCTION-SEDIMENTTAC depth0.28GATON / COOLINGSION / SUFFACEND ratioSION / SUFFACEWD ratio8.2WND realoManure / LagoonND ratioMANURE / LAND STAGNANTND ratio8.2ULARRY / FLOWDonkfull max depth0.24LAND STAGNANTLegacy Tree:Legacy Tree:	still a start
comment rc: reador consistency is readin typical of steamin, representation Observed - interied, Outer, Samping observations, Outcents, Process of evolus, exc. Small tributary to Marsh Run. Not as recently modified as S507 stretch, still deeply incised and modified. All glide and weeds. Flows SE under Hazelbrush Rd. via culvert, wetland present within incised channel.	unnamed tributary to Marsh Run that enters the primary unnamed tributary to Marsh Run at Rivermile 0.2, which in turn		Circle some & COMMENT WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT&GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ O (TILE) H ₂ O TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	A A A
ssrency is reach typical of steam <i>r, recreated</i> Jun. Not as recently modified as S507 stretch int within incised channel.		ırmile 0.85,	CS Dj MAINTENANCE PUBLIC / PRIVATE (BOTH) NA PUBLIC / PRIVATE (BOTH) NA ACTIVE / HISTORIC (BOTH) NA ACTIVE / ACTIVE / ACTIVE / ACTIVE ACTIVE / ACTIVE / ACTIVE / ACTIVE / ACTIVE ACTIVE / ACTIVE / ACTIVE / ACTIVE / ACTIVE ACTIVE / ACTIVE / AC	HAZellond HA
LED REACH (ALL that apply STAGE 1st comple pass-2nd -	MADE HIGH L LINE UP L LINE UP OTHER NORMAL	щ	0.5 Km CLARITY BJAESTHETICS 0.5 Km CLARITY BJAESTHETICS 0.15 Km Ist -sample pass- 2m Invasive MacRoPHYTES 0.12 km Ist -sample pass- 2m Invasive MacRoPHYTES 101 Ist -sample pass- 2m Invasive macRoPHYTES 0%-c50% Ist -sample passe- 2m Invasinte	Stream Drawing:

OhisEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Unnamed tributary to Marsh Run	
SITE NUMBER S508 RIVER BASIN Mohican DRAINAGE AREA (m²	0.87
LENGTH OF STREAM REACH (#) 331 LAT. 40.93050 LONG82.68310 RIVER CODE RIVER MIL	
DATE 09/25/09 SCORER J.Z. & J.T.L. COMMENTS	
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for In	structions
STREAM CHANNEL INONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO F	ECOVERY
1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxe (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.	s I HHEI
TYPE PERCENT TYPE PERCENT	Metric
BLDR SLABS [16 pts] 0% SILT [3 pt] 0% BOULDER (>256 mm) [16 pts] 0% LEAF PACK/WOODY DEBRIS [3 pts] 0%	Points
BEDROCK 16 pt 0% Image: Second se	Substrat Max = 4
COBBLE (65-256 mm) [12 pts] 0% CLAY or HARDPAN [0 pt] 0%	max - +
GRAVEL (2-64 mm) [9 pts] 0% I MUCK [0 pts] 100% SAND (<2 mm) [6 pts]	1
	TEXTER
Bldr Siabs, Boulder, Cobble, Bedrock	A+B
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 0 TOTAL NUMBER OF SUBSTRATE TYPES: 1	
2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of	Pool Dep
evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 30 centimeters [20 pts] > 5 cm - 10 cm [15 pts]	Max = 3
> 22.5 - 30 cm [30 pts] > 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts]	15
COMMENTS MAXIMUM POOL DEPTH (centimeters): 9	
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONL Y one box): ✓ > 4.0 meters (> 13') [30 pts] ✓ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]	Bankful Width
> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] ≤ 1.0 m (<≠3' 3") [5 pts]	Max=30
> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	-
COMMENTSAVERAGE BANKFULL WIDTH (meters): 5.0	2 I 30
This information <u>must</u> also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY ফ ১০০TE: River Left (L) and Right (R) as looking downstream গ	r
RIPARIAN WIDTH FLOODPLAIN QUALITY	•
L R (Per Bank) L R (Most Predominant per Bank) L R Wide >10m Mature Forest, Wetland Conservation Tillag	۵
Moderate 5-10m Immature Forest, Shrub or Old Urban or Industrial	•
Field	Crop
Narrow < 5m Residential, Park, New Field	
COMMENTS	
FLOW REGIME (At Time of Evaluation) (Check ONLY one box):	
Stream Flowing Moist Channel, isolated pools, no flow (Intermit	tent)
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral) COMMENTS	
SINUOSITY (Number of ben <u>ds per 61 m (200 ft) of channel) (Check ONLY one box):</u>	
✓ None 1.0 2.0 3.0	
0.5 1.5 2.5 >3	
STREAM GRADIENT ESTIMATE	0 #/100 fi)
	_ to row hy

ADDITIONAL STREAM INFORMATION (This Information Must Als	eo be Completed):
QHEI PERFORMED? - Ves No QHEI Score 16	.0 (If Yes, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)	
WWH Name:	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
	ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name: Shelby	NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Richland Town	nship / City: Plymouth
MISCELLANEOUS	
Base Flow Conditions? (Y/N): Y Date of last precipitation:	09/21/09 Quantity: 0.08
Photograph Information: Photo P1072, Northwest,09/25/09	
Elevated Turbidity? (Y/N): N Canopy (% open): 10	0%
Were samples collected for water chemistry? (Y/N): (Note is	ab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l)	pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N)	ot, please explain:
Additional comments/description of pollution impacts:	
ID number. Include appropriate field da Fish Observed? (Y/N) N Salamanders	ner collections optional. NOTE: all voucher samples must be labeled with the site ata sheets from the Primary Headwater Habitat Assessment Manual) Observed? (Y/N) N Voucher? (Y/N) N atic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) N
	N OF STREAM REACH (This <u>must</u> be completed): or site evaluation and a narrative description of the stream's location Few Shrubs
FLOW + CORN	HAY KY
A's	culat N
PHWH October 24, 2002 Revision	I Form Page - 2
APIANDI 74 TAAISIOII	

OnicEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

13

SITE NAME/LOCATION Black Fork Wind Project	
SITE NUMBER S013	
LENGTH OF STREAM REACH (ft) 163 LAT.	
DATE 10/18/10 SCORER A. Garder,	OMMENTS
NOTE: Complete All Items On This Form - Refer	to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions
STREAM CHANNEL INONE / NATURAL CH MODIFICATIONS:	
· · · · ·	substrate present. Check ONLY two predominant substrate TYPE boxes ate types found (Max of 8). Final metric score is sum of boxes A & B.
TYPE PERCENT	TYPE PERCENT Met
BLDR SLABS [16 pts] 0% BOULDER (>256 mm) [16 pts] 0%	LEAF PACK/WOODY DEBRIS [3 pts]
BEDROCK [16 pt]	FINE DETRITUS [3 pts]
COBBLE (65-256 mm) [12 pts] 0%	CLAY or HARDPAN [0 pt]
Image: Solution of the second secon	ARTIFICIAL [3 pts]
Total of Percentages of 0.00%	(A) 100% (B) A+1
Bidr Slabs, Boulder, Cobble, Bedrock	100%
2. Maximum Pool Depth (Measure the maximum p evaluation. Avoid plunge pools from road culverts of	oci depth within the 61 meter (200 ft) evaluation reach at the time of Pool D or storm water pipes) (Check ONLY one box): Max =
> 30 centimeters [20 pts]	🔄 🔜 🔁 > 5 cm - 10 cm [15 pts]
> 22.5 - 30 cm [30 pts] > 10 - 22.5 cm [25 pts]	<pre>< 5 cm [5 pts] NO WATER OR MOIST CHANNEL [0 pts]</pre>
COMMENTS Poor pool development	
	MAXIMUM POOL DEPTH (centimeters):
3. BANK FULL WIDTH (Measured as the average of >4.0 meters (> 13') [30 pts]	of 3-4 measurements) (Check ONLY one box): Bank
> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	▲ 1.0 m (<=3' 3") [5 pts]
> 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	
	AVERAGE BANKFULL WIDTH (meters): 2.08 0
ז RIPARIAN ZONE AND FLOODPLAIN QU/	This information <u>must</u> also be completed ALITY ଦ୍ୱNOTE: River Left (L) and Right (R) as looking downstream ଦ୍ୟ
	DPLAIN QUALITY
L R (Per Bank) L R	(Most Predominant per Bank) L R Mature Forest, Wetland Conservation Tillage
Moderate 5-10m	Immature Forest, Shrub or Old
Narrow <5m	Residential, Park, New Field Open Pasture, Row Crop
	Fenced Pasture Mining or Construction
COMMENTS Incised by 6-8 feet, no a	
FLOW REGIME (At Time of Evaluation) (Check ONLY one hox):
	Maint Channel, indicted masks in a flow (Intermittant)
Stream Flowing	(itial) Moist Channel, isolated pools, no flow (Intermittent)
Stream Flowing Subsurface flow with isolated pools (Intersti COMMENTS Likely intermittent, wa	tial) Dry channel, no water (Ephemeral)
Subsurface flow with isolated pools (Intersti COMMENTS Likely intermittent, wa	ter present due to time of year.
Subsurface flow with isolated pools (Intersti COMMENTS Likely intermittent , wa SINUOSITY (Number of bends per 61 m (2 None 1.0	Dry channel, no water (Ephemeral) ter present due to time of year. 200 ft) of channel) (Check ONLY one box): 2.0 3.0
Subsurface flow with isolated pools (Intersti COMMENTS Likely intermittent , wai SINUOSITY (Number of bends per 61 m (2 None 1.0 0.5 1.5	tial) Dry channel, no water (Ephemeral) ter present due to time of year. 200 ft) of channel) (Check ONLY one box):
Subsurface flow with isolated pools (Intersti COMMENTS Likely intermittent , wai SINUOSITY (Number of bends per 61 m (2 None 1.0 0.5 1.5 STREAM GRADIENT ESTIMATE	Dry channel, no water (Ephemeral) ter present due to time of year. 200 ft) of channel) (Check ONLY one box): 2.0 3.0

October 24, 2002 Revision

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):	
QHEI PERFORMED? - Yes No QHEI Score (If Yes, Atta	ich Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)	
WWH Name:	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
EWH Name:	Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED	AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name: NRCS Soil Map P	Page: NRCS Soil Map Stream Order
County: Crawford Township / City:	
MISCELLANEOUS	
Base Flow Conditions? (Y/N): Yes Date of last precipitation: 10/14/10	Quantity: 0.06
Photograph Information: P49 - Facing east from collection line crossing, looking ups	tream. P50 - Facing west from collection line
Elevated Turbidity? (Y/N): No Canopy (% open): 100%	
Were samples collected for water chemistry? (Y/N): No (Note lab sample no. or id. a	and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mq/l) pH (S.U.)	Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Yes If not, please explain:	
Additional comments/description of pollution impacts:	
	<u></u>
BIOTIC EVALUATION	
Performed? (Y/N): (If Yes, Record all observations. Voucher collections optional	•
ID number. Include appropriate field data sheets from the Pri	
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No	Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebrat	tes Observed? (Y/N) No Voucher? (Y/N)
Comments Regarding Biology:	
No aquatic wildlife observed.	

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Black Fork Wind Project		
SITE NUMBER S013	RIVER BASIN Ohio River DRAINAGE AREA (mi²)	
LENGTH OF STREAM REACH (ft) 163 LAT.		
DATE 10/18/10 SCORER A. Garder, COM	MMENTS	
NOTE: Complete All Items On This Form - Refer to	"Field Evaluation Manual for Ohio's PHWH Streams" for Ins	tructions
STREAM CHANNEL NONE / NATURAL CHAN MODIFICATIONS:		COVERY
	ubstrate present. Check ONLY two predominant substrate TYPE boxes a types found (Max of 8). Final metric score is sum of boxes A & B.	: HHEI
TYPE PERCENT BLDR SLABS [16 pts] 0% BOULDER (>256 mm) [16 pts] 0% BEDROCK [16 pt] 0% COBBLE (65-256 mm) [12 pts] 0% GRAVEL (2-64 mm) [9 pts] 0%	TYPE PERCENT SILT [3 pt] 75% LEAF PACK/WOODY DEBRIS [3 pts] 0% FINE DETRITUS [3 pts] 0% CLAY or HARDPAN [0 pt] 0% MUCK [0 pts] 0%	Metric Points Substrate Max = 40
SAND (<2 mm) [6 pts]	ARTIFICIAL [3 pts]	13
Total of Percentages of 0.00% Bidr Slabs, Boulder, Cobble, Bedrock SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE	(A) 100% (B) ES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 1	A+B
 Maximum Pool Depth (Measure the maximum pool evaluation. Avoid plunge pools from road culverts or s > 30 centimeters [20 pts] > 22.5 - 30 cm [30 pts] 	ol depth within the 61 meter (200 ft) evaluation reach at the time of storm water pipes) (Check ONLY one box): > 5 cm - 10 cm [15 pts] < 5 cm [5 pts]	Pool Depti Max = 30
> 10 - 22.5 cm [25 pts]		0
COMMENTS Poor pool development	MAXIMUM POOL DEPTH (centimeters):	
3. BANK FULL WIDTH (Measured as the average of 3 > 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	3-4 measurements) (Check ONL Y one box): > 1.0 m - 1.5 m (> 3' 3" + 4' 8") [15 pts] ≤ 1.0 m (<=3' 3") [5 pts]	Bankfull Width Max=30
COMMENTS	AVERAGE BANKFULL WIDTH (meters): 2.08	
RIPARIAN ZONE AND FLOODPLAIN QUAL	is information <u>must</u> also be completed ITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆ <u>LAIN QUALITY</u> (Most Predominant per Bank) <u>L R</u>	
Wide >10m	Mature Forest, Wetland Conservation Tillage	
Moderate 5-10m	Immature Forest, Shrub or Old Urban or Industrial Field	_
Narrow <5m	Field Other of industrial Residential, Park, New Field Open Pasture, Row	Crop
Narrow <5m	Field Contain or industrial Residential, Park, New Field Open Pasture, Row of Fenced Pasture Fenced Pasture Mining or Construction	•
Narrow <5m	Field Drain or industrial Residential, Park, New Field Open Pasture, Row of Pasture, Row of Pasture, Row of Pasture Fenced Pasture Mining or Construction iess to floodplain. Mining or Construction neck ONLY one box): Moist Channel, isolated pools, no flow (Intermitted Dry channel, no water (Ephemeral) r present due to time of year.	<u>)</u>
Narrow <5m	Field Drain or industrial Residential, Park, New Field Open Pasture, Row of Pasture, Row of Pasture, Row of Pasture Fenced Pasture Mining or Construction iess to floodplain. Mining or Construction neck ONLY one box): Moist Channel, isolated pools, no flow (Intermitted Dry channel, no water (Ephemeral) r present due to time of year.	<u>)</u>

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):	
QHEI PERFORMED? - Yes No QHEI Score (If Yes, Atta	ich Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)	
WWH Name:	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
EWH Name:	Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHEE	AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name: NRCS Soil Map P	age: NRCS Soil Map Stream Order
County: Crawford Township / City:	
MISCELLANEOUS	
Base Flow Conditions? (Y/N): Yes Date of last precipitation: 10/14/10	Quantity: 0.06
Photograph Information: P49 - Facing east from collection line crossing, looking ups	tream. P50 - Facing west from collection line
Elevated Turbidity? (Y/N): No Canopy (% open): 100%	
Were samples collected for water chemistry? (Y/N): No (Note lab sample no. or id. a	and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l)	Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Yes If not, please explain:	
Additional comments/description of pollution impacts:	
BIOTIC EVALUATION	
Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional	•
ID number. Include appropriate field data sheets from the Pri	
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N)	Voucher? (Y/N) No
Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroinvertebra	tes Observed? (Y/N) No Voucher? (Y/N)
Comments Regarding Biology:	โดยหลุดสามารถได้ เป็นสามารถสามารถได้ เป็นสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสามารถสาม
No aquatic wildlife observed.	

