

Firelands Wind, LLC
Case No. 18-1607-EL-BGN

Application Part 17 of 17

Part 17 includes:

- **Exhibit Z** **Ecological Assessment (Part 8 of 8)**
- **Exhibit AA** **Frac-Out Contingency Plan**

Date Filed: January 31, 2019

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Attorneys for Firelands Wind, LLC

SIM-168

ADDITIONAL STREAM INFORMATION (This information must also be completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSSTREAM 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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____

Photograph Information: SIM-168-01E, SIM-168-02 SUBSTRATE

Elevated Turbidity? (Y/N): Y Canopy (% open): 80 RECENT HEAVY RAIN

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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

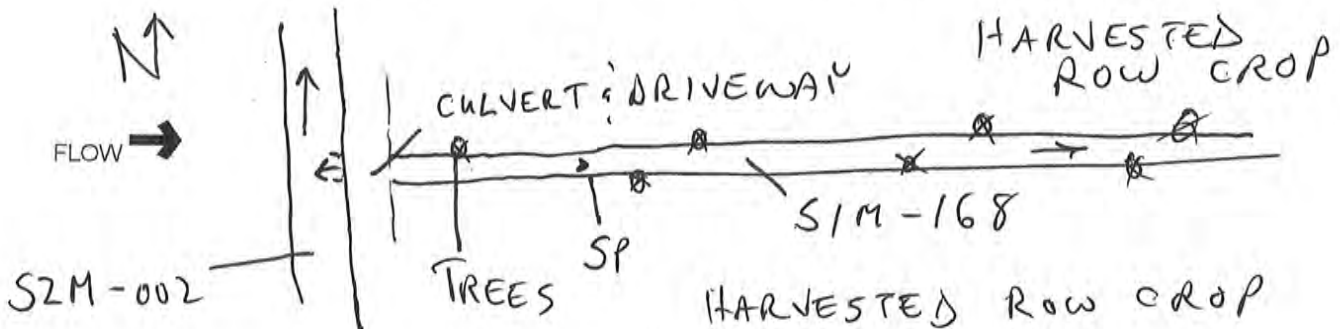
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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



SIM-169



Primary Headwater Habitat Evaluation Form

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

44

SITE NAME/LOCATION 4382000
 SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 1-3-19 SCORER DAF COMMENTS _____

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:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pt]	<u>30</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>10</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input checked="" type="checkbox"/> MUCK [0 pts]	<u>10</u>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
 Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 6(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

9

A + B

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):

<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

20

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters)

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

SIM-169

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: _____ Township / City: _____

MISCELLANEOUSBase Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____ RECENT HEAVY RAINSPhotograph Information: SIM-169-01 E, SIM-169-02 SUBSTRATEElevated Turbidity? (Y/N): ☒ Canopy (% open): 90Were 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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): 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)

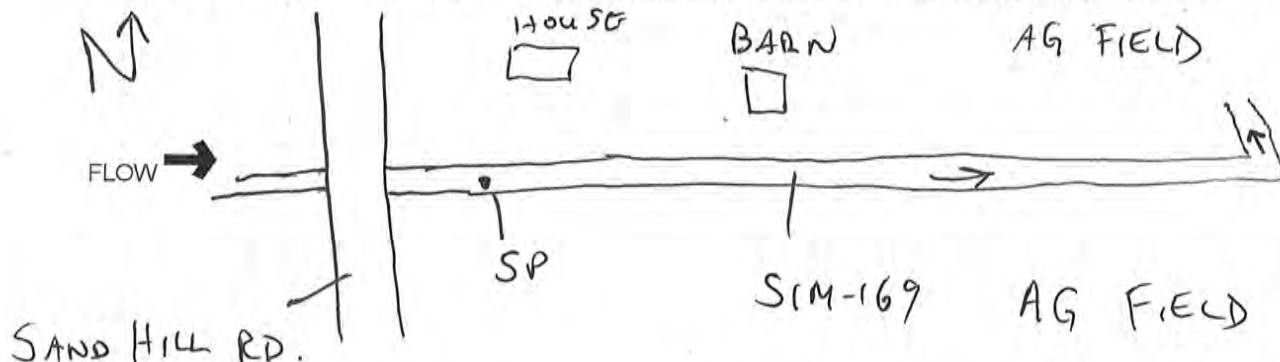
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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





Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

40

Stream & Location: S2M-002

RM:

Date: 9/11/06

Scorers Full Name & Affiliation: Katie Simon MSEI

River Code: -

STORET #: -

Lat./ Long.: 41.28584 82.7499

Office verified location ☐

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		OTHER TYPES	
POOL	RIFFLE	POOL	RIFFLE
<input type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/>
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>
<input checked="" type="checkbox"/> COBBLE [8]	<u>60</u>	<input type="checkbox"/> MUCK [2]	<u>10</u>
<input checked="" type="checkbox"/> GRAVEL [7]	<u>20</u>	<input type="checkbox"/> SILT [2]	<u>10</u>
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)	

ORIGIN

☐ LIMESTONE [1]

☐ TILLS [1]

☐ WETLANDS [0]

☐ HARDPAN [0]

☐ SANDSTONE [0]

☐ RIP/RAP [0]

☒ LACUSTURINE [0]

☐ SHALE [-1]

☐ COAL FINES [-2]

QUALITY

☐ HEAVY [-2]

☒ MODERATE [-1]

☐ NORMAL [0]

☐ FREE [1]

☐ EXTENSIVE [-2]

☐ MODERATE [-1]

☐ NORMAL [0]

☒ NONE [1]

Substrate

15

Maximum 20

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments

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 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)

<input checked="" type="checkbox"/> UNDERGUT BANKS [1]	<input checked="" type="checkbox"/> POOLS > 70cm [2]	<input checked="" type="checkbox"/> OXBOWS, BACKWATERS [1]
<input checked="" type="checkbox"/> OVERHANGING VEGETATION [1]	<input checked="" type="checkbox"/> ROOTWADS [1]	<input checked="" type="checkbox"/> AQUATIC MACROPHYTES [1]
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input checked="" type="checkbox"/> BOULDERS [1]	<input checked="" type="checkbox"/> LOGS OR WOODY DEBRIS [1]
<input checked="" type="checkbox"/> ROOTMATS [1]		

☐ EXTENSIVE >75% [11]

☐ MODERATE 25-75% [7]

☒ SPARSE 5-<25% [3]

☐ NEARLY ABSENT <5% [1]

Cover

Maximum 20

Comments

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input checked="" type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel

Maximum 20

Comments

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
<input checked="" type="checkbox"/> EROSION	<input type="checkbox"/>	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/>	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/>
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/>	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/>
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/>	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/>	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/>
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/>	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/>	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/>
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/>

Indicate predominant land use(s) past 100m riparian.

Riparian

Maximum 10

Comments

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

MAXIMUM DEPTH

CHANNEL WIDTH

CURRENT VELOCITY

Check ONE (ONLY)

Check ONE (Or 2 & average)

Check ALL that apply

☐ > 1m [6]

☐ 0.7-<1m [4]

☐ 0.4-<0.7m [2]

☐ 0.2-<0.4m [1]

☒ < 0.2m [0]

☐ POOL WIDTH > RIFFLE WIDTH [2]

☒ POOL WIDTH = RIFFLE WIDTH [1]

☐ POOL WIDTH > RIFFLE WIDTH [0]

☐ TORRENTIAL [-1]

☒ SLOW [1]

☐ VERY FAST [1]

☒ INTERSTITIAL [-1]

☐ FAST [1]

☐ INTERMITTENT [-2]

☐ MODERATE [1]

☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential

Primary Contact

Secondary Contact

(circle one and comment on back)

Pool / Current

Maximum 12

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Riffle / Run

Maximum 8

Comments

6) **GRADIENT** 25 ft/mi

☐ VERY LOW - LOW [2-4]

%POOL: 100

%GLIDE: 0

Gradient

DRAINAGE AREA

☐ MODERATE [6-10]

%RUN: 0

%RIFFLE: 0

Maximum 10

1.28 mi²

☒ HIGH - VERY HIGH [10-6]

AJ SAMPLED REACH

Check ALL that apply

METHOD STAGE

- 1st-sample pass- 2nd
- ☒ BOAT ☐ HIGH ☐
- ☒ WADE ☐ UP ☐
- ☐ L LINE ☐ NORMAL ☐
- ☐ OTHER ☐ LOW ☐
- ☐ DRY

DISTANCE

- ☐ 0.5 Km ☐
- ☐ 0.2 Km ☐
- ☐ 0.15 Km ☐
- ☐ 0.12 Km ☐
- ☒ OTHER ☐

CLARITY

- 1st -sample pass- 2nd
- ☒ < 20 cm ☐
- ☐ 20-40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ > 85%- OPEN ☐
- ☐ 55%-<85% ☐
- ☐ 30%-<55% ☐
- ☐ 10%-<30% ☐
- ☒ <10%- CLOSED ☐

CJ RECREATION

POOL: ☐ >100ft² ☐ >3ft

Stream Drawing:

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Typical reach - but with fast success

BJ AESTHETICS

- ☐ NUISANCE ALGAE ☐
- ☐ INVASIVE MACROPHYTES ☐
- ☐ EXCESS TURBIDITY ☐
- ☐ DISCOLORATION ☐
- ☐ FOAM / SCUM ☐
- ☐ OIL SHEEN ☐
- ☐ TRASH / LITTER ☐
- ☐ NUISANCE ODOR ☐
- ☐ SLUDGE DEPOSITS ☐
- ☐ CSOs/SSOs/OUTFALLS ☐

DJ MAINTENANCE

- ☐ PUBLIC / PRIVATE / BOTH / NA ☐
- ☐ ACTIVE / HISTORIC / BOTH / NA ☐
- ☐ YOUNG-SUCCESSION-OLD ☐
- ☐ SPRAY / SNAG / REMOVED ☐
- ☐ MODIFIED / DIPPED OUT / NA ☐
- ☐ LEVEED / ONE SIDED ☐
- ☐ RELOCATED / CUTOFFS ☐
- ☐ MOVING-BEDLOAD-STABLE ☐
- ☐ ARMORED / SLUMPS ☐
- ☐ ISLANDS / SCoured ☐
- ☐ IMPOUNDED / DESICCATED ☐
- ☐ FLOOD CONTROL / DRAINAGE ☐

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 H₂O / TILE / H₂O TABLE ☐
- ACID / MINE / QUARRY / FLOW ☐
- NATURAL / WETLAND / STAGNANT ☐
- PARK / GOLF / LAWN / HOME ☐
- ATMOSPHERE / DATA PAUCITY ☐

FJ MEASUREMENTS

- \bar{x} width ☐
- \bar{x} depth ☐
- max. depth ☐
- \bar{x} bankfull width ☐
- bankfull \bar{x} depth ☐
- W/D ratio ☐
- bankfull max. depth ☐
- floodprone \bar{x}^2 width ☐
- entrench. ratio ☐
- Legacy Tree: ☐

run map

Shrubland

at pool

run map

outstanding vegetation - scattered bar oak

run map

S N



Primary Headwater Habitat Evaluation Form

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

54

SITE NAME/LOCATION

A382001 SITE NUMBER RIVER BASIN DRAINAGE AREA (mi²) 0.83
LENGTH OF STREAM REACH (ft) LAT. 41.2753 LONG. -82.7359 RIVER CODE RIVER MILE
DATE 9/12/18 SCORER KLS COMMENTS

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:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	8
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	2	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	80	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	8	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

2

(A)

15

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

HHEI
Metric
PointsSubstrate
Max = 40

19

A + B

Pool Depth
Max = 30

15

Bankfull
Width
Max=30

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

L R

(Per Bank)

☒ ☒

Wide >10m

☐ ☐

Moderate 5-10m

☐ ☐

Narrow <5m

☐ ☐

None

L R

(Most Predominant per Bank)

☒ ☒

Mature Forest, Wetland

☐ ☐

Immature Forest, Shrub or Old Field

☐ ☐

Residential, Park, New Field

☐ ☐

Fenced Pasture

L R

Conservation Tillage

☐ ☐

Urban or Industrial

☐ ☐

Open Pasture, Row Crop

☐ ☐

Mining or Construction

COMMENTS

- ☒ **FLOW REGIME** (At Time of Evaluation) (Check ONLY one box):

☒

Stream Flowing

☐

Subsurface flow with isolated pools (Interstitial)

☐

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):☐ ☐

None

☐ ☒

0.5

☐ ☒

1.0

☐ ☐

1.5

☐ ☐

2.0

☐ ☐

2.5

☐ ☐

3.0

☐ ☐

>3

STREAM GRADIENT ESTIMATE☐ Flat (0.5 ft/100 ft)☐ 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 _____ (If Yes, Attach Completed QHEI Form)

DOWNSTEAM 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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/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) _____ 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)

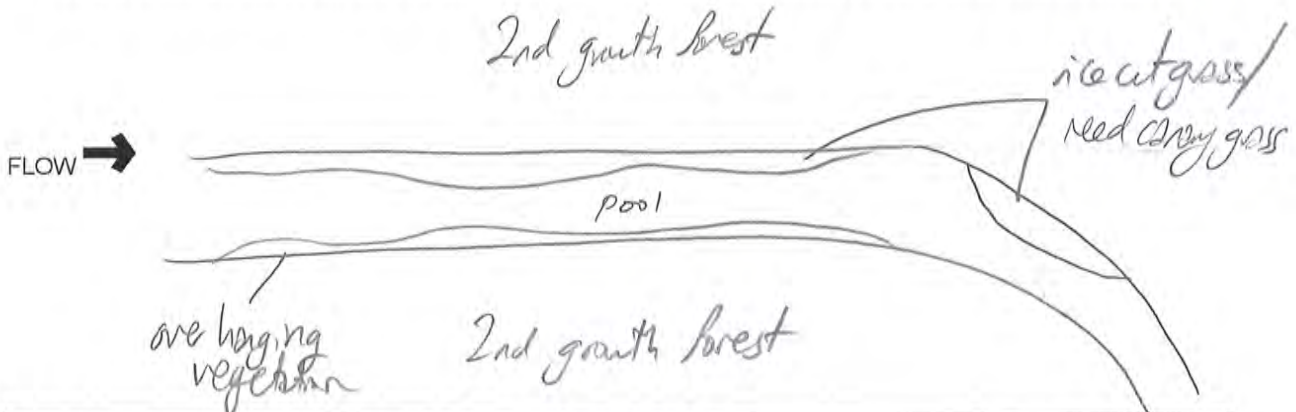
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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





Primary Headwater Habitat Evaluation Form

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

51

SITE NAME/LOCATION Unnamed tributary to Mayhew Creek
SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) 0.13
LENGTH OF STREAM REACH (ft) _____ LAT. 41.23047 LONG. -82.80938 RIVER CODE _____ RIVER MILE _____
DATE 9/14/18 SCORER KLS, MSB COMMENTS _____

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:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pt]	<u>50</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>20</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input checked="" type="checkbox"/> MUCK [0 pts]	<u>30</u>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

6

A + B

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters):

15

Pool Depth
Max = 30

25

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters)

2

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

- FLOW REGIME** (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

- SINUOSITY** (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): _____

Were samples collected for water chemistry? (Y/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) _____ 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) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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





Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: **(2)**

Stream & Location: S2M-012-

RM: _____ Date: 01/31/06

MEGGINSON CREEK

Scorers Full Name & Affiliation: _____

River Code: _____

STORET #: _____

Lat./Long.: _____

18

Office verified location ☐

1) **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
<input type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	Substrate (0) Maximum 20
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/>	<input type="checkbox"/> NORMAL [0]	
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/>	<input type="checkbox"/> SILT [2]	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/>	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/>	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/>	<input type="checkbox"/> MODERATE [-1]	
NUMBER OF BEST TYPES: <input type="checkbox"/> 4 or more [2] <input type="checkbox"/> 3 or less [0]				<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> EMBEDDEDNESS	<input type="checkbox"/> NORMAL [0]	
Comments				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/>	<input type="checkbox"/> NONE [1]	
				<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/>		

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 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.

AMOUNT

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	<input type="checkbox"/> EXTENSIVE > 75% [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> SPARSE 5-25% [3]
<input type="checkbox"/> ROOTMATS [1]			<input type="checkbox"/> NEARLY ABSENT < 5% [1]

Comments

Cover Maximum **(7)** 20

3) **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input checked="" type="checkbox"/> POOR [1]	<input checked="" type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum **(6)** 20

4) **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 60m [4]	<input type="checkbox"/> FOREST, SWAMP [3]	<input type="checkbox"/> CONSERVATION TILLAGE [1]		
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]		
<input type="checkbox"/> HEAVY / SEVERE [1]	<input checked="" type="checkbox"/> NARROW < 10m [2]	<input type="checkbox"/> RESIDENTIAL / PARK, NEW FIELD [1]	<input type="checkbox"/> MINING / CONSTRUCTION [0]		
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]			
	<input checked="" type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> OPEN PASTURE / ROWCROP [0]			

Comments

Indicate predominant land use(s) past 100m riparian. **(5)**
Riparian Maximum 10

5) **POOL / GLIDE AND RIFFLE / RUN QUALITY**

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ONE (Or 2 & average)
<input type="checkbox"/> > 2.1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [1]
<input type="checkbox"/> 0.7-2.1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> FAST FLOW [1]
<input type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> MODERATE FLOW [1]
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> SLOW FLOW [1]
<input checked="" type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> STAGNANT [0]

Comments

Pool / Current Maximum **(1)** 12

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average)

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM = 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

Riffle / Run Maximum **(0)** 8

6) **GRADIENT** (5 ft/mi) ☒ VERY LOW - LOW [2-4]
DRAINAGE AREA (4.95 mi²) ☐ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-8]

%POOL: **(100)** %GLIDE: **(0)**
%RUN: **(0)** %RIFFLE: **(0)**

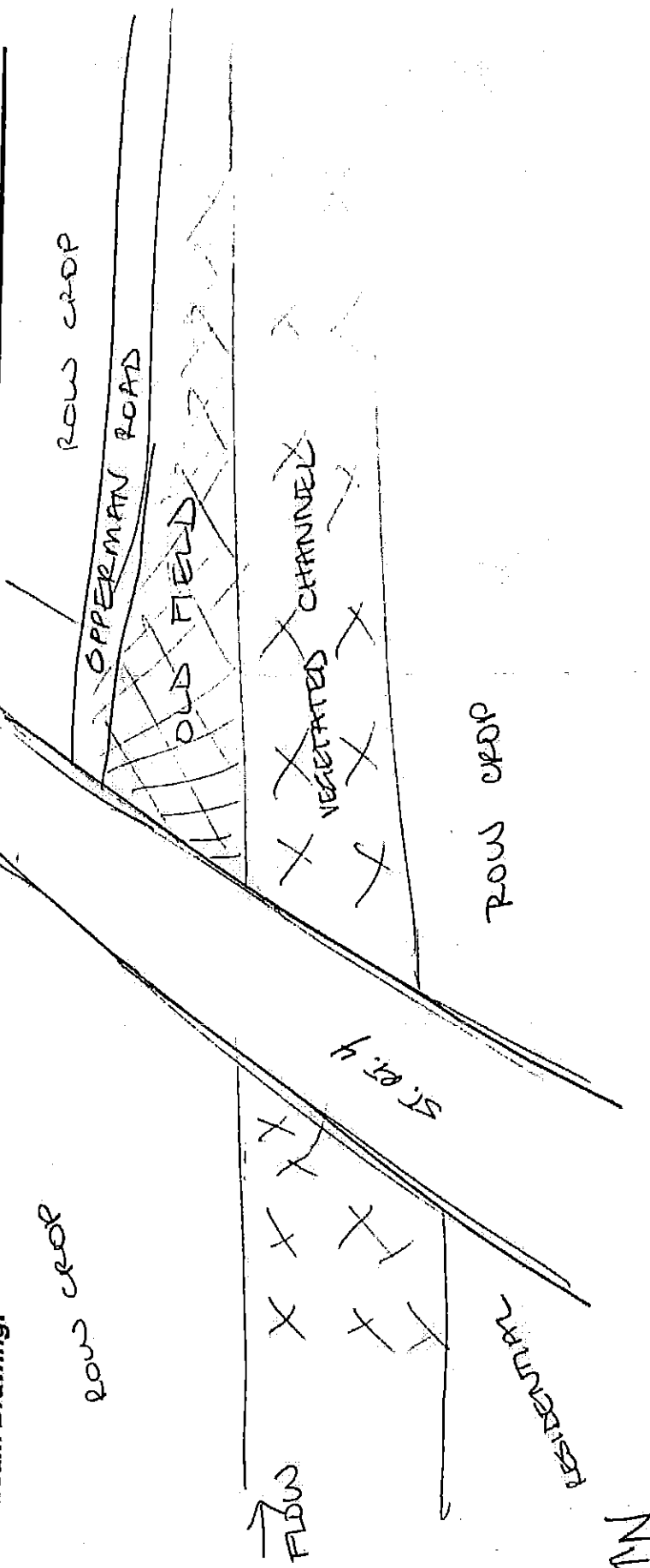
Gradient Maximum **(4)** 10

A) SAMPLED REACH

Check ALL that apply

<p>METHOD</p> <p><input type="checkbox"/> BOAT</p> <p><input checked="" type="checkbox"/> WADE</p> <p><input type="checkbox"/> LINE</p> <p><input type="checkbox"/> OTHER</p>		<p>STAGE</p> <p>1st - sample pass- 2nd</p> <p><input type="checkbox"/> HIGH</p> <p><input type="checkbox"/> UP</p> <p><input type="checkbox"/> NORMAL</p> <p><input checked="" type="checkbox"/> LOW</p> <p><input type="checkbox"/> DRY</p>	
<p>DISTANCE</p> <p><input type="checkbox"/> 0.5 Km</p> <p><input type="checkbox"/> 0.2 Km</p> <p><input type="checkbox"/> 0.15 Km</p> <p><input type="checkbox"/> 0.12 Km</p> <p><input type="checkbox"/> OTHER</p>		<p>CLARITY</p> <p>1st - sample pass- 2nd</p> <p><input type="checkbox"/> < 20 cm</p> <p><input type="checkbox"/> 20-40 cm</p> <p><input type="checkbox"/> 40-70 cm</p> <p><input type="checkbox"/> > 70 cm / CTB</p> <p><input type="checkbox"/> SECCHI DEPTH</p>	
<p>CANOPY</p> <p>1st 2nd</p> <p><input checked="" type="checkbox"/> > 85% - OPEN</p> <p><input type="checkbox"/> 55%-85%</p> <p><input type="checkbox"/> 30%-55%</p> <p><input type="checkbox"/> 10%-30%</p> <p><input type="checkbox"/> < 10% - CLOSED</p>		<p>CJ RECREATION</p> <p>AREA DEPTH</p> <p>POOL: <input type="checkbox"/> > 100m² <input type="checkbox"/> > 3ft</p>	

Stream Drawing:



<p>DJ MAINTENANCE</p> <p><input type="checkbox"/> PUBLIC / PRIVATE / BOTH / NA</p> <p><input type="checkbox"/> ACTIVE / HISTORIC / BOTH / NA</p> <p><input type="checkbox"/> YOUNG-SUCCESSION-OLD</p> <p><input type="checkbox"/> SPRAY / SNAG / REMOVED</p> <p><input type="checkbox"/> MODIFIED / DIPPED OUT / NA</p> <p><input type="checkbox"/> LEVEED / ONE SIDED</p> <p><input type="checkbox"/> RELOCATED / CUTOFFS</p> <p><input type="checkbox"/> MOVING-BEDLOAD-STABLE</p> <p><input type="checkbox"/> ARMOURD / SLUMPS</p> <p><input type="checkbox"/> ISLANDS / SCOURD</p> <p><input type="checkbox"/> IMPOUNDED / DESICCATED</p> <p><input type="checkbox"/> FLOOD CONTROL / DRAINAGE</p>	<p>EJ ISSUES</p> <p>WWTP / CSO / NPDES / INDUSTRY</p> <p>HARDENED / URBAN / DIRT & GRIME</p> <p>CONTAMINATED / LANDFILL</p> <p>BMPs-CONSTRUCTION-SEDIMENT</p> <p>LOGGING / IRRIGATION / COOLING</p> <p>BANK / EROSION / SURFACE</p> <p>FALSE BANK / MANURE / LAGOON</p> <p>WASH H₂O / TILE / H₂O-TABLE</p> <p>ACID / MINE / QUARRY / FLOW</p> <p>NATURAL / WETLAND / STAGNANT</p> <p>PARK / GOLF / LAWN / HOME</p> <p>ATMOSPHERE / DATA PAUCITY</p>	<p>FJ MEASUREMENTS</p> <p><input type="checkbox"/> width</p> <p><input type="checkbox"/> depth</p> <p><input type="checkbox"/> max. depth</p> <p><input type="checkbox"/> bankfull width</p> <p><input type="checkbox"/> bankfull x depth</p> <p><input type="checkbox"/> W/D ratio</p> <p><input type="checkbox"/> bankfull max. depth</p> <p><input type="checkbox"/> floodprone x² width</p> <p><input type="checkbox"/> entrench. ratio</p> <p>Legacy Tree:</p>
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Primary Headwater Habitat Evaluation Form