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

ChieEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Black Fork Wind Project	
SITE NUMBER S013 RIVER BASIN Ohio River DRAINAGE AREA (mi²)	
LENGTH OF STREAM REACH (ft) 163 LAT. LONG. RIVER CODE RIVER MILE	
DATE 10/18/10 SCORER A. Garder,	
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Inst	ructions
STREAM CHANNEL INONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO REC MODIFICATIONS:	RUGORARIO
1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.	HHE
TYPE PERCENT TYPE PERCENT	Metri
BLDR SLABS [16 pts] 0% SILT [3 pt] 75% BOULDER (>256 mm) [16 pts] 0% LEAF PACK/WOODY DEBRIS [3 pts] 25%	Point
BOULDER (>256 mm) [16 pts] 0% LEAF PACK/WOODY DEBRIS [3 pts] 25% BEDROCK [16 pt] 0% FINE DETRITUS [3 pts] 0%	Substrat
COBBLE (65-256 mm) [12 pts]	Max = 4
GRAVEL (2-64 mm) [9 pts]	13
SAND (<2 mm) [6 pts] 0% ARTIFICIAL [3 pts] 0%	
Total of Percentages of 0.00% (A) 100% (B)	A+B
CORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 1	
Maximum Pool Depth <i>(Measure the maximum pool depth within the 61 meter (200 ft)</i> evaluation reach at the time of	Pool Dep
evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):	Max = 3
> 30 centimeters [20 pts] > 22.5 - 30 cm [30 pts] > 5 cm - 10 cm [15 pts]	
> 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts]	0
COMMENTS Poor pool development MAXIMUM POOL DEPTH (centimeters):	
BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):	Bankful
> 4.0 meters (> 13') [30 pts]	Width
> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] ≤ 1.0 m (<=3' 3") [5 pts]	Max=30
COMMENTS AVERAGE BANKFULL WIDTH (meters): 2.08	1 O
This information must also be completed PIPAPIAN ZONE AND EL CODEL AN OLIALITY	<u> </u>
RIPARIAN ZONE AND FLOODPLAIN QUALITY OF NOTE: River Left (L) and Right (R) as looking downstream of RIPARIAN WIDTH FLOODPLAIN QUALITY	
L R (Per Bank) L R (Most Predominant per Bank) L R Wide >10m Mature Forest, Wetland Conservation Tillage	
Wide >10m Mature Forest, Wetland Conservation Tillage Moderate 5-10m Immature Forest, Shrub or Old Utban or Industrial	
	μ
None Fenced Pasture Mining or Construction COMMENTS Incised by 6-8 feet, no access to floodplain.	1
FLOW REGIME (At Time of Evaluation) (Check ONLY one box): Stream Flowing G Stream Flowing G Moist Channel, isolated pools, no flow (Intermitten	t)
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral)	~,
COMMENTS Likely intermittent, water present due to time of year.	L
SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):	
None 1.0 2.0 3.0 0.5 1.5 2.5 >3	
STREAM GRADIENT ESTIMATE	
Flat (0.5 ft/100 ft) Flat to Moderate Moderate (2 ft/100 ft) Moderate to Severe (10 ft)	100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Comp	leted):
	Yes, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)	
WWH Name:	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
EWH Name:	Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WAT	ERSHED AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name: NRCS Sc	bil Map Page: NRCS Soil Map Stream Order
County: Crawford Township / City:	
MISCELLANEOUS	
Base Flow Conditions? (Y/N): Yes Date of last precipitation: 10/14/1	0 Quantity: 0.06
Photograph Information:P49 - Facing east from collection line crossing, lool	king upstream. P50 - Facing west from collection line
Elevated Turbidity? (Y/N): No Canopy (% open): 100%	
Were samples collected for water chemistry? (Y/N): No (Note lab sample n	o. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/l)	(S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N)	plain:
Additional comments/description of pollution impacts:	· · · · · · · · · · · · · · · · · · ·
	s optional. NOTE: all voucher samples must be labeled with the site om the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Frogs or Tadpoles Observed? (Y/N) No Voucher? (Y/N) No Aquatic Macroin	(Y/N) No Voucher? (Y/N) No
Comments Regarding Biology:	
No aquatic wildlife observed.	

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



OnigEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Black Fork Wind Project	
SITE NUMBER S013 RIVER BASIN Ohio River DRAINAGE AREA (mi²)	
LENGTH OF STREAM REACH (ft) 163 LAT. LONG. RIVER CODE RIVER MILE	
DATE 10/18/10 SCORER A. Garder,	
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Inst	uctions
STREAM CHANNEL NONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OR NO REC	OVERY
1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes	
(Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B. TYPE PERCENT BLDR SLABS [16 pts] 0% BOULDER (>256 mm) [16 pts] 0% BEDROCK [16 pt] 0% FINE DETRITUS [3 pts] 0%	HHEI Metric Points Substrate Max = 40
COBBLE (65-256 mm) [12 pts] 0% CLAY or HARDPAN [0 pt] 0% GRAVEL (2-64 mm) [9 pts] 0% MUCK [0 pts] 0% SAND (<2 mm) [6 pts]	13
Total of Percentages of 0.00% (A) 100% (B) Bidr Slabs, Boulder, Cobble, Bedrock 0.00% (A) 100% (B) SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 1	A+B
Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 30 centimeters [20 pts] > 5 cm - 10 cm [15 pts]	Pool Dept Max = 30
> 22.5 - 30 cm [30 pts] > 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts]	
	V
COMMENTS POOL DEPTH (centimeters):	
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONL Y one box): > 4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] ≤ 1.0 m (<=3' 3") [5 pts]	Bankfull Width Max=30
COMMENTS AVERAGE BANKFULL WIDTH (meters); 2.08	
This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream ☆ RIPARIAN WIDTH FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream ☆ L R (Per Bank) L R Wide >10m Mature Forest, Wetland Conservation Tillage Moderate 5-10m Immature Forest, Shrub or Old Urban or Industrial	
Narrow <5m Residential, Park, New Field Open Pasture, Row Ci	op .
None Fenced Pasture Mining or Construction COMMENTS Incised by 6-8 feet. no access to floodplain.	
	<u>-</u>
FLOW REGIME (At Time of Evaluation) (Check ONLY one box): Stream Flowing Subsurface flow with isolated pools (Interstitial) COMMENTS_Likely intermittent, water present due to time of year.) [
SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 2.0 3.0 0.5 1.5 2.5 >3	
STREAM GRADIENT ESTIMATE Flat (0.5 ft/100 ft) Flat to Moderate (2 ft/100 ft) Moderate to Severe Severe (10 ft/	00 ft)

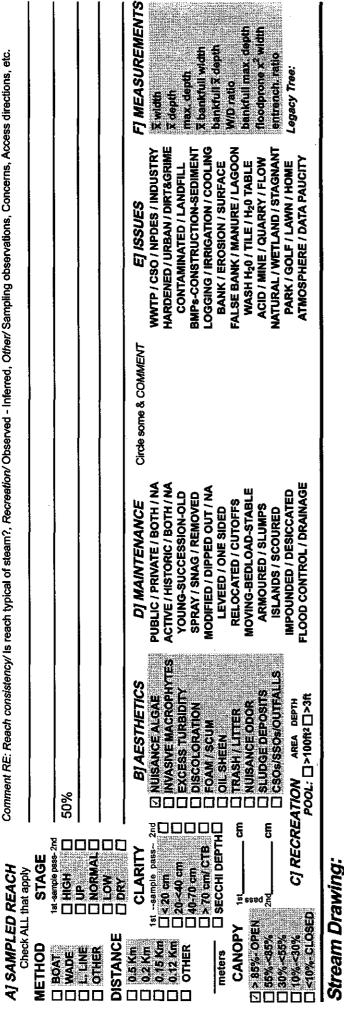
DDITIONAL STREAM INFORMATION (This Inform QHEI PERFORMED? - Yes No Q	NEI Score (If Yes, Attach Completed QHEI Form)
DOWNSTREAM DESIGNATED USE(S)	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
EWH Name:	Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INC	CLUDING THE <u>ENTIRE</u> WATERSHED AREA. CLEARLY MARK THE SITE LOCATION
SGS Quadrangle Name:	NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Crawford	Township / City:
MISCELLANEOUS	
base Flow Conditions? (Y/N): Yes Date of last p	precipitation: 10/14/10 Quantity: 0.06
hotograph Information: P49 - Facing east from co	llection line crossing, looking upstream. P50 - Facing west from collection line
levated Turbidity? (Y/N): No Canopy (%	open): 100%
Vere samples collected for water chemistry? (Y/N):	No (Note lab sample no, or id. and attach results) Lab Number:
and the second se	
ield Measures: Temp (°C)	
s the sampling reach representative of the stream (Y	/N) Yes If not, please explain:
dditional comments/description of pollution impacts:	
BIOTIC EVALUATION	
No	
'enformed'? (Y/N): (If Yes, Record all obse	arvations. Voucher collections optional. NOTE: all voucher samples must be labeled with the s propriate field data sheets from the Primary Headwater Habitat Assessment Manual)
. ("management	
ish Observed? (Y/N) No Voucher? (Y/N) No rogs or Tadpoles Observed? (Y/N) No Voucher? (Salamanders Observed? (Y/N) Voucher? (Y/N)
, I	
comments Regarding Biology:	
To aquallo winding observat.	
DRAWING AND NARRATIVE DI	ESCRIPTION OF STREAM REACH (This must be completed):
	ESCRIPTION OF STREAM REACH (This <u>must</u> be completed): res of interest for site evaluation and a narrative description of the stream's location





<u>OhioEPA</u>		at Evaluation Index ment Field Sheet	QHEI Score	: 51
Stream & Location: Black Fork				<u>9/18/19</u>
River Code:	Scorers STORET #:	Full Name & Affiliation: <u>A</u> Lat./ Long.:	. Gardner, K. Guadag	Office verified Incation
11 SUBSTRATE Check ONLY Two	substrate TYPE BOXES:	<u> </u>	**************************************	
estimate % or note		ODICIN	IE (Or 2 & average) QUALI	ту
DEST TIPES POOL RIFFL				
□ □ BOULDER [9]	_ 🗌 🗋 DETRITUS [3]			
□ □ COBBLE [8] 30 □ □ GRAVEL [7]	_ 🛛 🖾 MUCK [2] _ 🗹 🗔 Silt [2]	WETLANDS [0]		
□ □ SAND [6]		SANDSTONE [0]	DES EXTENSI	
	Score natural substrat	tes; ignore CRIP/RAP [0]	DEONE I EXTENSION MODERAT SI NORMAL NONE [1]	E [-1] Maximum
	a or more [2] sludge from point 3 or less [0]			101 20
Comments		LI COAL FINES [-2]		
Maintained, but is recovering, h 2) INSTREAM COVER Indicate pr	as not been altered in son	ne time. Habitat is absent a		
quality; 2-	Moderate amounts, but not of hi	ghest quality or in small amounts o	f highest	
quality; 3-Highest quality in moderate of diameter log that is stable, well develop	ped rootwad in deep / fast water	, or deep, well-defined, functional p		A CONTRACT OF A CONTRACT OF ADVANCEMENT OF ADVANCEMENT
	POOLS > 70cm [2]			的复数形式的复数形式 化合成合金
0 OVERHANGING VEGETATION 0 SHALLOWS (IN SLOW WATER	2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1 2014 1	2 AQUATIC MACROPHYTI 0 LOGS OR WOODY DEBI		A CONTRACT OF A
0 ROOTMATS [1]		: ಭಾಷ್ಟೆ ಭಾಷ್ : ದಾಶಿಕೆ ಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿಸಿಕೊಡಿ	Construction and a second s	Cover
Comments			M	laximum 8
3] CHANNEL MORPHOLOGY C SINUOSITY DEVELOPME				
MODERATE [3] GOOD [5]		MODERATE [2]	:	
☑ LOW [2] ☑ FAIR [3] ☑ NONE [1] ☑ POOR [1]	☑ RECOVERING [3] □ RECENT OR NO REC			Channel
Comments			. A	faximum 10
			·	
4] BANK EROSION AND RIPA River right looking downstream				
I R ''''	PARIAN WIDTH	FLOOD PLAIN QUALIT	LK:	
		OREST, SWAMP [3] HRUB OR OLD FIELD [2]		
MODERATE [2]	ROW 5-10m [2]	ESIDENTIAL PARK, NEW FIELD I		
	(Y NARROW < 5m [1] ∐ ∐ F NE M1	ENCED PASTURE [1] PEN PASTURE, ROWCROP [0]	Indicate predominant la past 100m riparian.	nd use(s) Riparian
Comments		na an a	8 ···	faximum 9
Stream incised by ~4 feet and c				10
5] POOL / GLIDE AND RIFFLE			Recreation	Potential
	ANNEL WIDTH	CURRENT VELOCITY Check ALL that apply	Primary	i 1
[] > 1m [6]	IDTH > RIFFLE WIDTH [2]		Secondary	
			AL [-1] (circle one and con	
[] 0.2<0.4m [1]		FAST [1] INTERMITTI MODERATE [1] DEDDIES [1]		Pool /
□ < 0.2m [0]		Indicate for reach - pools and riffle	es.	Current 4
Comments				
Indicate for functional riff			population	RIFFLE [metric=0]
of riffle-obligate species: RIFFLE DEPTH RU		Or 2 & average). RUN SUBSTRATE RIFFI		· · · · · · · · · · · · · · · · · · ·
	MUM > 50cm [2] STABLE (e			.DALOO
BEST AREAS 5-10cm [1] MAXI	MUM < 50cm [1] 🗹 MOD. STA	BLE (e.g., Large Gravel) [1]	🗖 LOW [1]	Diffie 1
BEST AREAS < 5cm [metric=0]		E (e.g., Fine Gravel, Sand) [0]	Ø NODERATE [0] ■ EXTENSIVE [-1]	Riffie / 2
Comments Riffles are few and far between.	. Runs present but nool ri	ffle run regime is not in sync		Maximum 8
	VERY LOW - LOW [2-4]			Gradiant
	MODERATE [6-10]			Gradient Maximum 2
(mi²) 🗆	HIGH - VERY HIGH [10-8]	%RUN: (70)%	6 RIFFLE: (10) "	10