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

50

SITE NAME/LOCATION Hayward Ditch (S2M-017)

SITE NUMBER 13820001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 9-14-18 SCORER ELM COMMENTS _____

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: channelization

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	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pts]	<u>40</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>30</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>20</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	<u>10</u>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>10</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
Bldg Slabs, Boulder, Cobble, Bedrock

(A) 6

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

16

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

20

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Intermittent)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 m/100 m) ☐ Flat to Moderate ☐ Moderate (2 m/100 m) ☐ Moderate to Severe ☐ Severe (10 m/100 m)

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): _____

Were samples collected for water chemistry? (Y/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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): 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) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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

residential

Rt. 269

FLOW →

dry channel

row
crop



Primary Headwater Habitat Evaluation Form

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

36

SITE NAME/LOCATION Huq's Ditch (52m - 018)
SITE NUMBER A3820001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 9/19/18 SCORER PLM COMMENTS _____

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: channelization

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	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pt]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>10</u>
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input checked="" type="checkbox"/> FINE DETRITUS [3 pts]	<u>40</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input checked="" type="checkbox"/> MUCK [0 pts]	<u>50</u>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock _____

(A) 3(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 406
A + B

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth
Max = 305

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

11

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

Bankfull
Width
Max=3025

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

3.5

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	
L	R	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wide >10m		Mature Forest, Wetland	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Narrow <5m		Residential, Park, New Field	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture	
			<input checked="" type="checkbox"/>
			Open Pasture, Row Crop
			<input type="checkbox"/>
			Mining or Construction

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input checked="" type="checkbox"/> Flat (0.5 ft/100 ft)	<input type="checkbox"/> Flat to Moderate	<input type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
--	---	---	---	--

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 100%

Were samples collected for water chemistry? (Y/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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): 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)

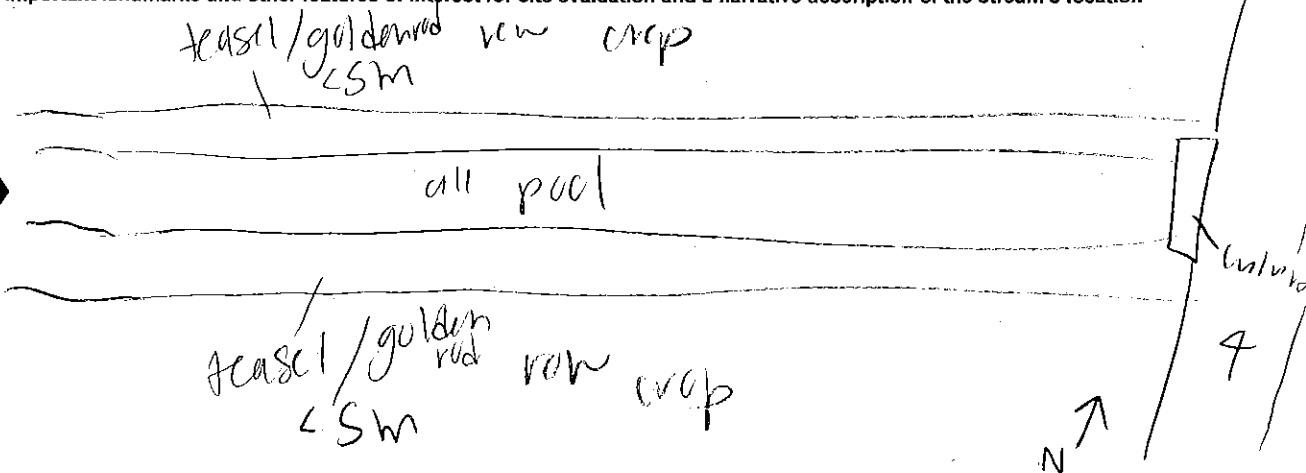
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

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 →





Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score:

43

Stream & Location: Frank Run (52M-019)

RM:

Date: 9/19/08

Scorer's Full Name & Affiliation: FLM, MSG

Lat./ Long.:

18

Office verified location ☐

River Code:

STORET #:

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES	POOL RIFFLE	OTHER TYPES	POOL RIFFLE
<input type="checkbox"/> BLDR / SLABS [10]		<input type="checkbox"/> HARDPAN [4]	
<input type="checkbox"/> BOULDER [9]		<input type="checkbox"/> DETRITUS [3]	5
<input checked="" type="checkbox"/> COBBLE [8]	20	<input type="checkbox"/> MUCK [2]	
<input type="checkbox"/> GRAVEL [7]	10	<input type="checkbox"/> SILT [2]	5
<input type="checkbox"/> SAND [6]		<input type="checkbox"/> ARTIFICIAL [0]	
<input checked="" type="checkbox"/> BEDROCK [5]	60	(Score natural substrates; ignore sludge from point-sources)	

ORIGIN	QUALITY
<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> WETLANDS [0]	<input checked="" type="checkbox"/> NORMAL [0]
<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
<input checked="" type="checkbox"/> LACUSTURINE [0]	<input checked="" type="checkbox"/> NORMAL [0]
<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
<input type="checkbox"/> COAL FINES [-2]	

Substrate
13
Maximum 20

NUMBER OF BEST TYPES: ☒ 4 or more [2] ☐ 3 or less [0]

Comments

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 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.)

COVER	AMOUNT	
<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]
<input type="checkbox"/> ROOTMATS [1]		

Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [1]
☐ MODERATE 25-75% [7]
☒ SPARSE 5-25% [3]
☐ NEARLY ABSENT <5% [1]

Cover
Maximum 20

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input checked="" type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input checked="" type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel
Maximum 20

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION	RIPIARIAN WIDTH	FLOOD PLAIN QUALITY
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input checked="" type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Indicate predominant land use(s) past 100m riparian.

Riparian
Maximum 10

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

CHANNEL WIDTH

CURRENT VELOCITY

Check ONE (ONLY)

Check ONE (Or 2 & average)

Check ALL that apply

<input type="checkbox"/> > 1m [6]
<input type="checkbox"/> 0.7-1m [4]
<input type="checkbox"/> 0.4-0.7m [2]
<input checked="" type="checkbox"/> 0.2-0.4m [1]
<input type="checkbox"/> < 0.2m [0]

<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]
<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]
<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]

<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> FAST [1]	<input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> SLOW [1]
<input type="checkbox"/> VERY SLOW [1]	<input type="checkbox"/> SLOW [1]	<input type="checkbox"/> MODERATE [1]	<input type="checkbox"/> FAST [1]

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current
Maximum 12

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☒ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 60cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input checked="" type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input checked="" type="checkbox"/> BEST AREAS < 5cm [0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input checked="" type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Riffle / Run
Maximum 8

6) GRADIENT

DRAINAGE AREA

VERY LOW - LOW [2-4]

MODERATE [6-10]

HIGH - VERY HIGH [10-5]

% POOL: 85

% GLIDE: 5

% RUN: 5

% RIFFLE: 5

Gradient
Maximum 10

Comment RE: Reach consistency/ Is reach typical of stream?, Recreational/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

A) SAMPLED REACH

Check ALL that apply

METHOD STAGE

- ☐ BOAT
- ☒ WADE
- ☐ LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☒ OTHER

200 meters

CLARITY

- 1st sample pass - 2nd
- ☒ < 20 cm
- ☐ 20-40 cm
- ☐ 40-70 cm
- ☐ > 70 cm/CTB
- ☐ SECCHI DEPTH

CANOPY

- ☒ > 85% - OPEN
- ☐ 55% - 85%
- ☐ 30% - 55%
- ☐ 10% - 30%
- ☐ < 10% - CLOSED

C) RECREATION

AREA DEPTH

POOL: ☐ > 100 ft ☐ > 2 ft

B) AESTHETICS

- ☐ NUISANCE ALGAE
- ☐ INVASIVE MACROPHYTES
- ☐ EXCESS TURBIDITY
- ☐ DISCOLORATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSOs/SSOs/OUTFALLS

D) MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURD / SLUMPS
- ISLANDS / SCoured
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

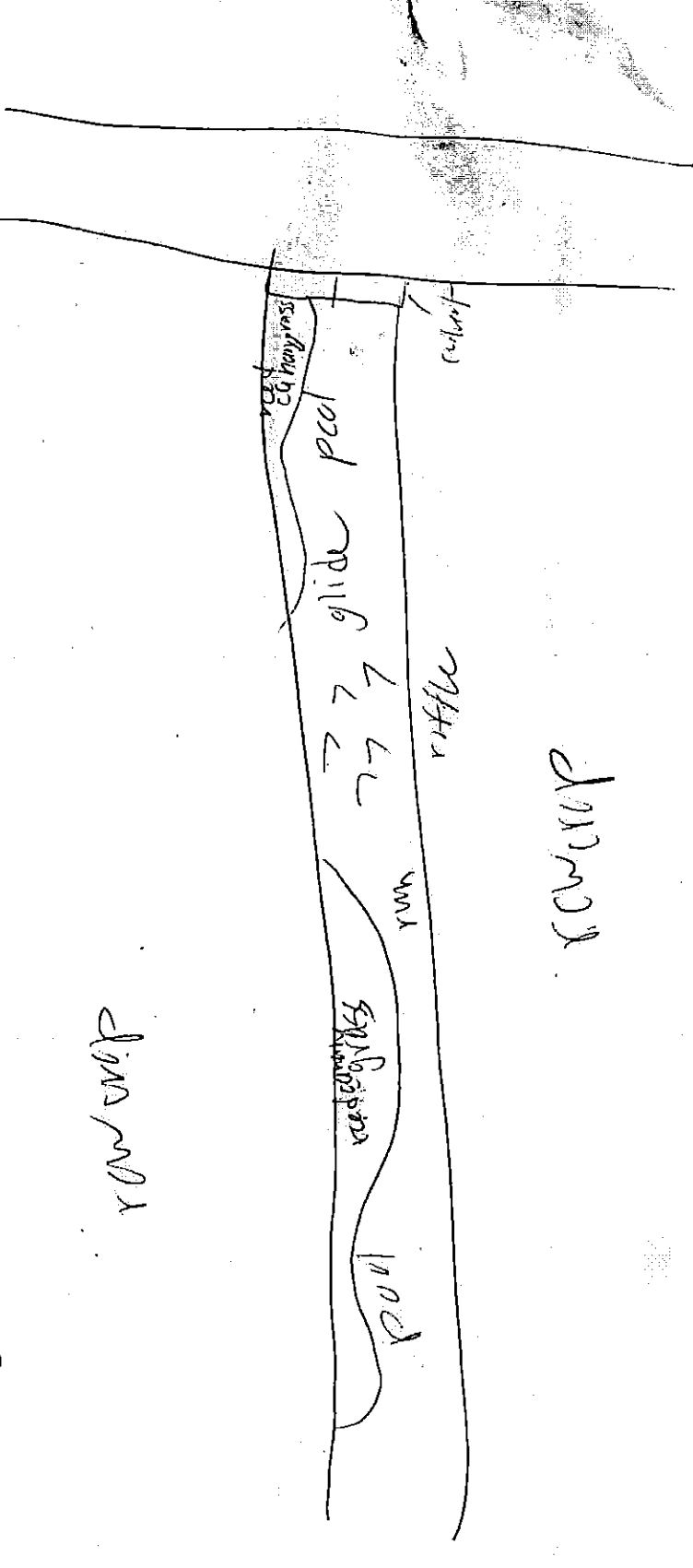
E) ISSUES

- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT & GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H₂O / TILE / H₂O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

F) MEASUREMENTS

- \bar{x} width 7'
- \bar{x} depth
- max. depth
- \bar{x} bankfull width
- bankfull \bar{x} depth
- W/D ratio
- bankfull max. depth
- floodprone \bar{x} width
- entrench. ratio
- Legacy Tree:

Stream Drawing:





Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: **51**

Stream & Location: **S2M-020**

RM: **---** Date: **9/17/05**

Scorers Full Name & Affiliation: **ELM, MSG**
River Code: **---** STORET #: **---** Lat./Long.: **41.1654182.80258** (NAD 83 - decimal)
Office verified location ☐

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL RIFFLE	OTHER TYPES	POOL RIFFLE	ORIGIN	QUALITY
<input type="checkbox"/> BLDR/SLABS [10]	<input type="checkbox"/> 10	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> 10	<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> 50	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> 30	<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> 50	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/> 30	<input type="checkbox"/> WETLANDS [0]	<input checked="" type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> 50	<input checked="" type="checkbox"/> SILT [2]	<input type="checkbox"/> 30	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/> 50	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/> 30	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/> 50	(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
				<input checked="" type="checkbox"/> LACUSTURINE [0]	<input checked="" type="checkbox"/> NORMAL [0]
				<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
				<input type="checkbox"/> COAL FINES [-2]	

NUMBER OF BEST TYPES: ☒ 4 or more [2] ☐ 3 or less [0]

Comments

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 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.

<input checked="" type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]	AMOUNT
<input checked="" type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
<input checked="" type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]	<input type="checkbox"/> EXTENSIVE >75% [1]
<input type="checkbox"/> ROOTMATS [1]			<input checked="" type="checkbox"/> MODERATE 25-75% [7]
			<input type="checkbox"/> SPARSE 5-<25% [3]
			<input type="checkbox"/> NEARLY ABSENT <5% [1]

Comments

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input checked="" type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Comments

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input checked="" type="checkbox"/> WIDE > 50m [4]	<input checked="" type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Comments

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	Recreation Potential
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	Primary Contact
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Secondary Contact
<input type="checkbox"/> 0.7-<1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input checked="" type="checkbox"/> SLOW [1]	(circle one and comment on back)
<input type="checkbox"/> 0.4-<0.7m [2]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.2-<0.4m [1]		<input type="checkbox"/> FAST [1]	
<input checked="" type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> MODERATE [1]	

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]

Comments

6] GRADIENT (12.5 ft/mi) ☐ VERY LOW - LOW [2-4] ☒ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (15.84 mi²)

%POOL: **100** %GLIDE: **0** %RUN: **0** %RIFFLE: **0**

Gradient Maximum **10**

AJ SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
☒ WADE
☐ L LINE
☐ OTHER
 DISTANCE
☐ 0.5 Km
☐ 0.2 Km
☐ 0.15 Km
☐ 0.12 Km
☒ OTHER
 CLARITY
 1st sample pass- 2nd
☒ < 20 cm
☐ 20-40 cm
☐ 40-70 cm
☐ > 70 cm/ CTB
☐ SECCI DEPTH
 meters
 CANOPY
☐ > 85% - OPEN
☐ 55% - 85%
☒ 30% - 55%
☐ 10% - 30%
☐ < 10% - CLOSED

STAGE

- 1st sample pass- 2nd
☐ HIGH
☐ UP
☒ NORMAL
☐ LOW
☐ DRY

Comment RE: Reach consistency/ Is reach typical of stream? reach typical of stream

BJAESTHETICS

- ☐ NUISANCE ALGAE
☐ INVASIVE MACROPHYTES
☐ EXCESS TURBIDITY
☐ DISCOLORATION
☐ FOAM / SCUM
☐ OIL SHEEN
☒ TRASH / LITTER
☐ NUISANCE ODOR
☐ SLUDGE DEPOSITS
☐ CSOs/SSOs/OUTFALLS

AREA DEPTH
POOL: ☐ > 100ft ☐ > 3ft

CJ RECREATION

POOL: ☐ > 100ft ☐ > 3ft

DJ MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA
 ACTIVE / HISTORIC / BOTH / NA
 YOUNG-SUCCESSION-OLD
 SPRAY / SNAG / REMOVED
 MODIFIED / DIPPED OUT / NA
 LEVEED / ONE SIDED
 RELOCATED / CUTOFFS
 MOVING-BEDLOAD-STABLE
 ARMoured / SLUMPS
 ISLANDS / SCOURED
 IMPOUNDED / DESICCATED
 FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

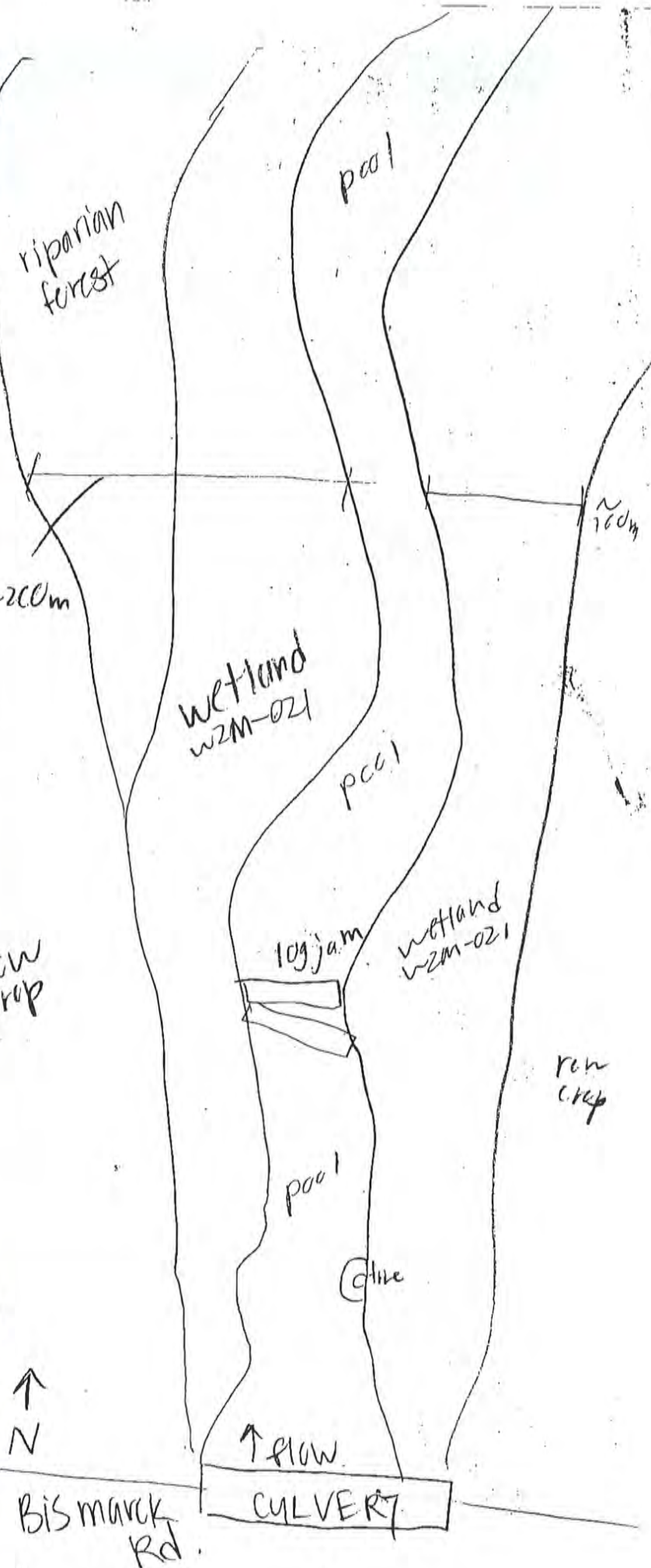
EJ ISSUES

- WWTP / CSO / NPDES / INDUSTRY
 HARDENED / URBAN / DIRT & GRIME
 CONTAMINATED / LANDFILL
 BMPs-CONSTRUCTION-SEDIMENT
 LOGGING / IRRIGATION / COOLING
 BANK / EROSION / SURFACE
 FALSE BANK / MANURE / LAGOON
 WASH H₂O / TILE / H₂O TABLE
 ACID / MINE / QUARRY / FLOW
 NATURAL / WETLAND / STAGNANT
 PARK / GOLF / LAWN / HOME
 ATMOSPHERE / DATA PAUCITY

FJ MEASUREMENTS

- x width 15'
 x depth 7'
 max. depth
 x bankfull width 25'
 bankfull x depth
 W/D ratio
 bankfull max. depth
 floodprone x width
 entrench. ratio
 Legacy Tree:

Stream Drawing:





Primary Headwater Habitat Evaluation Form

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

32

SITE NAME/LOCATION S2M-022
SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 9-17-18 SCORER ELM COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY
MODIFICATIONS:

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	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pt]	<u>30</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>20</u>
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>30</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock _____

(A)

9

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

12

A + B

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth
Max = 30

0

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

Bankfull
Width
Max=30

20

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

2

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			
L	R	L	R	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	(Per Bank)		(Most Predominant per Bank)		
<input checked="" type="checkbox"/>	Wide >10m	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	None	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	Mining or Construction

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 50

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

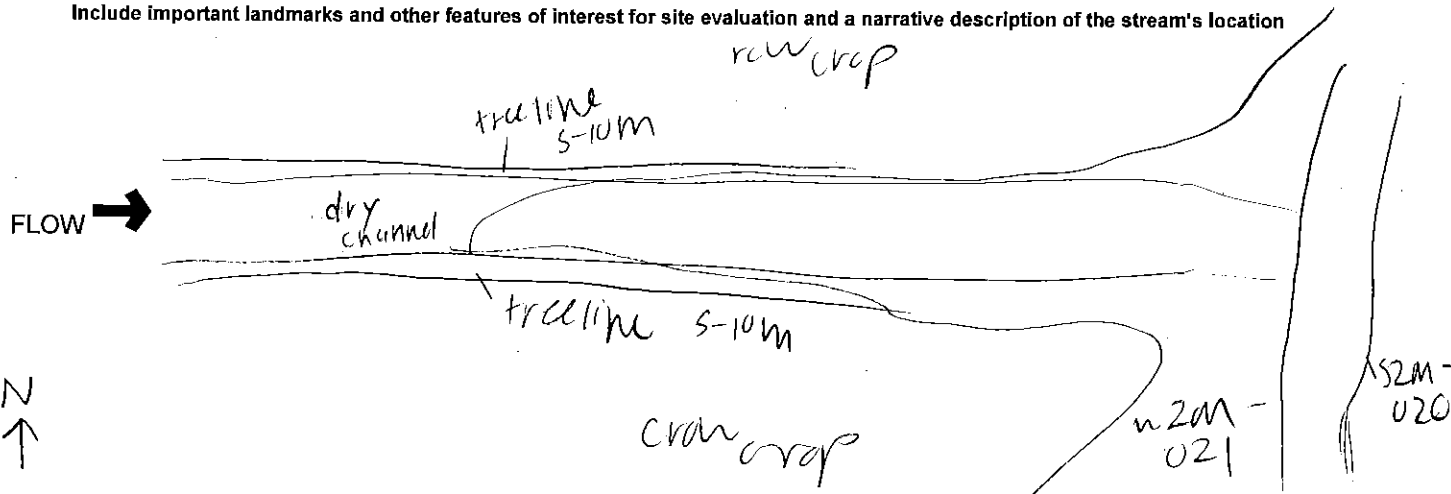
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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



Stream & Location: S2M-023RM: Date: 9/17/06Scorers Full Name & Affiliation: ELAN, MSAOffice verified location ☐River Code: STORET #: Lat./Long.:

18

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES		OTHER TYPES	
<input type="checkbox"/> BLDR / SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> MUCK [2]
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/> SAND [6]	<input type="checkbox"/> SILT [2]	<input type="checkbox"/> ARTIFICIAL [0]
<input type="checkbox"/> BEDROCK [5]			

ORIGIN	
<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT
<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]
<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]
<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> LACUSTURINE [0]
<input type="checkbox"/> SHALE [1]	<input type="checkbox"/> COAL FINES [2]

QUALITY	
<input type="checkbox"/> HEAVY [-2]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> EXTENSIVE [2]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/> NONE [1]

Substrate
Maximum
20NUMBER OF BEST TYPES: ☐ 4 or more [2]☐ 3 or less [0]

Comments

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 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.