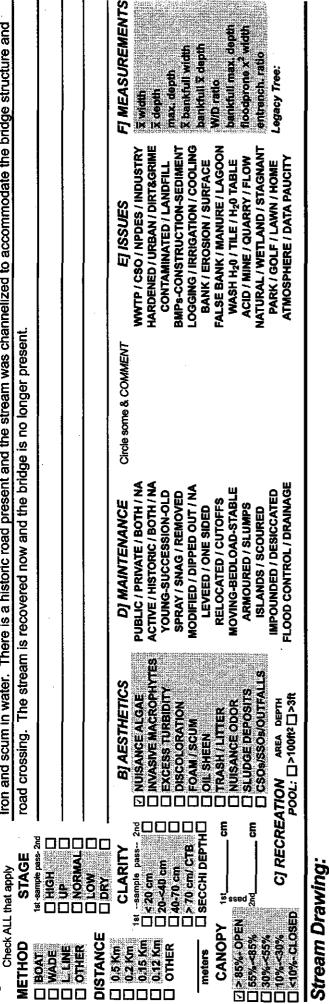


Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 51

Stream & Location: B	ack Fork Wind Project -	Stream S709		Date:10/18/10
		Scorers Full Name &	Affiliation: A. Gardne	r, K. Guadagno
River Code:	STORET #:	Lat./ Long.		Office verified location
BEST TYPES P(DNLY Two substrate TYPE BO which we are only type present DOL RIFFLE OTHER T 7 III HARDRA		Check ONE (Or 2 & ORIGIN JESTONE [1]	average) QUALITY HEAVY [-2]
BOULDER [9] COBBLE [8] GRAVEL [7] SAND [6] BEDROCK [5] NUMBER OF BEST TO Comments Poor pool-rifile development, all substrate	(PES: 4 of more [2] ^{slud} 3 of less [0]	g WI IAL [0]	LS [1] ETLANDS [0] RDPAN [0] NDSTONE [0] P/RAP [0] CUSTURINE [0] ALE [-1] PAL FINES [-2]	MODERATE [-1] Substrate NORMAL [0] FREE [1] MODERATE [-1] MODERATE [-1] NORMAL [0] NONE [1]
auality: 3-Highest quality in	quality; 2-Moderate amounts moderate or greater amounts vell developed rootwad in dee [1] 0 POOL ETATION [1] 0 WWATER) [1] 0 BOUL	WADS [1] 2 AQUAT	n small amounts of highest sep or fast water, large fined, functional pools.	Check ONE (Or 2 & average) EXTENSIVE>75% [11]
SINUOSITY DEVE HIGH [4] EX MODERATE [3] GO LOW [2] I FA	CELLENT [7]	NELIZATION S RED [4]	TABILITY HIGH [3] MODERATE [2] LOW [1]	Channel Maximum 20
River right looking downstream B EROSION NONE / LITTLE [3] MODERATE [2] HEAVY / SEVERE [1] Comments	RIPARIAN WIDTH B WIDE > 50m [4] Image: Image with the system of the syst	B C FOREST, SWAMP	LAIN QUALITY [3] [FIELD [2] RK, NEW FIELD [1] RE [1] ROWCROP [0] [] [] [] [] [] [] [] [] [] [& average) ONSERVATION TILLAGE [1] RBAN OR INDUSTRIAL [0] INING / CONSTRUCTION [0] predominant land use(s) om riparian. Riparian Maximum 10
5] POOL / GLIDE AND MAXIMUM DEPTH Check ONE (ONLY!) D > 1m [6] 0.7-<1m [4] 0.4-<0.7m [2] 0.2-<0.4m [1] 0.2-<0.4m [1] 0.2-<0.4m [1] Comments Pool riffle	RIFFLE / RUN QUALIT CHANNEL WIDT Check ONE (Or 2 & aver POOL WIDTH > RIFFLE WI POOL WIDTH - RIFFLE WI POOL WIDTH - RIFFLE WI development is lacking.	TY H CURREN Page) Check Al DTH [2] TORRENTIAL [- DTH [1] VERY FAST [1] DTH [0] FAST [1] MODERATE [1] Indicate for rea	T VELOCITY L that apply] SLOW [1] I INTERSTITIAL [-1] INTERMITTENT [-2] EDDIES [1] ch - pools and riffles.	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back) Pool / Current Maximum 12
of riffle-obligate s RIFFLE DEPTH BEST AREAS > 10cm [2] BEST AREAS 5-10cm [1] BEST AREAS < 5cm [metric=0] Comments Riffle and	pecies: RUN DEPTH □MAXIMUM > 50cm [2] ☑MAXIMUM < 50cm [1] [2]	must be large enough Check ONE (Or 2 & average). RIFFLE / RUN SUBST STABLE (e.g., Cobble, Bou MOD, STABLE (e.g., Large UNSTABLE (e.g., Fine Grav r.	RATE RIFFLE / RUN alder) [2]	INO RIFFLE [metric=0] I EMBEDDEDNESS DNE [2] W [1] DDERATE [0] RIffle / Run Maximum 8
6] GRADIENT (DRAINAGE AREA (EPA 4520	ff/mi) 🗹 VERY LOW - LOW MODERATE (6-1) mi ²) HIGH - VERY HIG		\sim	





ChieEPA Primary Headwater Habitat Evaluation Form

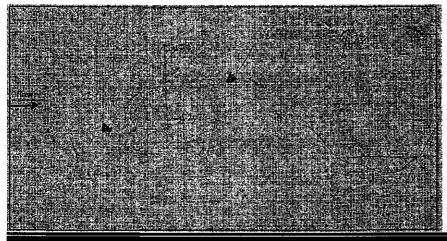
HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Black Fork Wind Project			
SITE NUMBER S013	RIVER BASIN Ohio River		
LENGTH OF STREAM REACH (ft) 163 LAT.	LONG.		
DATE 10/18/10 SCORER A. Garder, CON	MMENTS	<u></u>	
NOTE: Complete All Items On This Form - Refer to	• "Field Evaluation Manual for Ohio"	s PHWH Streams" for Instr	uctions
STREAM CHANNEL NONE / NATURAL CHA MODIFICATIONS:		KING 🔲 RECENT OR NO REC	OVERY
1. SUBSTRATE (Estimate percent of every type of second detection of significant substrate (Max of 32). Add total number of significant substrate PERCENT TYPE BLDR SLABS [16 pts] BOULDER (>256 mm) [16 pts] 0%	TYPE SILT [3 pt] LEAF PACK/WOODY DEB	b is sum of boxes A & B. PERCENT 75%	HHE Metric Points Substrate
BEDROCK [16 pt] 0% COBBLE (65-256 mm) [12 pts] 0% GRAVEL (2-64 mm) [9 pts] 0% SAND (<2 mm) [6 pts]	FINE DETRITUS [3 pts] CLAY or HARDPAN [0 pt] MUCK [0 pts] ARTIFICIAL [3 pts]	0%	Max = 40
Total of Percentages of 0.00% Bldr Slabs, Boulder, Cobble, Bedrock SCORE OF TWO MOST PREDOM/NATE SUBSTRATE TYP	(A) 100% ES: 12 TOTAL NUMBER OF 5	(B) SUBSTRATE TYPES: 1	A+B
 Maximum Pool Depth (Measure the maximum pool evaluation. Avoid plunge pools from road culverts or > 30 centimeters [20 pts] > 22.5 - 30 cm [30 pts] > 10 - 22.5 cm [25 pts] 	ol depth within the 61 meter (200 ft) eval storm water pipes) (Check ONLY one b > 5 cm - 10 cm [15 pts] < 5 cm [5 pts] NO WATER OR MOIST C	ox):	Pool Dept Max = 30
COMMENTS Poor pool development	R (Sarv Tale), 1, 30, 10 vanimuluki altende Presidentini (Sarran Martinia), 20, 10, 10, 10, 10, 10, 10, 10, 10	EPTH (centimeters):	
BANK FULL WIDTH (Measured as the average of > 4.0 meters (> 13') [30 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	3-4 measurements) (Check ONL > 1.0 m - 1.5 m (> 3', 3" - 4' ≤ 1.0 m (<=3' 3") [5 pts]	8") [15 pts]	Bankfull Width Max=30
COMMENTS	AVERAGE BANKF	ULL WIDTH (meters): 2.08	0
RIPARIAN ZONE AND FLOODPLAIN QUAL	PLAIN QUALITY (Most Predominant per Bank) Mature Forest, Wetland Immature Forest, Shrub or Old Field Residential, Park, New Field Fenced Pasture	 (R) as looking downstream ☆ R Conservation Tillage Urban or Industrial Open Pasture, Row Cr Mining or Construction 	•
FLOW REGIME (At Time of Evaluation) (Ct Stream Flowing Subsurface flow with isolated pools (Interstitia COMMENTS_Likely intermittent, wate	I) Moist Channel, isc Dry channel, no w	lated pools, no flow (Intermittent ater (Ephemeral))
SINUOSITY (Number of bends per 61 m (200 None 1.0 0.5 1.5	0 ft) of channel) (Check ONLY one box): 2.0 2.5	3.0 >3	
STREAM GRADIENT ESTIMATE	erate (2 fi/100 fi) Moderate to Sev	ere 🔲 Severe (10 fl/1	100 fi)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):				
QHEI PERFORMED? - Yes No QHEI Score (If Yes, Attach Completed QHEI Form)				
DOWNSTREAM DESIGNATED USE(S)				
WWH Name: Distance from Evaluated Stream				
CWH Name: Distance from Evaluated Stream				
EWH Name: Distance from Evaluated Stream				
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION				
USGS Quadrangle Name: NRCS Soil Map Page: NRCS Soil Map Stream Order				
County: Crawford Township / City:				
MISCELLANEOUS				
Base Flow Conditions? (Y/N): Yes Date of last precipitation: 10/14/10 Quantity: 0.06				
Photograph Information: P49 - Facing east from collection line crossing, looking upstream. P50 - Facing west from collection line				
Elevated Turbidity? (Y/N): No Canopy (% open): 100%				
Were samples collected for water chemistry? (Y/N): No (Note lab sample no. or id. and attach results) Lab Number:				
Field Measures: Temp (°C) Dissolved Oxygen (mg/l) pH (S.U.) Conductivity (µmhos/cm)				
Is the sampling reach representative of the stream (Y/N) If not, please explain:				
Additional comments/description of pollution impacts:				
BIOTIC EVALUATION Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site				
ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual) Fish Observed? (Y/N) No Voucher? (Y/N) No Salamanders Observed? (Y/N) No Voucher? (Y/N)				
Comments Regarding Biology:				
No aquatic wildlife observed.				

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

ChieEPA Primary Headwater Habitat Evaluation Form

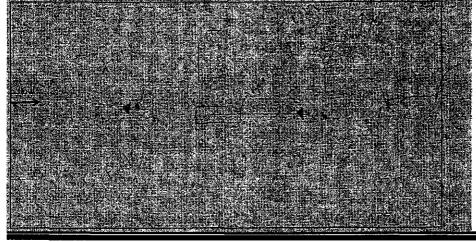
HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Black Fork Wind Project	
SITE NUMBER S013 RIVER BASIN Ohio River DRAINAGE AREA (mi²)	
LENGTH OF STREAM REACH (ft) 163 LAT. LONG. RIVER CODE RIVER MILE	
DATE 10/18/10 SCORER A. Garder, COMMENTS	
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH:Streams" for Instru	ctions
STREAM CHANNEL INONE / NATURAL CHANNEL RECOVERED RECOVERING RECENT OF NO RECOVERING	
1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B. TYPE BLDR SLABS [16 pts] PERCENT TYPE BUDR SLABS [16 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric score is sum of boxes A & B. BUDR SLABS [16 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric score is sum of boxes A & B. BUDR SLABS [16 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric score is sum of boxes A & B. BUDR SLABS [16 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric score is sum of boxes A & B. BUDR SLABS [16 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric score is sum of boxes A & B. BUDR SLABS [16 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric score is sum of boxes A & B. BUDR SLABS [16 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric score is sum of boxes A & B. GBAVEL (2-64 mm) [9 pts] 0% Image: Sill transmitted types found (Max of 8). Final metric for percentages of Bidr Slabs, Boulder, Cobble, Bedrock 0.00% A 100% (B) Total of Percentages of Bidr Slabs, Boulder, Cobble, Bedrock 0.00%	HHEI Metric Points Substrate Max = 40 13 A+B
	Pool Depth
evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 30 centimeters [20 pts] > 22.5 - 30 cm [30 pts] > 5 cm [5 pts]	Max = 30
> 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts]	0
COMMENTS POOR pool development MAXIMUM POOL DEPTH (centimeters):	
BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box): > 4.0 meters (> 13') [30 pts] > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.0 m (<=3' 3") [5 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts] ≤ 1.0 m (<=3' 3") [5 pts]	Bankfull Width Max=30
COMMENTS AVERAGE BANKFULL WIDTH (meters): 2.08	0
This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY INOTE: River Left (L) and Right (R) as looking downstream Integration Integratin Integration Integration Integration Integrat	p
FLOW REGIME (At Time of Evaluation) (Check ONLY one box): Stream Flowing Subsurface flow with isolated pools (Interstitial) COMMENTS_Likely intermittent, water present due to time of year.	
SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 2.0 3.0 0.5 1.5 2.5 >3	
STREAM GRADIENT ESTIMATE	

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):				
QHEI PERFORMED? - Yes No QHEI Score (If Yes, Attach Completed QHEI Form)				
DOWNSTREAM DESIGNATED USE(S)				
WWH Name:	Distance from Evaluated Stream			
CWH Name: _	Distance from Evaluated Stream			
EWH Name:	Distance from Evaluated Stream			
MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHEI	DAREA. CLEARLY MARK THE SITE LOCATION			
USGS Quadrangle Name: NRCS Soil Map F	Page: NRCS Soil Map Stream Order			
County: Crawford Township / City:				
MISCELLANEOUS				
Base Flow Conditions? (Y/N): Yes Date of last precipitation: 10/14/10	Quantity:			
Photograph Information: P49 - Facing east from collection line crossing, looking up	stream. P50 - Facing west from collection line			
Elevated Turbidity? (Y/N): No Canopy (% open): 100%				
Were samples collected for water chemistry? (Y/N): No (Note lab sample no. or id.	and attach results) Lab Number:			
Field Measures: Temp (*C) Dissolved Oxygen (mq/l) pH (S.U.)	Conductivity (µmhos/cm)			
Is the sampling reach representative of the stream (Y/N) Hes If not, please explain:				
Additional comments/description of pollution impacts:				
BIOTIC EVALUATION				
Performed? (Y/N): No (If Yes, Record all observations. Voucher collections optional				
Performed? (Y/N): (If Yes, Record all observations. Voucher collections optiona ID number. Include appropriate field data sheets from the Pr	•			
	multine benchning and			
Fish Observed? (Y/N) Voucher? (Y/N) Salamanders Observed? (Y/N)	Voucher? (Y/N)			
	No Volume (1/14)			
Comments Regarding Biology:				
No aquatic wildlife observed.				
	· · · · · · · · · · · · · · · · · · ·			

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This <u>must</u> be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