AMOUNT

Check ONE (Or 2 & average)

<input type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]
<input type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]
<input type="checkbox"/> ROOTMATS [1]		

<input type="checkbox"/> EXTENSIVE > 75% [1]
<input type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SPARSE 5-25% [3]
<input type="checkbox"/> NEARLY ABSENT < 5% [1]

Cover
Maximum
20

Comments

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]
<input type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel
Maximum
20

Comments

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)
River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
<input type="checkbox"/> NONE / LITTLE [3]	<input type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Indicate predominant land use(s)
past 100m riparian.Riparian
Maximum
10

Comments

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]
<input type="checkbox"/> 0.7-1m [4]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]
<input type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> MODERATE [1]
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> SLOW [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)Pool /
Current
Maximum
12

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average)

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Comments

6) GRADIENT 7.14 ft/mi
DRAINAGE AREA 1.95 mi²

<input type="checkbox"/> VERY LOW, LOW [1-4]
<input type="checkbox"/> MODERATE [5-10]
<input type="checkbox"/> HIGH, VERY HIGH [10-6]

%POOL: 100 %GLIDE: 0
%RUN: 0 %RIFFLE: 0Gradient
Maximum
10

AJ SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
☐ WADE
☐ LINE
☐ OTHER
- STAGE**
- 1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th
- ☐ HIGH
☐ UP
☐ NORMAL
☐ LOW
☐ DRY

DISTANCE

- ☐ 0.5 Km
☐ 0.2 Km
☐ 0.15 Km
☐ 0.1 Km
☐ OTHER

CLARITY

- 1st 2nd 3rd 4th 5th 6th 7th 8th 9th 10th
- ☐ < 20 cm
☐ 20-40 cm
☐ 40-70 cm
☐ > 70 cm/CTB
☐ SECCHI DEPTH

CANOPY

- ☐ > 85% OPEN
☐ 65%-85%
☐ 30%-65%
☐ 10%-30%
☐ < 10% CLOSED

CJ RECREATION

- AREA DEPTH
 POOL- ☐ > 100 M² ☐ > 3R

BJAESTHETICS

- ☐ NUISANCE ALGAE
☐ INVASIVE MACROPHYTES
☐ EXCESS TURBIDITY
☐ DISCOLORATION
☐ FOAM / SCUM
☐ OIL SHEEN
☐ TRASH / LITTER
☐ NUISANCE ODOR
☐ SLUDGE DEPOSITS
☐ CSO / SSO / OUTFALLS

DJ MAINTENANCE

- ☐ PUBLIC / PRIVATE / BOTH / NA
☐ ACTIVE / HISTORIC / BOTH / NA
☐ YOUNG-SUCCESSION-OLD
☐ SPRAY / SNAG / REMOVED
☐ MODIFIED / DIPPED OUT / NA
☐ LEVEED / ONE SIDED
☐ RELOCATED / CUTOFFS
☐ MOVING-BED LOAD-STABLE
☐ ARMOURD / SLUMPS
☐ ISLANDS / SCoured
☐ IMPOUNDED / DESICCATED
☐ FLOOD CONTROL / DRAINAGE

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 H₂O / TILE / H₂O TABLE
 ACID / MINE / QUARRY / FLOW
 NATURAL / WETLAND / STAGNANT
 PARK / GOLF / LAWN / HOME
 ATMOSPHERE / DATA PAUCITY

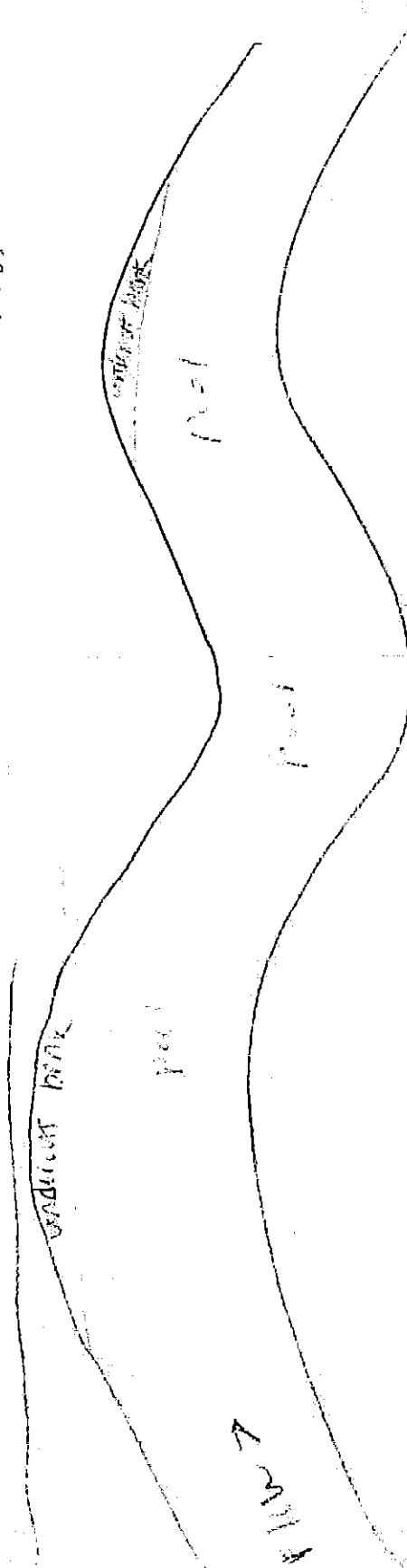
FJ MEASUREMENTS

- ☐ width
☐ depth
☐ max. depth
☐ bankfull width
☐ bankfull depth
☐ W/D ratio
☐ bankfull max. depth
☐ floodprone x² width
☐ entrench. ratio
 Legacy Tree:

Stream Drawing:

run 10/10

2nd growth forest



170-WZM
 PWD 10/10

N



Primary Headwater Habitat Evaluation Form

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

27

SITE NAME/LOCATION

A302001

SITE NUMBER

RIVER BASIN

DRAINAGE AREA (mi²)

0.56

LENGTH OF STREAM REACH (ft)

LAT. 41.176206

LONG. -82.79604

RIVER CODE

RIVER MILE

DATE

SCORER

KLS

COMMENTS

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:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). 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]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pt]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

10

TYPE

☒☐☐☐☒☐

SILT [3 pt]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

20

20

50

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

0

(A)

3

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

☐
☐
☐

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

☒
☐
☐

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

10

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐
☐
☐

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

☒
☐
☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

0.6

HHEI
Metric
PointsSubstrate
Max = 40

7

A + B

Pool Depth
Max = 30

15

Bankfull
Width
Max=30

5

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

L R

☐ ☒

(Per Bank)

Wide >10m

☐ ☐

Moderate 5-10m

☒ ☐

Narrow <5m

☐ ☐

None

COMMENTS

L R

☐ ☒

(Most Predominant per Bank)

Mature Forest, Wetland

☐ ☐

Immature Forest, Shrub or Old Field

☐ ☐

Residential, Park, New Field

☐ ☐

Fenced Pasture

L R

☐ ☐

Conservation Tillage

☐ ☐

Urban or Industrial

☒ ☐

Open Pasture, Row Crop

☐ ☐

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):☒
☐

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

☐
☐

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):☐ ☐

None

0.5

☒ ☐

1.0

1.5

☐ ☐

2.0

2.5

☐ ☐

3.0

>3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

reach typical of stream

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): *30-55*

Were samples collected for water chemistry? (Y/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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

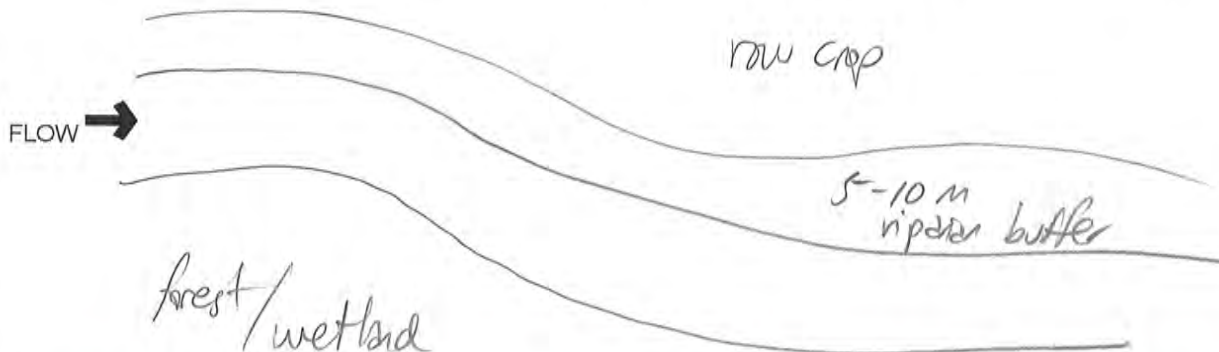
Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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





Primary Headwater Habitat Evaluation Form

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

56

SITE NAME/LOCATION S2M-030 SITE NUMBER A3820001 RIVER BASIN _____ DRAINAGE AREA (mi²) 0.39
LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE 2
DATE 7/10/18 SCORER ELM, MSG COMMENTS _____

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: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.				HHEI Metric Points
TYPE	PERCENT	TYPE	PERCENT	
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> BEDROCK [16 pts]	_____	Substrate Max = 40 <div>1</div> A + B
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____			
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____			
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>0</u>		(A) <u>0</u>	(B) <u>1</u>	
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ 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):				Pool Depth Max = 30 <div>25</div>
<input type="checkbox"/> > 30 centimeters [20 pts]	_____	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	_____	
<input checked="" type="checkbox"/> > 22.5 - 30 cm [30 pts]	_____	<input type="checkbox"/> < 5 cm [5 pts]	_____	
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	_____	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	_____	
COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): <u>20</u>				
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):				Bankfull Width Max=30 <div>30</div>
<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	_____	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3'3" - 4'8") [15 pts]	_____	
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9'7" - 13') [25 pts]	_____	<input type="checkbox"/> < 1.0 m (< 3'3") [5 pts]	_____	
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4'8" - 9'7") [20 pts]	_____			
COMMENTS _____ AVERAGE BANKFULL WIDTH (meters) <u>4.5</u>				

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

- | L | R | (Per Bank) |
|-------------------------------------|-------------------------------------|----------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Narrow <5m |
| <input type="checkbox"/> | <input type="checkbox"/> | None |

COMMENTS _____

FLOODPLAIN QUALITY

- | L | R | (Most Predominant per Bank) |
|--------------------------|--------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

- | L | R | |
|-------------------------------------|-------------------------------------|------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

- | | |
|---|--|
| <input checked="" type="checkbox"/> Stream Flowing | <input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstifial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

- | | | | |
|-------------------------------|---|------------------------------|------------------------------|
| <input type="checkbox"/> None | <input checked="" type="checkbox"/> 1.0 | <input type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

- | | | | | |
|---|--|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input checked="" type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|--|---|---|--|

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 90

Were samples collected for water chemistry? (Y/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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

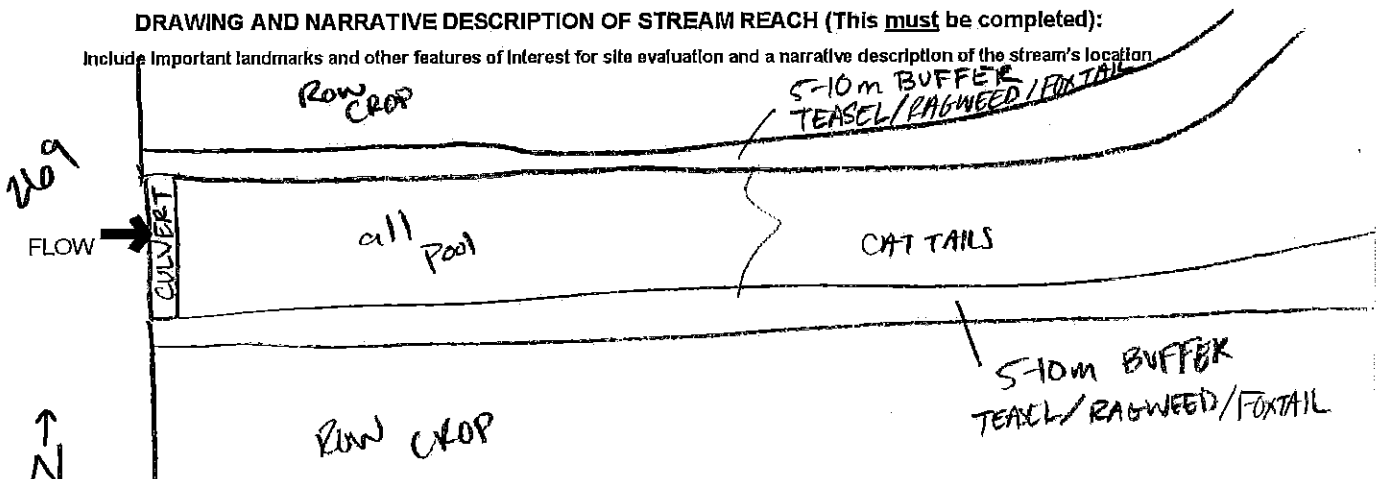
Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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





Primary Headwater Habitat Evaluation Form

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

54

SITE NAME/LOCATION 52A-177
SITE NUMBER A292001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 266 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 9/26/18 SCORER ELM COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY
MODIFICATIONS:

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	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pts]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	2
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	93
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ (A) 6 (B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ 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):			
PERCENT	PERCENT	PERCENT	PERCENT
<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 4"

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):			
PERCENT	PERCENT	PERCENT	PERCENT
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 7" - 9' 8") [20 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters) 8'

HHEI Metric Points

Substrate Max = 40

9

A + B

Pool Depth Max = 30

25

Bankfull Width Max = 30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L R (Per Bank)
☒ ☒ Wide >10m
☐ ☐ Moderate 5-10m
☐ ☐ Narrow <5m
☐ ☐ None

COMMENTS _____

FLOODPLAIN QUALITY

L R (Most Predominant per Bank)
☒ ☒ Mature Forest, Wetland
☐ ☐ Immature Forest, Shrub or Old Field
☐ ☐ Residential, Park, New Field
☐ ☐ Fenced Pasture

L R
☐ ☐ Conservation Tillage
☐ ☐ Urban or Industrial
☐ ☐ Open Pasture, Row Crop
☐ ☐ Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒ Stream Flowing
☐ Subsurface flow with isolated pools (interstitial)

☐ Moist Channel, isolated pools, no flow (intermittent)
☐ Dry channel, no water (ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐ None
☐ 0.5

☐ 1.0
☐ 1.5

☐ 2.0
☐ 2.5
☒ 3.0
☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.6 m/100 ft) ☒ Flat to Moderate ☐ Moderate (2 m/100 ft) ☐ Moderate to Severe ☐ Severe (10 m/100 ft)

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): _____

Were samples collected for water chemistry? (Y/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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): 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) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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





Primary Headwater Habitat Evaluation Form

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

35

82M-035

SITE NAME/LOCATION

SITE NUMBER A3820001 RIVER BASINDRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE

9/21/18

SCORER

K. SIMON

COMMENTS

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:

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	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	0	<input type="checkbox"/> SILT [3 pt]	10
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	0	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	2
<input type="checkbox"/> BEDROCK [16 pt]	0	<input checked="" type="checkbox"/> FINE DETRITUS [3 pts]	53
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	5	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	0
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	30	<input type="checkbox"/> MUCK [0 pts]	0
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	30	<input type="checkbox"/> ARTIFICIAL [3 pts]	0

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A)

6

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

10

A + B

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth
Max = 30

0

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

Bankfull
Width
Max=30

25

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

10'

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	
L	R	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Per Bank)		(Most Predominant per Bank)	
<input checked="" type="checkbox"/> Wide >10m		<input type="checkbox"/> Mature Forest, Wetland	
<input type="checkbox"/> Moderate 5-10m		<input checked="" type="checkbox"/> Immature Forest, Shrub or Old Field	
<input type="checkbox"/> Narrow <5m		<input type="checkbox"/> Residential, Park, New Field	
<input type="checkbox"/> None		<input type="checkbox"/> Fenced Pasture	
		<input type="checkbox"/> Conservation Tillage	
		<input type="checkbox"/> Urban or Industrial	
		<input type="checkbox"/> Open Pasture, Row Crop	
		<input type="checkbox"/> Mining or Construction	

COMMENTS

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):
- | | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Interstitial) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input checked="" type="checkbox"/> 2.5
		<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): _____ Canopy (% open): 10

Were samples collected for water chemistry? (Y/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) N If not, please explain: OUTSIDE OF WOODLOT, THE STREAM IS SURROUNDED BY AGRICULTURAL FIELDS.

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

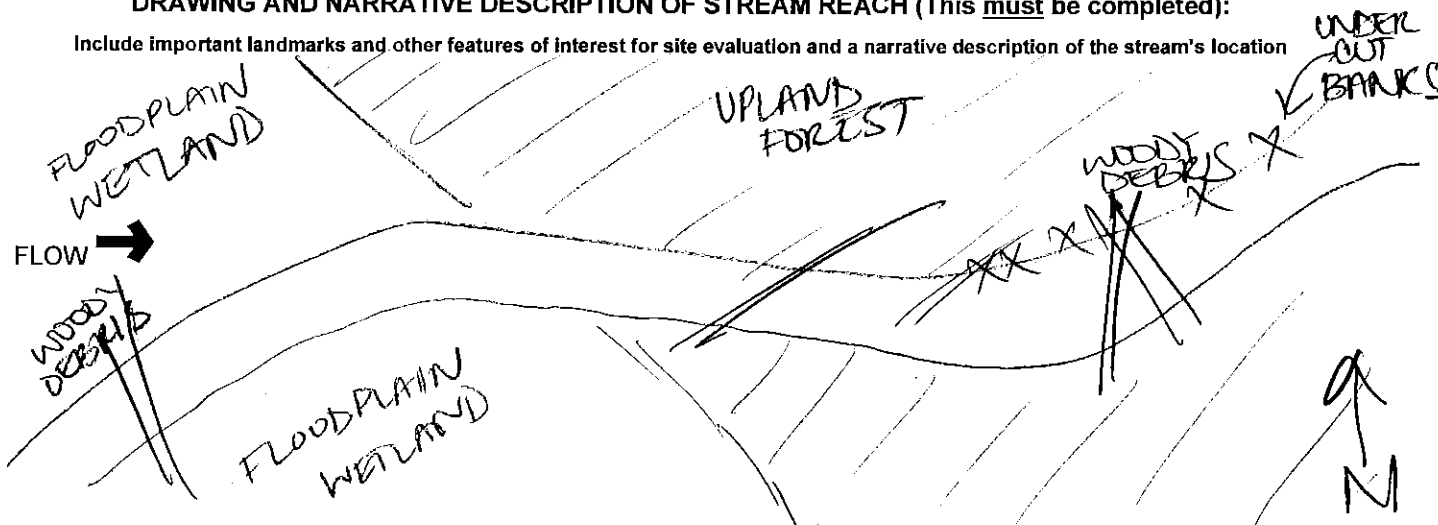
Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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





Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: **83**

Stream & Location: **S24M-037**

RM:

Date: **07/24/18**

River Code:

STORET #:

Scorers Full Name & Affiliation: **K. SIMON, MSG**

Lat./Long.: **41 125 182 7845**

Office verified location ☐

1] **SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES
☐ BLDR/SLABS [10]
☐ BOULDER [9]
☒ COBBLE [8]
☒ GRAVEL [7]
☐ SAND [6]
☐ BEDROCK [5]

OTHER TYPES
☐ HARDPAN [4]
☐ DETRITUS [3]
☐ MUCK [2]
☐ SILT [2]
☐ ARTIFICIAL [0]

(Score natural substrates; ignore sludge from point-sources)

ORIGIN
☐ LIMESTONE [1]
☐ TILLS [1]
☐ WETLANDS [0]
☐ HARDPAN [0]
☐ SANDSTONE [0]
☐ RIP/RAP [0]
☒ LACUSTURINE [0]
☐ SHALE [1]
☐ COAL FINES [2]

SILT

EMBEDDEDNESS

QUALITY
☐ HEAVY [-2]
☐ MODERATE [-1]
☐ NORMAL [0]
☒ FREE [1]
☐ EXTENSIVE [-2]
☐ MODERATE [-1]
☐ NORMAL [0]
☒ NONE [1]

Substrate
19
Maximum 20

NUMBER OF BEST TYPES: ☒ 4 or more ☐ 3 or less [0]

Comments

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 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.

AMOUNT
Check ONE (Or 2 & average)

☒ UNDERCUT BANKS [1]
☒ OVERHANGING VEGETATION [1]
☒ SHALLOWS (IN SLOW WATER) [1]
☒ ROOTMATS [1]

☐ POOLS > 70cm [2]
☐ ROOTWADS [1]
☐ BOULDERS [1]

☐ OXBOWS, BACKWATERS [1]
☐ AQUATIC MACROPHYTES [1]
☐ LOGS OR WOODY DEBRIS [1]

☒ EXTENSIVE > 75% [11]
☐ MODERATE 25-75% [7]
☐ SPARSE 5-25% [3]
☐ NEARLY ABSENT < 5% [1]

Cover
Maximum 20
20

Comments

3] **CHANNEL MORPHOLOGY** Check ONE in each category (Or 2 & average)

SINUOSITY
☒ HIGH [4]
☐ MODERATE [3]
☐ LOW [2]
☐ NONE [1]

DEVELOPMENT
☐ EXCELLENT [7]
☒ GOOD [6]
☐ FAIR [3]
☐ POOR [1]

CHANNELIZATION
☒ NONE [6]
☐ RECOVERED [4]
☐ RECOVERING [3]
☐ RECENT OR NO RECOVERY [1]

STABILITY
☒ HIGH [3]
☐ MODERATE [2]
☐ LOW [1]

Channel
Maximum 20
18

Comments

4] **BANK EROSION AND RIPARIAN ZONE** Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION
☐ NONE / LITTLE [3]
☒ MODERATE [2]
☐ HEAVY / SEVERE [1]

RIPARIAN WIDTH
☐ WIDE > 50m [4]
☐ MODERATE 10-50m [3]
☒ NARROW 5-10m [2]
☐ VERY NARROW < 5m [1]
☐ NONE [0]

FLOOD PLAIN QUALITY
☒ FOREST, SWAMP [3]
☐ SHRUB OR OLD FIELD [2]
☐ RESIDENTIAL, PARK, NEW FIELD [1]
☐ FENCED PASTURE [1]
☒ OPEN PASTURE, ROWCROP [0]

CONSERVATION, TILLAGE [1]
☐ URBAN OR INDUSTRIAL [0]
☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Riparian
Maximum 10
6

Comments

5] **POOL / GLIDE AND RIFFLE / RUN QUALITY**

MAXIMUM DEPTH

Check ONE (ONLY!)