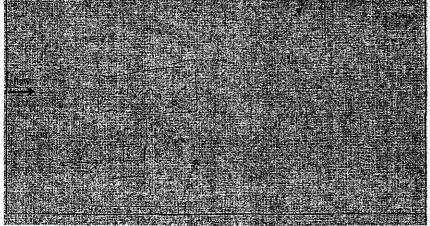
PHWH Form Page - 2

ChieEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

SITE NAME/LOCATION Black Fork Wind Project	
	AREA (m²)
DATE 10/18/10 SCORER A. Garder, COMMENTS	
NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Stream	ms" for Instructions
STREAM CHANNEL INONE / NATURAL CHANNEL RECOVERED RECOVERING RECENTIONS:	T OR NO RECOVERY
I. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate	
(Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes TYPE PERCENT TYPE PE	RCENT Metri
BLDR SLABS [16 pts]	75% Point
	25% 0% Substra
BEDROCK [16 pt] 0% FINE DETRITUS [3 pts] COBBLE (65-256 mm) [12 pts] 0% CLAY or HARDPAN [0 pt]	0% Max = 4
GRAVEL (2-64 mm) [9 pts]	0%
SAND (<2 mm) [6 pts]	
Total of Percentages of 0.00% (A) 100%	(B) A+B
Bidr Slabs, Boulder, Cobble, Bedrock	
CORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TY	
Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the	
evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box): > 30 centimeters [20 pts] > 5 cm - 10 cm [15 pts]	Max = :
> 22.5 - 30 cm [30 pts]	
> 10 - 22.5 cm [25 pts] NO WATER OR MOIST CHANNEL [0 pts]	
COMMENTS Poor pool development MAXIMUM POOL DEPTH (centime	ers):
BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):	Bankfu
> 4.0 meters (> 13') [30 pts]	Width
> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	Max=3
COMMENTSAVERAGE BANKFULL WIDTH (me	ers): 2.08 0
	$u_{i_1}, u_{i_2}, u_{i_3}, u_{i_4}, u_{i_5}, u$
This information must also be completed RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking do	wnstream≴r
RIPARIAN WIDTH FLOODPLAIN QUALITY	
L R (Per Bank) L R (Most Predominant per Bank) L R Wide >10m Mature Forest, Wetland Conser	ntion Tills
	vation Tillage
	r Industrial
Narrow <5m Residential, Park, New Field Open F	asture, Row Crop
	or Construction
COMMENTS Incised by 6-8 feet, no access to floodplain.	
FLOW REGIME (At Time of Evaluation) (Check ONLY one box):	
Stream Flowing Moist Channel, isolated pools, no fl	
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral	
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral COMMENTS_Likely Intermittent, water present due to time of year.	
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral COMMENTS_Likely intermittent, water present due to time of year. SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):	
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral COMMENTS_Likely Intermittent, water present due to time of year.	
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral COMMENTS_Likely Intermittent, water present due to time of year. SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 0.5 1.5	
Subsurface flow with isolated pools (Interstitial) Dry channel, no water (Ephemeral COMMENTS_Likely intermittent, water present due to time of year. SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box): None 1.0 2.0	

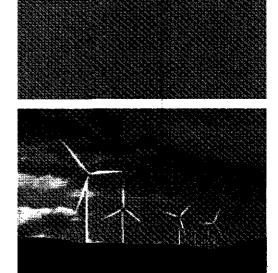
ADDITIONAL STREAM INFORMATION (This Information Must	Also be Completed):
QHEI PERFORMED? - Yes No QHEI Score	(If Yes, Attach Completed QHEI Form)
WWH Name:	Distance from Evaluated Stream
CWH Name:	Distance from Evaluated Stream
EWH Name:	Distance from Evaluated Stream
MAPPING: ATTACH COPIES OF MAPS, INCLUDING TH	E ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION
USGS Quadrangle Name:	NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Crawford To	winship / City:
MISCELLANEOUS	
Base Flow Conditions? (Y/N): Yes Date of last precipitation:	10/14/10 Quantity: 0.06
Photograph Information: P49 - Facing east from collection line	crossing, looking upstream. P50 - Facing west from collection line
Elevated Turbidity? (Y/N): No Canopy (% open):	100%
Were samples collected for water chemistry? (Y/N): No (Not	e lab sample no. or id. and attach results) Lab Number:
Field Measures: Temp (°C) Dissolved Oxygen (mg/)	pH (S.U.) Conductivity (µmhos/cm)
Is the sampling reach representative of the stream (Y/N) Yes If	not, please explain:
Additional comments/description of pollution impacts:	
BIOTIC EVALUATION	
· · · <u> </u>	ucher collections optional. NOTE: all voucher samples must be labeled with the site data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) No Voucher? (Y/N) No Salamande	rs Observed? (Y/N) No Voucher? (Y/N) No
	quatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)
Comments Regarding Biology:	
No aquatic wildlife observed.	
	· · · · · · · · · · · · · · · · · · ·
DRAWING AND NARRATIVE DESCRIPTI	ON OF STREAM REACH (This must be completed):
	t for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

RSG Sound Study





Sound Modeling for Black Fork Wind Farm

Richland & Crawford County, Ohio

March 2011

DATA M ANALYSIS M SOLUTIONS

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1.0 INTRODUCTION

Black Fork Wind, LLC proposes to construct and operate up to 91 wind turbines in an area west of Shelby, Ohio. The project is currently considering three possible turbine models: Vestas V100, Siemens SWT 2.3, and GE 1.6 XLE. The total capacity of the system would be up to 209.3 MW, with turbines generating between 1.6 and 2.3 MW each. This study assessed the sound levels from wind turbines and substations in the surrounding area. This report includes:

- 1) A description of the site
- 2) A noise primer
- 3) A discussion of noise issues specific to wind turbines
- 4) A discussion of applicable noise limits
- 5) The results of background sound level monitoring
- 6) The results of computer propagation modeling
- 7) A discussion of construction noise impacts
- 8) Summary and conclusions

2.0 SITE DESCRIPTION

The proposed turbines are located to the west of Shelby, Ohio within Auburn, Plymouth, Sandusky, Vernon, Sharon, and Jackson Townships. The area is primarily flat and used for agriculture. There are approximately 1,400 homes in and around the project area.

A map of the project area is provided in Figure 1.

3.0 A NOISE PRIMER

3.1 What is Noise?

Noise is defined as "a sound of any kind, especially when loud, confused, indistinct, or disagreeable." Passing vehicles, a noisy refrigerator, or an air conditioning system are sources of noise which may be bothersome or cause annoyance. These sounds are a part of generally accepted everyday life, and can be measured, modeled, and, if necessary, controlled.

3.2 How is Sound Described?

Sound is caused by variations in air pressure at a range of frequencies. Sound levels that are detectable by human hearing are defined in the decibel (dB) scale, with 0 dB being the threshold of human hearing at mid frequecies, and 120 dB to 150 dB causing pain and permanent damage to the ear. Figure 2 shows the sound levels of typical activities that generate noise.



Figure 1: Project Area Map





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Figure 2: Basic Theory: Common Sounds in Decibels

	Occupational Noise	Even day Maina	Tennenostation Moice	· 1	1	D.GCTD	els (dBA)
Perception	Measured at the ear	Everyday Noise	Transportation Noise Near a jet engine		-	140	۱.
			i comi a jui a la comi		-)
				: 1	_		
				:			
Threshold of Pain					_	130	
					-		
				:	-		
							Deafeni
					-		(
		Hard Rock Band		-	_	120	
					_		
				1			
					_		
	Chainsaw					110	
	ONBILISEN				-]
	Table saw					:	
	Circular saw				-		1
	Bandsaw			÷		100	
	Impact Wrench		Auto horn at 10 feet		_	100	
	F 1			:	_		Vanil
	Electric hand drill				-		
		v	Snowmobile	÷	-		1
		Riding lawn mower, at ear	Grommode		-	80	
			Street Sweeper		-		
		Shop-vac, at ear, outdoors	·		Ξ.		/
			Truck passby, 60 mph at 50 feet	1			
					_	80	
			Inside car, windows open, 65 mph		—		
		Vacuum cleaner, at ear	Truck passby, 30 mph. at 50 feet				
		vacuum cicaliei, at eal			—		Loud
		Playground recess (avg)	Inside car, windows closed, 65 mph	:			1
				!	_	70	
					_		1
]
			Car passby, 30 mph, at 50 feet	:			٦ ١
Jrban Area Conversational Spe	h	TV in quiet soor			—	60	
Joinversational Ope	CG11	TV in quiet room Microwave oven at 2.5 feet			—		
		mesonare oren et 2.0 root	Car passby, 30 mph, at 100 feet	i.			
							· · · ·
							/ Moder
					_	68	Modera
		Field with Insects	Idling car at 50 feet		-	50	Moder
	Office, with computer	Field with Insects	Idling car at 50 feet			50	Moder
Suburban area	Office, with computer and HVAC	Field with Insects	Idling car at 50 feet			50	
Suburban area			Idling car at 50 feet			50	
Suburban area		Field with Insects Refrigerator at 3 feet	Idling car at 50 feet			50	
Suburban area		Refrigerator at 3 feet	Idling car at 50 feet				
Suburban area			Idling car at 50 feet				
Suburban area		Refrigerator at 3 feet	Idling car at 50 feet				
	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	
Dulet rural area, no	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet				
Dulet fural area, no	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	
Quiet rural area, no	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	
Dulet fural area, no	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	
Quiet rural area, no insects or traffic	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	
Suburban area Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	
Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	- Faint
Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	Faint
Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t wind	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40	- Faint
Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t wind	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40 30 20	- Faint
Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t wind	and HVAC	Refrigerator at 3 feet Library	Idling car at 50 feet			40 30 20	Faint
Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t wind	and HVAC	Refrigerator at 3 feet	Idling car at 50 feet			40 30 20	Faint
Quiet rural area, no insects or traffic Quiet winter night, v area, no insects, t wind	and HVAC wind, vildemess raffic or	Refrigerator at 3 feet Library	Idling car at 50 feet			40 30 20	Very Fai