☐ > 1m [6]
☐ 0.7-1m [4]
☐ 0.4-0.7m [2]
☒ 0.2-0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

☒ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

☐ TORRENTIAL [-1]
☐ VERY FAST [1]
☐ FAST [1]
☐ MODERATE [1]
☒ SLOW [1]
☐ INTERSTITIAL [-1]
☐ INTERMITTENT [-2]
☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current
Maximum 12
4

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH

RUN DEPTH

RIFFLE / RUN SUBSTRATE

RIFFLE / RUN EMBEDDEDNESS

☐ MAXIMUM > 50cm [2]
☒ MAXIMUM < 50cm [1]

☐ MAXIMUM > 50cm [2]
☒ MAXIMUM < 50cm [1]

☒ STABLE (e.g., Cobble, Boulder) [2]
☐ MOD. STABLE (e.g., Large Gravel) [1]
☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

☒ NONE [2]
☐ LOW [1]
☐ MODERATE [0]
☐ EXTENSIVE [-1]

Riffle / Run
Maximum 8
6

Comments

6] **GRADIENT** (7.14 ft/mi)

DRAINAGE AREA

(27.8 mi²)

☐ VERY LOW - LOW [2-4]
☒ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL:

%GLIDE:

%RUN:

%RIFFLE:

Gradient
Maximum 10
10

A) SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
☒ WADE
☐ LINE
☐ OTHER

DISTANCE

- ☐ 0.5 Km
☐ 0.2 Km
☐ 0.1 Km
☐ 0.12 Km
☐ OTHER

STAGE

- 1st - sample pass - 2nd
☐ HIGH
☐ UP
☒ NORMAL
☐ LOW
☐ DRY

CLARITY

- 1st - sample pass - 2nd
☐ <20 cm
☐ 20-40 cm
☒ 40-70 cm
☐ >70 cm/CTB
☐ SECCHI DEPTH

CANOPY

- ☐ >85% - OPEN
☒ 55%-85%
☐ 30%-55%
☐ 10%-30%
☐ <10% - CLOSED

CJ RECREATION

- AREA DEPTH
POOL: ☐ >100ft ☐ >3ft

B) AESTHETICS

- ☐ NUISANCE ALGAE
☐ INVASIVE MACROPHYTES
☐ EXCESS TURBIDITY
☐ DISCOLORATION
☐ FOAM/SCUM
☐ OIL SHEEN
☐ TRASH/LITTER
☐ NUISANCE ODOR
☐ SLUDGE DEPOSITS
☐ CSOS/SSOS/OUTFALLS

DJ MAINTENANCE

- PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

E) ISSUES

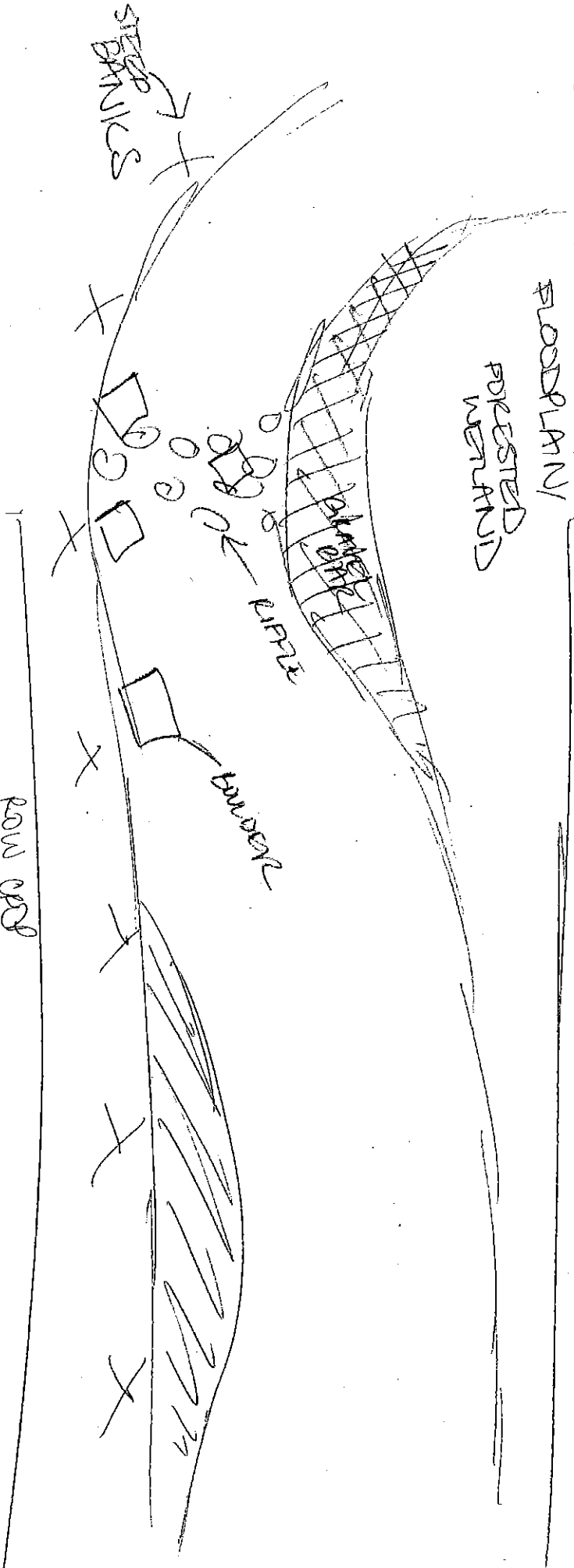
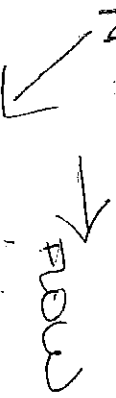
- WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H₂O / TILE / H₂O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F) MEASUREMENTS

- X width
X depth
max depth
X bankfull width
bankfull X depth
W/D ratio
bankfull max depth
Roodprone X width
entrench ratio

Legacy Tree:

Stream Drawing:





Primary Headwater Habitat Evaluation Form

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

39

SITE NAME/LOCATION S2M-038 SITE NUMBER A3820001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 200' LAT. 41.1430 LONG. -82.7909 RIVER CODE _____ RIVER MILE _____
DATE _____ SCORER E. SIMON COMMENTS _____

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: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>15</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>20</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]		<input checked="" type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>5</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____ (A) 0 (B) 4
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ 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):
- | | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): _____

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):
- | | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts] |
| <input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts] | |

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters) 2.5

HHEI
Metric
PointsSubstrate
Max = 40

4

A + B

Pool Depth
Max = 30

15

Bankfull
Width
Max=30

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	
L	R	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 9/25/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/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

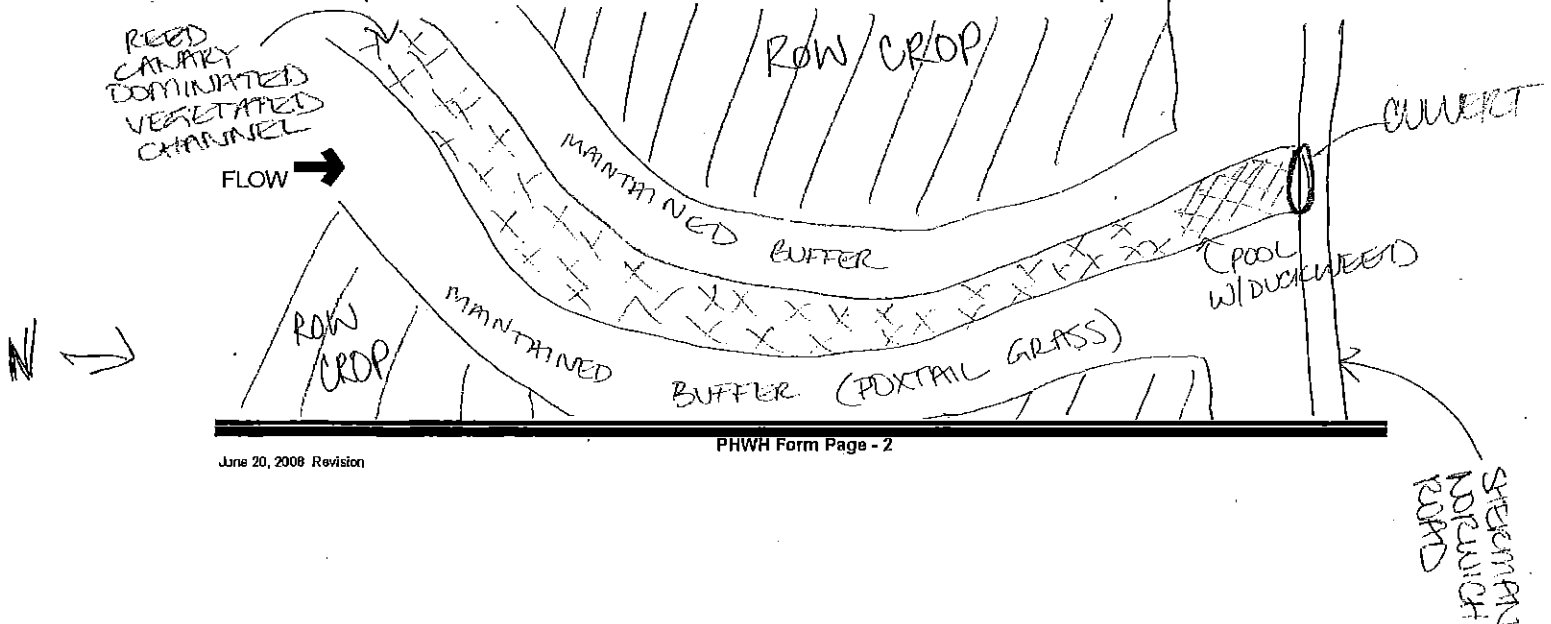
Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

61

SITE NAME/LOCATION

82M-040

SITE NUMBER

13820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

41.1454

LONG.

-82.7844

RIVER CODE

RIVER MILE

DATE

9/25/18

SCORER

K. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). 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]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pt]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [8 pts]

PERCENT

2

5

10

10

10

10

TYPE

☐

☐

☐

☐

☐

☐

SILT [3 pt]

LEAF PACKWOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

5

8

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A)

15

(B)

6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

21

A + B

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):

☒

☐

☐

☐

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

☐

☐

☐

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

31

Pool Depth
Max = 30

20

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐

☐

☒

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

☐

☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

25

Bankfull
Width
Max=30

20

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

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

L R

☒ ☒

(Per Bank)
Wide >10m

☐

☐

Moderate 5-10m

☐

☐

Narrow <5m

☐

☐

None

COMMENTS

L R

☒ ☒

(Most Predominant per Bank)

Mature Forest, Wetland

☐

☐

Immature Forest, Shrub or Old Field

☐

☐

Residential, Park, New Field

☐

☐

Fenced Pasture

L R

☐ ☐

Conservation Tillage

☐

☐

Urban or Industrial

☐

☐

Open Pasture, Row Crop

☐

☐

Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒

☐

Stream Flowing

Subsurface flow with isolated pools (Interstitial)

COMMENTS

☐

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐

☐

None

0.5

☐

☐

1.0

1.5

☐

☐

2.0

2.5

☒

☐

3.0

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/25/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 10

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

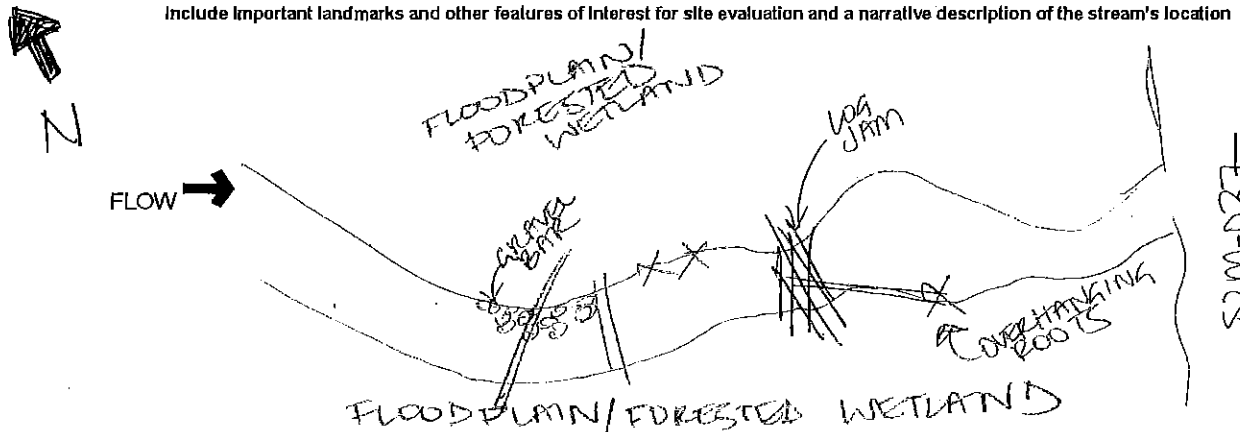
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) Y Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

100

SITE NAME/LOCATION

S2M-041

SITE NUMBER

A3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

41.1456

LONG.

-92.774

RIVER CODE

RIVER MILE

DATE

7/25/18

SCORER

K.S. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). 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]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

5

15

30

40

TYPE

☐

☐

☐

☐

☐

☐

SILT [3 pts]

LEAF PACKWOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pts]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

10

HHEI Metric Points

Substrate
Max = 40

20

A + B

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A)

15

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

☐

☐

☐

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

☒

☐

☐

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

7

Pool Depth
Max = 30

15

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐

☒

☐

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

☐

☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

< 1.0 m (< 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.5

Bankfull
Width
Max=30

25

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L R

(Per Bank)

☒

☐

☐

☐

☐

Wide >10m

Moderate 5-10m

Narrow <5m

None

COMMENTS

FLOODPLAIN QUALITY

L R

(Most Predominant per Bank)

☐

☒

☐

☐

Mature Forest, Wetland

Immature Forest, Shrub or Old Field

Residential, Park, New Field

Fenced Pasture

L R

(Most Predominant per Bank)

☐

☐

☒

☐

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☐

☐

☒

Stream Flowing

Subsurface flow with isolated pools (Intermittent)

COMMENTS

☒

☐

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐

☐

☐

☐

None

0.5

☐

☐

☐

☐

1.0

1.5

☐

☐

☐

☐

2.0

2.5

☐

☒

☐

☐

3.0

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 9/25/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 2

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

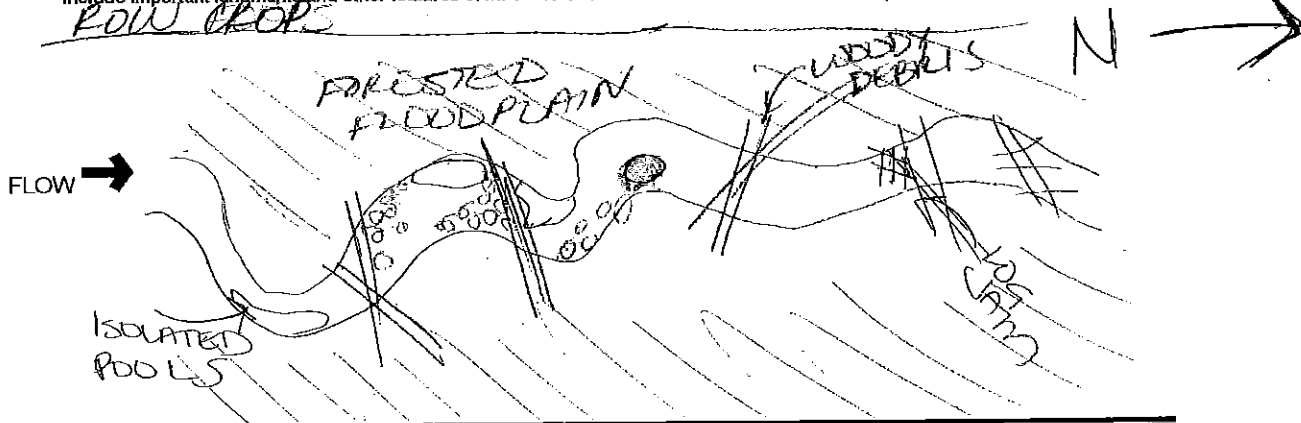
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N): N Voucher? (Y/N): N Salamanders Observed? (Y/N): N Voucher? (Y/N): N
Frogs or Tadpoles Observed? (Y/N): Y Voucher? (Y/N): N Aquatic Macroinvertebrates Observed? (Y/N): N Voucher? (Y/N): 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





Primary Headwater Habitat Evaluation Form

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

100

SITE NAME/LOCATION S2M-013 SITE NUMBER A3820001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) _____ LAT. 41.1971 LONG. -82.7973 RIVER CODE _____ RIVER MILE _____
DATE 9/26/18 SCORER K SIMON COMMENTS _____

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pts]	<u>10</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	<u>5</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>10</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>20</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	<u>35</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

(A) 6

TOTAL NUMBER OF SUBSTRATE TYPES: (B) 5

HHEI Metric Points

Substrate Max = 40

11
A + B

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):
- | | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input checked="" type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

Pool Depth Max = 30

24
30

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):
- | | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts] | |

Bankfull Width Max = 30

25
35

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS _____

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Intersittial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input checked="" type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ 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):

S2M-043

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/26/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 15

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): N If not, please explain: SAMPLING REACH IS

REPRESENTATIVE OF THE STREAM WITHIN THE WOODLOT,
NOT WITHIN THE AG. FIELDS.

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): Y (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)

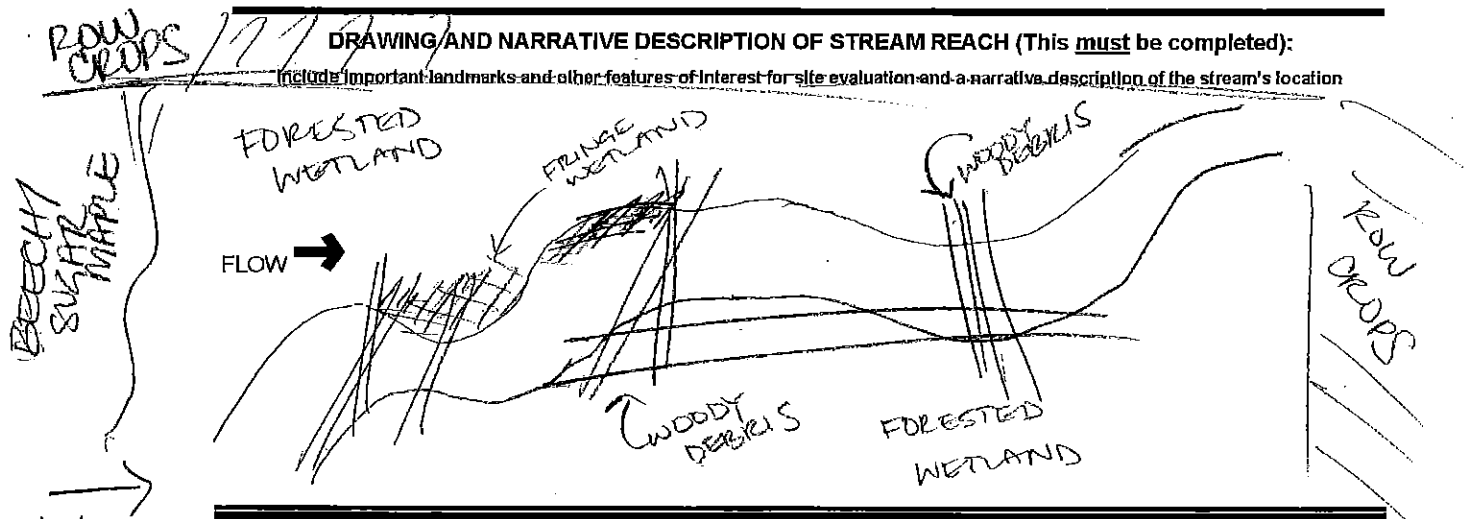
Fish Observed? (Y/N): N Voucher? (Y/N): _____ Salamanders Observed? (Y/N): N Voucher? (Y/N): _____

Frogs or Tadpoles Observed? (Y/N): N Voucher? (Y/N): _____ Aquatic Macroinvertebrates Observed? (Y/N): 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





Primary Headwater Habitat Evaluation Form

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

34

SITE NAME/LOCATION

S2M-049

SITE NUMBER

A382001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

41.1550

LONG.

-82.1775

RIVER CODE

RIVER MILE

DATE

9/27/18

SCORER

K. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). 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]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

TYPE

☒

☒

☒

☐

☐

☐

☐

☐

SILT [3 pts]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pts]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

85

10

5

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock

(A)

6

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

☐

☐

☐

☐

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

☐

☒

☐

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐

☐

☒

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

☐

☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

< 1.0 m (< 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI Metric Points

Substrate

Max = 40

9

A + B

Pool Depth

Max = 30

5'

Bankfull

Width

Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

NOTE: River Left (L) and Right (R) as looking downstream

RIPARIAN WIDTH

L

R

(Per Bank)

☐

☐

Wide > 10m

☐

☐

Moderate 5-10m

☐

☐

Narrow < 5m

☒

☒

None

COMMENTS

FLOODPLAIN QUALITY

L

R

(Most Predominant per Bank)

☐

☐

Mature Forest, Wetland

☐

☐

Immature Forest, Shrub or Old Field

☐

☐

Residential, Park, New Field

☐

☐

Fenced Pasture

L

R

(Per Bank)

☐

☐

Conservation Tillage

☐

☐

Urban or Industrial

☒

☒

Open Pasture, Row Crop

☐

☐

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☐

☐

Stream Flowing

Subsurface flow with isolated pools (interstitial)

COMMENTS

☒

Moist Channel, isolated pools, no flow (intermittent)

☐

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☒

☐

None

0.5

☐

1.0

☐

1.5

☐

2.0

☐

2.5

☐

3.0

☐

> 3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 9/26/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): _____

Were samples collected for water chemistry? (Y/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) _____ 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)

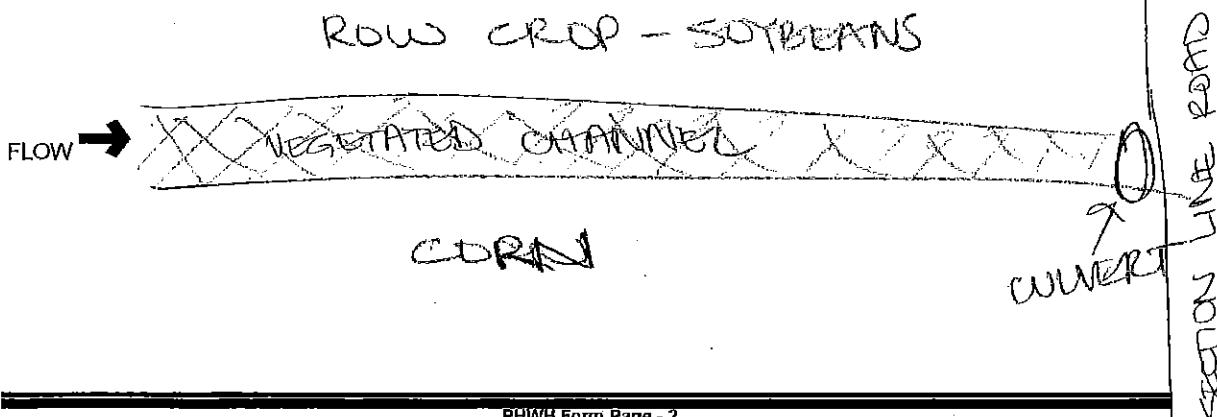
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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





Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: **75**Stream & Location: **A3820001, S2M-051**

RM:

Date: **09/27/18**

River Code:

STORET #:

Scorers Full Name & Affiliation: **K. SIMON**Lat./Long.: **41 1279 182 7691**Office verified location ☐**1] SUBSTRATE** Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES	POOL RIFFLE	OTHER TYPES	POOL RIFFLE
<input type="checkbox"/> BLDR/SLABS [10]		<input type="checkbox"/> HARDPAN [4]	
<input type="checkbox"/> BOULDER [9]		<input type="checkbox"/> DETRITUS [3]	
<input checked="" type="checkbox"/> COBBLE [8]	5	<input type="checkbox"/> MUCK [2]	
<input checked="" type="checkbox"/> GRAVEL [7]	30	<input type="checkbox"/> SILT [2]	2
<input type="checkbox"/> SAND [6]	14	<input type="checkbox"/> ARTIFICIAL [0]	
<input type="checkbox"/> BEDROCK [5]	3		

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☒ 4 or more [2] ☐ 3 or less [0]

ORIGIN	QUALITY
<input type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> TILLS [1]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> HARDPAN [0]	<input checked="" type="checkbox"/> FREE [1]
<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> NORMAL [0]
<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> NONE [1]
<input type="checkbox"/> COAL FINES [-2]	

SILT

EMBEDDEDNESS

Substrate
18
Maximum
20

Comments

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 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.

AMOUNT

Check ONE (Or 2 & average)

<input checked="" type="checkbox"/> UNDERCUT BANKS [1]	<input type="checkbox"/> POOLS > 70cm [2]	<input type="checkbox"/> OXBOWS, BACKWATERS [1]
<input checked="" type="checkbox"/> OVERHANGING VEGETATION [1]	<input type="checkbox"/> ROOTWADS [1]	<input type="checkbox"/> AQUATIC MACROPHYTES [1]
<input type="checkbox"/> SHALLOWS (IN SLOW WATER) [1]	<input type="checkbox"/> BOULDERS [1]	<input type="checkbox"/> LOGS OR WOODY DEBRIS [1]
<input type="checkbox"/> ROOTMATS [1]		

<input type="checkbox"/> EXTENSIVE >75% [11]
<input checked="" type="checkbox"/> MODERATE 25-75% [7]
<input type="checkbox"/> SPARSE 5-25% [3]
<input type="checkbox"/> NEARLY ABSENT <5% [1]

Cover
Maximum
20
16

Comments

3] CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input type="checkbox"/> HIGH [4]	<input checked="" type="checkbox"/> EXCELLENT [7]	<input type="checkbox"/> NONE [6]	<input checked="" type="checkbox"/> HIGH [3]
<input checked="" type="checkbox"/> MODERATE [3]	<input type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input type="checkbox"/> MODERATE [2]
<input type="checkbox"/> LOW [2]	<input type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input type="checkbox"/> LOW [1]
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]	

Channel
Maximum
20
15

Comments

4] BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
<input checked="" type="checkbox"/> NONE / LITTLE [3]	<input checked="" type="checkbox"/> WIDE > 50m [4]	<input type="checkbox"/> FOREST, SWAMP [3]
<input checked="" type="checkbox"/> MODERATE [2]	<input type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> SHRUB OR OLD FIELD [2]
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NARROW 5-10m [2]	<input checked="" type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]
	<input checked="" type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> FENCED PASTURE [1]
	<input type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> OPEN PASTURE, ROWCROP [0]

Indicate predominant land use(s) past 100m riparian.

Riparian
Maximum
10
6

Comments

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply
<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [1]
<input type="checkbox"/> 0.7-1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> SLOW [1]
<input checked="" type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> VERY FAST [4]
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> FAST [1]
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [1]
		<input type="checkbox"/> INTERMITTENT [2]
		<input checked="" type="checkbox"/> MODERATE [1]
		<input type="checkbox"/> EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)Pool /
Current
Maximum
12
4

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
<input checked="" type="checkbox"/> BEST AREAS > 10cm [2]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> STABLE (e.g., Cobble, Boulder) [2]	<input type="checkbox"/> NONE [2]
<input type="checkbox"/> BEST AREAS 5-10cm [1]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> MOD. STABLE (e.g., Large Gravel) [1]	<input checked="" type="checkbox"/> LOW [1]
<input type="checkbox"/> BEST AREAS < 5cm [metric=0]		<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> MODERATE [0]
			<input type="checkbox"/> EXTENSIVE [-1]

Riffle /
Run
Maximum
8
6

Comments

6] GRADIENT **10** ft/mi
DRAINAGE AREA **15** mi²
☐ VERY LOW - LOW [2-4]
☒ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]%POOL: **0** %GLIDE: **0**
%RUN: **0** %RIFFLE: **0**Gradient
Maximum
10
10

A) SAMPLED REACH

Check ALL that apply

Comment RE: Reach consistency/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

METHOD

- ☐ BOAT
☒ WADE
☐ L LINE
☐ OTHER

STAGE

- 1st - sample pass - 2nd
☐ HIGH
☐ UP
☒ NORMAL
☐ LOW
☐ DRY

DISTANCE

- ☐ 0.5 km
☐ 0.2 km
☐ 0.1 km
☐ 0.12 km
☐ OTHER

CLARITY

- 1st - sample pass - 2nd
☒ < 20 cm
☐ 20 - 40 cm
☐ 40 - 70 cm
☐ > 70 cm/ CTE
☐ SECCHI DEPTH

CANOPY

- ☐ 85%+ OPEN
☒ 55% - 85%
☐ 30% - 55%
☐ 10% - 30%
☐ < 10% - CLOSED

C) RECREATION

- AREA DEPTH
POOL: ☐ > 100ft ☐ > 3ft

B) AESTHETICS

- ☐ NUISANCE ALGAE
☐ INVASIVE MACROPHYTES
☐ EXCESS TURBIDITY
☐ DISCOLORATION
☐ FOAM/ SCUM
☐ OIL SHEEN
☐ TRASH/ LITTER
☐ NUISANCE ODOR
☐ SLUDGE DEPOSITS
☐ CSO/ SSO/ GUTFALLS

D) MAINTENANCE

- ☐ PUBLIC / PRIVATE / BOTH / NA
☐ ACTIVE / HISTORIC / BOTH / NA
☐ YOUNG-SUCCESSION-OLD
☐ SPRAY / SNAG / REMOVED
☐ MODIFIED / DIPPED OUT / NA
☐ LEVEED / ONE SIDED
☐ RELOCATED / CUTOFFS
☐ MOVING-BED/LOAD-STABLE
☐ ARMORED / SLUMPS
☐ ISLANDS / SCoured
☐ IMPOUNDED / DESICCATED
☐ FLOOD CONTROL / DRAINAGE

E) 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 H₂O / TILE / H₂O TABLE
☐ ACID / MINE / QUARRY / FLOW
☐ NATURAL / WETLAND / STAGNANT
☐ PARK / GOLF / LAWN / HOME
☐ ATMOSPHERE / DATA PAUCITY

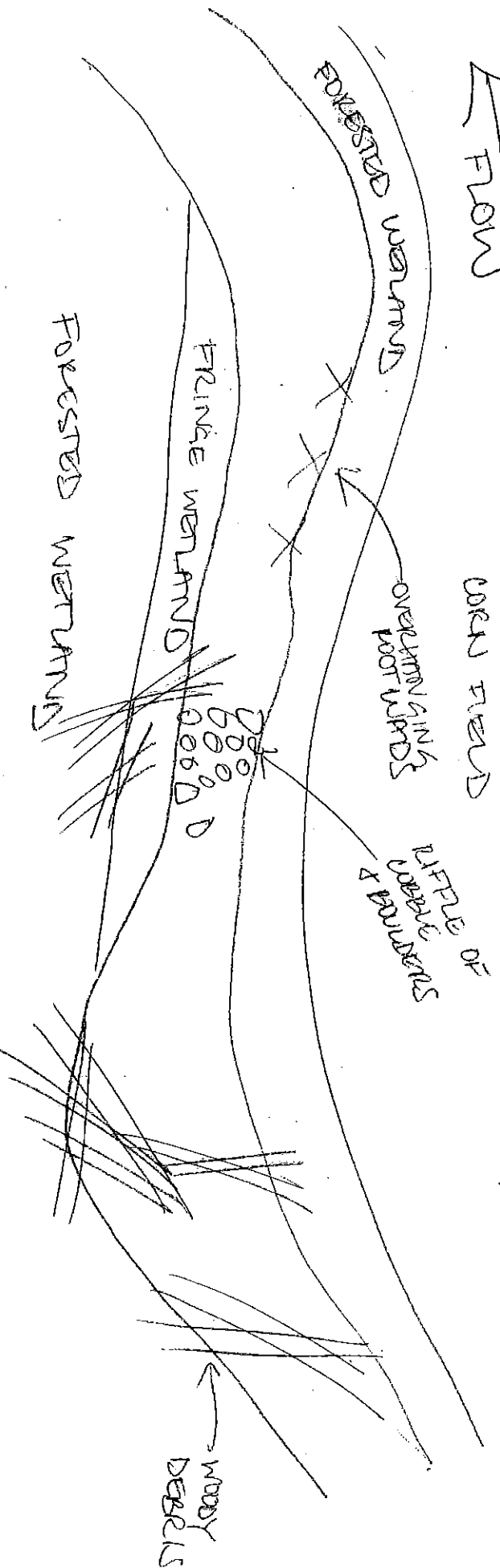
F) MEASUREMENTS

- ☒ width
☒ depth
☒ max. depth
☒ bankfull width
☒ bankfull x depth
☒ W/D ratio
☒ bankfull max. depth
☒ floodprone x width
☒ entrench. ratio

Legacy Tree:

Stream Drawing:

← FLOW





Primary Headwater Habitat Evaluation Form

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

67

SITE NAME/LOCATION 4 STM-053

SITE NUMBER A382000 RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 9/28/18

SCORER K. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.			
TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS (16 pts)		<input type="checkbox"/> SILT (3 pts)	
<input type="checkbox"/> BOULDER (>256 mm) (16 pts)		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS (3 pts)	
<input type="checkbox"/> BEDROCK (16 pts)		<input type="checkbox"/> FINE DETRITUS (3 pts)	
<input type="checkbox"/> COBBLE (65-256 mm) (12 pts)		<input checked="" type="checkbox"/> CLAY or HARDPAN (0 pts)	
<input type="checkbox"/> GRAVEL (2-64 mm) (9 pts)		<input type="checkbox"/> MUCK (0 pts)	
<input checked="" type="checkbox"/> SAND (<2 mm) (8 pts)	100	<input type="checkbox"/> ARTIFICIAL (3 pts)	

Total of Percentages of Bldg Slabs, Boulder, Cobble, Bedrock (A) 6 (B) 6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 TOTAL NUMBER OF SUBSTRATE TYPES: 6

Substrate Max = 40

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):

<input type="checkbox"/> > 30 centimeters (20 pts)	<input type="checkbox"/> > 5 cm - 10 cm (15 pts)
<input checked="" type="checkbox"/> > 22.5 - 30 cm (30 pts)	<input type="checkbox"/> < 5 cm (5 pts)
<input type="checkbox"/> > 10 - 22.5 cm (25 pts)	<input type="checkbox"/> NO WATER OR MOIST CHANNEL (0 pts)

COMMENTS: MAXIMUM POOL DEPTH (centimeters): 20

Pool Depth Max = 30

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 m (> 13') (30 pts)	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3'3" - 4'8") (15 pts)
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9'7" - 13') (25 pts)	<input type="checkbox"/> < 1.0 m (< 3'3") (5 pts)
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4'8" - 9'7") (20 pts)	

COMMENTS: AVERAGE BANKFULL WIDTH (meters): 3.2

Bankfull Width Max = 30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

NOTE: River Left (L) and Right (R) as looking downstream

RIPARIAN WIDTH

- | L | R |
|-------------------------------------|-------------------------------------|
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

COMMENTS

FLOODPLAIN QUALITY

- | L | R |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

- | L | R |
|-------------------------------------|-------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

- | | |
|-------------------------------------|--------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

COMMENTS

- | | |
|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> |

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

STREAM GRADIENT ESTIMATE

- | | | | | |
|--------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|--------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/26/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 85

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) _____ 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)

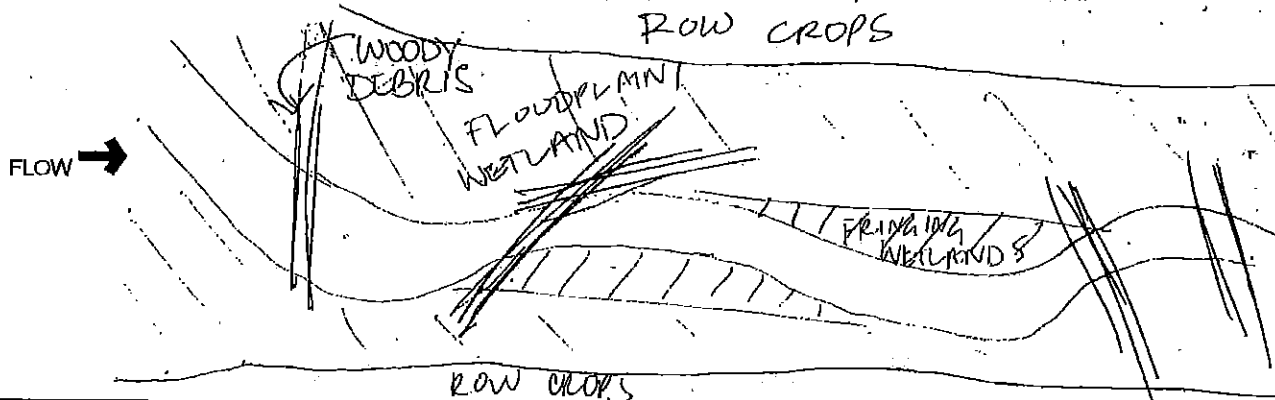
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aqualic 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





Primary Headwater Habitat Evaluation Form

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

31

SITE NAME/LOCATION

S2M-054

SITE NUMBER

A3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE

9/23/18

SCORER

K. SIMON

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☒ RECOVERED

☒ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE
☐
☐
☐
☐
☐
☐
☐

BLDR SLABS (15 pts)
BOULDER (>256 mm) (15 pts)
BEDROCK (15 pts)
COBBLE (65-256 mm) (12 pts)
GRAVEL (2-64 mm) (8 pts)
SAND (<2 mm) (8 pts)

PERCENT

15

TYPE
☐
☐
☐
☐
☐
☐
☐

SILT (3 pts)
LEAF PACK/WOODY DEBRIS (3 pts)
FINE DETRITUS (3 pts)
CLAY or HARDPAN (0 pts)
MUCK (0 pts)
ARTIFICIAL (3 pts)

PERCENT

5
80

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A) 6

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

9

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 81 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)
>22.5 - 30 cm (30 pts)
>10 - 22.5 cm (25 pts)

☐
☒
☐

>5 cm - 10 cm (15 pts)
<5 cm (5 pts)
NO WATER OR MOIST CHANNEL (0 pts)

3

Pool Depth
Max = 30

5

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐
☐
☒

>4.0 meters (>13') (30 pts)
>3.0 m - 4.0 m (>9'7" - 13') (25 pts)
>1.5 m - 3.0 m (>4'8" - 9'7") (20 pts)

☐
☐
☒

>1.0 m - 1.5 m (>3'3" - 4'8") (15 pts)
<1.0 m (<3'3") (5 pts)

20

Bankfull
Width
Max=30

20

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

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

L R

(Per Bank)

☐
☐

Wide >10m
Moderate 5-10m

☐
☒

Narrow <5m
None

COMMENTS

L R

(Most Predominant per Bank)

☐
☐

Mature Forest, Wetland
Immature Forest, Shrub or Old Field

☐
☒

Residential, Park, New Field
Fenced Pasture

L R

Conservation Tillage

☐
☐

Urban or Industrial

☒
☐

Open Pasture, Row Crop
Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☐
☐

Stream Flowing
Subsurface flow with isolated pools (Intermittent)

COMMENTS

☒
☐

Moist Channel, isolated pools, no flow (Intermittent)
Dry channel, no water (Ephemeral)

- SINUOSITY (Number of bends per 81 m (200 ft) of channel) (Check ONLY one box):

☒
☐

None
0.5

☐
☐

1.0
1.5

☐
☐

2.0
2.5

☐
☐

3.0
>3

STREAM GRADIENT ESTIMATE

Flat (0.5 m/100 ft)

☐ Flat to Moderate

☐ Moderate (2 m/100 ft)

☐ Moderate to Severe

☐ Severe (10 m/100 ft)

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 9/25/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 100

Were samples collected for water chemistry? (Y/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) _____ 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)

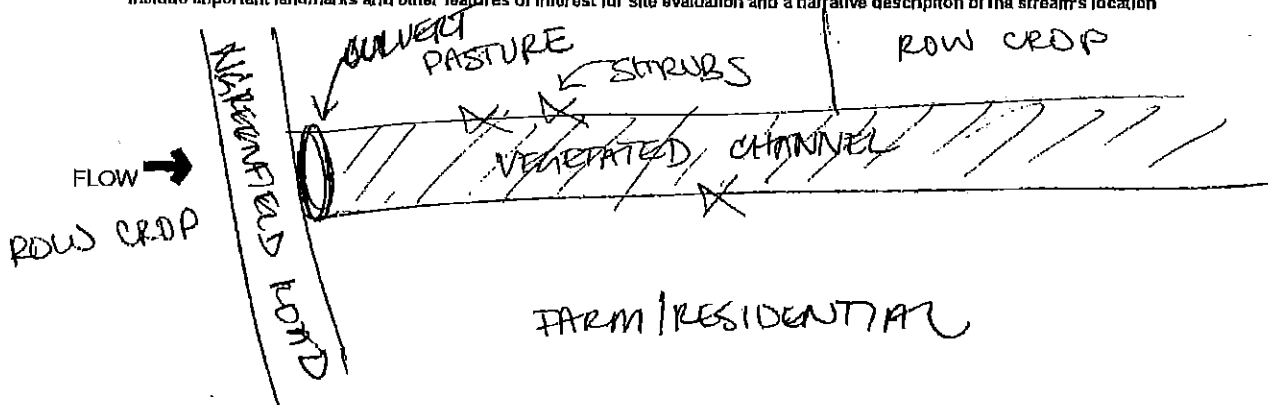
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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





Primary Headwater Habitat Evaluation Form

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

67

SITE NAME/LOCATION

82M-055

SITE NUMBER

AB820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

LAT

LONG

RIVER CODE

RIVER MILE

DATE

9/28/18

SCORER

K. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS (16 pts)		<input type="checkbox"/> SILT (3 pts)	
<input type="checkbox"/> BOULDER (>256 mm) (16 pts)		<input type="checkbox"/> LEAF PACK/GOBY DEBRIS (3 pts)	5
<input type="checkbox"/> BEDROCK (16 pts)		<input checked="" type="checkbox"/> FINE DETRITUS (3 pts)	80
<input type="checkbox"/> COBBLE (63-256 mm) (12 pts)		<input type="checkbox"/> CLAY or HARDPAN (0 pts)	
<input type="checkbox"/> GRAVEL (2-64 mm) (8 pts)		<input type="checkbox"/> MUCK (0 pts)	
<input checked="" type="checkbox"/> SAND (<2 mm) (8 pts)	15	<input type="checkbox"/> ARTIFICIAL (3 pts)	

Total of Percentages of
Bldg Slabs, Boulder, Cobble, Bedrock

(A) 9

(B) 3

HHEI
Metric
Points

Substrate
Max = 40

12

A + B

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input type="checkbox"/> >30 centimeters (20 pts)	<input type="checkbox"/> >8 cm - 10 cm (15 pts)
<input checked="" type="checkbox"/> >22.5 - 30 cm (10 pts)	<input type="checkbox"/> <5 cm (5 pts)
<input type="checkbox"/> >10 - 22.5 cm (25 pts)	<input type="checkbox"/> NO WATER OR MOIST CHANNEL (0 pts)

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

27

Pool Depth
Max = 30

30

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> >4.0 meters (>13') (30 pts)	<input type="checkbox"/> >1.0 m - 1.5 m (>3' - 4'6") (15 pts)
<input checked="" type="checkbox"/> >3.0 m - 4.0 m (>9' - 13') (25 pts)	<input type="checkbox"/> <1.0 m (<3' - 3'6") (5 pts)
<input type="checkbox"/> >1.0 m - 3.0 m (>3' - 9') (20 pts)	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.1

Bankfull
Width
Max=30

25

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

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

COMMENTS

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Intermittent)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 9/26/18 Quantity: _____

Photograph information: _____

Elevated Turbidity? (Y/N): Y 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): _____ 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)

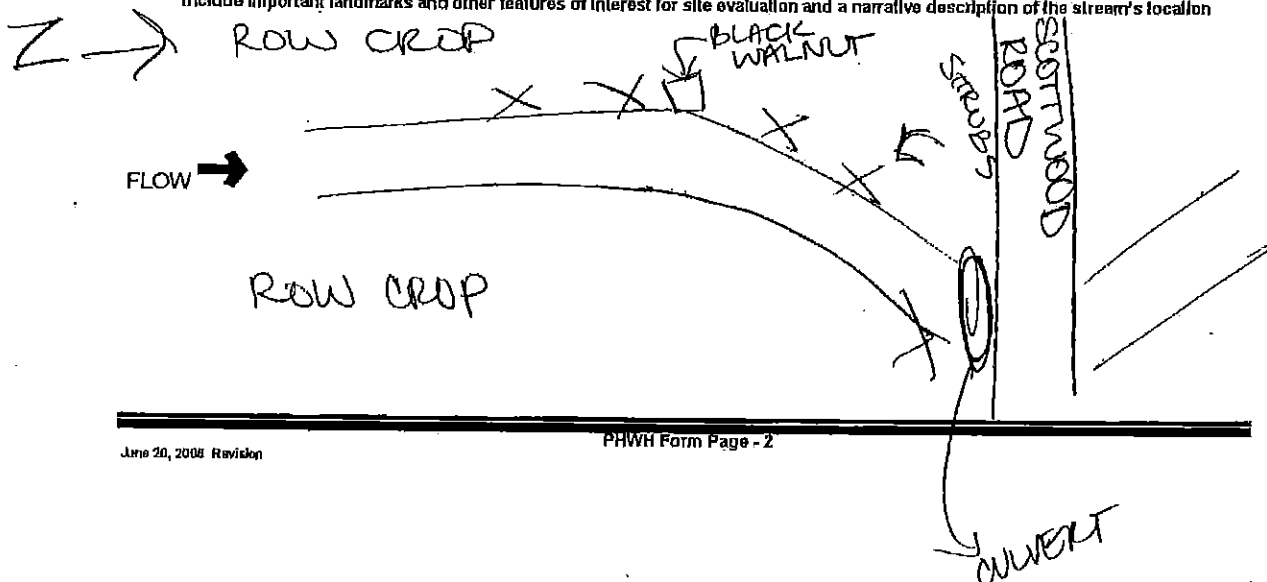
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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





Primary Headwater Habitat Evaluation Form

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

51

SITE NAME/LOCATION

S2M-059

SITE NUMBER

13820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 10/1/18

SCORER

E. Simon

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B)				HHEI Metric Points
TYPE	PERCENT	TYPE	PERCENT	
<input type="checkbox"/> BLDR SLABS [18 pts]		<input type="checkbox"/> SILT [3 pts]		Substrate Max = 40 9
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]		
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]		Pool Depth Max = 30 30
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	80	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	5	<input type="checkbox"/> MUCK [0 pts]		COMMENTS
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	15	<input type="checkbox"/> ARTIFICIAL [3 pts]		
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock		(A) 6	(B) 3	AVERAGE BANKFULL WIDTH (meters)
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:				
TOTAL NUMBER OF SUBSTRATE TYPES:				AVERAGE BANKFULL WIDTH (meters)
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):				
<input type="checkbox"/> > 30 centimeters [20 pts]				AVERAGE BANKFULL WIDTH (meters)
<input checked="" type="checkbox"/> > 22.5 - 30 cm [30 pts]				
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]				AVERAGE BANKFULL WIDTH (meters)
<input type="checkbox"/> > 5 cm - 10 cm [15 pts]				
<input type="checkbox"/> < 5 cm [5 pts]				AVERAGE BANKFULL WIDTH (meters)
<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]				
COMMENTS				AVERAGE BANKFULL WIDTH (meters)
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):				
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]				AVERAGE BANKFULL WIDTH (meters)
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]				
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]				AVERAGE BANKFULL WIDTH (meters)
<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]				
<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]				AVERAGE BANKFULL WIDTH (meters)
COMMENTS				

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

NOTE: River Left (L) and Right (R) as looking downstream

RIPARIAN WIDTH

- | | | |
|-------------------------------------|-------------------------------------|----------------|
| L | R | (Per Bank) |
| <input type="checkbox"/> | <input type="checkbox"/> | Wide >10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Moderate 5-10m |
| <input type="checkbox"/> | <input type="checkbox"/> | Narrow <5m |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | None |

COMMENTS

FLOODPLAIN QUALITY

- | | | |
|--------------------------|--------------------------|-------------------------------------|
| L | R | (Most Predominant per Bank) |
| <input type="checkbox"/> | <input type="checkbox"/> | Mature Forest, Wetland |
| <input type="checkbox"/> | <input type="checkbox"/> | Immature Forest, Shrub or Old Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Residential, Park, New Field |
| <input type="checkbox"/> | <input type="checkbox"/> | Fenced Pasture |

- | | | |
|-------------------------------------|-------------------------------------|------------------------|
| L | R | |
| <input type="checkbox"/> | <input type="checkbox"/> | Conservation Tillage |
| <input type="checkbox"/> | <input type="checkbox"/> | Urban or Industrial |
| <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | Open Pasture, Row Crop |
| <input type="checkbox"/> | <input type="checkbox"/> | Mining or Construction |

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

- | | |
|---|---|
| <input type="checkbox"/> Stream Flowing | <input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent) |
| <input type="checkbox"/> Subsurface flow with isolated pools (Intermittent) | <input type="checkbox"/> Dry channel, no water (Ephemeral) |

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

- | | | | |
|-------------------------------|------------------------------|---|------------------------------|
| <input type="checkbox"/> None | <input type="checkbox"/> 1.0 | <input checked="" type="checkbox"/> 2.0 | <input type="checkbox"/> 3.0 |
| <input type="checkbox"/> 0.5 | <input type="checkbox"/> 1.5 | <input type="checkbox"/> 2.5 | <input type="checkbox"/> >3 |

STREAM GRADIENT ESTIMATE

- | | | | | |
|---|---|---|---|--|
| <input type="checkbox"/> Flat (0.5 ft/100 ft) | <input type="checkbox"/> Flat to Moderate | <input type="checkbox"/> Moderate (2 ft/100 ft) | <input type="checkbox"/> Moderate to Severe | <input type="checkbox"/> Severe (10 ft/100 ft) |
|---|---|---|---|--|

521.05

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: _____ HRCS Soil Map Page: _____ HRCS Soil Map Stream Order: _____
County: HURON Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N) _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 98

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): _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

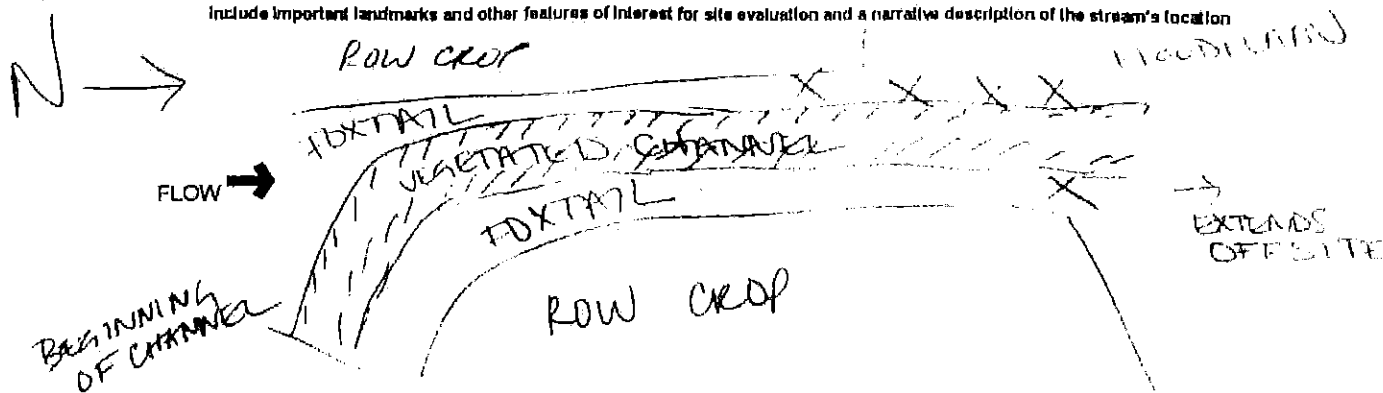
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collected (optional). NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

55

SITE NAME/LOCATION

S2M-002

SITE NUMBER

1382000

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE

10/1/18

SCORER

ESTIMON

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 6). Final metric score is sum of boxes A & B.			
TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	5
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	25
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]		<input type="checkbox"/> MUCK [0 pts]	5
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock		(A)	(B)
		4	5
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:		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):			
<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]		
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]		
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]		
COMMENTS		MAXIMUM POOL DEPTH (centimeters):	
		15	

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):			
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]		
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]		
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]			
COMMENTS		AVERAGE BANKFULL WIDTH (meters)	
		1.7	

HHEI Metric Points
Substrate Max = 40
11
A + B
Pool Depth Max = 30
25
Bankfull Width Max = 30
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

L R

(Per Bank)

☐

Wide >10m

☐

Moderate 5-10m

☐

Narrow <5m

☒

None

COMMENTS

L R

(Most Predominant per Bank)

☒

Mature Forest, Wetland

☐

Immature Forest, Shrub or Old

☐

Field

☐

Residential, Park, New Field

☐

Fenced Pasture

L R

Conservation Tillage

☐

Urban or Industrial

☐

Open Pasture, Row

☒

Crop

☐

Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒

Stream Flowing

☐

Subsurface flow with isolated pools (Intermittent)

☐

Moist Channel, isolated pools, no flow (Intermittent)

☐

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

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)☒ Flat to Moderate☐ Moderate (2 ft/100 ft)☐ Moderate to Severe☐ Severe (10 ft/100 ft)

02001502

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 _____ Township / City _____

MISCELLANEOUS

Base Flow Conditions? (Y/N) N Date of last precipitation _____ Quantity _____

Photograph Information: _____

Elevated Turbidity? (Y/N) Y Canopy (% open) _____

Were samples collected for water chemistry? (Y/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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

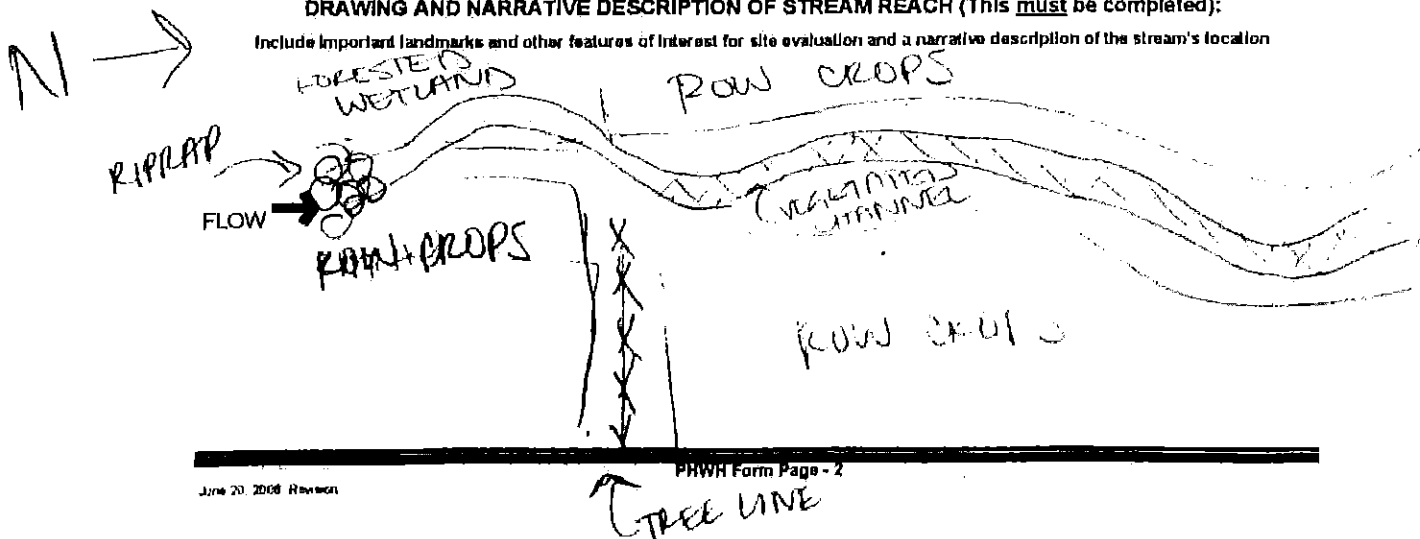
Performed? (Y/N) _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) Y 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





Primary Headwater Habitat Evaluation Form

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

55

SITE NAME/LOCATION S2M-005 SITE NUMBER 1382000 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 200 LAT _____ LONG _____ RIVER CODE _____ RIVER MILE _____
DATE 10/31/18 SCORER K. SIMON COMMENTS _____

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B)				HHEI Metric Points
TYPE	PERCENT	TYPE	PERCENT	
<input type="checkbox"/> BLDR SLABS (16 pts)		<input type="checkbox"/> SILT (3 pts)		Substrate Max = 40
<input type="checkbox"/> BOULDER (>256 mm) (16 pts)		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS (3 pts)		
<input type="checkbox"/> BEDROCK (16 pts)		<input type="checkbox"/> FINE DETRITUS (3 pts)		10
<input type="checkbox"/> COBBLE (65-256 mm) (12 pts)	<u>15</u>	<input type="checkbox"/> CLAY or HARDPAN (0 pts)	<u>20</u>	
<input type="checkbox"/> GRAVEL (2-64 mm) (9 pts)	<u>15</u>	<input type="checkbox"/> MUCK (0 pts)	<u>15</u>	A + B
<input checked="" type="checkbox"/> SAND (<2 mm) (6 pts)	<u>10</u>	<input type="checkbox"/> ARTIFICIAL (3 pts)		
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>5</u>		(A) <u>6</u>	(B) <u>4</u>	
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:				TOTAL NUMBER OF SUBSTRATE TYPES: <u>4</u>
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).				
<input type="checkbox"/> > 30 centimeters (20 pts)	<input type="checkbox"/> > 5 cm - 10 cm (15 pts)	15		
<input type="checkbox"/> > 22.5 - 30 cm (30 pts)	<input type="checkbox"/> < 5 cm (5 pts)			
<input type="checkbox"/> > 10 - 22.5 cm (25 pts)	<input type="checkbox"/> NO WATER OR MOIST CHANNEL (0 pts)	15		
COMMENTS _____				MAXIMUM POOL DEPTH (centimeters):
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements). (Check ONLY one box):				
<input type="checkbox"/> > 4.0 meters (> 13') (30 pts)	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") (15 pts)	24		
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') (25 pts)	<input type="checkbox"/> < 1.0 m (< 3' 3") (5 pts)			
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") (20 pts)		20		
COMMENTS _____				AVERAGE BANKFULL WIDTH (meters):

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY (NOTE: River Left (L) and Right (R) as looking downstream)

RIPARIAN WIDTH (Per Bank)		FLOODPLAIN QUALITY (Most Predominant per Bank)	
L	R	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wide >10m		Mature Forest/Wetland	
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest/Shrub or Old Field	
Moderate 5-10m		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	
Narrow <5m		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	
None		<input type="checkbox"/>	<input type="checkbox"/>
		Conservation Tillage	
		Urban or Industrial	
		Open Pasture, Row Crop	
		Mining or Construction	

COMMENTS _____

FLOW REGIME (At Time of Evaluation) (Check ONLY one box)

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Most Channel isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Intermittent)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box)

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input checked="" type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat to Slight ☒ Flat to Moderate ☐ Moderate to Steep ☐ Moderate to Severe ☐ Severe

82M-100E

ADDITIONAL STREAM INFORMATION (This information must also be completed):

OHEI PERFORMED? ☐ Yes ☒ No OHEI Score _____ (If Yes, Attach Completed OHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ VWH 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: HYRON Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 20

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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): Y (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)

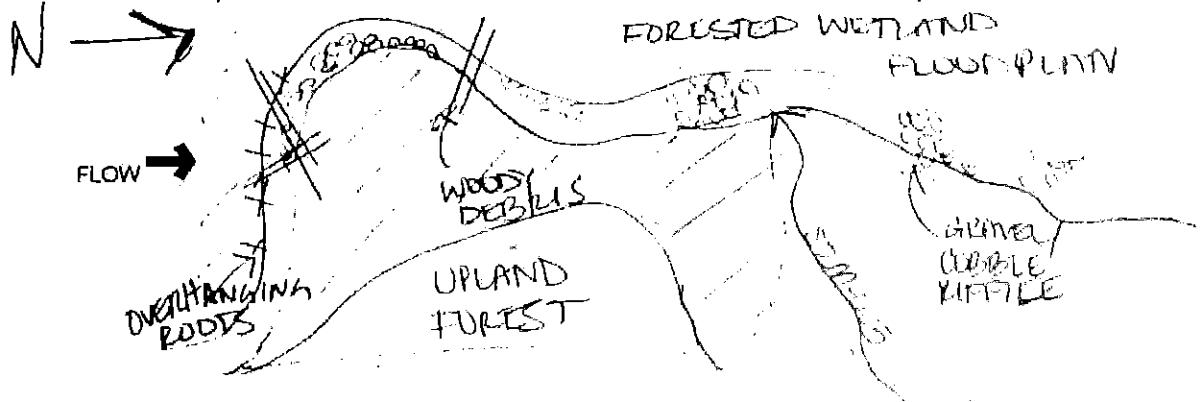
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

31

SITE NAME/LOCATION

S2M-DL07

SITE NUMBER

A382000

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 10/3/18

SCORER

K. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	2	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	56
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	12	<input type="checkbox"/> MUCK [0 pts]	10
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A)

4

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

4

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

1.5

HHEI
Metric
Points

Substrate

Max = 40

11

A + B

Pool Depth

Max = 30

5

Bankfull

Width

Max=30

15

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

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (interstitial)	<input type="checkbox"/> Dry channel, no water (ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input checked="" type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

2216-06 F

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: HURON Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 15

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): _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

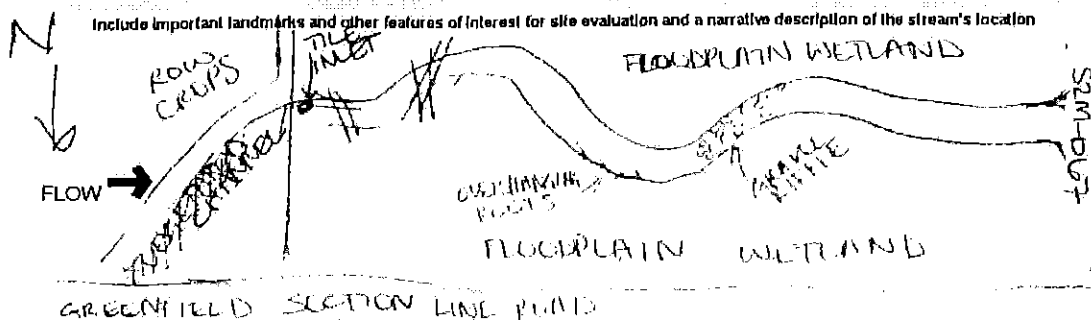
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N
Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

53

SITE NAME/LOCATION

S2M-068

SITE NUMBER A3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 10/4/18

SCORER K. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [15 pts]		<input type="checkbox"/> SILT [3 pt]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	10
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	40
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]		<input checked="" type="checkbox"/> MUCK [0 pts]	50
<input type="checkbox"/> SAND (<2 mm) [8 pts]		<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A)

0

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

- | | |
|---|--|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

- | | |
|--|---|
| <input type="checkbox"/> > 4.0 meters (> 13') [30 pts] | <input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts] |
| <input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] | <input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts] |
| <input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts] | |

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

2
A + B

Pool Depth
Max = 30

15

Bankfull
Width
Max=30

33

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

L R (Per Bank)

L R (Most Predominant per Bank)

L R

☒ Wide >10m

☒ Mature Forest, Wetland

☐ Conservation Tillage

☐ Moderate 5-10m

☒ Immature Forest, Shrub or Old Field

☐ Urban or Industrial

☐ Narrow <5m

☐ Residential, Park, New Field

☒ Open Pasture, Row Crop

☒ None

☐ Fenced Pasture

☐ Mining or Construction

COMMENTS

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

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

☐ Severe (10 ft/100 ft)

S2M-068

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: Huron Township / City: _____**MISCELLANEOUS**Base Flow Conditions? (Y/N): N Date of last precipitation: 10/4/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 100Were 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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): Y (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)

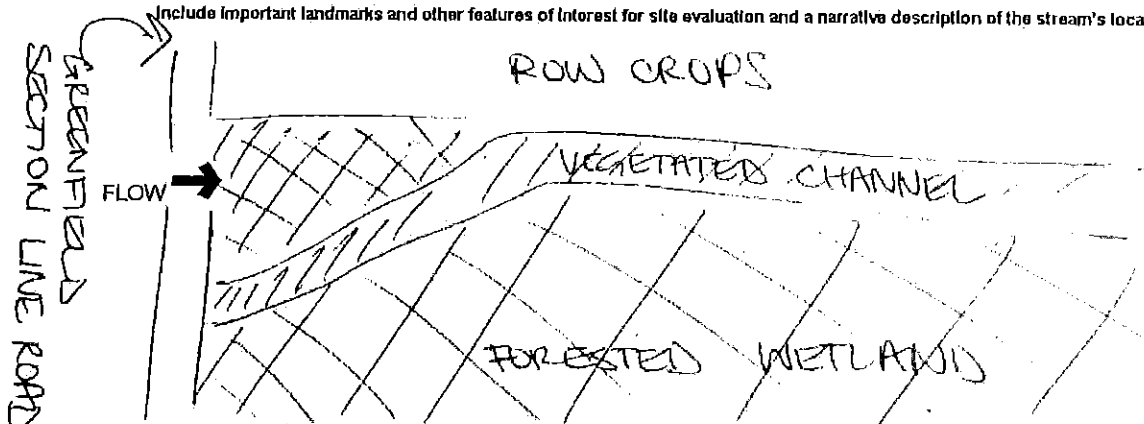
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y 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





Primary Headwater Habitat Evaluation Form

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

56

SITE NAME/LOCATION

S2M-070

SITE NUMBER A3820001 RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 6/4/18

SCORER K. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.			
TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input checked="" type="checkbox"/> FINE DETRITUS [3 pts]	40
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input type="checkbox"/> CLAY or HARDPAN [0 pts]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]		<input checked="" type="checkbox"/> MUCK [0 pts]	50
<input type="checkbox"/> SAND (<2 mm) [5 pts]		<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Blkr Slabs, Boulder, Cobble, Bedrock (A) **3** (B) **5**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **3** TOTAL NUMBER OF SUBSTRATE TYPES: **5**

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):	
<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input checked="" type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS: MAXIMUM POOL DEPTH (centimeters): **17**

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):	
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS: AVERAGE BANKFULL WIDTH (meters): **5**

HHEI Metric Points

Substrate Max = 40 **6**

A + B

Pool Depth Max = 30 **25**

Bankfull Width Max = 30 **25**

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

L R (Per Bank)

L R (Most Predominant per Bank)

L R

☐ Wide >10m

☐ Mature Forest, Wetland

☐ Conservation Tillage

☐ Moderate 5-10m

☐ Immature Forest, Shrub or Old Field

☐ Urban or Industrial

☐ Narrow <5m

☐ Residential, Park, New Field

☒ Open Pasture, Row Crop

☒ None

☐ Fenced Pasture

☐ Mining or Construction

COMMENTS

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

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☒ None

☐ 0.5

☐ 1.0

☐ 1.5

☐ 2.0

☐ 2.5

☐ 3.0

☐ >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 m/100 ft)

☐ Flat to Moderate

☐ Moderate (2 m/100 ft)

☐ Moderate to Severe

☐ Severe (10 m/100 ft)

S2M-070

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)**

☐ VWH 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: HURON Township / City: _____**MISCELLANEOUS**Base Flow Conditions? (Y/N): N Date of last precipitation: 10/4/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 100Were 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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): Y (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)

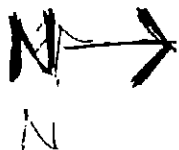
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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 →

ROW CROPS

VEGETATED CHANNEL (REED CANARY GRASS)

ROW CROPS

SOUTHWOOD
CULVERT



Primary Headwater Habitat Evaluation Form

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

69

SITE NAME/LOCATION

S2M-073

SITE NUMBER A3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 200

LAT.

LONG

RIVER CODE

RIVER MILE

DATE 10/4/18

SCORER

ESIMON

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL☐ RECOVERED☒ RECOVERING☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	5
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	70	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Blkr Slabs, Boulder, Cobble, Bedrock

0

(A)

15

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input checked="" type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

26

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

18

HHEI
Metric
PointsSubstrate
Max = 40

19

A + B

Pool Depth
Max = 30

30

Bankfull
Width
Max=30

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

L R (Per Bank)

L R (Most Predominant per Bank)

L R

☐ Wide >10m☐ Mature Forest, Wetland☐ Conservation Tillage☒ Moderate 5-10m☐ Immature Forest, Shrub or Old Field☐ Urban or Industrial☐ Narrow <5m☐ Residential, Park, New Field☒ Open Pasture, Row Crop☐ None☐ Fenced Pasture☐ Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒ Stream Flowing☐ Moist Channel, isolated pools, no flow (Intermittent)☐ Subsurface flow with isolated pools (Intermittent)☐ Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 81 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☐ Severe (10 ft/100 ft)

S2M-013

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: HURON Township / City: _____**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/4/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 100Were 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) _____ If not, please explain: _____

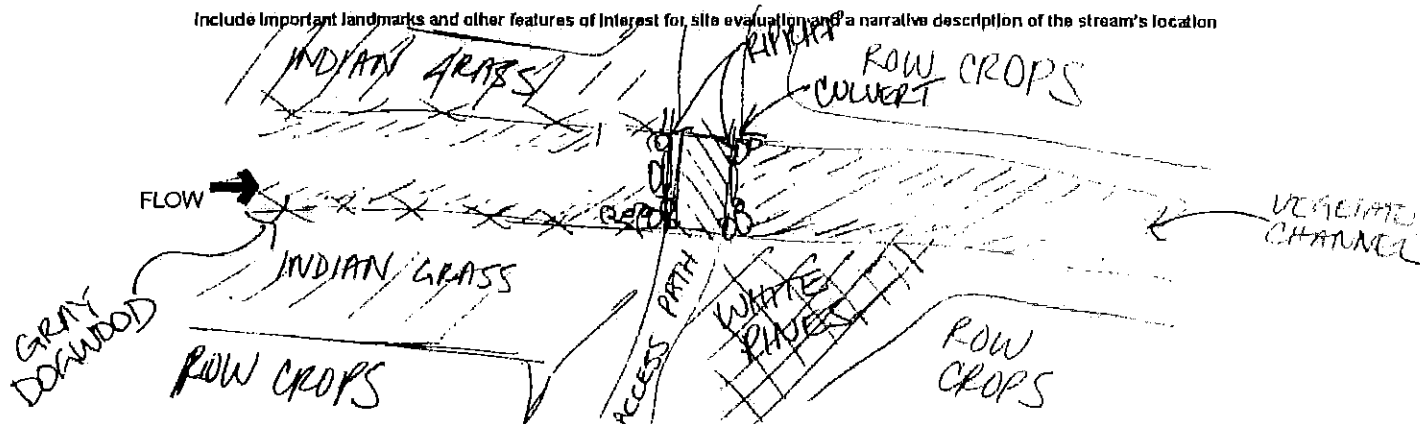
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): Y (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) N Voucher? (Y/N) _____Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

54

SITE NAME/LOCATION S2M-074 SITE NUMBER A3820001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 200 LAT _____ LONG _____ RIVER CODE _____ RIVER MILE _____
DATE 10/5/18 SCORER K. SIMON COMMENTS _____

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.				HHEI Metric Points
TYPE	PERCENT	TYPE	PERCENT	
<input type="checkbox"/> BLDR SLABS [16 pts]		<input checked="" type="checkbox"/> SILT [3 pt]	<u>28</u>	Substrate Max = 40 <u>14</u> A + B
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>20</u>	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>20</u>	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>20</u>	
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]	<u>7</u>	<input type="checkbox"/> MUCK [0 pts]		
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	<u>30</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]		
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock		(A) <u>9</u>	(B) <u>5</u>	
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:				TOTAL NUMBER OF SUBSTRATE TYPES: <u>5</u>
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):				
<input checked="" type="checkbox"/> > 30 centimeters [20 pts]		<input type="checkbox"/> > 5 cm - 10 cm [15 pts]		Pool Depth Max = 30 <u>20</u>
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]		<input type="checkbox"/> < 5 cm [5 pts]		
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]		<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]		
COMMENTS _____				MAXIMUM POOL DEPTH (centimeters): <u>31</u>
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):				
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]		<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]		Bankfull Width Max=30 <u>20</u>
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]		<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]		
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]				
COMMENTS _____				AVERAGE BANKFULL WIDTH (meters): <u>27</u>

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		
L	R	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
COMMENTS _____				

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):
☒ Stream Flowing
☐ Subsurface flow with isolated pools (Intersittial)
☐ Moist Channel, Isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)
COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):
☐ None
☐ 0.5
☐ 1.0
☐ 1.5
☒ 2.0
☐ 2.5
☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE
☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

82M-074

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: HURON CO. Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/4/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y 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

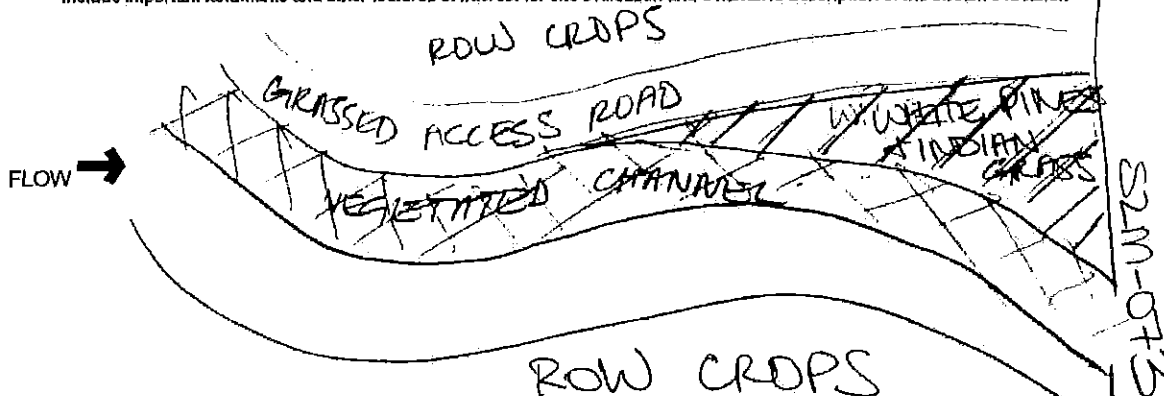
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N): Y Voucher? (Y/N): N Salamanders Observed? (Y/N): N Voucher? (Y/N): _____
 Frogs or Tadpoles Observed? (Y/N): Y Voucher? (Y/N): N Aquatic Macroinvertebrates Observed? (Y/N): Y Voucher? (Y/N): 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





Primary Headwater Habitat Evaluation Form

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

64

SITE NAME/LOCATION

S2M-076

SITE NUMBER A3820001 RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 10/5/18

SCORER K. SIMON

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.			
TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	10	<input type="checkbox"/> CLAY or HARPAN [0 pts]	20
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	30	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	40	<input type="checkbox"/> ARTIFICIAL [3 pts]	
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10		(A) 15	(B) 4
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 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):			
<input type="checkbox"/> > 30 centimeters [20 pts]		<input type="checkbox"/> > 5 cm - 10 cm [15 pts]	
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]		<input type="checkbox"/> < 5 cm [5 pts]	
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]		<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]	
COMMENTS		MAXIMUM POOL DEPTH (centimeters): 12	
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):			
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]		<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]	
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]		<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]	
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]			
COMMENTS		AVERAGE BANKFULL WIDTH (meters): 2.1	

HHEI Metric Points

Substrate Max = 40
19
A + B

Pool Depth Max = 30
25

Bankfull Width Max = 30
20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

NOTE: River Left (L) and Right (R) as looking downstream

RIPARIAN WIDTH

- ☒ L ☒ R (Per Bank)
- ☒ Wide >10m
- ☐ Moderate 5-10m
- ☐ Narrow <5m
- ☐ None

COMMENTS

FLOODPLAIN QUALITY

- ☒ L ☒ R (Most Predominant per Bank)
- ☒ Mature Forest, Wetland
- ☒ Immature Forest, Shrub or Old Field
- ☐ Residential, Park, New Field
- ☐ Fenced Pasture

- ☐ L ☐ R
- ☐ Conservation Tillage
- ☐ Urban or Industrial
- ☐ Open Pasture, Row Crop
- ☐ Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

- ☒ Stream Flowing
- ☐ Subsurface flow with isolated pools (Intermittent)

- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

- ☐ None
- ☐ 0.5

- ☐ 1.0
- ☐ 1.5

- ☒ 2.0
- ☐ 2.5

- ☐ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

S2M-076

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: HURON Township / City: _____**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/5/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 100Were 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 EVALUATIONPerformed? (Y/N): Y (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): N Voucher? (Y/N): _____Frogs or Tadpoles Observed? (Y/N): N Voucher? (Y/N): N Aquatic Macroinvertebrates Observed? (Y/N): Y 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





Primary Headwater Habitat Evaluation Form

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

74

SITE NAME/LOCATION

S2M-078

SITE NUMBER

R3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 10/8/18

SCORER

K. SIMON

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	10
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	40	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

10

(A)

15

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

19

A + B

Pool Depth

Max = 30

30

Bankfull

Width

Max = 30

25

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):

<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

23

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

33

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

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (interstitial)	<input type="checkbox"/> Dry channel, no water (ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input checked="" type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

S2M-078

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)

☐ WWI 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: CLACK Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 40

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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

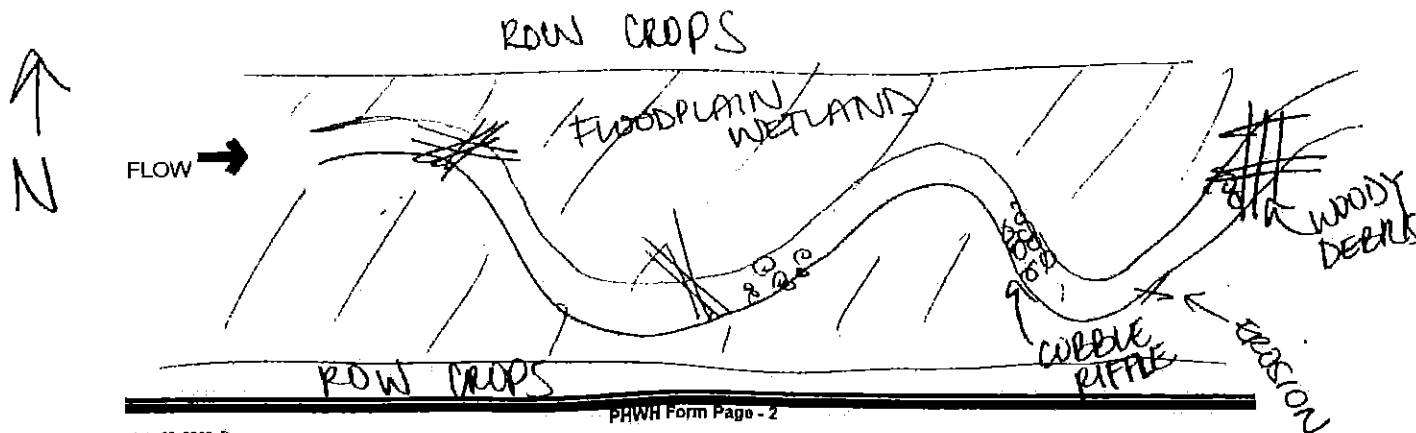
Performed? (Y/N): _____ (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/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



Stream & Location: A3820001

RM:

Date: 10/8/18

S2M-079

Scorers Full Name & Affiliation: K. SIMON

River Code:

STORET #:

Lat./ Long.:

18

Office verified location ☐

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present.

40° 42' 5" N 82° 50' 41" W

Check ONE (Or 2 & average)

BEST TYPES

- ☐ BLDR / SLABS [10]
☐ BOULDER [9]
☐ COBBLE [8]
☒ GRAVEL [7]
☒ SAND [6]
☐ BEDROCK [5]

POOL RIFFLE

- ☐ POOL
☐ RIFFLE
☐ POOL
☐ RIFFLE
☐ POOL
☐ RIFFLE

OTHER TYPES

- ☐ HARDPAN [4]
☐ DETRITUS [3]
☐ MUCK [2]
☐ SILT [2]
☐ ARTIFICIAL [0]

(Score natural substrates; ignore sludge from point-sources)

ORIGIN

- ☐ LIMESTONE [1]
☐ TILLS [1]
☐ WETLANDS [0]
☐ HARDPAN [0]
☐ SANDSTONE [0]
☐ RIP/RAP [0]
☐ LACUSTURINE [0]
☐ SHALE [-1]
☐ COAL FINES [-2]

QUALITY

- ☐ HEAVY [-2]
☐ MODERATE [-1]
☐ NORMAL [0]
☒ FREE [1]
☐ EXTENSIVE [-2]
☐ MODERATE [-1]
☒ NORMAL [0]
☐ NONE [1]

SILT

EMBEDDEDNESS

Substrate

14

Maximum 20

NUMBER OF BEST TYPES:

- ☐ 4 or more [2]
☒ 3 or less [0]

Comments

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 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.

AMOUNT

Check ONE (Or 2 & average)

UNDERCUT BANKS [1]

OVERHANGING VEGETATION [1]

SHALLOWS (IN SLOW WATER) [1]

ROOTMATS [1]

POOLS > 70cm [2]

ROOTWADS [1]

BOULDERS [1]

OXBOWS, BACKWATERS [1]

AQUATIC MACROPHYTES [1]

LOGS OR WOODY DEBRIS [1]

☐ EXTENSIVE >75% [11]☒ MODERATE 25-75% [7]☐ SPARSE 5-25% [3]☐ NEARLY ABSENT <5% [1]

Comments

Cover
Maximum
20

15

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average)

SINUOSITY

- ☐ HIGH [4]
☒ MODERATE [3]
☐ LOW [2]
☐ NONE [1]

DEVELOPMENT

- ☐ EXCELLENT [7]
☐ GOOD [5]
☒ FAIR [3]
☐ POOR [1]

CHANNELIZATION

- ☒ NONE [6]
☐ RECOVERED [4]
☐ RECOVERING [3]
☐ RECENT OR NO RECOVERY [1]

STABILITY

- ☐ HIGH [3]
☒ MODERATE [2]
☐ LOW [1]

Comments

Channel
Maximum
20

14

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION

- ☐ NONE / LITTLE [3]
☐ MODERATE [2]
☐ HEAVY / SEVERE [1]

RIPARIAN WIDTH

- ☐ WIDE > 50m [4]
☐ MODERATE 10-50m [3]
☐ NARROW 5-10m [2]
☐ VERY NARROW < 5m [1]
☐ NONE [0]

FLOOD PLAIN QUALITY

- ☐ FOREST, SWAMP [3]
☐ SHRUB OR OLD FIELD [2]
☐ RESIDENTIAL, PARK, NEW FIELD [1]
☐ FENCED PASTURE [1]
☐ OPEN PASTURE, ROWCROP [0]

- ☐ CONSERVATION TILLAGE [1]
☐ URBAN OR INDUSTRIAL [0]
☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian
Maximum
10

10

5) POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH

Check ONE (ONLY!)

- ☐ > 1m [6]
☐ 0.7-1m [4]
☐ 0.4-0.7m [2]
☒ 0.2-0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH

Check ONE (Or 2 & average)

- ☒ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY

Check ALL that apply

- ☐ TORRENTIAL [4]
☐ VERY FAST [1]
☐ FAST [1]
☒ MODERATE [1]
☐ SLOW [1]
☐ INTERSTITIAL [1]
☐ INTERMITTENT [2]
☒ EDDIES [1]

Indicate for reach - pools and riffles.

Comments

Recreation Potential

Primary Contact

Secondary Contact

(circle one and comment on back)

Pool /
Current
Maximum
12

4

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:

Check ONE (Or 2 & average).

☐ NO RIFFLE [metric=0]

RIFFLE DEPTH

- ☐ BEST AREAS > 10cm [2]
☒ BEST AREAS 5-10cm [1]
☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH

- ☐ MAXIMUM > 50cm [2]
☒ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE

- ☐ STABLE (e.g., Cobble, Boulder) [2]
☐ MOD. STABLE (e.g., Large Gravel) [1]
☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS

- ☐ NONE [2]
☒ LOW [1]
☐ MODERATE [0]
☐ EXTENSIVE [-1]

Riffle /
Run
Maximum
8

5

Comments

6) GRADIENT (9.1 ft/m)

DRAINAGE AREA (2.25 mi²)☐ VERY LOW - LOW [2-4]☒ MODERATE [5-10]☐ HIGH - VERY HIGH [10-8]

% POOL:

% GLIDE:

% RUN:

% RIFFLE:

Gradient

Maximum
10

6

A) SAMPLED REACH

Check ALL that apply

METHOD

STAGE

- ☐ BOAT
☒ WADE
☐ LINE
☐ OTHER

- ☐ HIGH
☒ UP
☐ NORMAL
☐ LOW
☐ DRY

- ☐ DISTANCE
☐ 0.5 Km
☐ 0.2 Km
☐ 0.15 Km
☐ 0.12 Km
☐ OTHER

- ☐ CLARITY
☐ 1st - sample pass - 2nd
☒ < 20 cm
☐ 20 - 40 cm
☐ 40 - 70 cm
☐ > 70 cm / CTB
☐ SECCHI DEPTH

- ☐ CANOPY
☐ > 85% - OPEN
☒ 55% - 85%
☐ 30% - 55%
☐ 10% - 30%
☐ < 10% - CLOSED

- ☐ 1st
☐ 2nd
☐ cm
☐ cm

- ☐ C) RECREATION
☐ AREA
☐ DEPTH
☐ POOL: ☐ > 100ft? ☐ > 3ft

- ☐ B) AESTHETICS
☐ NUISANCE ALGAE
☐ INVASIVE MACROPHYTES
☒ EXCESS TURBIDITY
☐ DISCOLORATION
☐ FOAM / SCUM
☐ OIL SHEEN
☐ TRASH / LITTER
☐ NUISANCE ODOR
☐ SLUDGE DEPOSITS
☐ CSO/SOSS/OUTFALLS

- ☐ D) MAINTENANCE
☐ PUBLIC / PRIVATE / BOTH / NA
☐ ACTIVE / HISTORIC / BOTH / NA
☐ YOUNG-SUCCESSION-OLD
☐ SPRAY / SNAG / REMOVED
☐ MODIFIED / DIPPED OUT / NA
☐ LEVEED / ONE SIDED
☐ RELOCATED / CUTOFFS
☐ MOVING-BEDLOAD-STABLE
☐ ARMOURD / SLUMPS
☐ ISLANDS / SCOURD
☐ IMPOUNDED / DESICCATED
☐ FLOOD CONTROL / DRAINAGE

- ☐ E) ISSUES
☐ WWTP / CSO / NPDES / INDUSTRY
☐ HARDENED / URBAN / DIRTYGRIME
☐ CONTAMINATED / LANDFILL
☐ BMPs-CONSTRUCTION-SEDIMENT
☐ LOGGING / IRRIGATION / COOLING
☐ BANK / EROSION / SURFACE
☐ FALSE BANK / MANURE / LAGOON
☐ WASH H₂O / TILE / H₂O TABLE
☐ ACID / MINE / QUARRY / FLOW
☐ NATURAL / WETLAND / STAGNANT
☐ PARK / GOLF / LAWN / HOME
☐ ATMOSPHERE / DATA PAUCITY

- ☐ F) MEASUREMENTS
☐ 1st
☐ 2nd
☐ cm
☐ cm

- ☐ LEGACY TREE

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.
YES, REACH IS TYPICAL OF STREAM

Stream Drawing: N

FROM

WETLAND

POW CROPS

FLOODPLAIN / WETLAND

WETLAND

UNDER BANKS

ROOT LOAD

REACH



Primary Headwater Habitat Evaluation Form

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

64

SITE NAME/LOCATION

S2M-082

SITE NUMBER A3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 10/9/18

SCORER

R. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐

☐

☐

☐

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☒

☒

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [8 pts]

SAND (<2 mm) [8 pts]

PERCENT

25

TYPE

☐

☐

☐

☐

☐

☐

SILT [3 pts]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pts]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

10

5

Total of Percentages of

BLDR Slabs, Boulder, Cobble, Bedrock

(A)

5

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

☐

☐

☒

☐

☐

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

☐

☐

☐

☐

☐

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐

☒

☐

☐

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

☐

☐

☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

HHEI Metric Points

Substrate Max = 40

19

A + B

Pool Depth Max = 30

25

Bankfull Width Max = 30

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

L R

☒ ☒

☐ ☐

☐ ☐

☐ ☐

☐ ☐

☐ ☐

(Per Bank)

Wide >10m

Moderate 5-10m

Narrow <5m

None

L R

☒ ☒

☐ ☐

☐ ☐

☐ ☐

☐ ☐

☐ ☐

(Most Predominant per Bank)

Mature Forest, Wetland

Immature Forest, Shrub or Old Field

Residential, Park, New Field

Fenced Pasture

L R

☐ ☐

☐ ☐

☐ ☐

☐ ☐

☐ ☐

☐ ☐

Conservation Tillage

Urban or Industrial

Open Pasture, Row Crop

Mining or Construction

COMMENTS

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒

☐

☐

Stream Flowing

Subsurface flow with isolated pools (Intermittent)

COMMENTS

☐

☐

Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐

☐

☐

☐

None

0.5

☐

☐

☐

☐

1.0

1.5

☐

☐

☐

☐

2.0

2.5

☐

☐

☐

☐

3.0

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/8/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 60

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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

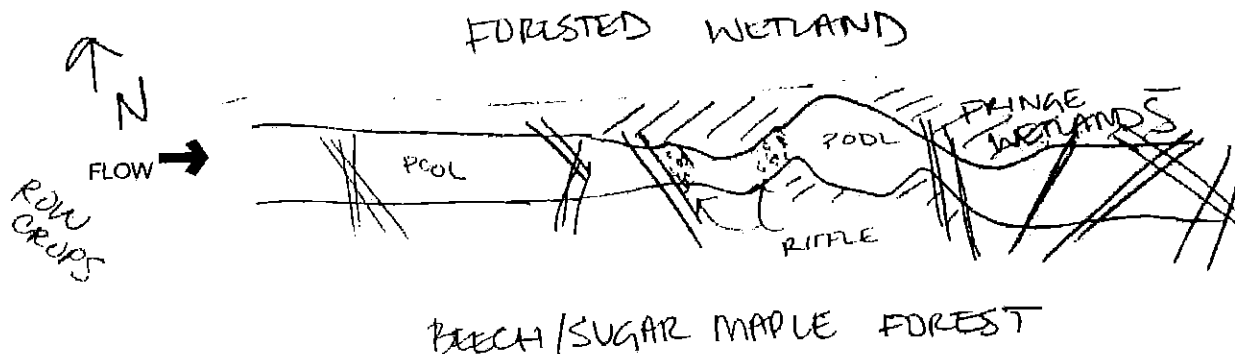
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) N Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

37

SITE NAME/LOCATION S2M088 SITE NUMBER A382000 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 7/1/18 SCORER K Simon COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY
MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.)				HHEI Metric Points
TYPE	PERCENT	TYPE	PERCENT	
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pts]	<u>15</u>	Substrate Max = 40 <u>35</u> A + B
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>5</u>	
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>10</u>	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>40</u>	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input checked="" type="checkbox"/> MUCK [0 pts]	_____	
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____	
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>0</u>		(A) <u>3</u>	(B) <u>4</u>	
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:				TOTAL NUMBER OF SUBSTRATE TYPES: <u>4</u>
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):				
<input type="checkbox"/> > 30 centimeters [20 pts]		<input type="checkbox"/> > 5 cm - 10 cm [15 pts]		Pool Depth Max = 30 <u>5</u>
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]		<input checked="" type="checkbox"/> < 5 cm [5 pts]		
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]		<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]		
COMMENTS _____				MAXIMUM POOL DEPTH (centimeters): <u>3</u>
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):				
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]		<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]		Bankfull Width Max = 30 <u>25</u>
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]		<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]		
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]				
COMMENTS _____				AVERAGE BANKFULL WIDTH (meters): <u>35</u>

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	
L	R	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(Per Bank)		(Most Predominant per Bank)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wide >10m		Mature Forest, Wetland	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Narrow <5m		Residential, Park, New Field	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture	
COMMENTS _____			

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):
☐ Stream Flowing
☐ Subsurface flow with isolated pools (Intermittent)
☒ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)
COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):
☐ None
☐ 0.5
☐ 1.0
☐ 1.5
☐ 2.0
☐ 2.5
☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE
☐ Flat (0.5 ft/100 ft)
☐ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): _____ Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 100

Were samples collected for water chemistry? (Y/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): _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

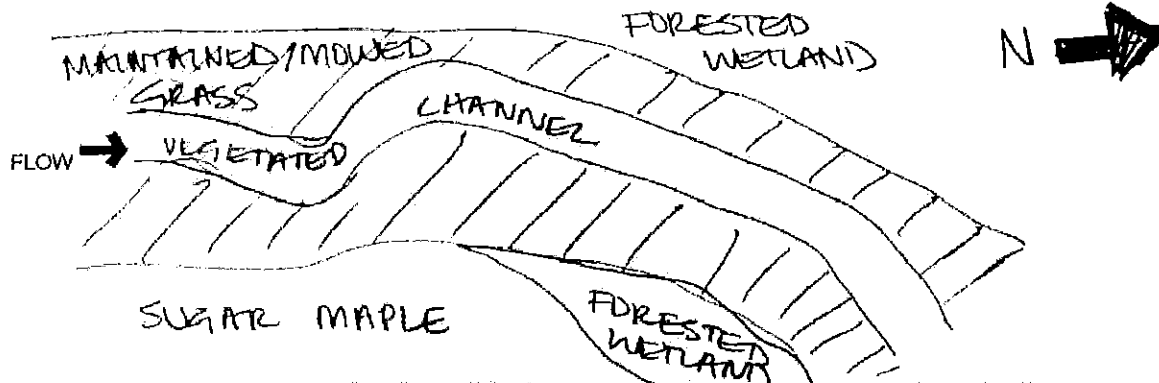
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N): N Voucher? (Y/N): N Salamanders Observed? (Y/N): N Voucher? (Y/N): N
Frogs or Tadpoles Observed? (Y/N): Y Voucher? (Y/N): Y Aquatic Macroinvertebrates Observed? (Y/N): Y Voucher? (Y/N): Y

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





Primary Headwater Habitat Evaluation Form

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

48

SITE NAME/LOCATION S2M-092 SITE NUMBER A382000 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 10/29/18 SCORER K. SWANSON COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☒ RECENT OR NO RECOVERY
MODIFICATIONS: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pts]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	_____
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input checked="" type="checkbox"/> FINE DETRITUS [3 pts]	<u>20</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>10</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	<u>10</u>
<input type="checkbox"/> SAND (<2 mm) [8 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
Bltr Slabs, Boulder, Cobble, Bedrock _____

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____

TOTAL NUMBER OF SUBSTRATE TYPES: _____

HHEI
Metric
Points

Substrate
Max = 40

3

A + B

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):

<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters): _____

Pool Depth

Max = 30

20

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters) _____

Bankfull
Width
Max=30

25

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY (NOTE: River Left (L) and Right (R) as looking downstream)

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Intermittent)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

S2M-092

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: _____ Township / City: _____

MISCELLANEOUSBase Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 99Were 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) _____ If not, please explain: _____

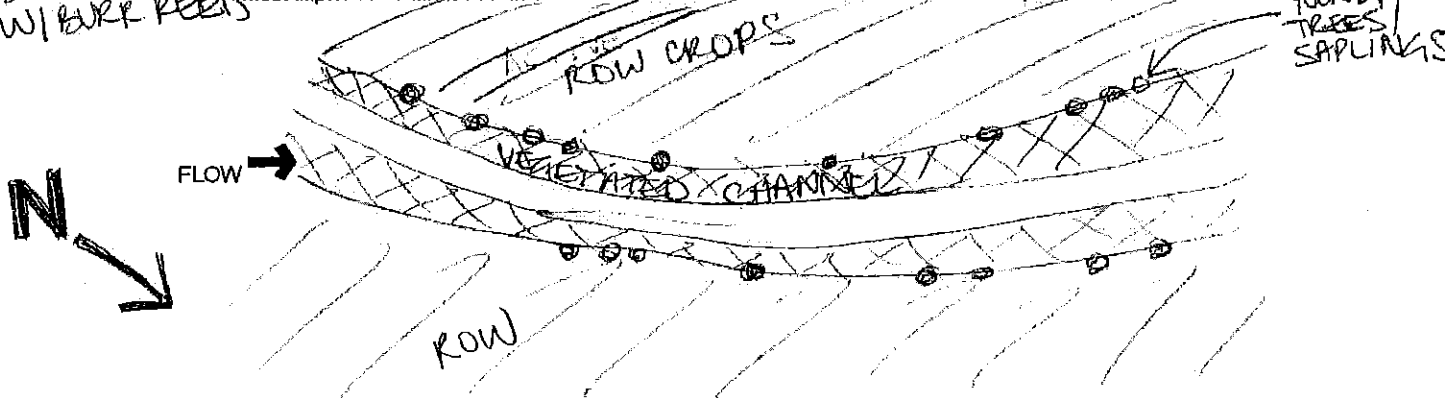
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): Y (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) N Voucher? (Y/N) _____Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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

CHANNEL
DOMINATED
W/ BURR REEDS



Primary Headwater Habitat Evaluation Form

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

54

SITE NAME/LOCATION

S2M-093

SITE NUMBER

A3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE

10/31/18

SCORER

K. SIMON

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☒ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	5
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	80
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]		<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock

0

(A)

6

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

60

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

3.1

HHEI Metric Points

Substrate Max = 40

9

A + B

Pool Depth Max = 30

20

Bankfull Width Max = 30

25

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

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Intermittent)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

82M-093

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: HURON Township / City: BELLEVE**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 10/31/18 Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 100Were 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: _____

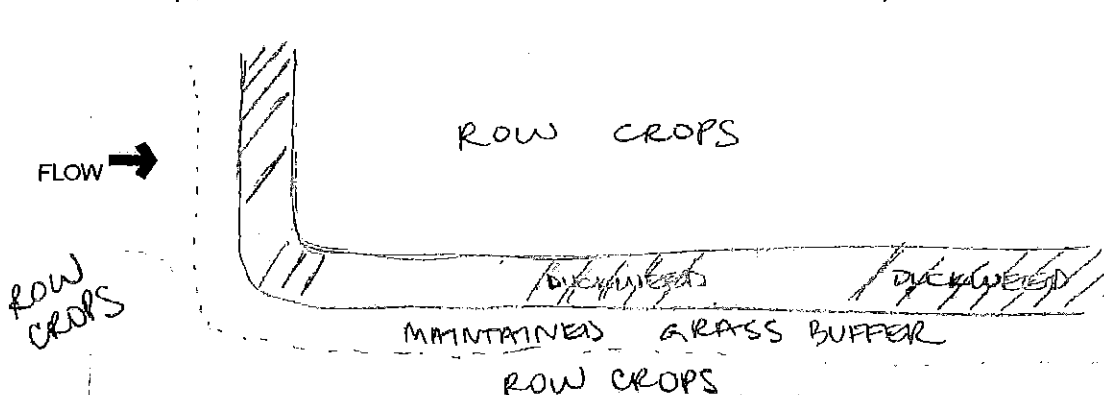
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): Y (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): N Voucher? (Y/N): _____Frogs or Tadpoles Observed? (Y/N): Y Voucher? (Y/N): _____ Aquatic Macroinvertebrates Observed? (Y/N): 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





Primary Headwater Habitat Evaluation Form

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

49

SITE NAME/LOCATION S2M-094 SITE NUMBER A3820001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 11/1/18 SCORER K. SIMON COMMENTS _____

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: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.			
TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pt]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>10</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>55</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input checked="" type="checkbox"/> MUCK [0 pts]	<u>30</u>
<input type="checkbox"/> SAND (<2 mm) [8 pts]	<u>5</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock _____		(A) <u>0</u>	(B) <u>4</u>
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____		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):	
<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]
COMMENTS _____	MAXIMUM POOL DEPTH (centimeters): <u>30</u>

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):	
<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3'3" - 4'8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9'7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3'3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4'8" - 9'7") [20 pts]	
COMMENTS _____	AVERAGE BANKFULL WIDTH (meters): <u>33</u>

HHEI Metric Points
Substrate Max = 40
4
A + B

Pool Depth Max = 30
20

Bankfull Width Max = 30
25

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			
L	R	L	R		
<input type="checkbox"/>	<input type="checkbox"/> (Per Bank)	<input type="checkbox"/>	<input type="checkbox"/> (Most Predominant per Bank)	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):
☒ Stream Flowing
☐ Subsurface flow with isolated pools (Intermittent)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):
☐ None
☐ 0.5
☒ 1.0
☐ 1.5
☐ 2.0
☐ 2.5
☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE
☐ Flat (0.5 ft/100 ft)
☒ 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 _____ (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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/1/18 Quantity: _____

Photograph information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 100

Were samples collected for water chemistry? (Y/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): Y (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) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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

N →

ROW CROPS

FLOW →

PHACELLES DOMINATED CHANNEL

ROW CROPS



Primary Headwater Habitat Evaluation Form

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

69

SITE NAME/LOCATION: S2M-097 SITE NUMBER: A3820001 RIVER BASIN: _____ DRAINAGE AREA (mi²): _____
LENGTH OF STREAM REACH (ft): 200 LAT: _____ LONG: _____ RIVER CODE: _____ RIVER MILE: _____
DATE: 11/6/18 SCORER: K. SIMON COMMENTS: _____

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: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pts]	5
<input type="checkbox"/> BOULDER (>258 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	5
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	30	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A) 15

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS: _____

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS: _____

AVERAGE BANKFULL WIDTH (meters):

HHEI
Metric
Points

Substrate
Max = 40

19

A + B

Pool Depth
Max = 30

25

Bankfull
Width
Max=30

25

This information must also be completed

RIPIARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPIARIAN WIDTH

L	R	(Per Bank)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS: _____

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
COMMENTS: _____

☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input checked="" type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ 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 _____ (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: MURKIN Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y 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 (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

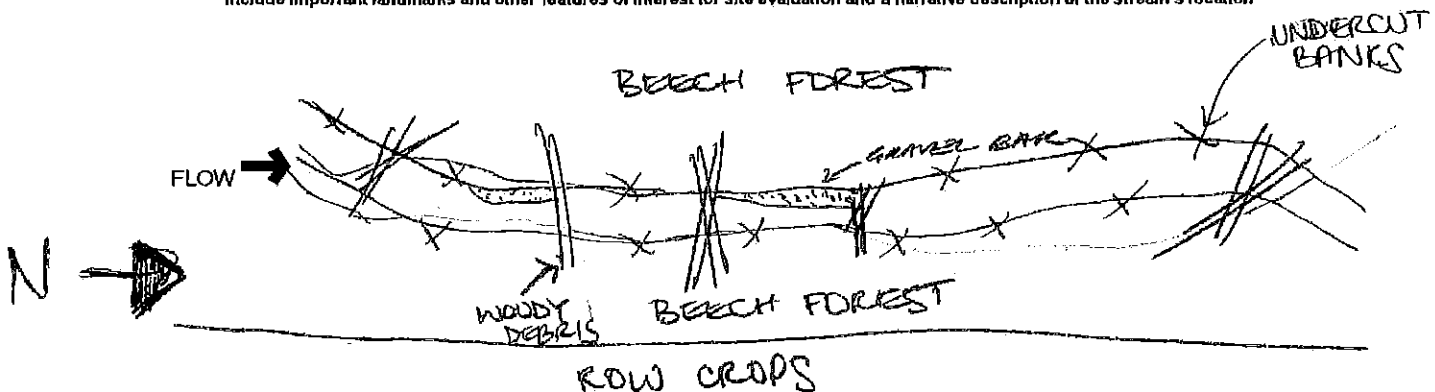
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

49

SITE NAME/LOCATION

S2M-0918

SITE NUMBER

A382,000

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE

4/16/18

SCORER

R. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	10
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	10
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]		<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	20	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

0

(A)

6

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

22

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

2.1

HHEI
Metric
Points

Substrate
Max = 40

9

A + B

Pool Depth
Max = 30

20

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN ZONE

FLOODPLAIN QUALITY

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Intermittent)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input checked="" type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

S2M-098

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: HURON Township / City: _____**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y Canopy (% open): 80Were 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) _____ If not, please explain: _____

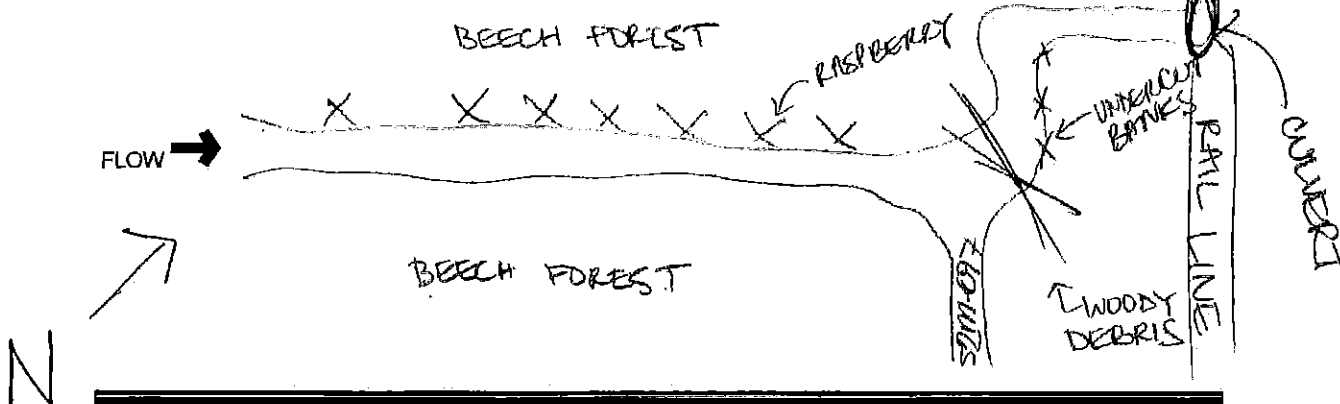
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): Y (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) N Voucher? (Y/N) _____Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

591

SITE NAME/LOCATION S2M-100 SITE NUMBER A3820001 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
DATE 11/6/18 SCORER K. SIMON COMMENTS _____

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: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pt]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	90
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]	_____	<input checked="" type="checkbox"/> MUCK [0 pts]	10
<input type="checkbox"/> SAND (<2 mm) [8 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock 0

(A) 2

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [16 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 8' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

4

A + B

Pool Depth
Max = 30

25

Bankfull
Width
Max=30

15
30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L	R	(Per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Narrow <5m
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

L	R	(Most Predominant per Bank)
<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture

L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)

☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

82M-100

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: Huron Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): Y 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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

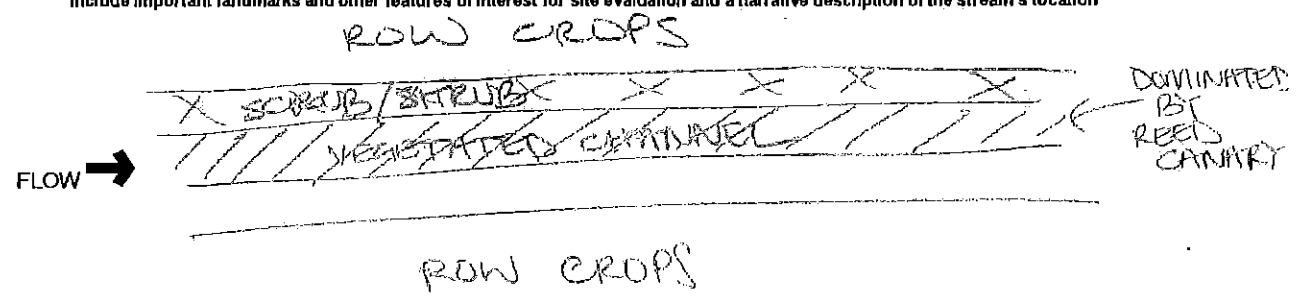
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
 Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

52

SITE NAME/LOCATION

S2M-1016

SITE NUMBER

A3820001

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 11/7/18

SCORER

R. SIMON

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input checked="" type="checkbox"/> SILT [3 pts]	55
<input type="checkbox"/> BOULDER (>256 mm) [18 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	20
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]		<input type="checkbox"/> MUCK [0 pts]	10
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	15	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

- ☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☒ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

- ☐ > 4.0 meters (> 13') [30 pts]
☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
☒ > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]
☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

HHEI
Metric
Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

25

Bankfull
Width
Max=30

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

L R

(Per Bank)

L R

(Most Predominant per Bank)

L R

☒ ☒

Wide >10m

☐ ☒

Mature Forest, Wetland

☐ ☐

Conservation Tillage

☐ ☐

Moderate 5-10m

☐ ☐

Immature Forest, Shrub or Old Field

☐ ☐

Urban or Industrial

☐ ☐

Narrow <5m

☐ ☐

Residential, Park, New Field

☒ ☐

Open Pasture, Row Crop

☐ ☐

None

☐ ☐

Fenced Pasture

☐ ☐

Mining or Construction

COMMENTS

☒ FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

- ☒ Stream Flowing
☐ Subsurface flow with isolated pools (Intermittent)

- ☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

- ☐ None
☐ 0.5

- ☐ 1.0
☐ 1.5

- ☒ 2.0
☐ 2.5

- ☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

82M-101

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: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

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 (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

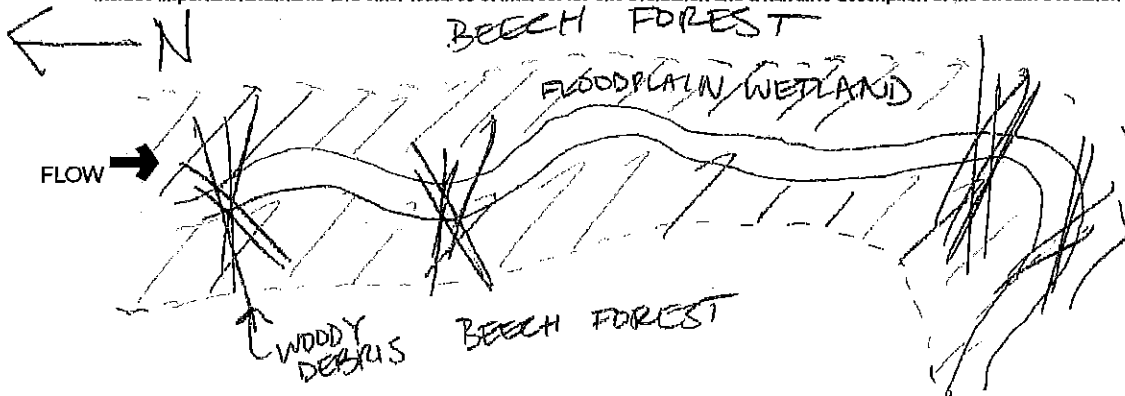
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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





Primary Headwater Habitat Evaluation Form

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

47

SITE NAME/LOCATION #

S2M-105

SITE NUMBER

13820061

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE

11/12/18

SCORER

K. Simon

COMMENTS

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:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [18 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	3
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	30
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	2	<input checked="" type="checkbox"/> MUCK [0 pts]	40
<input type="checkbox"/> SAND (<2 mm) [6 pts]	5	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock

0

(A)

0

(B)

7

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

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):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

15

Bankfull
Width
Max = 30

25

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

L	R	(Per Bank)	L	R	(Most Predominant per Bank)	L	R	
<input type="checkbox"/>	<input type="checkbox"/>	Wide >10m	<input type="checkbox"/>	<input type="checkbox"/>	Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m	<input type="checkbox"/>	<input type="checkbox"/>	Immature Forest, Shrub or Old Field	<input type="checkbox"/>	<input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m	<input type="checkbox"/>	<input type="checkbox"/>	Residential, Park, New Field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Open Pasture, Row Crop
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>	<input type="checkbox"/>	Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/>	Mining or Construction

COMMENTS

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, Isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5
		<input type="checkbox"/> 3.0
		<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☒ Flat (0.5 ft/100 ft)

☐ 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 _____ (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: HURON Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: _____

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 100

Were samples collected for water chemistry? (Y/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) _____ If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): Y (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) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) 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

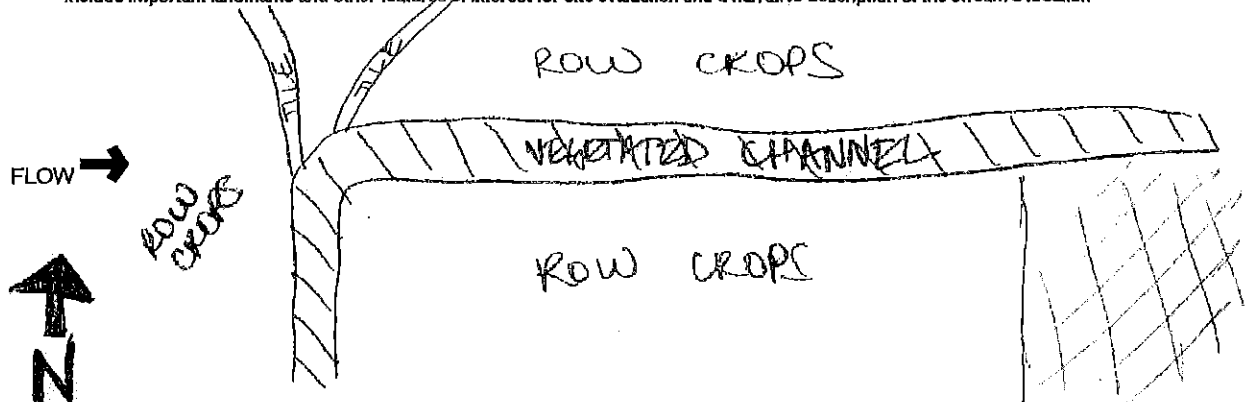


Exhibit AA

Frac-Out Contingency Plan

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(Counsel of Record)
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wvorys@dickinsonwright.com

Attorneys for Firelands Wind, LLC

INADVERTENT RELEASE OF DRILLING FLUID CONTINGENCY PLAN

For Horizontal Directional Drilling
Under Certain Sensitive Streams and Wetlands
Emerson Creek Wind Farm
Huron and Erie Counties, Ohio

I. Introduction

Construction of the Emerson Creek Wind Farm in Erie and Huron Counties, Ohio, will include the use of trenchless excavation methods known as horizontal directional drilling (“HDD”). This widely used technique accomplishes the installation of buried utilities with minimal impact, by routing the utility under a sensitive feature (such as a stream, river or wetland). The HDD procedure uses a bentonite slurry, a fine clay material as a drilling lubricant (“drilling mud”). Although bentonite is non-toxic and non-hazardous, a potential environmental risk associated with conducting HDD under sensitive features occurs when bentonite is released to the surface during construction (sometimes referred to as an inadvertent release or “frac-out”).

Seepage of drilling fluid is most likely to occur near the bore entry and exit points where the drill head is shallow. Frac-outs can occur, however, in any location along a directional bore. This plan establishes operational procedures and responsibilities for HDD near sensitive environmental features such as streams, rivers, or wetlands for the prevention, containment, and remediation of any of frac-outs that may occur in connection with the proposed HDD as part of the construction of the Emerson Creek Wind in Erie and Huron Counties, Ohio.

The objectives of this Plan are to:

1. Minimize the potential for an inadvertent release associated with HDD activities;
2. Provide for the timely detection of an inadvertent release;
3. Protect sensitive water courses and associated riparian vegetation;
4. Ensure an organized, timely, and minimum-impact response in the event an inadvertent release occurs; and
5. Ensure that all appropriate notifications are made immediately to management and environmental personnel.

Measures to be deployed as part of the contingency plan include site inspection, proper training of the contractor and construction personnel, development of response procedures, provision of containment materials, and implementation of appropriate clean up procedures. These measures are described in detail below:

II. Description of Work

Drilling operations will be carefully monitored to determine if and when a frac-out may be occurring. Operations will be halted immediately upon detection of a significant decline in drilling pressure or other evidence that a frac-out may be occurring. The clean-up of all spills shall begin immediately. Management and environmental personnel shall be notified

immediately of any spills and shall be consulted regarding remediation procedures. Spill response kits shall be maintained on-site and used if a frac-out occurs. A vacuum truck and containment materials, such as straw bales, shall also be readily available. In the event of a frac-out, the on-site supervisor of construction activities ("Site Supervisor") will conduct an evaluation of the situation and direct recommended mitigation actions, based on the following guidelines:

1. If the frac-out is minor, easily contained, has not reached the surface, and is not threatening sensitive resources, then drilling operations may resume after use of a leak-stopping compound or redirection of the bore; and
2. If the frac-out has reached the surface, any hazardous materials within the bentonite shall be removed, contained and properly disposed of, as required by law. The drilling contractor shall be responsible for ensuring that the bentonite either is properly disposed of at an approved disposal facility or properly recycled in an approved manner. The Site Supervisor shall notify and take any necessary follow-up response actions in coordination with the relevant regulatory agency representatives. The Site Supervisor shall coordinate the mobilization of equipment stored at off-site locations (e.g., vacuum trucks) on an as needed basis.

III. Site Supervisor Responsibilities

The Site Supervisor has ultimate responsibility for implementing this plan. The Site Supervisor shall ensure that all relevant employees are trained prior to drilling. The Site Supervisor shall be notified immediately when a frac-out is detected. The Site Supervisor shall be responsible for ensuring that environmental personnel are aware of the frac-out, and coordinate personnel, response, remediation, and regulatory agency notification. The Site Supervisor shall ensure all waste materials are properly containerized, labeled, and removed from the site to an approved disposal facility by personnel experienced in the removal, transport and disposal of drilling mud.

The Site Supervisor shall be familiar with all aspects of the drilling activity, the contents of this plan and the conditions of approval under which the HDD is authorized to take place. The Site Supervisor shall have the authority to stop work and commit the resources (personnel and equipment) necessary to implement this plan. The Site Supervisor shall ensure that a copy of this plan is available (at the project work site) and accessible to all construction personnel. The Site Supervisor shall ensure that all workers are properly trained and familiar with the necessary procedures for response to a frac-out, prior to commencement of drilling operations.

IV. Equipment

The Site Supervisor shall ensure that:

1. Spill responses kit and spill containment materials are available on-site at all times, and that the equipment is in good working order;

2. Equipment required to contain and remediate a frac-out release either will either be available at the work site or readily available at an offsite location within 15- minutes of the bore site; and
3. If equipment is required to be operated adjacent to a water course, absorbent pads and plastic sheeting for placement beneath motorized equipment shall be used to protect sensitive areas from engine fluids.

V. Training

Prior to the start of construction, the Site Supervisor shall ensure that relevant workers receive training in the following areas:

1. The provisions of this plan, equipment maintenance and site-specific permit and monitoring requirements;
2. Inspection procedures for release prevention and containment equipment and materials;
3. Contractor/employee obligations to immediately stop the drilling operation upon first evidence of the occurrence of a frac-out and to immediately report any frac-out releases;
4. Contractor/employee responsibilities in the event of a release;
5. Operation of release prevention and control equipment and the location of release control materials, as necessary and appropriate; and
6. Protocols for communication with relevant regulatory agency representatives who might be on-site during the remediation effort.

VI. Procedures

The following procedures shall be followed each day, prior to the start of work. This plan shall be available on-site during all construction. The Site Supervisor shall be on-site at any time that HDD is occurring or is planned to occur. The Site Supervisor shall ensure that a briefing is held at the start of each day of HDD to review the appropriate procedures to be followed in case of a frac-out. Questions shall be answered, and clarification given on any point over which the HDD operating crew or other employees or contractors have concerns.

A. Drilling

Drilling pressures shall be closely monitored so they do not exceed those needed to penetrate the target formation. Pressure levels shall be monitored randomly by the operator. Pressure levels shall be set at a minimum level to prevent frac-outs. During the pilot bore,

the drilled annulus shall be maintained. Cutters and reamers shall be pulled back into previously-drilled sections after each new joint of pipe is added.

Exit and entry pits shall be enclosed by silt fences and straw or similar material. A spill kit shall be on-site and used if a frac-out occurs. A vacuum truck shall be readily available prior to and during all HDD operations. Containment materials (straw, silt fencing, sand bags, frac-out spill kits, etc.) shall be staged on-site at locations where they are readily available and easily mobilized for immediate use in the event of a frac-out. If necessary, barriers (straw bales or sedimentation fences) between the bore site and the edge of the water source, shall be constructed, prior to drilling, to prevent released bentonite material from reaching the water.

Once the drill rig is in place, and drilling begins, the drill operator shall stop work whenever the pressure in the drill rig significantly drops or there is a lack of returns in the entrance pit. If either of these occur, the Site Supervisor shall be informed that a possible frac-out has occurred. The Site Supervisor and the drill rig operator(s) shall work to coordinate the likely location of the frac-out.

The location of the frac-out shall be recorded and notes made on the location and measures taken to address the concern. The following subsections shall be adhered to when addressing a frac-out situation.

Water containing mud, silt, bentonite, or other pollutants from equipment washing or other activities, shall not be allowed to enter any water course. The bentonite used in the drilling process shall be either disposed of at an approved disposal facility or recycled in an approved manner. Other construction materials and wastes shall be recycled, or disposed of, as appropriate.

B. Vacuum Truck

A vacuum truck shall be staged at a location from which it can be mobilized and relocated so that any place along the drill shot, can be reached by the apparatus, within thirty (30) minutes of information indicating a possible frac-out.

C. Field Response

The response of the field crew to a frac-out release shall be immediate and in accordance with procedures set forth in this plan. All appropriate emergency actions that do not pose additional threats to sensitive resources will be taken, as follows:

1. Boring shall stop immediately;
2. The bore stem shall be pulled back to relieve pressure on the frac-out;

3. The Site Supervisor shall be notified to ensure that management and environmental personnel are notified, adequate response actions are taken and required notifications are made;
4. The Site Supervisor shall evaluate the situation and recommend the type and level of response warranted, including the level of notification required;
5. If the frac-out is minor, easily contained, has not reached the surface and is not threatening any sensitive resources, then a leak-stopping compound shall be employed to block the frac-out. If the use of leak-stopping compound is not fully successful, then the bore stem shall be redirected to a new location along the desired drill path (i.e., where a frac-out has not occurred);
6. If the frac-out has reached the surface, any hazardous materials within the bentonite shall be removed to a depth of 48 inches, contained and properly disposed of, as required by law. A dike or berm may be constructed around the frac-out to entrap released drilling fluid, if necessary. Clean sand shall be deployed and the area returned to pre-project contours; and
7. If a frac-out occurs, reaches the surface and becomes widespread, the Site

Supervisor shall authorize a vacuum truck and bulldozer stored off-site to be mobilized. The vacuum truck may be either positioned at either end of the line of the drill so that the frac-out can be reached by crews on foot, or may be pulled by a bulldozer, so that contaminated soils can be vacuumed up.

D. Response Close-out Procedures

1. When the release has been contained and remediated, response close-out activities shall be conducted at the direction of the Site Supervisor. These activities shall include those below.
2. The recovered drilling fluid shall either be recycled or transported to an approved facility for disposal. No recovered drilling fluids may be discharged into streams, storm drains or any other water source;
3. All frac-out excavation and remediation sites shall be returned to pre-project contours using clean fill, as necessary; and
4. All containment measures (fiber rolls, straw bale, etc.) shall be removed, unless otherwise specified by the Site Supervisor.

E. Resumption of HDD

For minor releases not necessitating external notification, HDD may continue, if full containment is achieved through the use of a leak-stopping compound or redirection of the

bore and the cleanup crew remains at the frac-out location throughout the HDD activity. For releases necessitating external notification, HDD activities shall not restart without prior approval from the Site Supervisor.

F. Bore Abandonment

Abandonment of the bore will only be required when all efforts to control the frac-out within the existing directional bore have failed.

VII. Notification

In the event of a frac-out that reaches a water source, the Site Supervisor shall notify safety personnel so they can notify the appropriate regulatory agencies. All agency notifications will occur within 24 hours and proper documentation will be created in a timely and complete manner.

The following information will be provided:

1. Name and telephone number of person reporting;
2. Location of the release;
3. Date and time of release;
4. Type and quantity, estimated size of release;
5. How the release occurred;
6. The type of activity that was occurring around the area of the frac-out;
7. Description of any sensitive areas, and their location in relation to the frac-out; and
8. Description of the methods used to remediate the site.

A. Communicating with Regulatory Agency Personnel

All employees and subcontractors shall adhere to the following protocols when regulatory agency personnel arrive on site. Regulatory agency personnel shall be required to comply with appropriate safety rules. Only the Site Supervisor, safety personnel and environmental should coordinate communication with regulatory agency personnel.

B. Documentation

The Site Supervisor shall record the frac-out event in his or her daily log. The log will include the following:

1. Details on the release event, including an estimate of the amount of bentonite released;
2. The location and time of release;
3. The size of the area impacted, and the success of the remediation action;
4. Name and telephone number of person reporting;
5. Date;
6. How the release occurred;
7. The type of activity that was occurring around the area of the frac-out;
8. Description of any sensitive areas, and their location in relation to the frac-out;
9. Description of the methods used to remediate the site; and
10. Listing of the water-related permits for the project.

VIII. Project Completion and Clean-up

1. All materials and any rubbish-construction debris shall be removed from the construction zone at the end of each work day;
2. Sump pits at bore entry and exits will be filled and returned to natural grade; and
3. All protective measures (fiber rolls, straw bale, silt fence, etc.) will be removed unless otherwise specified by the Site Supervisor.

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Summary: Application - Part 17 of 17 electronically filed by Christine M.T. Pirik on behalf of Firelands Wind, LLC