Resource Systems Group, Inc. 2 March 2011 The decibel scale can be weighted to mimic the human perception of certain frequencies. The most common of these weighting scales is the "A" weighting, and this scale is used most frequently in environmental noise analysis. Sound levels that are weighted by the "A" scale have units of dBA or dB(A).

3.3 Sound Pressure vs Sound Power Levels

Both sound power and sound pressure levels are described in terms of decibels, but they are not the same thing. Sound power is a measure of the acoustic power emitted or radiated by a source. The sound power level of a source does not change with its surrounding conditions.

Sound pressure level is observed at a specific location and is related to the difference in air pressure above or below atmospheric pressure. This fluctuation in air pressure is a result of the sound power of a source, the distance at which the sound pressure level is being observed, and the characteristics of the path and environment around the source and receiver. When one refers to sound level, they are generally speaking of the perceived level, or sound pressure level.

For example, a coffee grinder will have the same sound power whether or not it is grinding indoors or outdoors. The amount of sound the coffee grinder generates is always the same. However, if you are standing six feet away from the coffee grinder indoors, you would experience a higher sound pressure level than you would if you were six feet away from the coffee grinder outdoors in an open field. The reason for this is that the sound being emitted from the coffee grinder would bounce off walls and other surfaces indoors which would cause sound to build up and raise the sound pressure level.

Sound power cannot be directly measured. However, since sound pressure and sound power are related, sound power can be calculated by measurements of sound pressure and/or sound intensity. It can be helpful to note that over soft ground outside, the sound pressure level of a small source observed 50 feet away is roughly 33 dB lower than its sound power level.

3.4 How is Sound Modeled?

The decibel sound level is on a logarithmic scale. One manifestation of this is that sound power increases by a factor of 10 for every 10 dB increase. However, for every 10 dB increase in sound pressure level at mid frequencies, we perceive an approximate doubling of loudness. Small changes in sound pressure level, below 3 dB, are generally not perceptible¹.

For a point source, sound level diminishes or attenuates by 6 dB for every doubling of distance due to geometrical divergence. For example, if an idling truck is measured at 50 feet as 66 dBA, at 100 feet the level will decline to 60 dBA, and at 200 feet, 54 dBA, assuming no other influences. From a line source, sound attenuates at approximately 3 dB per doubling distance. Line sources transition to an attenuation of 6 dB per doubling at a distance of roughly a third of the length of the line source.

Other factors, such as intervening vegetation, terrain, walls, berms, buildings, and atmospheric absorption will also further reduce the sound level reaching the listener. In each of these, higher frequencies will attenuate faster than lower frequencies. Finally, the ground can also have an impact on sound levels. Harder ground generally increases and softer ground generally decreases the sound level at a receiver. Reflections off of buildings and walls can increase broadband sound levels by as much as 3 dB.



¹ There is a range of perception thresholds depending on the character of the sound and the way it is presented to the listener

If we add two equal sources together, the resulting sound level will be 3 dB higher. For example, if one machine registers 76 dBA at 50 feet, two co-located machines would register 3 dB more, or 79 dBA at that distance. In a similar manner, at a distance of 50 feet, four machines, all operating at the same place and time, would register 82 dBA and eight machines would register 85 dBA. If the two sources differ in sound level then 0 to 3 dB will be added to the higher level as shown in Table 1.

Table 1: L	Decibel	Addition
------------	---------	----------

If Two Sources Differ By	Add
0-1 dB	3 dB
2-4 dB	2 dB
5-9 dB	1 dB
>9 dB	0 dB

3.5 Description of Terms

Sound can be measured in many different ways. Perhaps the simplest way is to take an instantaneous measurement, which gives the sound pressure level at an exact moment in time. The level reading could be 62 dB, but a second later it could 57 dB. Sound pressure levels are constantly changing. It is for this reason that it makes sense to describe noise and sound in terms of time.

The most common ways of describing noise over time is in terms of various statistics. Take, as an example, the sound levels measured shown in Figure 3. Instantaneous measurements are shown as a ragged grey line. The sound levels that occur over this time can be described verbally, but it is much easier to describe the recorded levels statistically. This is done using a variety of "levels" which are described below.

3.5.1 Equivalent Average Sound Level - Leq

One of the most common ways of describing noise levels is in terms of the continuous equivalent sound level (Leq). The Leq is the average of the sound pressure over an entire monitoring period and expressed as a decibel. The monitoring period could be for any amount of time. It could be one second (Leq 1-sec), one hour (Leq(1)), or 24 hours (Leq(24)). Because Leq describes the average pressure, loud and infrequent noises have a greater effect on the resulting level than quieter and more frequent noises. For example, in Figure 3, the median sound level is about 47 dBA, but the equivalent average sound level (Leq) is 53 dBA. Because it tends to weight the higher sound levels and is representative of sound that takes place over time, the Leq is the most commonly used descriptor in noise standards and regulations.



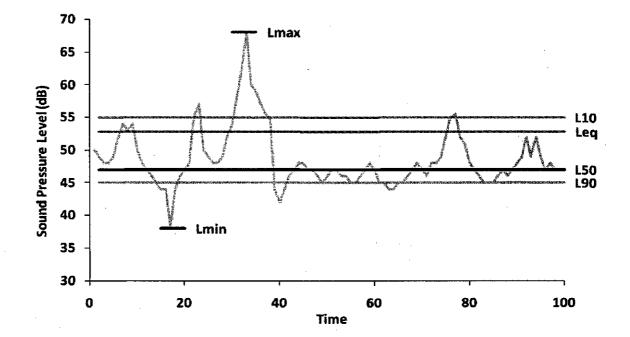


Figure 3: Example of Sound Measurement over Time and Descriptive Statistics

3.5.2 Percentile Sound Level - Ln

Ln is the sound level exceeded n percent of the time. This type of statistical sound level, also shown in Figure 3, gives us information about the distribution of sound levels over time. For example, the L10 is the sound level that is exceeded 10 percent of the time, while the L90 is the sound level exceeded 90% of the time. The L50 is exceeded half the time. The L90 is a residual base level which most of the sound exceeds, while the L10 is representative of the peaks and higher, but less frequent levels. When one is trying to measure a continuous sound, like a wind turbine, the L90 is often used to filter out other short-term environmental sounds that increase the level, such as dogs barking, vehicle passbys, wind gusts, and talking. That residual sound, or L90, is then the sound that is occurring in the absence of these noises.

3.5.3 Lmin and Lmax

Lmin and Lmax are simply the minimum and maximum sound level, respectively, monitored over a period of time. These are shown in Figure 3.

4.0 OHIO SITING REQUIREMENTS AND STANDARDS

4.1 Application Requirements

The Ohio Power Siting Board has defined the materials required of an applicant during the permitting process in Ohio Administrative Code 4906-17-08. This reads:

"(2) Noise. The applicant shall:

