Stream Reach S6S044a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **11**

SITE NAME/LOCATION: UNT West Fork Clear Creek

SITE NUMBER: S6S044a | RIVER BASIN: Clear Creek - East/West/ | DRAINAGE AREA (mi): 0.01

LENGTH OF STEAM REACH (ft): | LAT: 39.46078 | LONG.: -86.378063 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 1/14/2016 | SCORER: ry kl | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☑ ☑	MUCK [0 pts]	100
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** (A)

Substrate Percentage Check: **100 %** (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: 0 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

HHEI Metric Points

Substrate Max = 40: 1 (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)

- ☐ > >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):** 0

Pool Depth Max = 30: 5

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** 0

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 (Per Bank)

L	R	
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☑	☑	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: _____ (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☑	WWH Name: **West Fork Clear Creek**	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 **Martinsville** NRCS Soil Map Page **37** NRCS Soil Map Stream Order: **2**

County: **Morgan** Township / City: **Washington**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **20**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

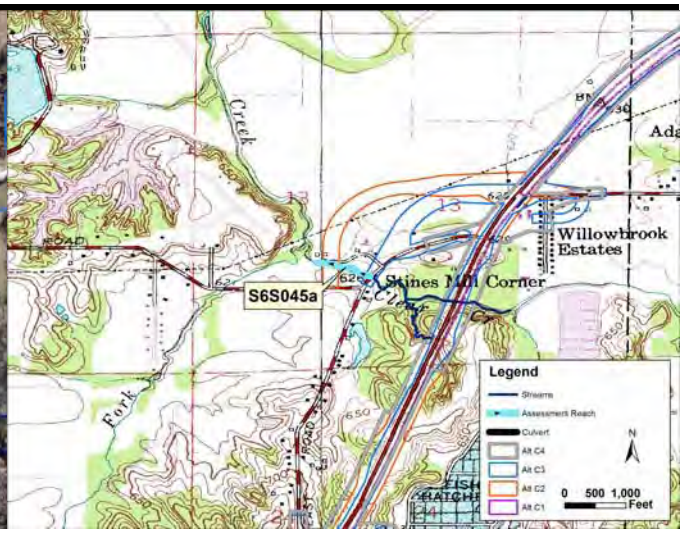
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S045a

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	Clear Creek	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R1E
IDEM 303(d) Listed:	No	**Section:**	13
Predominant Substrate:	sand	**Quarter:**	SW
Evaluation Score:	QHEI = 46.25	**Latitude:**	39.476144
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.374665
OHWM width:	25.4	**Basin:**	Clear Creek - East/West/Grassy
OHWM depth:	2.6	**14-digit HUC:**	05120201140140
USACE Jurisdiction:	Yes	**Drainage area:**	16.647
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**0**	**0.000**	**0.00**
Aternative C2	**210**	**0.122**	**0.39**
Aternative C3	**67**	**0.039**	**0.11**
Aternative C4 (Preferred)	**0**	**0.000**	**0.00**

Stream Reach S6S045a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S045a	N/A	Clear Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
ry kl	1/15/2016	Morgan	N/A		46.25

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☑	☑	10
SAND [6]	☑	☑	☑	☑	90
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

ORIGIN

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

QUALITY

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

Substrate 15.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount	
		UNDERCUT BANKS [1]
2	1	OVERHANGING VEGETATION [1]
		SHALLOWS (IN SLOW WATER)[1]
		ROOTMATS [1]
20	2	POOOLS>70CM [2]
		ROOTWADS [1]
		BOULDERS [1]
		OXBOWS, BACKWATERS [1]
		AQUATIC MACROPHYTES [1]
2	1	LOGS OR WOODY DEBRIS [1]

AMOUNT

Check One (Or 2 and average)

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

Cover Maximum 20: 7.0

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: 10.0

Comments

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

River right looking downstrea

EROSION

L	R	
☐	☐	NONE/LITTLE [3]
☐	☑	MODERATE [2]
☑	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☑	VERY NARROW [1]
☑	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☑	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☑	☑	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: 2.3

Comments canopy is 90% open

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

MAXIMUM DEPTH Check ONE (ONLY!)

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

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: 8.0

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: 2.0

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (0 ft/mi)

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

% POOL: 30 **% GLIDE:** 5 **% RUN:** 45 **% RIFFLE:** 20

Riparian Maximum 10: 2.0

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	[x] > 100ft ^{2}	[x] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic
- Succession: [ ] Young [x] Old
- [ ] Spray [ ] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [ ] Relocated [ ] Cutoffs
- Bedload: [x] Moving [ ] Stable
- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

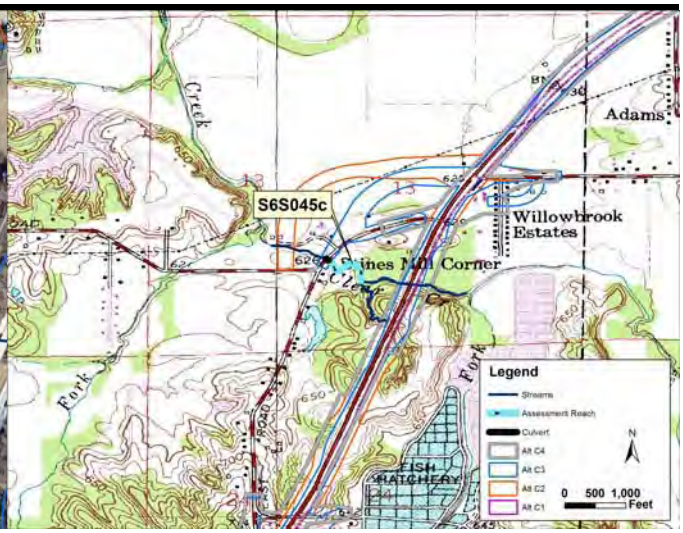
E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [x] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [x] Bank [ ] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [x] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S045c

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	Clear Creek	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R1E
IDEM 303(d) Listed:	No	**Section:**	13
Predominant Substrate:	sand	**Quarter:**	SW
Evaluation Score:	QHEI = 58.25	**Latitude:**	39.47547
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.372592
OHWM width:	28.7	**Basin:**	Clear Creek - East/West/Grassy
OHWM depth:	2.6	**14-digit HUC:**	05120201140140
USACE Jurisdiction:	Yes	**Drainage area:**	16.647
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**0**	**0.000**	**0.00**
Aternative C2	**0**	**0.000**	**0.00**
Aternative C3	**45**	**0.030**	**0.13**
Aternative C4 (Preferred)	**0**	**0.000**	**0.00**

Stream Reach S6S045c

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S045c	N/A	Clear Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
ry kl	1/16/2016	Morgan	N/A		58.25

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☑	☑	5
SAND [6]	☑	☑	☑	☑	95
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

Check ONE (Or 2 and average)

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

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

Substrate 14.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

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

% Amount	
POOOLS>70CM [2]	
ROOTWADS [1]	2 1
BOULDERS [1]	

% Amount	
OXBOWS, BACKWATERS [1]	
AQUATIC MACROPHYTES [1]	
LOGS OR WOODY DEBRIS [1]	10 2

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **5.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **16.0**

Comments

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

River right looking downstrea

EROSION	L	R
NONE/LITTLE [3]	☐	☐
MODERATE [2]	☐	☐
HEAVY/SEVERE [1]	☑	☑

RIPARIAN WIDTH	L	R
WIDE >50m [4]	☐	☐
MODERATE 10-50m	☑	☐
NARROW 5-10m [2]	☐	☑
VERY NARROW [1]	☐	☐
NONE [0]	☐	☐

FLOOD PLAIN QUALITY	L	R
FOREST, SWAMP [3]	☑	☑
SCRUB OR OLD FIELD [2]	☐	☑
RESIDENTIAL, PRK, NEW FIELD [1]	☐	☐
FENCED PASTURE [1]	☐	☐
OPEN PASURE, ROWCROP [0]	☐	☐

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **6.3**

Comments 50%caopy open

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☑ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **11.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☑ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **4.0**

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (0 ft/mi)

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

% POOL: 30 **% GLIDE:** 5

% RUN: 40 **% RIFFLE:** 25

Riparian Maximum 10: **2.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [x] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [x] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [x] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

Flow: [x] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S045d

Stream Location on 2013 Aerial Photograph

Stream Location on Cope USGS Quadrangle

Stream Name:	Clear Creek	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R1E
IDEM 303(d) Listed:	No	**Section:**	13
Predominant Substrate:	sand	**Quarter:**	SE
Evaluation Score:	QHEI = 62	**Latitude:**	39.474484
Use Designation:	Warm Water Habitat	**Longitude:**	-86.369309
OHWM width:	34.9	**Basin:**	Clear Creek - East/West/Grassy
OHWM depth:	2.6	**14-digit HUC:**	05120201140140
USACE Jurisdiction:	Yes	**Drainage area:**	16.407
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**284**	**0.228**	**1.11**
Aternative C2	**281**	**0.225**	**1.10**
Aternative C3	**122**	**0.098**	**0.42**
Aternative C4 (Preferred)	**281**	**0.225**	**1.10**

Stream Reach S6S045d

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S045d	N/A	Clear Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
ry kl	1/15/2016	Morgan	N/A		62

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☑	☐	10
SAND [6]	☑	☑	☑	☑	90
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

ORIGIN

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

QUALITY

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

Substrate 14.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

	%	Amount
UNDERCUT BANKS [1]		
OVERHANGING VEGETATION [1]		
SHALLOWS (IN SLOW WATER)[1]		
ROOTMATS [1]		
POOOLS>70CM [2]	10	1
ROOTWADS [1]	2	1
BOULDERS [1]		
OXBOWS, BACKWATERS [1]		
AQUATIC MACROPHYTES [1]		
LOGS OR WOODY DEBRIS [1]	10	1

AMOUNT Check One (Or 2 and average)

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

Cover Maximum 20: 7.0

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: 16.0

Comments

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

River right looking downstrea

EROSION

L	R	
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☑	☑	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: 9.0

Comments 60% open

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

MAXIMUM DEPTH Check ONE (ONLY!)

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

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: 10.0

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: 4.0

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (0 ft/mi)

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

% POOL: 15 **% GLIDE:** 5 **% RUN:** 30 **% RIFFLE:** 50

Riparian Maximum 10: 2.0

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [x] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	[ ] > 100ft ^{2}	[ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic
- Succession: [ ] Young [x] Old
- [ ] Spray [ ] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [ ] Relocated [ ] Cutoffs
- Bedload: [x] Moving [ ] Stable
- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

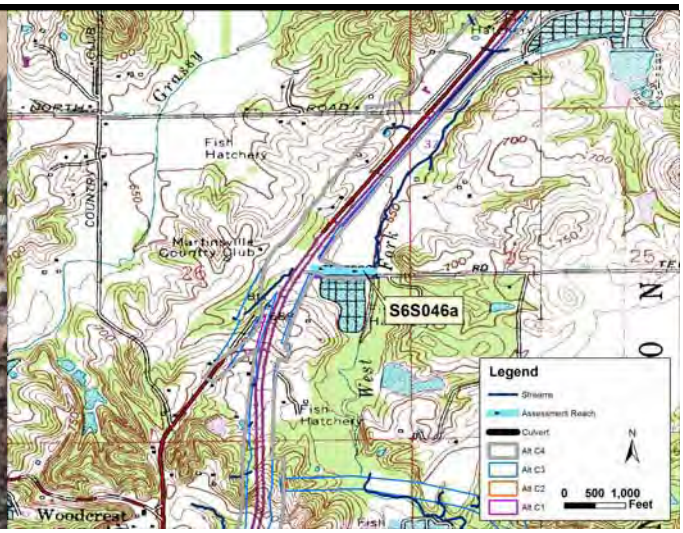
E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [x] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [x] Bank [ ] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [x] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S046a

Stream Location on 2013 Aerial Photograph



Stream Location on Martinsville USGS Quadrangle

Stream Name:	UNT 17 West Fork Clear Creek	**Quadrangle:**	Martinsville
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R1E
IDEM 303(d) Listed:	No	**Section:**	26
Predominant Substrate:	sand	**Quarter:**	SE
Evaluation Score:	HHEI = 58	**Latitude:**	39.449602
Use Designation:	Rheocrene Potential	**Longitude:**	-86.384035
OHWM width:	5.0	**Basin:**	Clear Creek - East/West/Grassy
OHWM depth:	0.3	**14-digit HUC:**	05120201140140
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**671**	**0.077**	**0.81**
Aternative C2	**672**	**0.077**	**0.82**
Aternative C3	**672**	**0.077**	**0.82**
Aternative C4 (Preferred)	**672**	**0.077**	**0.82**

Stream Reach S6S046a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **58**

SITE NAME/LOCATION: UNT West Fork Clear Creek

SITE NUMBER: S6S046a | RIVER BASIN: Clear Creek - East/West/ | DRAINAGE AREA (mi): 0.001

LENGTH OF STEAM REACH (ft): | LAT: 39.449602 | LONG.: -86.384035 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 4/23/2016 | SCORER: rh | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☐	CLAY or HARDPAN [0 pts]	0
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	100	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** (A)

Substrate Percentage Check: **100 %** (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: 12 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

HHEI Metric Points

Substrate Max = 40: 13 (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)

- ☐ > >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):** 0

Pool Depth Max = 30: 25

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** 0

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 (Per Bank)

L	R	
☑	☐	Wide >10 m
☐	☑	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Martinsville** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Washington**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/23** Quantity **0.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

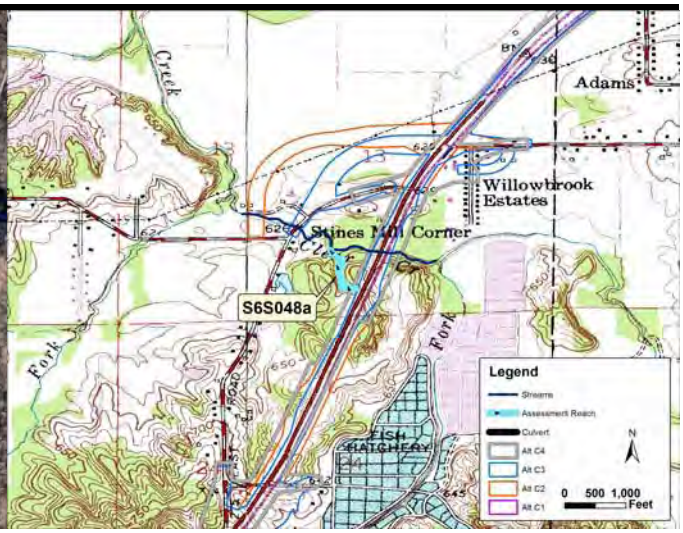
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S048a

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 18 West Fork Clear Creek	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R1E
IDEM 303(d) Listed:	No	**Section:**	13
Predominant Substrate:	sand - hardpan	**Quarter:**	SW
Evaluation Score:	QHEI = 43.5	**Latitude:**	39.47284
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.370183
OHWM width:	4.6	**Basin:**	Clear Creek - East/West/Grassy
OHWM depth:	0.5	**14-digit HUC:**	05120201140140
USACE Jurisdiction:	Yes	**Drainage area:**	0.036
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**58**	**0.006**	**0.18**
Aternative C2	**54**	**0.006**	**0.17**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**54**	**0.006**	**0.17**

Stream Reach S6S048a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S048a	N/A	UNT West Fork Clear Creek	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
ry kl	1/14/2016	Morgan	N/A	☐	43.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☑	☑	20
SAND [6]	☑	☐	☑	☑	40
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☑	☑	☑	40
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

QUALITY
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ NONE [1]

Substrate 11.0 (Maximum 20)

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount		% Amount		% Amount	
UNDERCUT BANKS [1]		POOOLS>70CM [2]		OXBOWS, BACKWATERS [1]	
OVERHANGING VEGETATION [1]		ROOTWADS [1]	5	AQUATIC MACROPHYTES [1]	
SHALLOWS (IN SLOW WATER)[1]		BOULDERS [1]	1	LOGS OR WOODY DEBRIS [1]	
ROOTMATS [1]					

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☐ SPARSE -<25% [3]
- ☑ NEARLY ABSENT <5% [1]

Cover Maximum 20: **2.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **16.5**

Comments

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

River right looking downstrea

EROSION L	EROSION R
☑ NONE/LITTLE [3]	☑
☐ MODERATE [2]	☐
☐ HEAVY/SEVERE [1]	☐

RIPARIAN WIDTH L	RIPARIAN WIDTH R
☑ WIDE >50m [4]	☑
☐ MODERATE 10-50m	☐
☐ NARROW 5-10m [2]	☐
☐ VERY NARROW [1]	☐
☐ NONE [0]	☐

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R
☑ FOREST, SWAMP [3]	☑
☐ SCRUB OR OLD FIELD [2]	☐
☐ RESIDENTIAL, PRK, NEW FIELD [1]	☐
☐ FENCED PASTURE [1]	☐
☐ OPEN PASURE, ROWCROP [0]	☐

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **10.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☑ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **2.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☑ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (0 ft/mi)

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

% POOL: 10 **% GLIDE:** 10 **% RUN:** 50 **% RIFFLE:** 30

Riparian Maximum 10: **2.0**

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	[x] > 100ft ^{2}	[x] > 3ft

D-MAINTENANCE

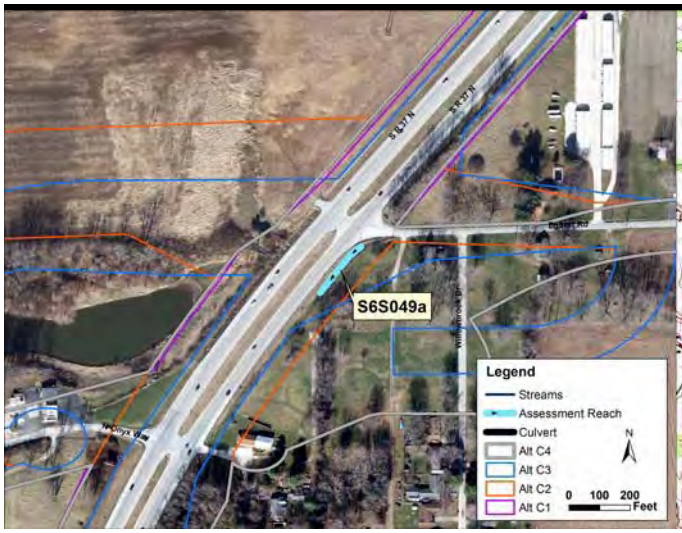
- [ ] Public [ ] Private
- [ ] Active [ ] Historic
- Succession: [ ] Young [x] Old
- [ ] Spray [ ] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [ ] Relocated [ ] Cutoffs
- Bedload: [x] Moving [ ] Stable
- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

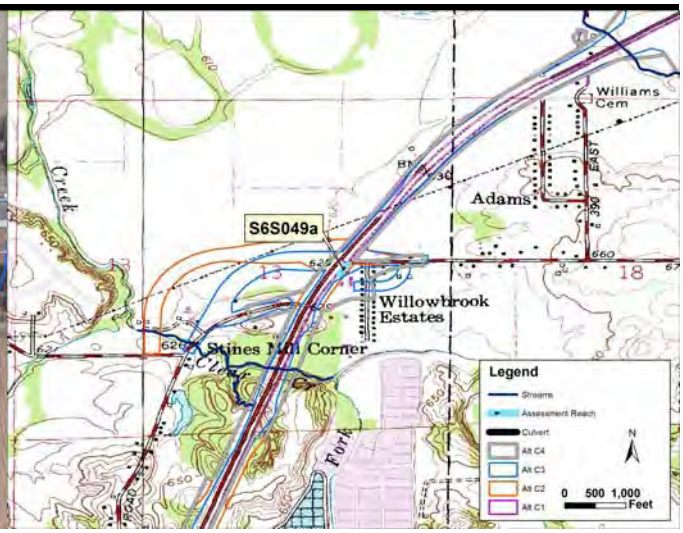
- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [x] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [x] Bank [ ] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [x] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S049a



Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 19 Clear Creek	**Quadrangle:**	Cope
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R1E
IDEM 303(d) Listed:	No	**Section:**	13
Predominant Substrate:	sand - hardpan	**Quarter:**	SE
Evaluation Score:	HHEI = 13	**Latitude:**	39.478892
Use Designation:	Class I PHWH	**Longitude:**	-86.366011
OHWM width:	1.5	**Basin:**	Clear Creek - East/West/Grassy
OHWM depth:	0.5	**14-digit HUC:**	05120201140140
USACE Jurisdiction:	Yes	**Drainage area:**	0.06
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**181**	**0.006**	**0.00**
Aternative C2	**181**	**0.006**	**0.00**
Aternative C3	**181**	**0.006**	**0.00**
Aternative C4 (Preferred)	**181**	**0.006**	**0.00**

Stream Reach S6S049a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **13**

SITE NAME/LOCATION: UNT Clear Creek

SITE NUMBER: S6S049a | RIVER BASIN: Clear Creek - East/West/ | DRAINAGE AREA (mi): 0.06

LENGTH OF STEAM REACH (ft): | LAT: 39.478892 | LONG.: -86.366011 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 2/19/2016 | SCORER: rh | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☑	CLAY or HARDPAN [0 pts]	60
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	40	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** (A)

Substrate Percentage Check: **100 %** (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40: **8** (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)

- ☐ > >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):** 0

Pool Depth Max = 30: **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** ####

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 (Per Bank)

L	R	
☐	☐	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☑	☑	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Immature Forest, Shrub or Old Field	☑	☑	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Cope** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Washington**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **2/14** Quantity **2.3**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

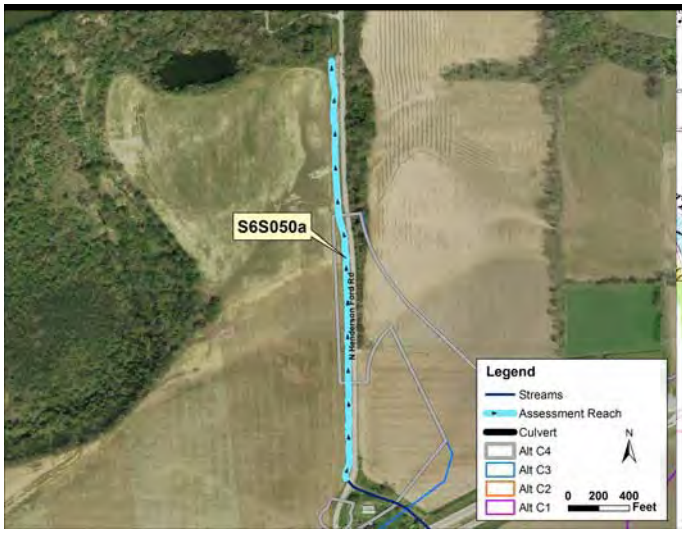
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

DRAWING AMD 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 Reach S6S050a



Stream Location on 2013 Aerial Photograph

Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 1 White River	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	7
Predominant Substrate:	sand	**Quarter:**	SW & NW
Evaluation Score:	QHEI = 38	**Latitude:**	39.493247
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.355219
OHWM width:	7.4	**Basin:**	White River - Henderson Bridge
OHWM depth:	0.8	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.794
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**1096**	**0.185**	**1.04**
Aternative C2	**1096**	**0.185**	**1.04**
Aternative C3	**1096**	**0.185**	**1.04**
Aternative C4 (Preferred)	**1096**	**0.185**	**1.04**

Stream Reach S6S050a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S050a	N/A	UNT White River	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
ry kl	1/15/2016	Morgan	N/A		38

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
☐	☐	☐	☐	BLDR/SLABS [10]
☐	☐	☐	☐	BOULDERS [9]
☐	☐	☐	☐	COBBLE [8]
☐	☐	☐	☐	GRAVEL [7]
☑	☑	☑	☑	SAND [6] 100
☐	☐	☐	☐	BEDROCK [5]

OTHER TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
☐	☐	☐	☐	HARDPAN [4]
☐	☐	☐	☐	DETRITUS [3]
☐	☐	☐	☐	MUCK [2]
☐	☐	☐	☐	SILT [2]
☐	☐	☐	☐	ARTIFICIAL [0]

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

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

ORIGIN

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

QUALITY

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

Substrate 14.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount		% Amount		% Amount	
___	UNDERCUT BANKS [1]	___	POOOLS>70CM [2]	___	OXBOWS, BACKWATERS [1]
___	OVERHANGING VEGETATION [1]	___	ROOTWADS [1]	5	AQUATIC MACROPHYTES [1]
___	SHALLOWS (IN SLOW WATER)[1]	___	BOULDERS [1]	___	LOGS OR WOODY DEBRIS [1]
___	ROOTMATS [1]				

AMOUNT

Check One (Or 2 and average)

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

Cover Maximum 20: **4.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **9.5**

Comments

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

River right looking downstrea

EROSION

L	R	
☐	☑	NONE/LITTLE [3]
☑	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☑	☑	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☑	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☐	☑	URBAN OR INDUSTRIAL [0]
☐	☐	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **2.5**

Comments canopy is 100% open

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

MAXIMUM DEPTH

Check ONE (ONLY!

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

CHANNEL WIDTH

Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **3.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: **3.0**

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (0 ft/mi)

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

% POOL: 15 **% GLIDE:** 10 **% RUN:** 55 **% RIFFLE:** 20

Riparian Maximum 10: **2.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic
- Succession: [ ] Young [ ] Old
- [ ] Spray [ ] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [ ] Relocated [ ] Cutoffs
- Bedload: [ ] Moving [ ] Stable
- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

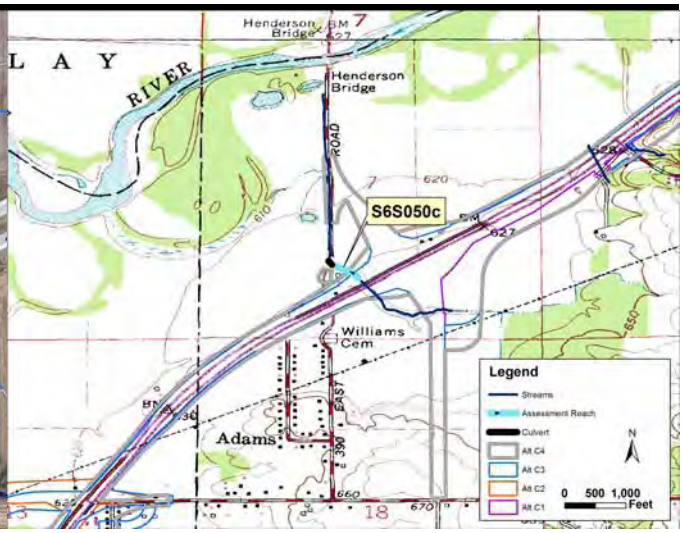
E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [x] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [x] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [x] Bank [x] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [ ] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S050c

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 1 White River	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	7
Predominant Substrate:	sand	**Quarter:**	SW
Evaluation Score:	QHEI = 38.5	**Latitude:**	39.489446
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.354111
OHWM width:	6.9	**Basin:**	White River - Henderson Bridge
OHWM depth:	1.0	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.794
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**169**	**0.027**	**0.00**
Aternative C2	**170**	**0.027**	**0.00**
Aternative C3	**101**	**0.016**	**0.00**
Aternative C4 (Preferred)	**170**	**0.027**	**0.00**

Stream Reach S6S050c

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S050c	N/A	UNT White River	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
ry kl	1/15/2016	Morgan	N/A		38.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☑	☑	5
SAND [6]	☑	☑	☑	☑	95
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

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

Substrate 14.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

	%	Amount
UNDERCUT BANKS [1]		
OVERHANGING VEGETATION [1]		
SHALLOWS (IN SLOW WATER)[1]		
ROOTMATS [1]		
POOOLS>70CM [2]		
ROOTWADS [1]		
BOULDERS [1]		
OXBOWS, BACKWATERS [1]		
AQUATIC MACROPHYTES [1]	10	2
LOGS OR WOODY DEBRIS [1]		

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: 4.0

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: 10.0

Comments

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

River right looking downstrea

EROSION

L	R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☑	☑	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☑	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☑	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: 3.5

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☑ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: 3.0

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☑ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: 2.0

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (0 ft/mi)

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

% POOL: 5 **% GLIDE:** 10 **% RUN:** 70 **% RIFFLE:** 15

Riparian Maximum 10: 2.0

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [x] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

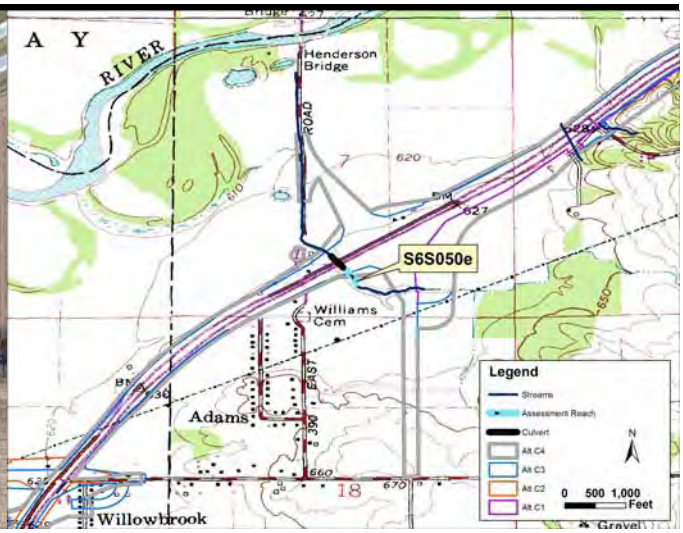
Flow: [x] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [x] Lawn [x] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S050e

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 1 White River	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	7
Predominant Substrate:	sand - muck	**Quarter:**	SE
Evaluation Score:	HHEI = 53	**Latitude:**	39.488587
Use Designation:	Class II PHWH	**Longitude:**	-86.353175
OHWM width:	8.0	**Basin:**	White River - Henderson Bridge
OHWM depth:	0.7	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.782
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**181**	**0.033**	**0.47**
Aternative C2	**181**	**0.033**	**0.47**
Aternative C3	**120**	**0.022**	**0.34**
Aternative C4 (Preferred)	**181**	**0.033**	**0.47**

Stream Reach S6S050e

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **53**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S050e RIVER BASIN White River - Henderson DRAINAGE AREA (mi) 0.782

LENGTH OF STEAM REACH (ft) _____ LAT 39.488587 LONG. -86.353175 RIVER CODE N/A RIVER MILE N/A

DATE 10/23/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☑	MUCK [0 pts]	50
☑ ☐	SAND (<2 mm) [6 pts]	50	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **8** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **25**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

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 >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☑ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Cope** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/23** Quantity **.01**

Photograph information: _____

Elevated Turbidity? (Y/N) _____ Canopy (% open): **25**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

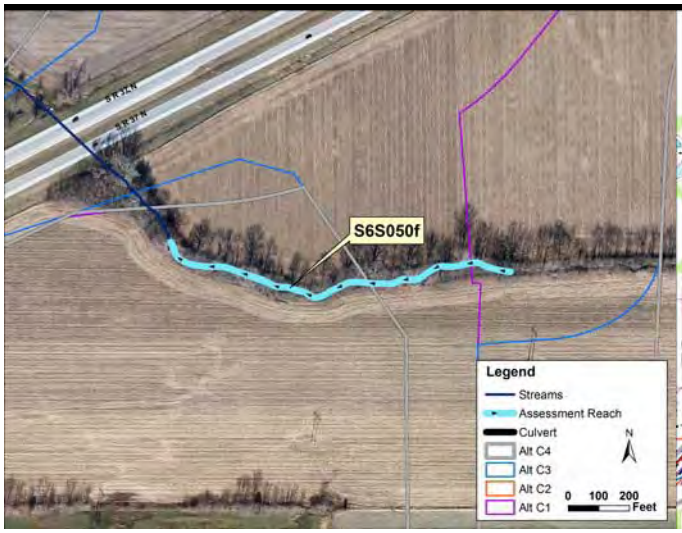
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

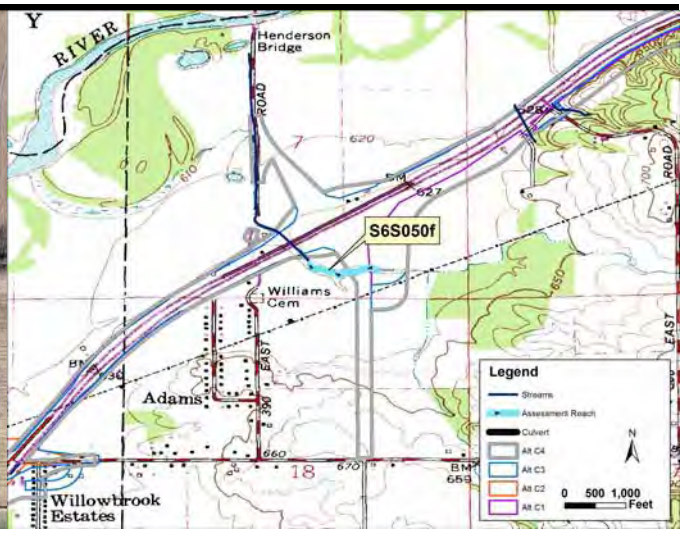
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S050f



Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 1 White River	**Quadrangle:**	Cope
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	7
Predominant Substrate:	sand - gravel	**Quarter:**	SE
Evaluation Score:	HHEI = 62	**Latitude:**	39.487856
Use Designation:	Class II PHWH	**Longitude:**	-86.350403
OHWM width:	5.5	**Basin:**	White River - Henderson Bridge
OHWM depth:	0.4	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.656
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**277**	**0.035**	**0.42**
Aternative C2	**383**	**0.048**	**0.61**
Aternative C3	**383**	**0.048**	**0.61**
Aternative C4 (Preferred)	**383**	**0.048**	**0.61**

Stream Reach S6S050f

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **62**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S050f RIVER BASIN White River - Henderson DRAINAGE AREA (mi) 0.656

LENGTH OF STEAM REACH (ft) LAT 39.487856 LONG. -86.350403 RIVER CODE N/A RIVER MILE N/A

DATE 2/19/2016 SCORER rh COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☑	GRAVEL (2-64 mm) [9 pts]	50	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	50	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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):** **15**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **1.8**

HHEI Metric Points

Substrate Max = 40 **17**

Pool Depth Max = 30 **25**

Bankfull Width Max = 30 **20**

(A+B)

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 >10 m
☐	☐	Moderate 5-10 m
☑	☑	Narrow <5 m
☐	☐	None

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

Comments: Fence row between field

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☑ Steam 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 ☐ 1.0 ☐ 2.0 ☐ 3.0
☑ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Cope** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **2/14** Quantity **2.3**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

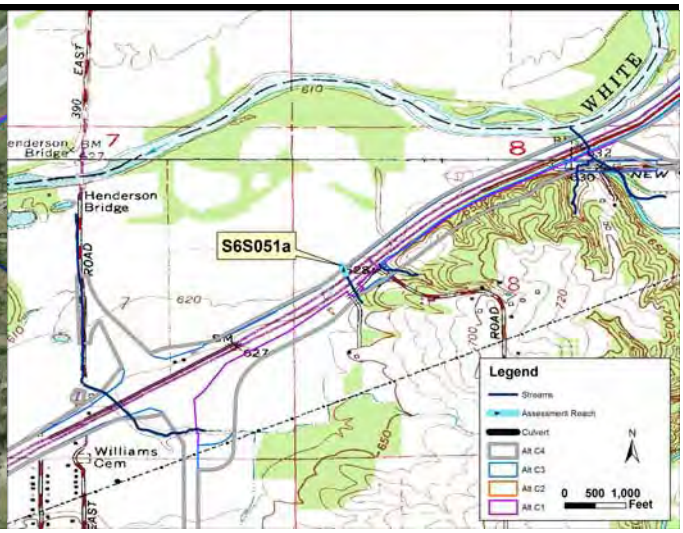
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S051a

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 2 White River	**Quadrangle:**	Cope
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	sand - artificial	**Quarter:**	NW
Evaluation Score:	HHEI = 21	**Latitude:**	39.49496
Use Designation:	Modified Class I PHWH	**Longitude:**	-86.343497
OHWM width:	3.9	**Basin:**	White River - Henderson Bridge
OHWM depth:	0.2	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.055
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**83**	**0.007**	**0.00**
Aternative C2	**80**	**0.007**	**0.00**
Aternative C3	**63**	**0.006**	**0.00**
Aternative C4 (Preferred)	**80**	**0.007**	**0.00**

Stream Reach S6S051a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **21**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S051a RIVER BASIN White River - Henderson DRAINAGE AREA (mi) 0.055

LENGTH OF STEAM REACH (ft) _____ LAT 39.49496 LONG. -86.343497 RIVER CODE N/A RIVER MILE N/A

DATE 1/15/2016 SCORER ry kl COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	95	☐ ☑	ARTIFICIAL [3 pts]	5

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **9** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

HHEI Metric Points

Substrate Max = 40 **11**

(A+B)

Pool Depth Max = 30 **5**

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

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

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

Comments: stream channel is discontinuous; flows into ag field

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☑ Steam 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 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: _____ (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☑ WWH Name: **White River** 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 **Cope** NRCS Soil Map Page **30** NRCS Soil Map Stream Order: **0**

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **95**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

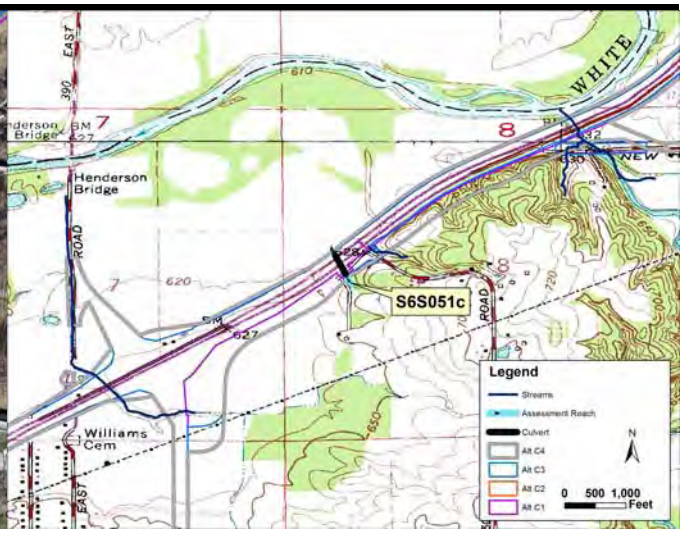
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S051c

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 2 White River	**Quadrangle:**	Cope
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	hardpan	**Quarter:**	SW
Evaluation Score:	HHEI = 6	**Latitude:**	39.49394
Use Designation:	Class I PHWH	**Longitude:**	-86.342916
OHWM width:	10.0	**Basin:**	White River - Henderson Bridge
OHWM depth:	0.5	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**46**	**0.011**	**0.00**
Aternative C2	**64**	**0.015**	**0.00**
Aternative C3	**64**	**0.015**	**0.00**
Aternative C4 (Preferred)	**64**	**0.015**	**0.00**

Stream Reach S6S051c

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **6**

SITE NAME/LOCATION: UNT White River

SITE NUMBER: S6S051c | RIVER BASIN: White River - Henderson | DRAINAGE AREA (mi): 0.001

LENGTH OF STEAM REACH (ft): | LAT: 39.49394 | LONG.: -86.342916 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 10/23/2015 | SCORER: rh | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☑	CLAY or HARDPAN [0 pts]	100
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** **(A)**

Substrate Percentage Check: **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: **0** **TOTAL NUMBER OF SUBSTRATE TYPES:** **1**

HHEI Metric Points

Substrate Max = 40: **1** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30: **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **0**

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 (Per Bank)

L	R	
☐	☐	Wide >10 m
☐	☐	Moderate 5-10 m
☑	☑	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☑	☐	Residential, Park, New Field	☐	☑	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Cope** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/23** Quantity **.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

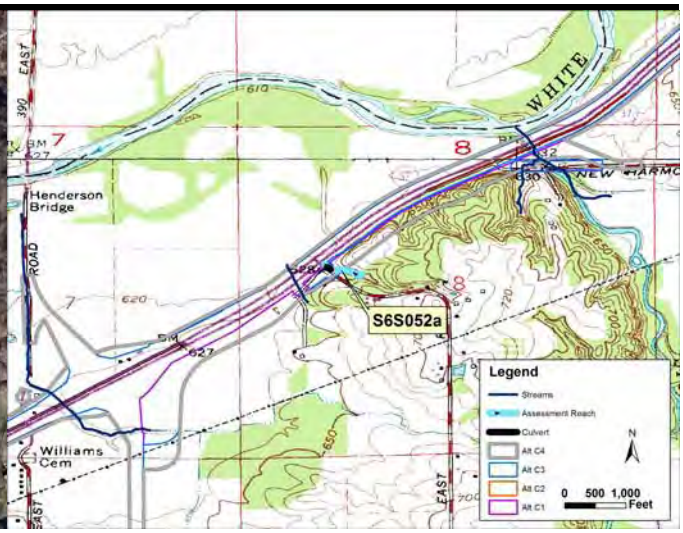
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S052a

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 3 White River	**Quadrangle:**	Cope
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	gravel - sand	**Quarter:**	NW
Evaluation Score:	HHEI = 32	**Latitude:**	39.495001
Use Designation:	Class II PHWH	**Longitude:**	-86.341394
OHWM width:	4.3	**Basin:**	White River - Henderson Bridge
OHWM depth:	0.5	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.06
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**32**	**0.003**	**0.00**
Aternative C2	**220**	**0.022**	**0.09**
Aternative C3	**171**	**0.017**	**0.05**
Aternative C4 (Preferred)	**220**	**0.022**	**0.09**

Stream Reach S6S052a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **32**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S052a RIVER BASIN White River - Henderson DRAINAGE AREA (mi) 0.06

LENGTH OF STEAM REACH (ft) LAT 39.495001 LONG. -86.341394 RIVER CODE N/A RIVER MILE N/A

DATE 10/23/2015 SCORER rh COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☐	CLAY or HARDPAN [0 pts]	0
☑	GRAVEL (2-64 mm) [9 pts]	50	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	50	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **1.3**

HHEI Metric Points

Substrate Max = 40 **17**

(A+B)

Pool Depth Max = 30 **0**

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
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Cope** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/23** Quantity **0.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

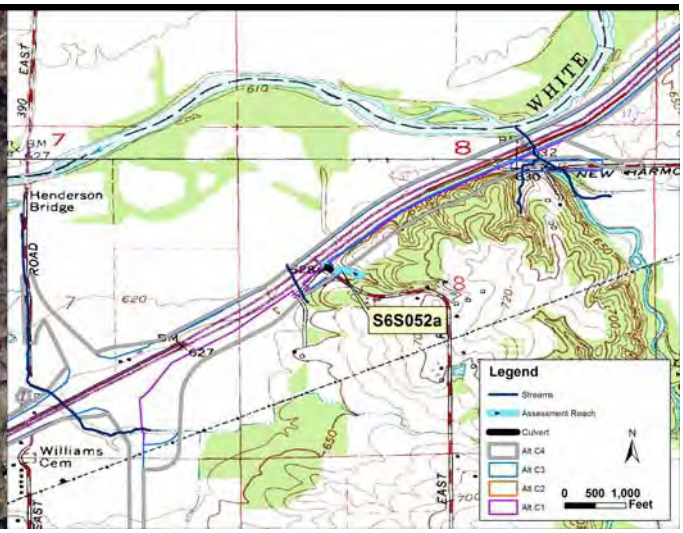
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S052b

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 3 White River	**Quadrangle:**	Cope
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	gravel - sand	**Quarter:**	NW
Evaluation Score:	HHEI = 32	**Latitude:**	39.495001
Use Designation:	Class II PHWH	**Longitude:**	-86.341394
OHWM width:	4.3	**Basin:**	White River - Henderson Bridge
OHWM depth:	0.5	**14-digit HUC:**	05120201140130
USACE Jurisdiction:	Yes	**Drainage area:**	0.06
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**32**	**0.003**	**0.00**
Aternative C2	**220**	**0.022**	**0.09**
Aternative C3	**171**	**0.017**	**0.05**
Aternative C4 (Preferred)	**220**	**0.022**	**0.09**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S053b	N/A	Stotts Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
ry kl	1/15/2016	Morgan	N/A		57.25

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES PREDOMINANT P	BEST TYPES PREDOMINANT R	BEST TYPES PRESENT P	BEST TYPES PRESENT R	BEST TYPES TOTAL %	OTHER TYPES PREDOMINANT P	OTHER TYPES PREDOMINANT R	OTHER TYPES PRESENT P	OTHER TYPES PRESENT R	OTHER TYPES TOTAL %
☐ BLDR/SLABS [10]	☐	☐	☐		☐ HARDPAN [4]	☐	☐	☐	
☐ BOULDERS [9]	☐	☐	☐		☐ DETRITUS [3]	☐	☐	☐	
☐ COBBLE [8]	☐	☐	☐		☐ MUCK [2]	☐	☐	☐	
☐ GRAVEL [7]	☐	☐	☐		☐ SILT [2]	☐	☐	☐	
☑ SAND [6]	☑	☑	☑	100	☐ ARTIFICIAL [0]	☐	☐	☐	
☐ BEDROCK [5]	☐	☐	☐						

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

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

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

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

Substrate 14.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount		% Amount		% Amount	
___	UNDERCUT BANKS [1]	2	POOOLS>70CM [2]	___	OXBOWS, BACKWATERS [1]
___	OVERHANGING VEGETATION [1]	___	ROOTWADS [1]	___	AQUATIC MACROPHYTES [1]
___	SHALLOWS (IN SLOW WATER)[1]	___	BOULDERS [1]	1	LOGS OR WOODY DEBRIS [1]
___	ROOTMATS [1]				

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **16.0**

Comments

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

River right looking downstrea

EROSION L	EROSION R		RIPARIAN WIDTH L	RIPARIAN WIDTH R		FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R		L	R	
☐	☐	NONE/LITTLE [3]	☐	☐	WIDE >50m [4]	☑	☑	FOREST, SWAMP [3]	☐	☐	CONSERVATION TILLAGE [1]
☑	☑	MODERATE [2]	☑	☑	MODERATE 10-50m	☐	☐	SCRUB OR OLD FIELD [2]	☐	☐	URBAN OR INDUSTRIAL [0]
☐	☐	HEAVY/SEVERE [1]	☐	☐	NARROW 5-10m [2]	☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]	☐	☐	MINING/CONSTRUCTION [0]
			☐	☐	VERY NARROW [1]	☐	☐	FENCED PASTURE [1]			
			☐	☐	NONE [0]	☐	☑	OPEN PASURE, ROWCROP [0]			

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **7.3**

Comments canopy cover is 10-30% open

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☑ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **9.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☑ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **4.0**

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (0 ft/mi)

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

% POOL: ____ **% GLIDE:** ____

% RUN: ____ **% RIFFLE:** ____

Riparian Maximum 10: **4.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	[x] > 100ft ^{2}	[x] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic
- Succession: [ ] Young [x] Old
- [ ] Spray [x] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [ ] Relocated [ ] Cutoffs
- Bedload: [ ] Moving [ ] Stable
- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

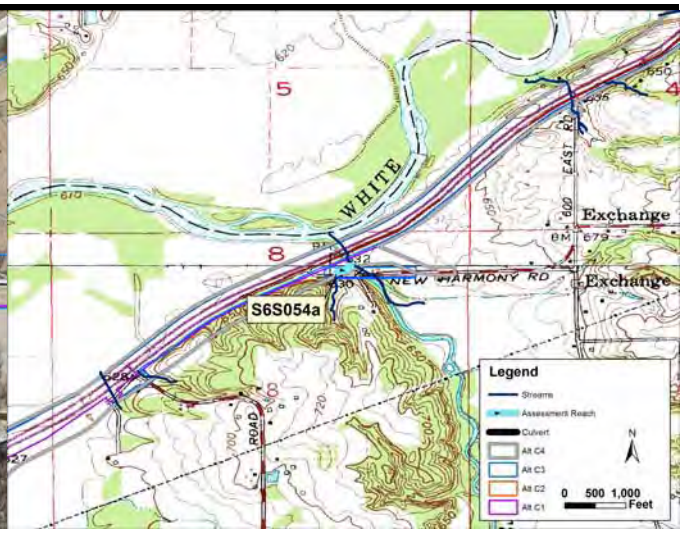
E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [ ] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [x] Bank [ ] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [ ] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S054a

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 1 Stotts Creek	**Quadrangle:**	Cope
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	sand	**Quarter:**	NE
Evaluation Score:	HHEI = 43	**Latitude:**	39.499739
Use Designation:	Rheocrene Potential	**Longitude:**	-86.332667
OHWM width:	2.7	**Basin:**	Stotts Creek - Exchange
OHWM depth:	0.2	**14-digit HUC:**	05120201140120
USACE Jurisdiction:	Yes	**Drainage area:**	0.055
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**222**	**0.014**	**0.00**
Aternative C2	**281**	**0.017**	**0.00**
Aternative C3	**222**	**0.014**	**0.00**
Aternative C4 (Preferred)	**281**	**0.017**	**0.00**

Stream Reach S6S054a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **43**

SITE NAME/LOCATION UNT Stotts Creek

SITE NUMBER S6S054a RIVER BASIN Stotts Creek - Exchange DRAINAGE AREA (mi) 0.055

LENGTH OF STEAM REACH (ft) _____ LAT 39.499739 LONG. -86.332667 RIVER CODE N/A RIVER MILE N/A

DATE 1/15/2016 SCORER ry kl COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☑ ☑	SAND (<2 mm) [6 pts]	100	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **12** **TOTAL NUMBER OF SUBSTRATE TYPES** **1**

HHEI Metric Points

Substrate Max = 40 **13** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **15**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

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 (Per Bank)

L	R	
☐	☐	Wide >10 m
☐	☐	Moderate 5-10 m
☑	☑	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☑	☑	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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	☐ 1.0	☑ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: _____ (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☑ WWH Name: **Stotts Creek** 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 **Cope** NRCS Soil Map Page **30** NRCS Soil Map Stream Order: **2**

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **10**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

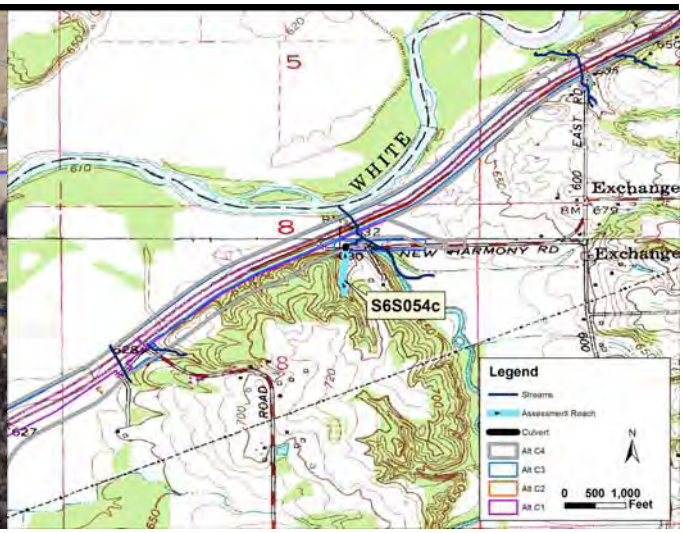
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S054c

Stream Location on 2013 Aerial Photograph



Stream Location on Cope USGS Quadrangle

Stream Name:	UNT 1 Stotts Creek	**Quadrangle:**	Cope
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	sand	**Quarter:**	NE
Evaluation Score:	HHEI = 43	**Latitude:**	39.49948
Use Designation:	Rheocrene Potential	**Longitude:**	-86.33306
OHWM width:	3.3	**Basin:**	Stotts Creek - Exchange
OHWM depth:	0.2	**14-digit HUC:**	05120201140120
USACE Jurisdiction:	Yes	**Drainage area:**	0.05
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**61**	**0.005**	**0.00**
Aternative C2	**14**	**0.001**	**0.00**
Aternative C3	**61**	**0.005**	**0.00**
Aternative C4 (Preferred)	**14**	**0.001**	**0.00**

Stream Reach S6S054c

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **43**

SITE NAME/LOCATION: UNT Stotts Creek

SITE NUMBER: S6S054c | RIVER BASIN: Stotts Creek - Exchange | DRAINAGE AREA (mi): 0.05

LENGTH OF STEAM REACH (ft): | LAT: 39.49948 | LONG.: -86.33306 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 1/15/2016 | SCORER: ry kl | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☐	CLAY or HARDPAN [0 pts]	0
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	100	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** (A)

Substrate Percentage Check: **100 %** (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: 12 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

2. MAXIMUM POOL DEPTH (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes)

- ☐ > >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):** 0

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** 0

HHEI Metric Points

Substrate Max = 40: 13

(A+B)

Pool Depth Max = 30: 15

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 (Per Bank)

L	R	
☐	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☑	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☑	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: _____ (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☑ WWH Name: **Stotts Creek** 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 **Cope** NRCS Soil Map Page **30** NRCS Soil Map Stream Order: **2**

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **5**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

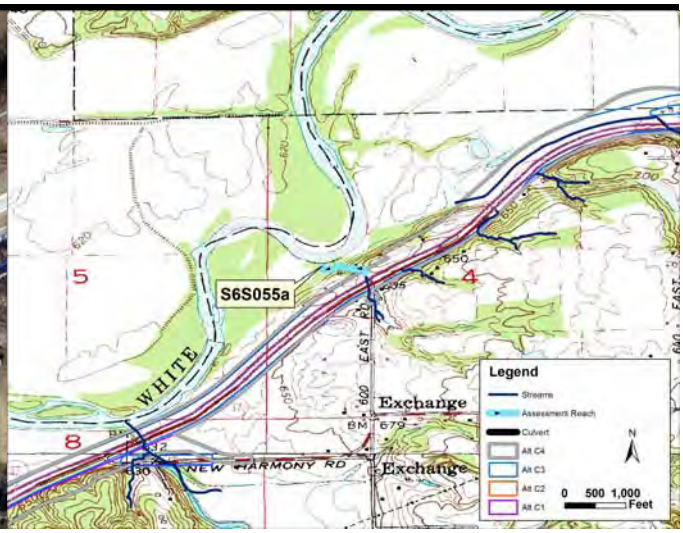
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S055a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 8 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	R12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	sand - gravel	**Quarter:**	SE
Evaluation Score:	HHEI = 42	**Latitude:**	39.508126
Use Designation:	Class II PHWH	**Longitude:**	-86.322669
OHWM width:	24.0	**Basin:**	White River - North Trib
OHWM depth:	0.9	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.298
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**51**	**0.028**	**0.07**
Aternative C2	**51**	**0.028**	**0.07**
Aternative C3	**33**	**0.018**	**0.06**
Aternative C4 (Preferred)	**51**	**0.028**	**0.07**

Stream Reach S6S055a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **42**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S055a RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.298

LENGTH OF STEAM REACH (ft) _____ LAT 39.508126 LONG. -86.322669 RIVER CODE N/A RIVER MILE N/A

DATE 10/20/2015 SCORER rjc COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☐	CLAY or HARDPAN [0 pts]	0
☑	GRAVEL (2-64 mm) [9 pts]	20	☐	MUCK [0 pts]	0
☐	SAND (<2 mm) [6 pts]	80	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** ####

HHEI Metric Points

Substrate Max = 40 **17** **(A+B)**

Pool Depth Max = 30 **0**

Bankfull Width Max = 30 **25**

ADDITIONAL STREAM INFORMATION (This information must also be complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/3** Quantity **.13**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

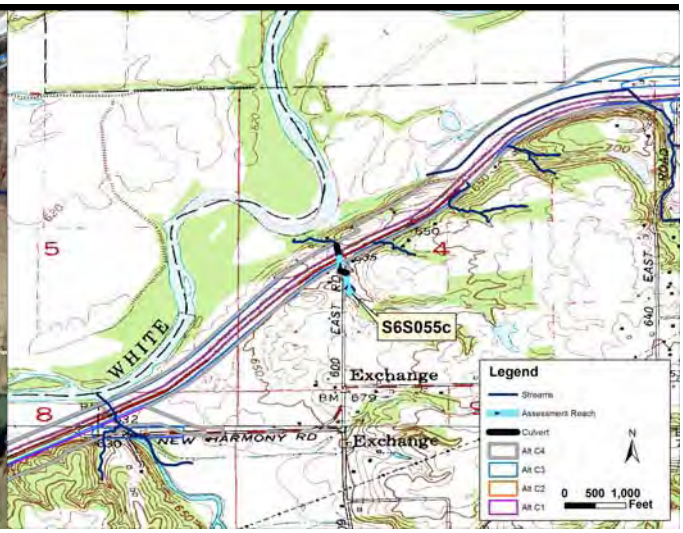
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S055c

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 4 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	sand - gravel	**Quarter:**	SW
Evaluation Score:	HHEI = 67	**Latitude:**	39.506771
Use Designation:	Class II PHWH	**Longitude:**	-86.322202
OHWM width:	0.8	**Basin:**	White River - North Trib
OHWM depth:	0.3	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.212
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**222**	**0.004**	**0.25**
Aternative C2	**233**	**0.004**	**0.23**
Aternative C3	**207**	**0.004**	**0.23**
Aternative C4 (Preferred)	**233**	**0.004**	**0.23**

Stream Reach S6S055c

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **67**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S055c RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.212

LENGTH OF STEAM REACH (ft) LAT 39.506771 LONG. -86.322202 RIVER CODE N/A RIVER MILE N/A

DATE 2/18/2016 SCORER rh COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☑	GRAVEL (2-64 mm) [9 pts]	60	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	40	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **17** **(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)

☐ > >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**

Pool Depth Max = 30 **25**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **3.4**

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 >10 m
☐	☐	Moderate 5-10 m
☑	☑	Narrow <5 m
☐	☐	None

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☑ Steam 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 ☐ 1.0 ☐ 2.0 ☐ 3.0
☑ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **2/14** Quantity **2.3**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

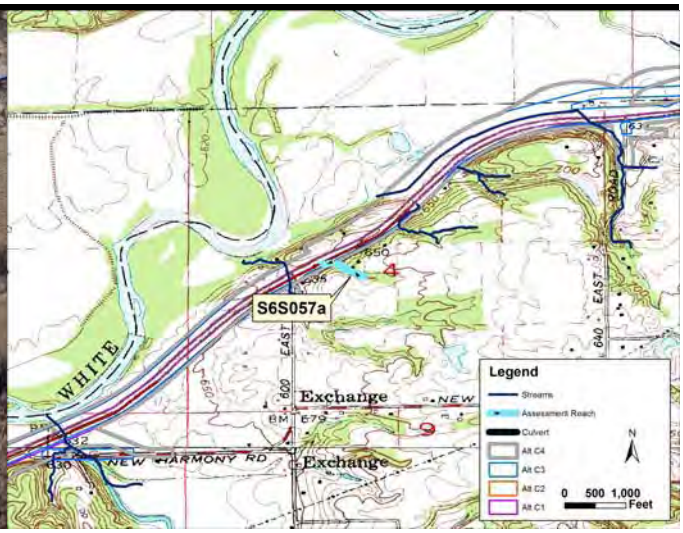
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S057a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 6 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	bedrock - sand	**Quarter:**	SW
Evaluation Score:	HHEI = 29	**Latitude:**	39.508188
Use Designation:	Class I PHWH	**Longitude:**	-86.320802
OHWM width:	3.3	**Basin:**	White River - North Trib
OHWM depth:	0.9	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.058
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**145**	**0.011**	**0.40**
Aternative C2	**145**	**0.011**	**0.40**
Aternative C3	**71**	**0.005**	**0.26**
Aternative C4 (Preferred)	**145**	**0.011**	**0.40**

Stream Reach S6S057a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **29**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S057a RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.058

LENGTH OF STEAM REACH (ft) LAT 39.508188 LONG. -86.320802 RIVER CODE N/A RIVER MILE N/A

DATE 2/18/2016 SCORER rh COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0
☐	BOULDER (>256 mm) [16 pts	0
☑	BEDROCK [16 pts]	60
☐	COBBLE (65-256 mm) [9 pt	0
☐	GRAVEL (2-64 mm) [9 pts]	0
☑	SAND (<2 mm) [6 pts]	40

TYPE		PERCENT
☐	SILT [3 pt]	0
☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	FINE DETRITUS [3 pts]	0
☐	CLAY or HARDPAN [0 pts]	0
☐	MUCK [0 pts]	0
☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **60.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **22** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **0.9**

HHEI Metric Points

Substrate Max = 40 **24**

(A+B)

Pool Depth Max = 30 **0**

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

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

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **90**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

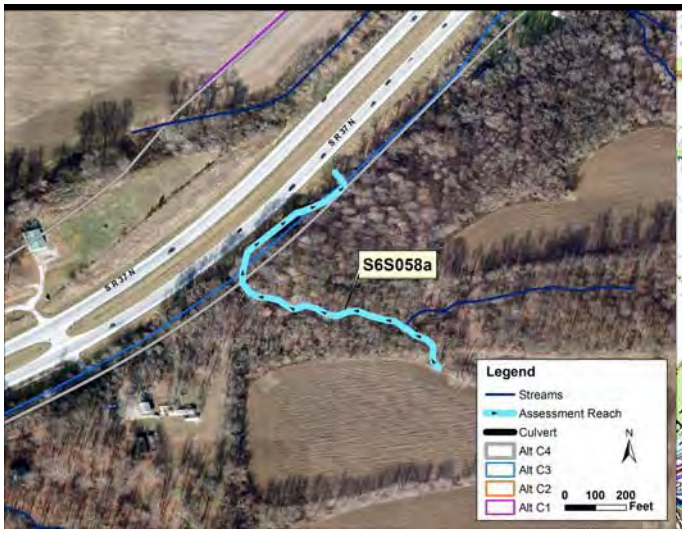
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

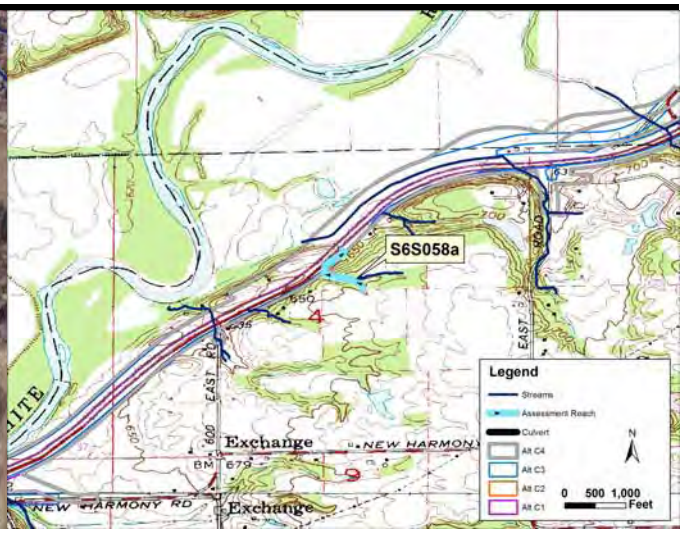
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S058a



Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 7 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	bedrock - boulder	**Quarter:**	NE
Evaluation Score:	HHEI = 54	**Latitude:**	39.510435
Use Designation:	Class II PHWH	**Longitude:**	-86.317201
OHWM width:	4.6	**Basin:**	White River - North Trib
OHWM depth:	0.6	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.051
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**476**	**0.050**	**0.62**
Aternative C2	**476**	**0.050**	**0.62**
Aternative C3	**330**	**0.034**	**0.36**
Aternative C4 (Preferred)	**476**	**0.050**	**0.62**

Stream Reach S6S058a

Stream Reach S6S058a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **54**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S058a RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.051

LENGTH OF STEAM REACH (ft) _____ LAT 39.510435 LONG. -86.317201 RIVER CODE N/A RIVER MILE N/A

DATE 10/20/2015 SCORER rjc COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☑	BOULDER (>256 mm) [16 pts	40	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☑	BEDROCK [16 pts]	60	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☐	CLAY or HARDPAN [0 pts]	0
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☐	SAND (<2 mm) [6 pts]	0	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ####### **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **32** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** ####

HHEI Metric Points

Substrate Max = 40 **34**

(A+B)

Pool Depth Max = 30 **0**

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 >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☑ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/03** Quantity **.13**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

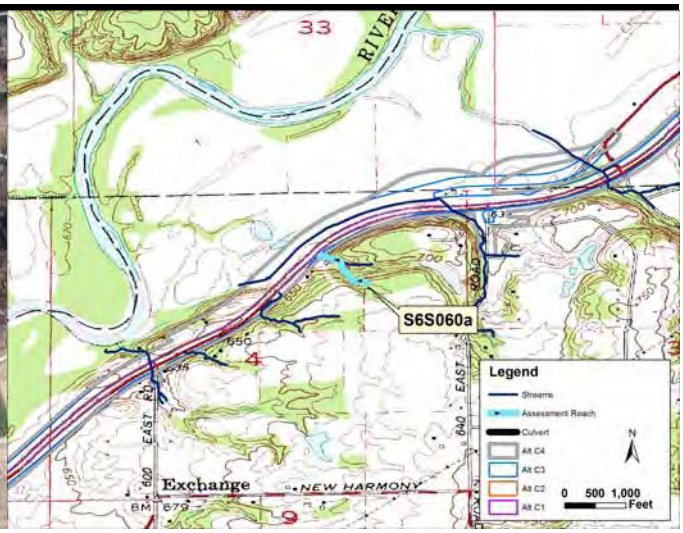
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S060a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 9 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	cobble - sand	**Quarter:**	NE
Evaluation Score:	HHEI = 35	**Latitude:**	39.51253
Use Designation:	Class II PHWH	**Longitude:**	-86.314889
OHWM width:	5.5	**Basin:**	White River - North Trib
OHWM depth:	0.3	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.05
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**34**	**0.004**	**0.10**
Aternative C2	**34**	**0.004**	**0.10**
Aternative C3	**0**	**0.000**	**0.04**
Aternative C4 (Preferred)	**34**	**0.004**	**0.10**

Stream Reach S6S060a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **35**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S060a RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.05

LENGTH OF STEAM REACH (ft) LAT 39.51253 LONG. -86.314889 RIVER CODE N/A RIVER MILE N/A

DATE 10/20/2015 SCORER rjc COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☑	COBBLE (65-256 mm) [9 pt	40	☐	CLAY or HARDPAN [0 pts]	0
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	60	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **40.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **18** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **20** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **4.5**

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

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

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/03** Quantity **.13**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

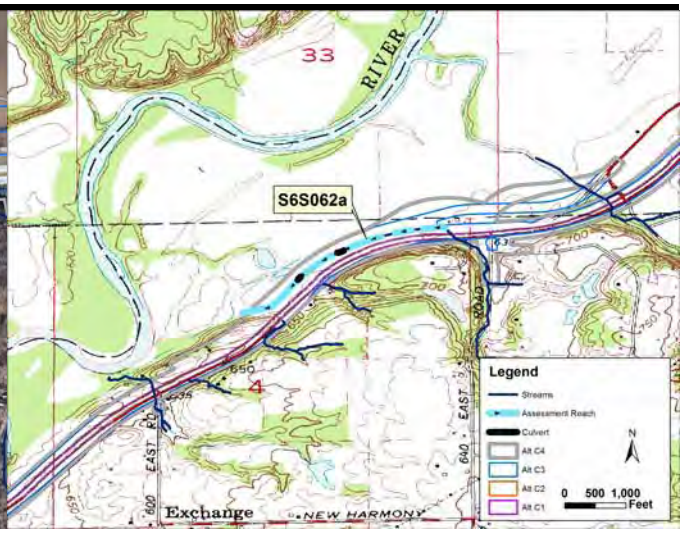
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S062a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 11 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	cobble - sand	**Quarter:**	NE
Evaluation Score:	HHEI = 40	**Latitude:**	39.514369
Use Designation:	Class II PHWH	**Longitude:**	-86.313211
OHWM width:	7.0	**Basin:**	White River - North Trib
OHWM depth:	0.6	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**2396**	**0.385**	**4.33**
Aternative C2	**2396**	**0.385**	**4.33**
Aternative C3	**2394**	**0.385**	**4.23**
Aternative C4 (Preferred)	**2396**	**0.385**	**4.33**

Stream Reach S6S062a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **40**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S062a RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.514369 LONG. -86.313211 RIVER CODE N/A RIVER MILE N/A

DATE 10/19/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☑	COBBLE (65-256 mm) [9 pt	60	☐	CLAY or HARDPAN [0 pts]	0
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☐	SAND (<2 mm) [6 pts]	40	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **60.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **18** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **20**

(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

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 (Per Bank)

L	R	
☐	☐	Wide >10 m
☐	☑	Moderate 5-10 m
☑	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☑ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/12** Quantity **0.02**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

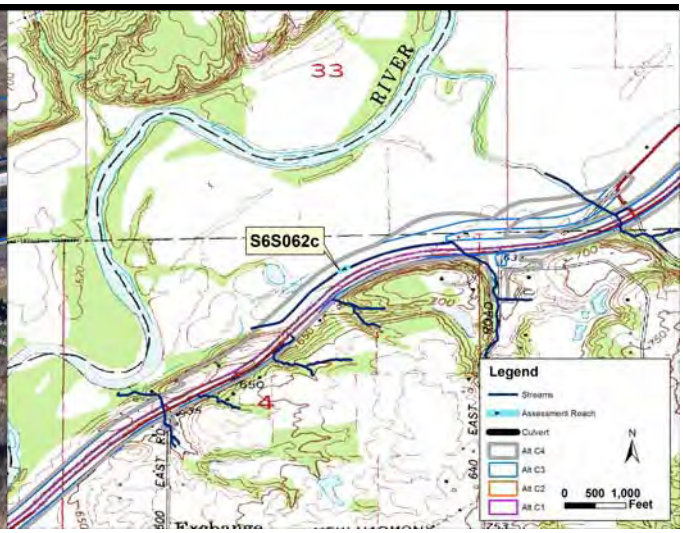
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S062c

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 11 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	gravel - sand	**Quarter:**	NE
Evaluation Score:	HHEI = 37	**Latitude:**	39.513858
Use Designation:	Class II PHWH	**Longitude:**	-86.314453
OHWM width:	5.3	**Basin:**	White River - North Trib
OHWM depth:	0.7	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**92**	**0.011**	**0.15**
Aternative C2	**92**	**0.011**	**0.15**
Aternative C3	**92**	**0.011**	**0.15**
Aternative C4 (Preferred)	**92**	**0.011**	**0.15**

Stream Reach S6S062c

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **37**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S062c RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.513858 LONG. -86.314453 RIVER CODE N/A RIVER MILE N/A

DATE 10/19/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☑ ☐	GRAVEL (2-64 mm) [9 pts]	50	☐ ☐	MUCK [0 pts]	0
☐ ☑	SAND (<2 mm) [6 pts]	50	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

HHEI Metric Points

Substrate Max = 40 **17**

(A+B)

Pool Depth Max = 30 **0**

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 >10 m
☑	☐	Moderate 5-10 m
☐	☑	Narrow <5 m
☐	☐	None

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☐ Steam 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 ☑ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) _____ Date of last precipitation: **10/12** Quantity **.02**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

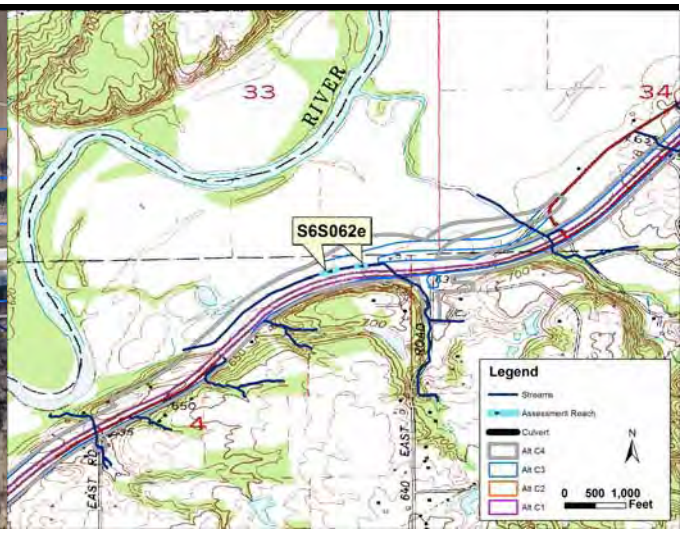
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S062e

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 11 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	sand - hardpan	**Quarter:**	NE
Evaluation Score:	HHEI = 23	**Latitude:**	39.514982
Use Designation:	Class I PHWH	**Longitude:**	-86.310623
OHWM width:	4.4	**Basin:**	White River - North Trib
OHWM depth:	0.8	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**272**	**0.027**	**0.42**
Aternative C2	**272**	**0.027**	**0.42**
Aternative C3	**272**	**0.027**	**0.42**
Aternative C4 (Preferred)	**272**	**0.027**	**0.42**

Stream Reach S6S062e

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **23**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S062e RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.514982 LONG. -86.310623 RIVER CODE N/A RIVER MILE N/A

DATE 10/19/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☑	CLAY or HARDPAN [0 pts]	30
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	70	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40

8

(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)

- ☐ > >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):** **0**

Pool Depth Max = 30

0

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

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
☐	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☑	☐	Narrow <5 m
☐	☐	None

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☑ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/12** Quantity **0.02**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

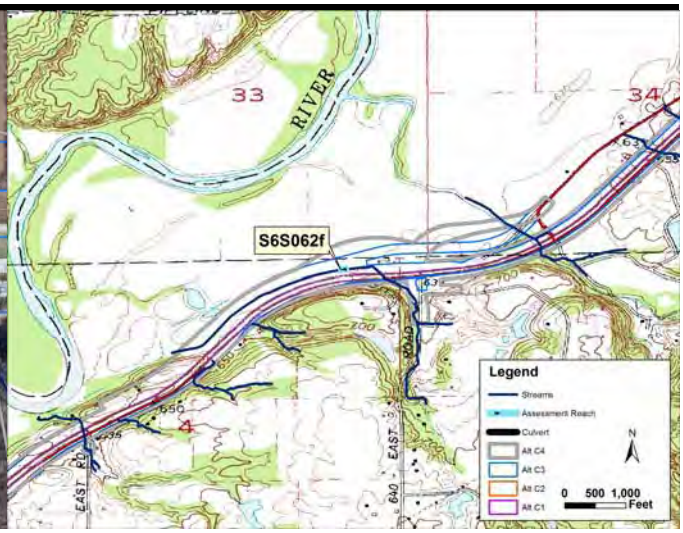
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S062f

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 11 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	cobble - sand	**Quarter:**	NE
Evaluation Score:	HHEI = 40	**Latitude:**	39.514956
Use Designation:	Class II PHWH	**Longitude:**	-86.310886
OHWM width:	7.0	**Basin:**	White River - North Trib
OHWM depth:	0.6	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**58**	**0.009**	**0.10**
Aternative C2	**58**	**0.009**	**0.10**
Aternative C3	**58**	**0.009**	**0.11**
Aternative C4 (Preferred)	**58**	**0.009**	**0.10**

Stream Reach S6S062f

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **40**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S062f RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.514956 LONG. -86.310886 RIVER CODE N/A RIVER MILE N/A

DATE 10/19/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☑	COBBLE (65-256 mm) [9 pt	80	☐	CLAY or HARDPAN [0 pts]	0
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☐ ☑	SAND (<2 mm) [6 pts]	20	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **80.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **18** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

HHEI Metric Points

Substrate Max = 40 **20**

Pool Depth Max = 30 **0**

Bankfull Width Max = 30 **20**

(A+B)

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)

L	R	
☐	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☑	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/12** Quantity **0.02**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

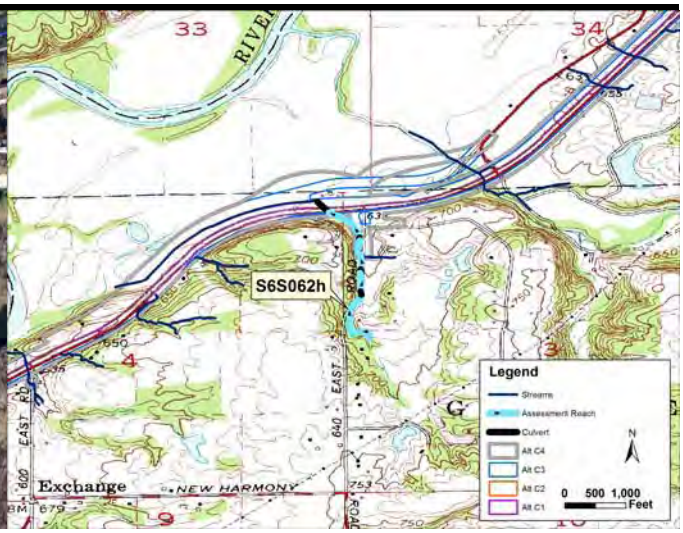
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S062h

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 11 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	4
Predominant Substrate:	cobble - gravel	**Quarter:**	SW
Evaluation Score:	HHEI = 78	**Latitude:**	39.513355
Use Designation:	Class III PHWH	**Longitude:**	-86.307627
OHWM width:	16.0	**Basin:**	White River - North Trib
OHWM depth:	1.3	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.0469
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**701**	**0.257**	**0.68**
Aternative C2	**699**	**0.257**	**0.67**
Aternative C3	**25**	**0.009**	**0.05**
Aternative C4 (Preferred)	**699**	**0.257**	**0.67**

Stream Reach S6S062h

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **78**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S062h RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.0469

LENGTH OF STEAM REACH (ft) LAT 39.513355 LONG. -86.307627 RIVER CODE N/A RIVER MILE N/A

DATE 10/20/2015 SCORER rjc COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☑ ☐	COBBLE (65-256 mm) [9 pt	40	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☑	GRAVEL (2-64 mm) [9 pts]	60	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **40.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **21** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **23**

(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)

☐ > >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):** **0**

Pool Depth Max = 30 **25**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **0**

Bankfull Width Max = 30 **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
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☐ Steam 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 ☑ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **.13** Quantity **10/03**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

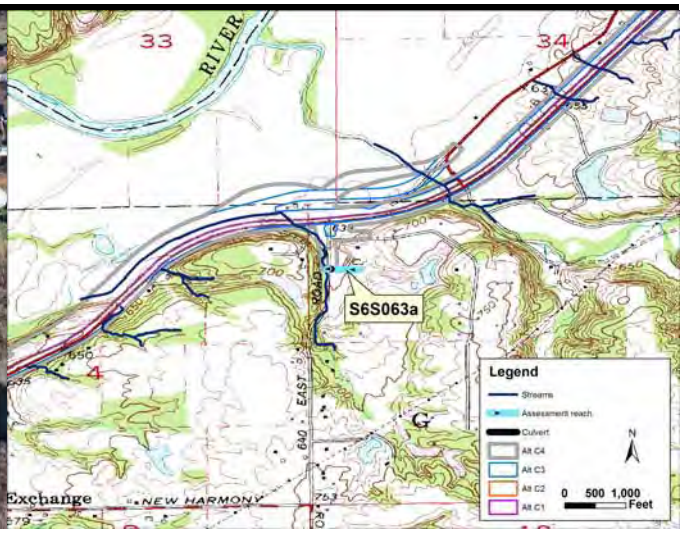
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S063a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 12 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T12N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	3
Predominant Substrate:	silt - fine detritus	**Quarter:**	NW
Evaluation Score:	HHEI = 13	**Latitude:**	39.512559
Use Designation:	Class I PHWH	**Longitude:**	-86.307406
OHWM width:	15.0	**Basin:**	White River - North Trib
OHWM depth:	0.3	**14-digit HUC:**	05120201140060
USACE Jurisdiction:	Yes	**Drainage area:**	0.071
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**94**	**0.032**	**0.00**
Aternative C2	**95**	**0.033**	**0.00**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**95**	**0.033**	**0.00**

Stream Reach S6S063a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **13**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S063a RIVER BASIN White River - North Trib DRAINAGE AREA (mi) 0.071

LENGTH OF STEAM REACH (ft) _____ LAT 39.512559 LONG. -86.307406 RIVER CODE N/A RIVER MILE N/A

DATE 10/20/2015 SCORER rjc COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☑ ☐	SILT [3 pt]	60
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☑	FINE DETRITUS [3 pts]	40
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **8** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **4.5**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☑ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Green**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **8/29** Quantity **.27**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

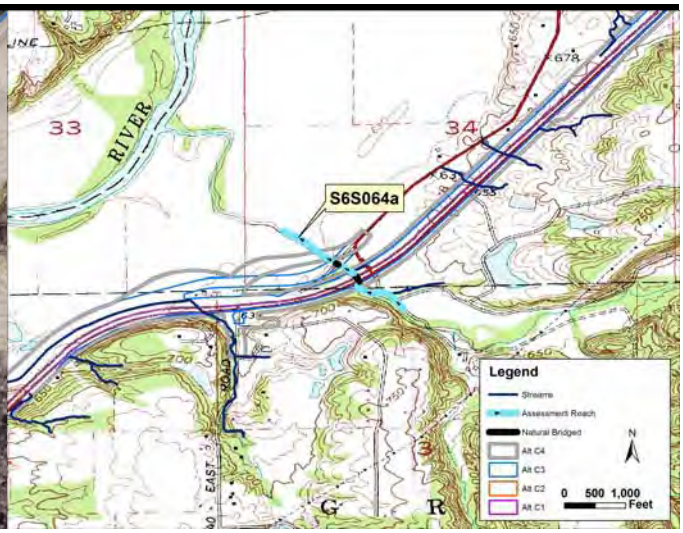
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S064a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	Crooked Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	Yes	**Section:**	34
Predominant Substrate:	gravel - sand	**Quarter:**	SW
Evaluation Score:	QHEI = 53	**Latitude:**	39.516305
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.302292
OHWM width:	36.5	**Basin:**	Crooked Creek - Banta Creek
OHWM depth:	1.6	**14-digit HUC:**	05120201140050
USACE Jurisdiction:	Yes	**Drainage area:**	15.528
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**389**	**0.326**	**1.04**
Aternative C2	**389**	**0.326**	**1.04**
Aternative C3	**210**	**0.176**	**0.70**
Aternative C4 (Preferred)	**389**	**0.326**	**1.04**

Stream Reach S6S064a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S064a	N/A	Crooked Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
rh	8/31/2015	Morgan	N/A		53

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES PREDOMINANT P	BEST TYPES PREDOMINANT R	BEST TYPES PRESENT P	BEST TYPES PRESENT R	BEST TYPES TOTAL %	OTHER TYPES PREDOMINANT P	OTHER TYPES PREDOMINANT R	OTHER TYPES PRESENT P	OTHER TYPES PRESENT R	OTHER TYPES TOTAL %
☐ BLDR/SLABS [10]	☐	☐	☐		☐ HARDPAN [4]	☐	☐	☐	
☐ BOULDERS [9]	☐	☐	☐		☐ DETRITUS [3]	☐	☐	☐	
☐ COBBLE [8]	☐	☐	☐		☐ MUCK [2]	☐	☐	☐	
☑ GRAVEL [7]	☐	☐	☐	50	☐ SILT [2]	☐	☐	☐	
☐ SAND [6]	☑	☐	☐	50	☐ ARTIFICIAL [0]	☐	☐	☐	
☐ BEDROCK [5]	☐	☐	☐						

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

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

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

QUALITY
- ☐ HEAVY [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 12.0 (Maximum 20)

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	1	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	1	ROOTWADS [1]	0	0	AQUATIC MACROPHYTES [1]
0	2	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☑ MODERATE 25-75% [7]
- ☐ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **13.0**

Comments

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

River right looking downstrea

L	R	EROSION
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☑	☑	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☑	☑	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **5.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☑ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **6.0**

Comments

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

☐ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☑ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **2.0**

Comments

6] *GRADIENT* (15.6 ft/mi)

DRAINAGE AREA (19.5 ft/mi)

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

% POOL: 30 **% GLIDE:** 20 **% RUN:** 40 **% RIFFLE:** 10

Riparian Maximum 10: **8.0**

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

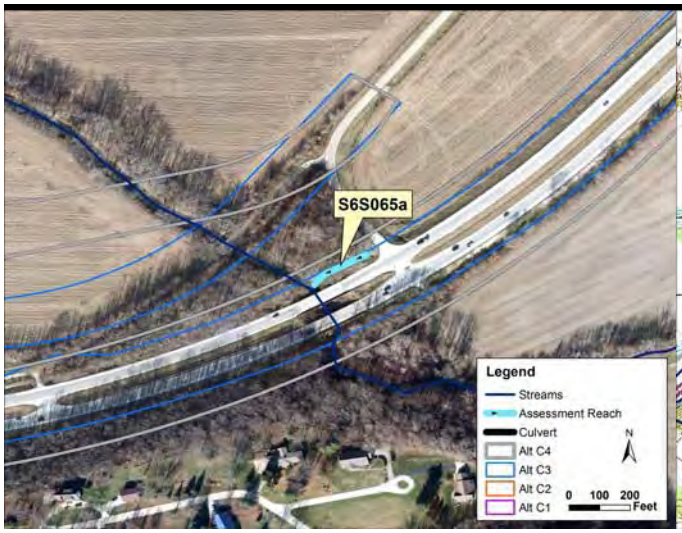
Mine: [ ] Acid [ ] Quarry

Flow: [ ] Natural [ ] Stagnant

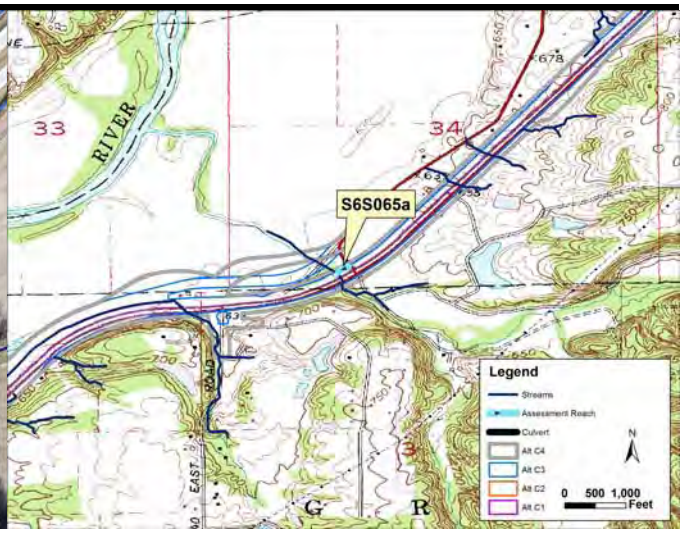
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S065a



Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 1 Crooked Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	34
Predominant Substrate:	artificial - muck	**Quarter:**	SW
Evaluation Score:	HHEI = 10	**Latitude:**	39.516476
Use Designation:	Class I PHWH	**Longitude:**	-86.302009
OHWM width:	1.1	**Basin:**	Crooked Creek - Banta Creek
OHWM depth:	0.2	**14-digit HUC:**	05120201140050
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**165**	**0.004**	**0.19**
Aternative C2	**165**	**0.004**	**0.19**
Aternative C3	**165**	**0.004**	**0.13**
Aternative C4 (Preferred)	**165**	**0.004**	**0.19**

Stream Reach S6S065a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **10**

SITE NAME/LOCATION UNT Crooked Creek

SITE NUMBER S6S065a RIVER BASIN Crooked Creek - Banta Cr DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.516476 LONG. -86.302009 RIVER CODE N/A RIVER MILE N/A

DATE 9/21/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☑	MUCK [0 pts]	80
☐ ☐	SAND (<2 mm) [6 pts]	0	☑ ☐	ARTIFICIAL [3 pts]	20

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **3** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **5**

(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)

☐ > >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):** **0**

Pool Depth Max = 30 **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0.3**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☐ Steam 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 ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Washington**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **9/19** Quantity **.58**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

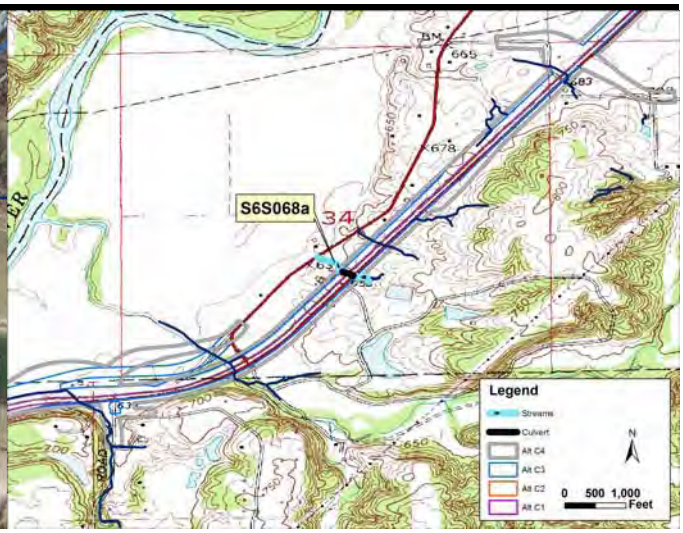
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S068a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 4 Crooked Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	34
Predominant Substrate:	sand - gravel	**Quarter:**	SE
Evaluation Score:	HHEI = 37	**Latitude:**	39.520173
Use Designation:	Class II PHWH	**Longitude:**	-86.296555
OHWM width:	1.1	**Basin:**	Crooked Creek - Banta Creek
OHWM depth:	0.3	**14-digit HUC:**	05120201140050
USACE Jurisdiction:	Yes	**Drainage area:**	0.039
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**175**	**0.004**	**0.31**
Aternative C2	**175**	**0.004**	**0.31**
Aternative C3	**55**	**0.001**	**0.09**
Aternative C4 (Preferred)	**175**	**0.004**	**0.31**

Stream Reach S6S068a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **37**

SITE NAME/LOCATION UNT Crooked Creek

SITE NUMBER S6S068a RIVER BASIN Crooked Creek - Banta Cr DRAINAGE AREA (mi) 0.039

LENGTH OF STEAM REACH (ft) _____ LAT 39.520173 LONG. -86.296555 RIVER CODE N/A RIVER MILE N/A

DATE 2/18/2016 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☑	GRAVEL (2-64 mm) [9 pts]	40	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	60	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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):** **8**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0.3**

HHEI Metric Points

Substrate Max = 40 **17**

(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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☐ Steam 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 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Washington**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **2/14** Quantity **2.3**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

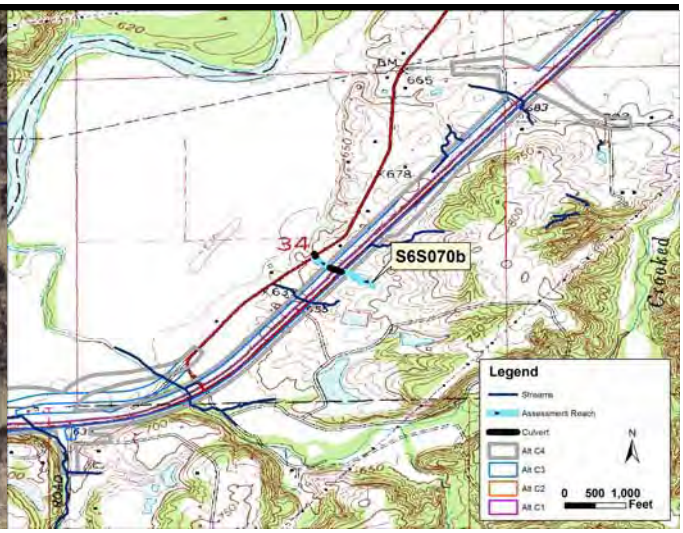
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S070b

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 13 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	34
Predominant Substrate:	sand - gravel	**Quarter:**	SE
Evaluation Score:	HHEI = 27	**Latitude:**	39.521525
Use Designation:	Class I PHWH	**Longitude:**	-86.295118
OHWM width:	2.0	**Basin:**	White River - Sinking Creek
OHWM depth:	0.1	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**156**	**0.007**	**0.38**
Aternative C2	**156**	**0.007**	**0.38**
Aternative C3	**40**	**0.002**	**0.11**
Aternative C4 (Preferred)	**156**	**0.007**	**0.38**

Stream Reach S6S070b

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **27**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S070b RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) LAT 39.521525 LONG. -86.295118 RIVER CODE N/A RIVER MILE N/A

DATE 2/18/2016 SCORER rh COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☐	CLAY or HARDPAN [0 pts]	0
☑	GRAVEL (2-64 mm) [9 pts]	30	☐	MUCK [0 pts]	0
☐	SAND (<2 mm) [6 pts]	70	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **2**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **0.6**

HHEI Metric Points

Substrate Max = 40 **17**

(A+B)

Pool Depth Max = 30 **5**

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 (Per Bank)

L	R	
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **2/14** Quantity **2.3**

Photograph information: _____

Elevated Turbidity? (Y/N) _____ Canopy (% open): **25**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

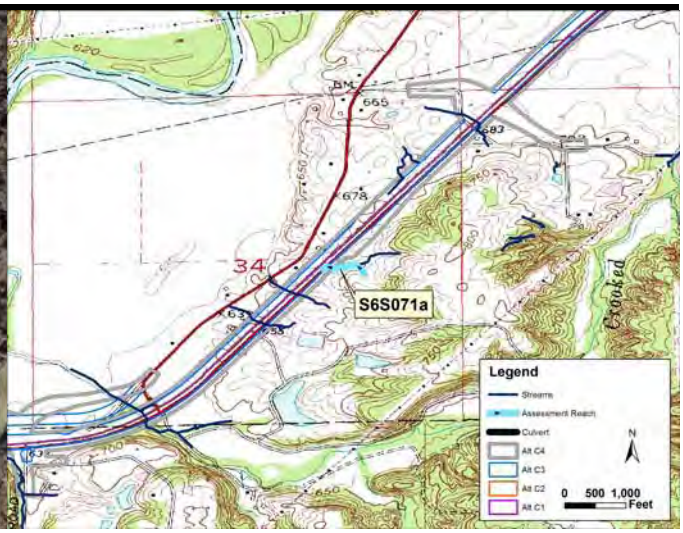
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S071a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 14 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	34
Predominant Substrate:	sand - woody detritus	**Quarter:**	SE
Evaluation Score:	HHEI = 41	**Latitude:**	39.522757
Use Designation:	Class II PHWH	**Longitude:**	-86.293898
OHWM width:	2.3	**Basin:**	White River - Sinking Creek
OHWM depth:	0.3	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**135**	**0.007**	**0.32**
Aternative C2	**135**	**0.007**	**0.32**
Aternative C3	**63**	**0.003**	**0.07**
Aternative C4 (Preferred)	**135**	**0.007**	**0.32**

Stream Reach S6S071a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **41**

SITE NAME/LOCATION: UNT White River

SITE NUMBER: S6S071a | RIVER BASIN: White River - Sinking Cre | DRAINAGE AREA (mi): 0.001

LENGTH OF STEAM REACH (ft): | LAT: 39.522757 | LONG.: -86.293898 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 2/18/2016 | SCORER: rh | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☑	LEAF PACK/WOODY DEBRIS [3 pts	10
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	90	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** (A)

Substrate Percentage Check: **100 %** (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: 9 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

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)

- ☐ > >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):** 15

Pool Depth Max = 30: **25**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** 0.9

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 (Per Bank)

L	R	
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **2/14** Quantity **2.3**

Photograph information: _____

Elevated Turbidity? (Y/N) _____ Canopy (% open): **25**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

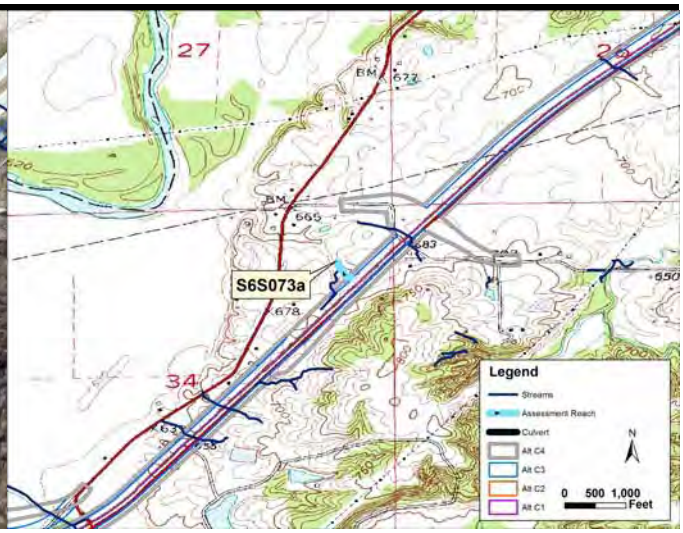
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S073a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 16 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	34
Predominant Substrate:	muck - sand	**Quarter:**	NE
Evaluation Score:	HHEI = 43	**Latitude:**	39.52748
Use Designation:	Rheocrene Potential	**Longitude:**	-86.289906
OHWM width:	3.3	**Basin:**	White River - Sinking Creek
OHWM depth:	0.3	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.041
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**34**	**0.003**	**0.10**
Aternative C2	**34**	**0.003**	**0.10**
Aternative C3	**0**	**0.000**	**0.02**
Aternative C4 (Preferred)	**34**	**0.003**	**0.10**

Stream Reach S6S073a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **43**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S073a RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.041

LENGTH OF STEAM REACH (ft) _____ LAT 39.52748 LONG. -86.289906 RIVER CODE N/A RIVER MILE N/A

DATE 8/31/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☑ ☐	MUCK [0 pts]	7
☐ ☑	SAND (<2 mm) [6 pts]	3	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **10 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40

8

(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)

- ☐ > >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**

Pool Depth Max = 30

30

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0.9**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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	☑ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **8/19** Quantity **.61**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

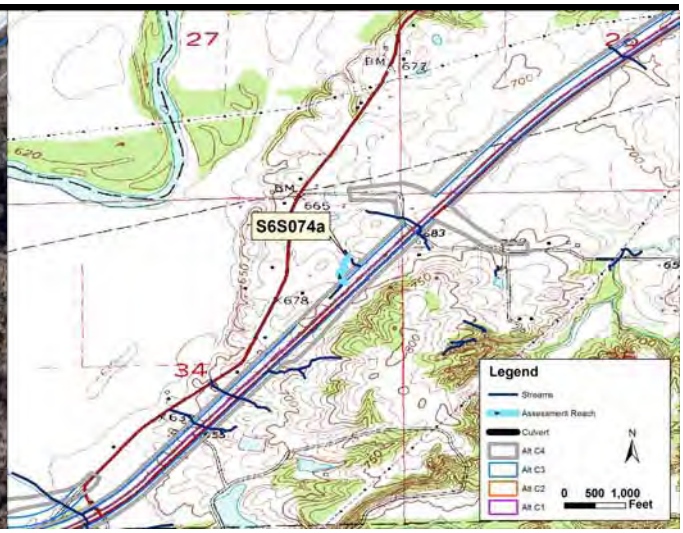
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S074a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 17 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	34
Predominant Substrate:	hardpan - artificial	**Quarter:**	NE
Evaluation Score:	HHEI = 10	**Latitude:**	39.526805
Use Designation:	Class I PHWH	**Longitude:**	-86.290594
OHWM width:	2.9	**Basin:**	White River - Sinking Creek
OHWM depth:	0.1	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.036
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**55**	**0.004**	**0.12**
Aternative C2	**55**	**0.004**	**0.12**
Aternative C3	**7**	**0.000**	**0.01**
Aternative C4 (Preferred)	**55**	**0.004**	**0.12**

Stream Reach S6S074a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **10**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S074a RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.036

LENGTH OF STEAM REACH (ft) _____ LAT 39.526805 LONG. -86.290594 RIVER CODE N/A RIVER MILE N/A

DATE 8/5/2016 SCORER ry COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☐	CLAY or HARDPAN [0 pts]	80
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☑	ARTIFICIAL [3 pts]	20

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **3** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0.8**

HHEI Metric Points

Substrate Max = 40 **5**

(A+B)

Pool Depth Max = 30 **0**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☐ Steam 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 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: _____

MISCELLANEOUS

Base flow conditions? (Y/N) _____ Date of last precipitation: _____ Quantity _____

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

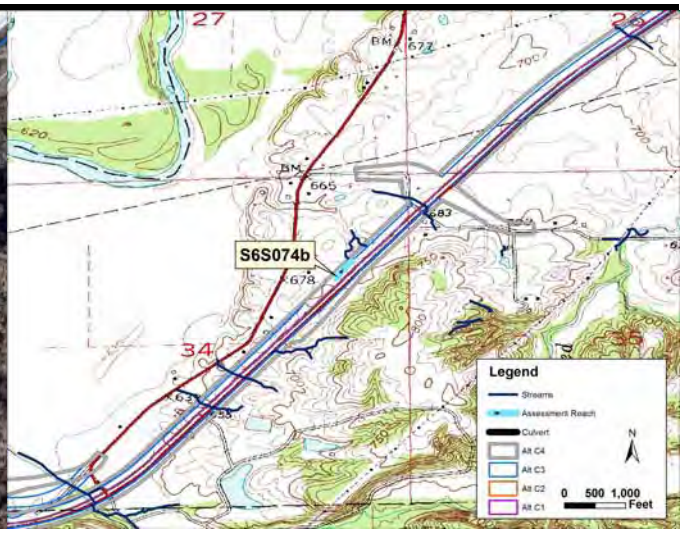
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S074b

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 17 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	34
Predominant Substrate:	sand - hardpan	**Quarter:**	NE
Evaluation Score:	HHEI = 13	**Latitude:**	39.526403
Use Designation:	Modified Class I PHWH	**Longitude:**	-86.290853
OHWM width:	2.9	**Basin:**	White River - Sinking Creek
OHWM depth:	0.2	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.036
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**318**	**0.022**	**0.41**
Aternative C2	**318**	**0.022**	**0.41**
Aternative C3	**318**	**0.022**	**0.34**
Aternative C4 (Preferred)	**318**	**0.022**	**0.41**

Stream Reach S6S074b

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **13**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S074b RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.036

LENGTH OF STEAM REACH (ft) _____ LAT 39.526403 LONG. -86.290853 RIVER CODE N/A RIVER MILE N/A

DATE 9/3/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☑	CLAY or HARDPAN [0 pts]	5
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	5	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **10 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **8**

(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **1**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **8/15** Quantity **.22**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

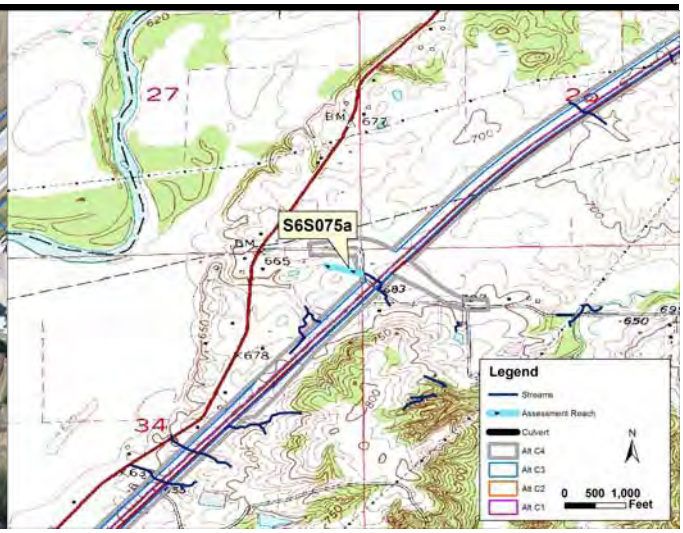
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S075a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 18 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	35
Predominant Substrate:	cobble - sand	**Quarter:**	NE
Evaluation Score:	HHEI = 61	**Latitude:**	39.529627
Use Designation:	Class II PHWH	**Longitude:**	-86.288099
OHWM width:	3.8	**Basin:**	White River - Sinking Creek
OHWM depth:	0.5	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.029
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**39**	**0.003**	**0.05**
Aternative C2	**39**	**0.003**	**0.05**
Aternative C3	**39**	**0.003**	**0.05**
Aternative C4 (Preferred)	**39**	**0.003**	**0.05**

Stream Reach S6S075a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **61**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S075a RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.029

LENGTH OF STEAM REACH (ft) _____ LAT 39.529627 LONG. -86.288099 RIVER CODE N/A RIVER MILE N/A

DATE 1/26/2016 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐ BLDR SLABS [16 pts]		0	☐ ☐ SILT [3 pt]		0
☐ ☐ BOULDER (>256 mm) [16 pts		0	☐ ☐ LEAF PACK/WOODY DEBRIS [3 pts		0
☐ ☐ BEDROCK [16 pts]		0	☐ ☐ FINE DETRITUS [3 pts]		0
☑ ☐ COBBLE (65-256 mm) [9 pt		40	☐ ☐ CLAY or HARDPAN [0 pts]		0
☐ ☐ GRAVEL (2-64 mm) [9 pts]		0	☐ ☑ MUCK [0 pts]		20
☐ ☑ SAND (<2 mm) [6 pts]		40	☐ ☐ ARTIFICIAL [3 pts]		0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **40.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **18** **TOTAL NUMBER OF SUBSTRATE TYPES** **3**

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)

☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

HHEI Metric Points

Substrate Max = 40 **21**

(A+B)

Pool Depth Max = 30 **25**

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
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☐ Steam 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 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **1/26** Quantity **0.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

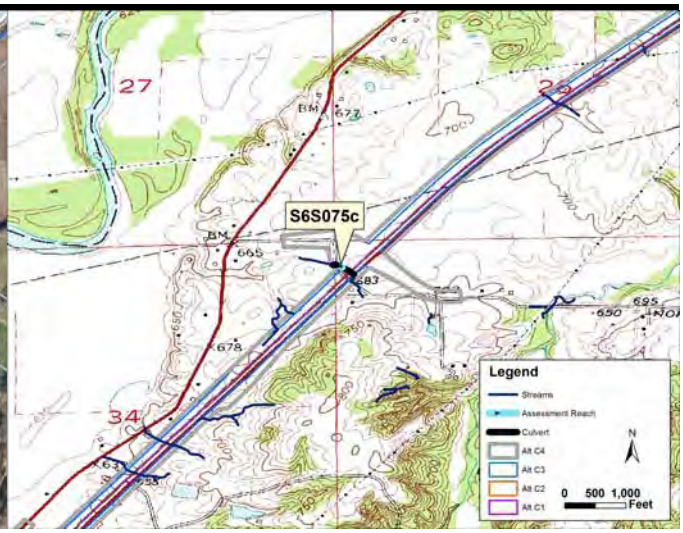
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S075c

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 18 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	35
Predominant Substrate:	muck - hardpan	**Quarter:**	NW
Evaluation Score:	HHEI = 32	**Latitude:**	39.529573
Use Designation:	Class II PHWH	**Longitude:**	-86.287757
OHWM width:	2.3	**Basin:**	White River - Sinking Creek
OHWM depth:	0.3	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.019
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**84**	**0.004**	**0.00**
Aternative C2	**84**	**0.004**	**0.00**
Aternative C3	**84**	**0.004**	**0.00**
Aternative C4 (Preferred)	**84**	**0.004**	**0.00**

Stream Reach S6S075c

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **32**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S075c RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.019

LENGTH OF STEAM REACH (ft) _____ LAT 39.529573 LONG. -86.287757 RIVER CODE N/A RIVER MILE N/A

DATE 1/26/2016 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☑	CLAY or HARDPAN [0 pts]	20
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☑ ☐	MUCK [0 pts]	80
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **0** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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 teh average of 3-4 measurements) (Check ONLY one box):

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0.7**

HHEI Metric Points

Substrate Max = 40 **2**

(A+B)

Pool Depth Max = 30 **25**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/26** Quantity **0.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

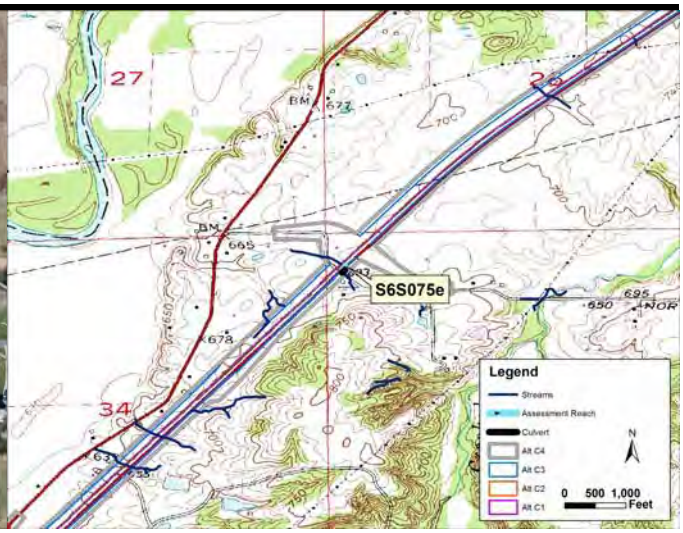
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S075e

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 18 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Roadside Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	35
Predominant Substrate:	sand - hardpan	**Quarter:**	NW
Evaluation Score:	HHEI = 18	**Latitude:**	39.529135
Use Designation:	Class I PHWH	**Longitude:**	-86.287141
OHWM width:	1.6	**Basin:**	White River - Sinking Creek
OHWM depth:	0.3	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**61**	**0.002**	**0.00**
Aternative C2	**61**	**0.002**	**0.00**
Aternative C3	**27**	**0.001**	**0.00**
Aternative C4 (Preferred)	**61**	**0.002**	**0.00**

Stream Reach S6S075e

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **18**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S075e RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.529135 LONG. -86.287141 RIVER CODE N/A RIVER MILE N/A

DATE 4/26/2016 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☑	CLAY or HARDPAN [0 pts]	25
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	75	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0.5**

HHEI Metric Points

Substrate Max = 40 **8**

(A+B)

Pool Depth Max = 30 **5**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☑ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **1/26** Quantity **0.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

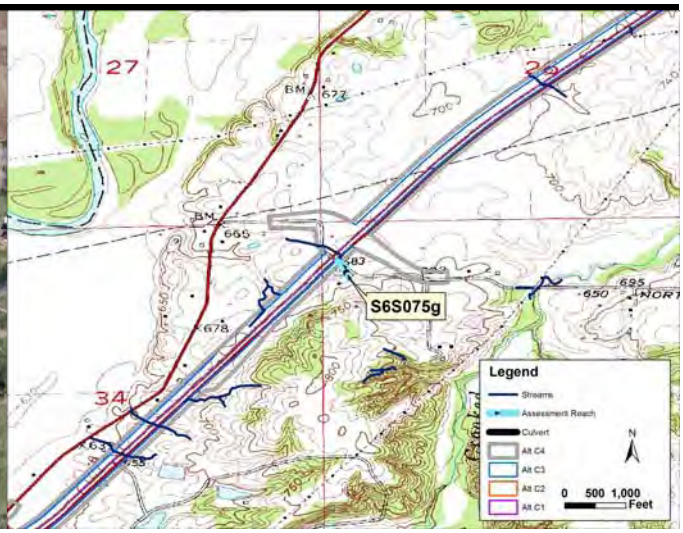
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S075g

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 18 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	35
Predominant Substrate:	hardpan	**Quarter:**	NW
Evaluation Score:	HHEI = 6	**Latitude:**	39.528893
Use Designation:	Class I PHWH	**Longitude:**	-86.287185
OHWM width:	2.0	**Basin:**	White River - Sinking Creek
OHWM depth:	0.5	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**45**	**0.002**	**0.11**
Aternative C2	**45**	**0.002**	**0.11**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**45**	**0.002**	**0.11**

Stream Reach S6S075g

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **6**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S075g RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.528893 LONG. -86.287185 RIVER CODE N/A RIVER MILE N/A

DATE 10/21/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☑	CLAY or HARDPAN [0 pts]	100
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **0** **TOTAL NUMBER OF SUBSTRATE TYPES** **1**

HHEI Metric Points

Substrate Max = 40 **1**

(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☑ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) _____ Date of last precipitation: **10/12** Quantity **0.02**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

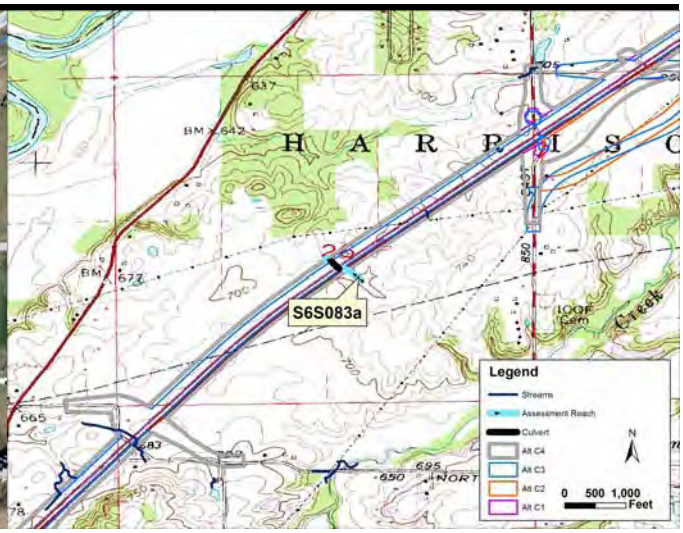
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S083a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 20 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	26
Predominant Substrate:	muck - silt	**Quarter:**	SE
Evaluation Score:	HHEI = 35	**Latitude:**	39.537016
Use Designation:	Rheocrene Potential	**Longitude:**	-86.278226
OHWM width:	2.8	**Basin:**	White River - Sinking Creek
OHWM depth:	0.5	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.036
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**181**	**0.011**	**0.26**
Aternative C2	**181**	**0.011**	**0.26**
Aternative C3	**43**	**0.003**	**0.00**
Aternative C4 (Preferred)	**181**	**0.011**	**0.26**

Stream Reach S6S083a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **35**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S083a RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.036

LENGTH OF STEAM REACH (ft) _____ LAT 39.537016 LONG. -86.278226 RIVER CODE N/A RIVER MILE N/A

DATE 10/21/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☑	SILT [3 pt]	30
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☑ ☐	MUCK [0 pts]	70
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **3** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **5** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **25**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/12** Quantity **.02**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

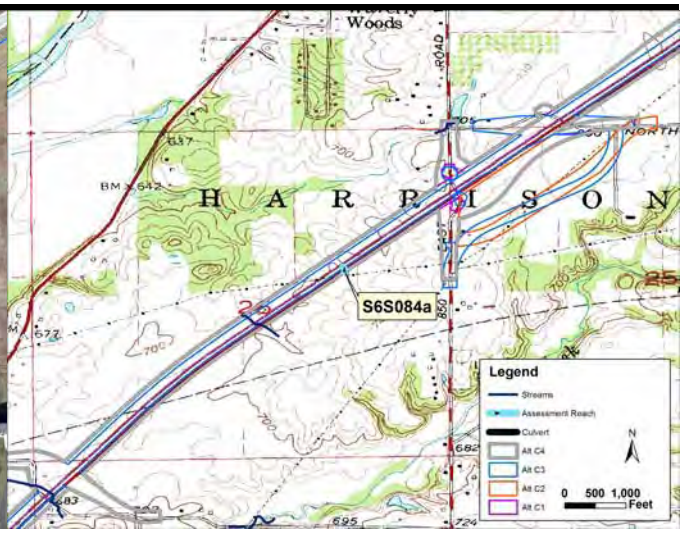
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S084a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 21 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	T2E
IDEM 303(d) Listed:	No	**Section:**	26
Predominant Substrate:	sand - muck	**Quarter:**	SE
Evaluation Score:	HHEI = 38	**Latitude:**	39.539316
Use Designation:	Rheocrene Potential	**Longitude:**	-86.274078
OHWM width:	2.1	**Basin:**	White River - Sinking Creek
OHWM depth:	0.5	**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**95**	**0.005**	**0.13**
Aternative C2	**95**	**0.005**	**0.13**
Aternative C3	**20**	**0.001**	**0.00**
Aternative C4 (Preferred)	**95**	**0.005**	**0.13**

Stream Reach S6S084a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **38**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S084a RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.539316 LONG. -86.274078 RIVER CODE N/A RIVER MILE N/A

DATE 1/26/2016 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☑	MUCK [0 pts]	20
☑ ☐	SAND (<2 mm) [6 pts]	80	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **20**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** ####

HHEI Metric Points

Substrate Max = 40 **8**

(A+B)

Pool Depth Max = 30 **25**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **1/26** Quantity **.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

DRAWING AMD 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 Reach S6S085a

Stream Location on 2013 Aerial Photograph

Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 22 White River	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	26
Predominant Substrate:	hardpan - gravel	**Quarter:**	NE
Evaluation Score:	HHEI = 41	**Latitude:**	39.545656
Use Designation:	Rheocrene Potential	**Longitude:**	-86.269518
OHWM width:	3.3	**Basin:**	White River - Sinking Creek
OHWM depth:		**14-digit HUC:**	05120201140040
USACE Jurisdiction:	Yes	**Drainage area:**	0.082
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**0**	**0.000**	**0.00**
Aternative C2	**171**	**0.013**	**0.03**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**171**	**0.013**	**0.03**

Stream Reach S6S085a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **41**

SITE NAME/LOCATION UNT White River

SITE NUMBER S6S085a RIVER BASIN White River - Sinking Cre DRAINAGE AREA (mi) 0.082

LENGTH OF STEAM REACH (ft) LAT 39.545656 LONG. -86.269518 RIVER CODE N/A RIVER MILE N/A

DATE 6/4/2016 SCORER ry COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☐	CLAY or HARDPAN [0 pts]	70
☐ ☑	GRAVEL (2-64 mm) [9 pts]	30	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **9** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **1**

HHEI Metric Points

Substrate Max = 40 **11**

(A+B)

Pool Depth Max = 30 **15**

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
☐	☐	Wide >10 m
☐	☐	Moderate 5-10 m
☑	☑	Narrow <5 m
☐	☐	None

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam flowing
- ☐ Subsurface flow with isolated pools (interstitial)
- ☐ Moist channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

Comments: receives overflow from pond across road

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

☐ None	☑ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

STREAM 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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **30**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

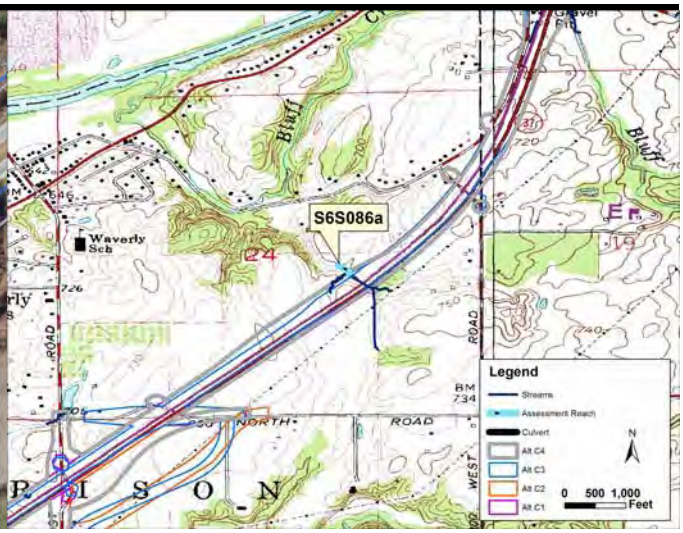
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S086a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 1 Bluff Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	24
Predominant Substrate:	sand - gravel	**Quarter:**	SE
Evaluation Score:	HHEI = 58	**Latitude:**	39.552216
Use Designation:	Class III PHWH	**Longitude:**	-86.256465
OHWM width:	11.0	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.5	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.167
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**1**	**0.000**	**0.01**
Aternative C2	**18**	**0.005**	**0.06**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**18**	**0.005**	**0.06**

Stream Reach S6S086a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **58**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S086a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.167

LENGTH OF STEAM REACH (ft) LAT 39.552216 LONG. -86.256465 RIVER CODE N/A RIVER MILE N/A

DATE 6/26/2016 SCORER ry COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	20	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☑	GRAVEL (2-64 mm) [9 pts]	35	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	45	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **20.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **3**

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)

- ☐ > >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):** **6**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **3.5**

HHEI Metric Points

Substrate Max = 40 **18**

(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

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

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **20**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

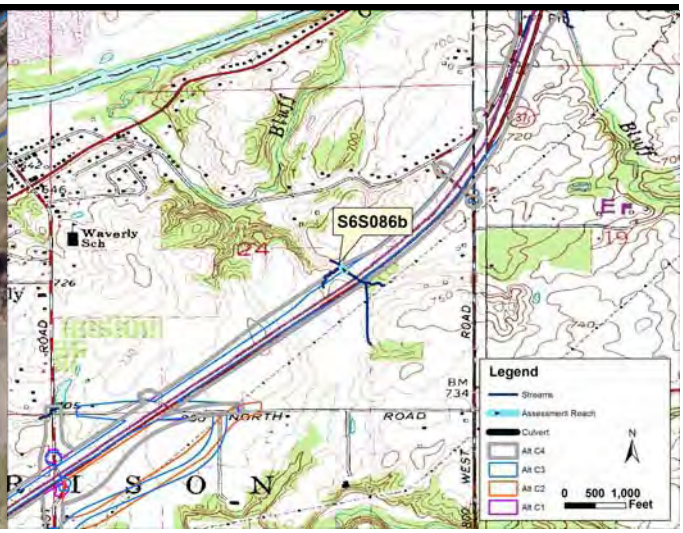
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S086b

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 1 Bluff Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	24
Predominant Substrate:	cobble - gravel	**Quarter:**	SE
Evaluation Score:	HHEI = 48	**Latitude:**	39.552111
Use Designation:	Rheocrene Potential	**Longitude:**	-86.256377
OHWM width:	5.6	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.6	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.067
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**73**	**0.009**	**0.33**
Aternative C2	**73**	**0.009**	**0.33**
Aternative C3	**17**	**0.002**	**0.09**
Aternative C4 (Preferred)	**73**	**0.009**	**0.33**

Stream Reach S6S086b

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **48**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S086b RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.067

LENGTH OF STEAM REACH (ft) LAT 39.552111 LONG. -86.256377 RIVER CODE N/A RIVER MILE N/A

DATE 6/25/2016 SCORER ry COMMENT

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
	BLDR SLABS [16 pts]	0		SILT [3 pt]	0
	BOULDER (>256 mm) [16 pts	0		LEAF PACK/WOODY DEBRIS [3 pts	0
	BEDROCK [16 pts]	0		FINE DETRITUS [3 pts]	0
✓	COBBLE (65-256 mm) [9 pt	80		CLAY or HARDPAN [0 pts]	0
✓	GRAVEL (2-64 mm) [9 pts]	20		MUCK [0 pts]	0
	SAND (<2 mm) [6 pts]	0		ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **80.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **21** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- [ ] > >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):** **4**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **1.7**

HHEI Metric Points

Substrate Max = 40 **23**

(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 >10 m
		Moderate 5-10 m
		Narrow <5 m
		None

FLOODPLAIN QUALITY

L	R	(Most Predominant Per Bank
✓	✓	Mature Forest, Wetland
		Immature Forest, Shrub or Old Field
		Residential, Park, New Field
		Fenced Pasture
		Conservation Tillage
		Urban or Industrial
		Open Pasture, Row Crop
		Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- [✓] Steam 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
- [ ] >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **20**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

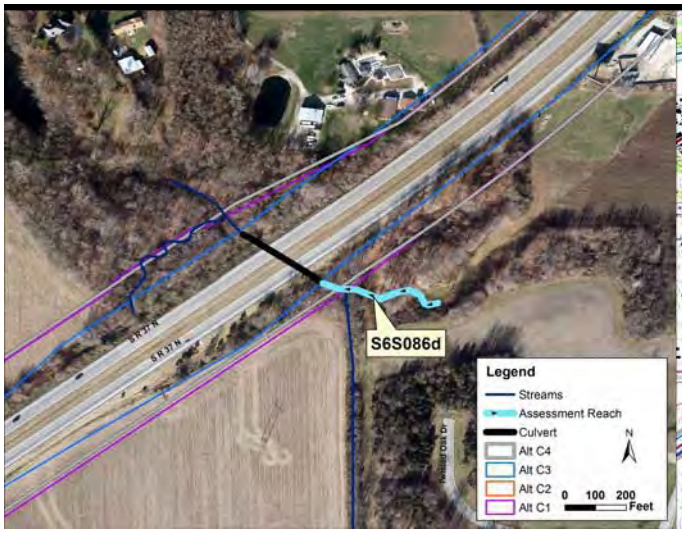
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

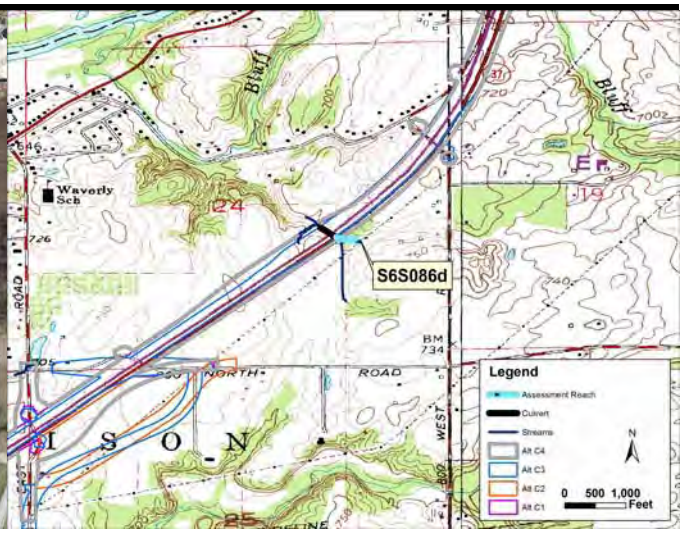
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S086d



Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 1 Bluff Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Perennial	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	24
Predominant Substrate:	gravel - sand	**Quarter:**	SE
Evaluation Score:	HHEI = 57	**Latitude:**	39.551563
Use Designation:	Rheocrene Potential	**Longitude:**	-86.255475
OHWM width:	1.7	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.4	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.054
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**67**	**0.003**	**0.19**
Aternative C2	**44**	**0.002**	**0.14**
Aternative C3	**0**	**0.000**	**0.03**
Aternative C4 (Preferred)	**44**	**0.002**	**0.14**

Stream Reach S6S086d

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **57**

SITE NAME/LOCATION: UNT Bluff Creek

SITE NUMBER: S6S086d | RIVER BASIN: White River - North Bluff/ | DRAINAGE AREA (mi): 0.054

LENGTH OF STEAM REACH (ft): | LAT: 39.551563 | LONG.: -86.255475 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 1/26/2016 | SCORER: rh | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☑ ☐	GRAVEL (2-64 mm) [9 pts]	30	☐ ☐	MUCK [0 pts]	0
☐ ☑	SAND (<2 mm) [6 pts]	70	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** (A)

Substrate Percentage Check: **100 %** (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: 15 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40: **17** (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)

- ☑ > >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):** 33

Pool Depth Max = 30: **20**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** 1.5

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 (Per Bank)

L	R	
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☑	☑	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/26** Quantity **0.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

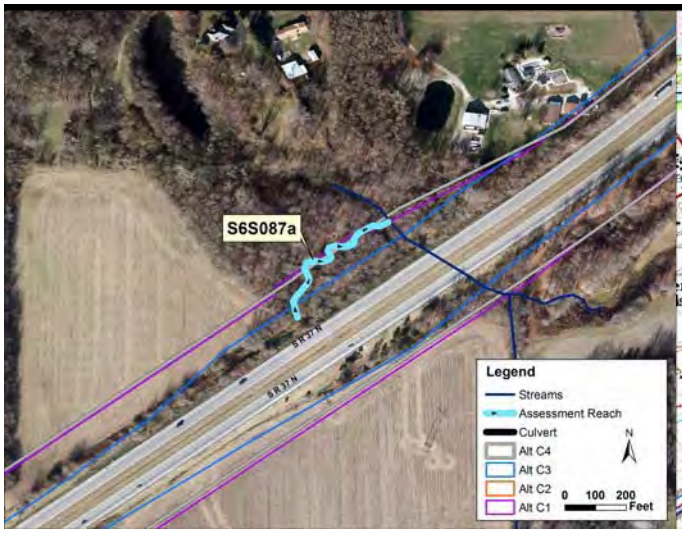
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

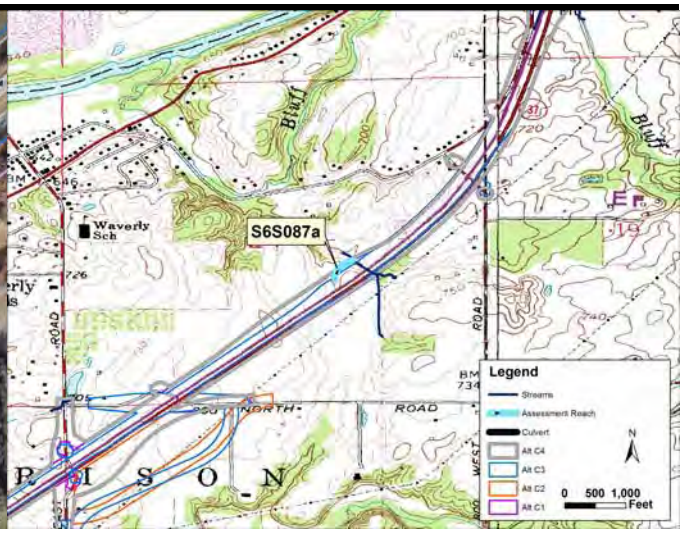
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S087a



Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 2 Bluff Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	24
Predominant Substrate:	silt - sand	**Quarter:**	SE
Evaluation Score:	HHEI = 60	**Latitude:**	39.551901
Use Designation:	Class III PHWH	**Longitude:**	-86.256989
OHWM width:	6.0	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.5	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.078
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**356**	**0.049**	**0.93**
Aternative C2	**312**	**0.043**	**0.90**
Aternative C3	**40**	**0.006**	**0.39**
Aternative C4 (Preferred)	**312**	**0.043**	**0.90**

Stream Reach S6S087a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **60**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S087a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.078

LENGTH OF STEAM REACH (ft) LAT 39.551901 LONG. -86.256989 RIVER CODE N/A RIVER MILE N/A

DATE 6/23/2016 SCORER al COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0
☐	BOULDER (>256 mm) [16 pts	5
☐	BEDROCK [16 pts]	0
☐	COBBLE (65-256 mm) [9 pt	10
☐	GRAVEL (2-64 mm) [9 pts]	10
☑	SAND (<2 mm) [6 pts]	30

TYPE		PERCENT
☑	SILT [3 pt]	35
☐	LEAF PACK/WOODY DEBRIS [3 pts	10
☐	FINE DETRITUS [3 pts]	0
☐	CLAY or HARDPAN [0 pts]	0
☐	MUCK [0 pts]	0
☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **15.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **9** **TOTAL NUMBER OF SUBSTRATE TYPES** **6**

HHEI Metric Points

Substrate Max = 40

15

(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)

- ☐ > >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):** **20**

Pool Depth Max = 30

25

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **2.8**

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 >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

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

Comments: severe erosion on banks at bends

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **10**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

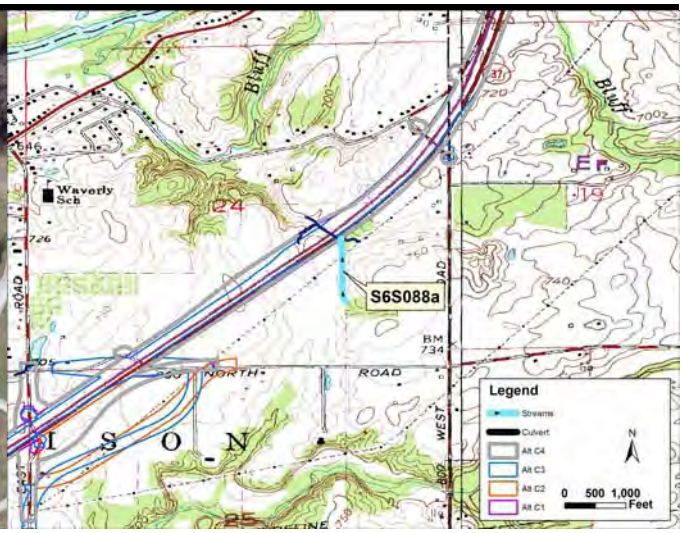
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S088a

Stream Location on 2013 Aerial Photograph



Stream Location on Mooresville East USGS Quadra

Stream Name:	UNT 3 Bluff Creek	**Quadrangle:**	Mooresville East
Flow Regime:	Intermittent	**County:**	Morgan
Channel Type:	Channelized Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R2E
IDEM 303(d) Listed:	No	**Section:**	24
Predominant Substrate:	sand - muck	**Quarter:**	SE
Evaluation Score:	HHEI = 28	**Latitude:**	39.551542
Use Designation:	Class I PHWH	**Longitude:**	-86.255376
OHWM width:	1.6	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.4	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**3**	**0.000**	**0.00**
Aternative C2	**0**	**0.000**	**0.00**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**0**	**0.000**	**0.00**

Stream Reach S6S088a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **28**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S088a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.551542 LONG. -86.255376 RIVER CODE N/A RIVER MILE N/A

DATE 1/26/2016 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☑	MUCK [0 pts]	70
☑ ☐	SAND (<2 mm) [6 pts]	30	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

HHEI Metric Points

Substrate Max = 40 **8**

(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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☐ Steam 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 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Mooresville East** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Morgan** Township / City: **Harrison**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **1/26** Quantity **.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

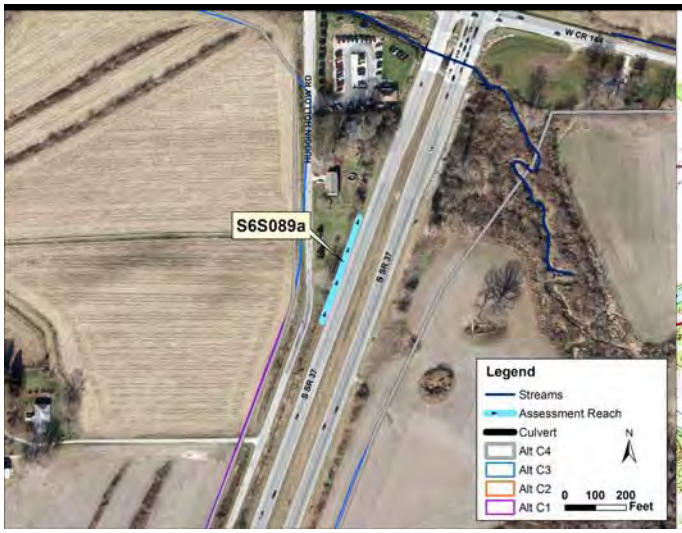
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

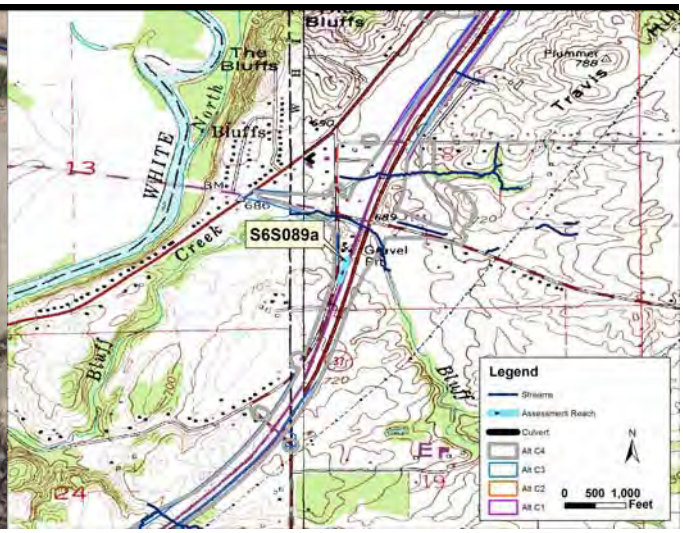
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S089a



Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	UNT 4 Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Ephemeral	**County:**	Johnson
Channel Type:	Roadside Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	sand - hardpan	**Quarter:**	SW
Evaluation Score:	HHEI = 13	**Latitude:**	39.563046
Use Designation:	Class I PHWH	**Longitude:**	-86.248175
OHWM width:	1.0	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.4	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**352**	**0.008**	**0.00**
Aternative C2	**352**	**0.008**	**0.00**
Aternative C3	**352**	**0.008**	**0.00**
Aternative C4 (Preferred)	**352**	**0.008**	**0.00**

Stream Reach S6S089a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **13**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S089a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) LAT 39.563046 LONG. -86.248175 RIVER CODE N/A RIVER MILE N/A

DATE 2/18/2016 SCORER rh COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☑	CLAY or HARDPAN [0 pts]	70
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	30	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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: Constructed Roadside Ditch **MAXIMUM POOL DEPTH (centimeters):** **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **0.3**

HHEI Metric Points

Substrate Max = 40 **8**

(A+B)

Pool Depth Max = 30 **0**

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

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

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Bargersville** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Johnson** Township / City: **White River**

MISCELLANEOUS

Base flow conditions? (Y/N) **No** Date of last precipitation: **2/14** Quantity **2.2**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

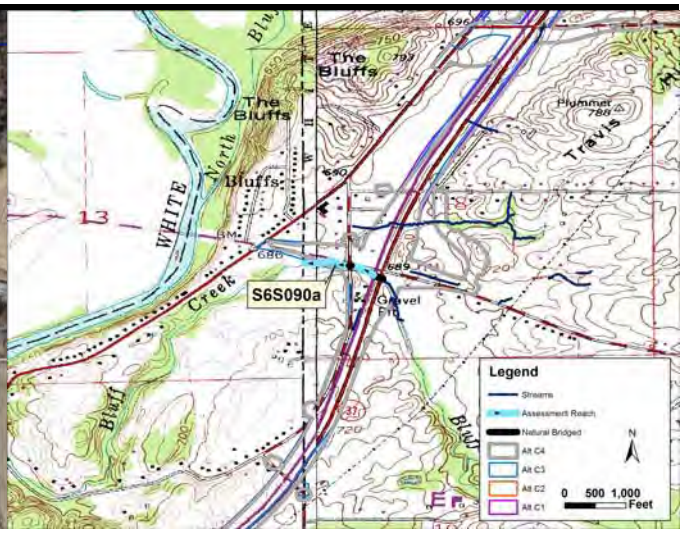
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S090a

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	muck - silt	**Quarter:**	SW
Evaluation Score:	QHEI = 32	**Latitude:**	39.565282
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.247877
OHWM width:	11.5	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.3	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	3.689
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**776**	**0.205**	**0.95**
Aternative C2	**699**	**0.185**	**0.85**
Aternative C3	**776**	**0.205**	**0.95**
Aternative C4 (Preferred)	**699**	**0.185**	**0.85**

Stream Reach S6S090a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S090a	N/A	Bluff Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
rh	4/26/2016	Johnson	N/A		32

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☐	☐	
SAND [6]	☐	☐	☐	☐	
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☑	☐	☐	☐	60
SILT [2]	☐	☑	☐	☐	40
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

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

Substrate 4.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount		
0	1	UNDERCUT BANKS [1]
0	0	OVERHANGING VEGETATION [1]
0	0	SHALLOWS (IN SLOW WATER)[1]
0	0	ROOTMATS [1]
0	1	POOOLS>70CM [2]
0	0	ROOTWADS [1]
0	0	BOULDERS [1]
0	0	OXBOWS, BACKWATERS [1]
0	1	AQUATIC MACROPHYTES [1]
0	1	LOGS OR WOODY DEBRIS [1]

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **10.0**

Comments

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

River right looking downstrea

EROSION L	EROSION R	
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH L	RIPARIAN WIDTH R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☑	☑	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☑	☑	URBAN OR INDUSTRIAL [0]
☐	☐	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **3.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☑ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **6.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (8.6 ft/mi)

DRAINAGE AREA (3.69 ft/mi)

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

% POOL: 50 **% GLIDE:** 10 **% RUN:** 0 **% RIFFLE:** 40

Riparian Maximum 10: **6.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

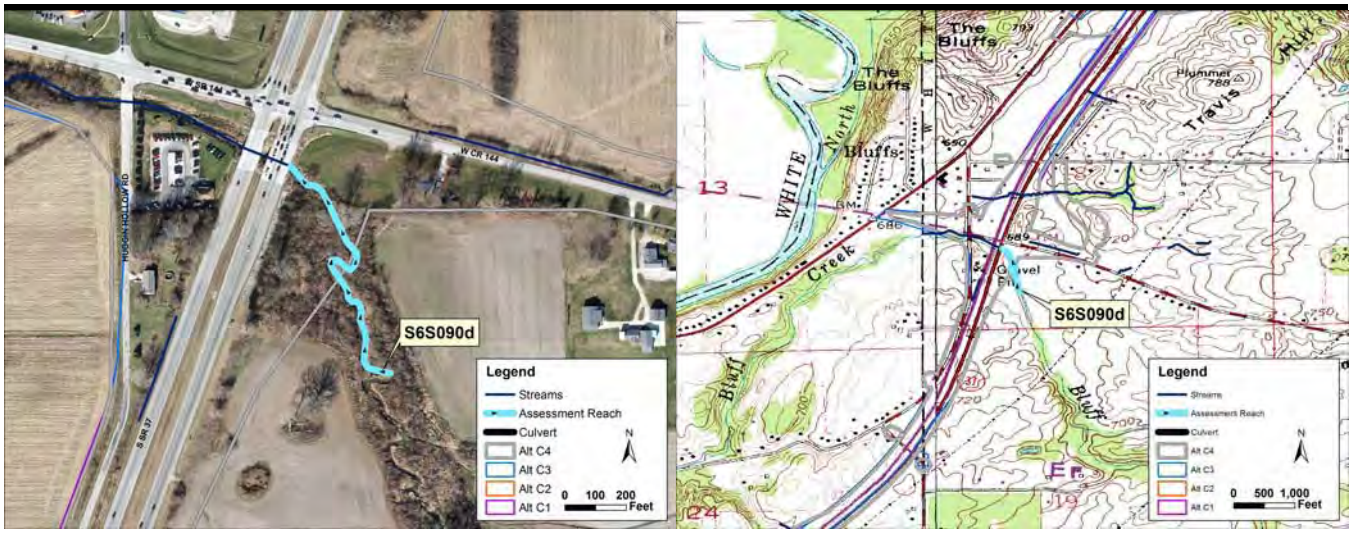
Mine: [ ] Acid [ ] Quarry

Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S090d

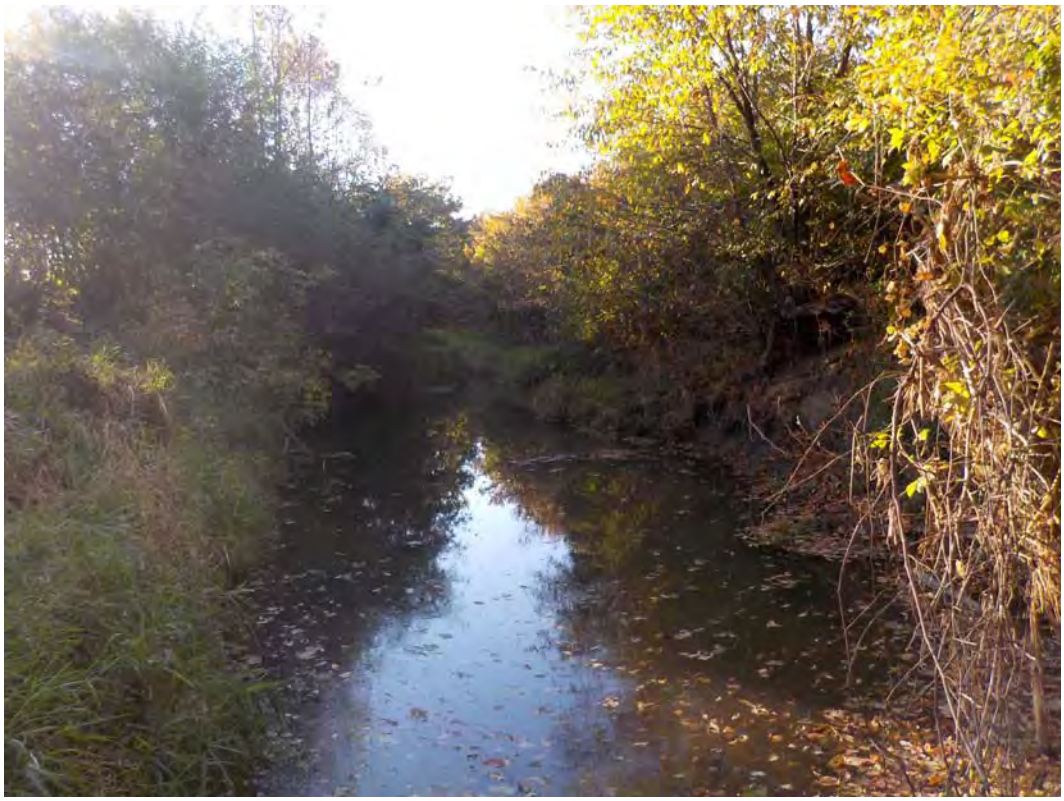


Stream Location on 2013 Aerial Photograph **Stream Location on Bargersville USGS Quadrangle**

Stream Name:	Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	muck - silt	**Quarter:**	18
Evaluation Score:	QHEI = 46	**Latitude:**	39.564653
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.246731
OHWM width:	16.5	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	3.0	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	3.4
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**451**	**0.171**	**1.10**
Aternative C2	**441**	**0.167**	**1.06**
Aternative C3	**441**	**0.167**	**1.06**
Aternative C4 (Preferred)	**441**	**0.167**	**1.05**

Stream Reach S6S090d



OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S090d	N/A	Bluff Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
rc	10/20/2015	Johnson	N/A		46

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R		PRESENT P	PRESENT R	TOTAL %
☐	☐	BLDR/SLABS [10]	☐	☐	
☐	☐	BOULDERS [9]	☐	☐	
☐	☐	COBBLE [8]	☐	☐	
☐	☐	GRAVEL [7]	☐	☐	
☐	☐	SAND [6]	☐	☐	
☐	☐	BEDROCK [5]	☐	☐	

OTHER TYPES

PREDOMINANT P	PREDOMINANT R		PRESENT P	PRESENT R	TOTAL %
☐	☐	HARDPAN [4]	☐	☐	
☐	☐	DETRITUS [3]	☐	☐	
☑	☐	MUCK [2]	☐	☐	40
☐	☑	SILT [2]	☐	☐	60
☐	☐	ARTIFICIAL [0]	☐	☐	

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

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

ORIGIN

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

QUALITY

- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 4.0 (Maximum 20)

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount			% Amount			% Amount		
0	1	UNDERCUT BANKS [1]	0	1	POO0LS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	1	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT

Check One (Or 2 and average)

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

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **16.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☑	☐	NARROW 5-10m [2]
☐	☑	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☑	☐	FOREST, SWAMP [3]
☐	☑	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **6.0**

Comments

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

MAXIMUM DEPTH

Check ONE (ONLY!

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

CHANNEL WIDTH

Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **7.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (8.6 ft/mi)

DRAINAGE AREA (3.4 ft/mi)

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

% POOL: 65 **% GLIDE:** 5

% RUN: 20 **% RIFFLE:** 10

Riparian Maximum 10: **10.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

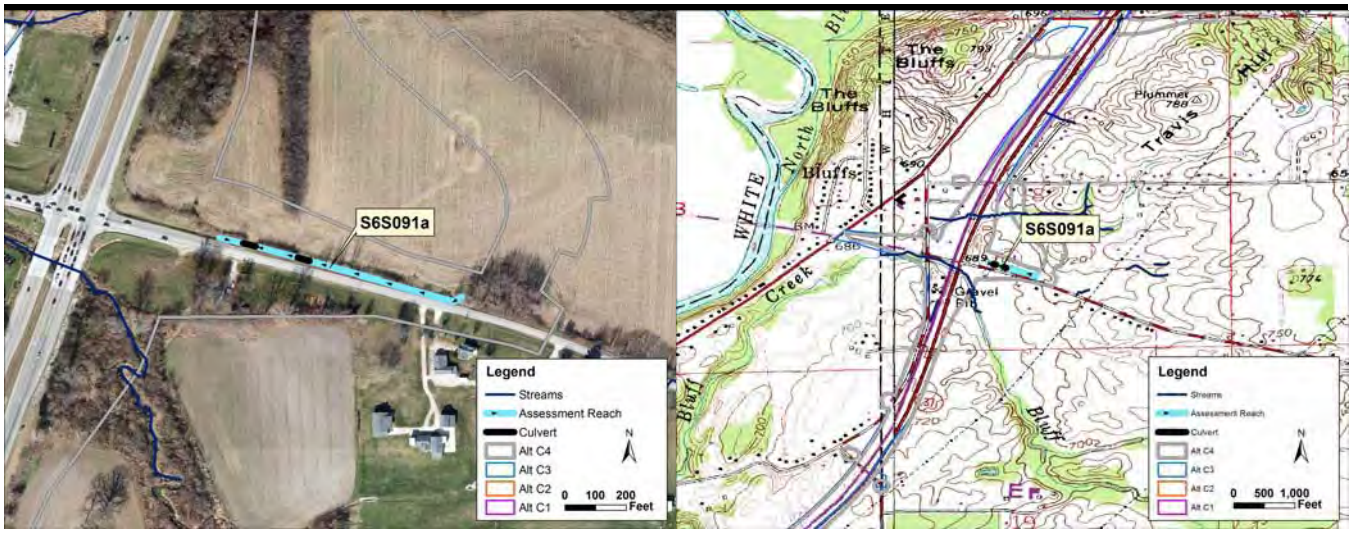
Mine: [ ] Acid [ ] Quarry

Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S091a



Stream Location on 2013 Aerial Photograph **Stream Location on Bargersville USGS Quadrangle**

Stream Name:	UNT 5 Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Ephemeral	**County:**	Johnson
Channel Type:	Roadside Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	woody detritus - fine detritus	**Quarter:**	SE
Evaluation Score:	HHEI = 13	**Latitude:**	39.565043
Use Designation:	Class I PHWH	**Longitude:**	-86.245235
OHWM width:	1.3	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.5	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.005
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**588**	**0.017**	**0.04**
Aternative C2	**588**	**0.017**	**0.04**
Aternative C3	**588**	**0.017**	**0.04**
Aternative C4 (Preferred)	**588**	**0.017**	**0.04**

Stream Reach S6S091a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **13**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S091a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.005

LENGTH OF STEAM REACH (ft) _____ LAT 39.565043 LONG. -86.245235 RIVER CODE N/A RIVER MILE N/A

DATE 10/20/2015 SCORER rjc COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☑ ☐	LEAF PACK/WOODY DEBRIS [3 pts	20
☐ ☐	BEDROCK [16 pts]	0	☐ ☑	FINE DETRITUS [3 pts]	80
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40 **8** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **4.5**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Bargersville** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Johnson** Township / City: **White River**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/3** Quantity **.13**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

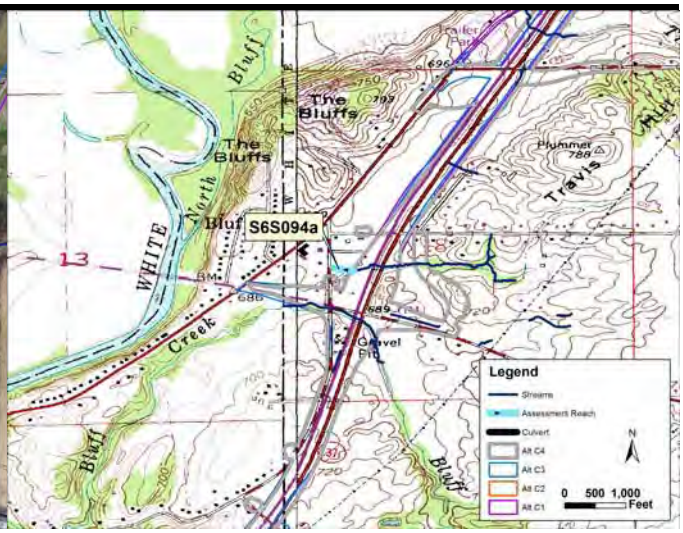
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S094a

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	UNT 8 Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Intermittent	**County:**	Johnson
Channel Type:	Channelized Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	artificial - hardpan	**Quarter:**	SW
Evaluation Score:	HHEI = 25	**Latitude:**	39.567102
Use Designation:	Class I PHWH	**Longitude:**	-86.247457
OHWM width:	3.0	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.3	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.253
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**21**	**0.001**	**0.00**
Aternative C2	**18**	**0.001**	**0.00**
Aternative C3	**14**	**0.001**	**0.00**
Aternative C4 (Preferred)	**18**	**0.001**	**0.00**

Stream Reach S6S094a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **25**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S094a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.253

LENGTH OF STEAM REACH (ft) _____ LAT 39.567102 LONG. -86.247457 RIVER CODE N/A RIVER MILE N/A

DATE 1/26/2016 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☐	CLAY or HARDPAN [0 pts]	75
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☑ ☐	ARTIFICIAL [3 pts]	25

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **3** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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 teh average of 3-4 measurements) (Check ONLY one box):

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** ####

HHEI Metric Points

Substrate Max = 40 **5**

(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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☑ Steam 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 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Bargersville** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Johnson** Township / City: **White River**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **1/26** Quantity **0.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

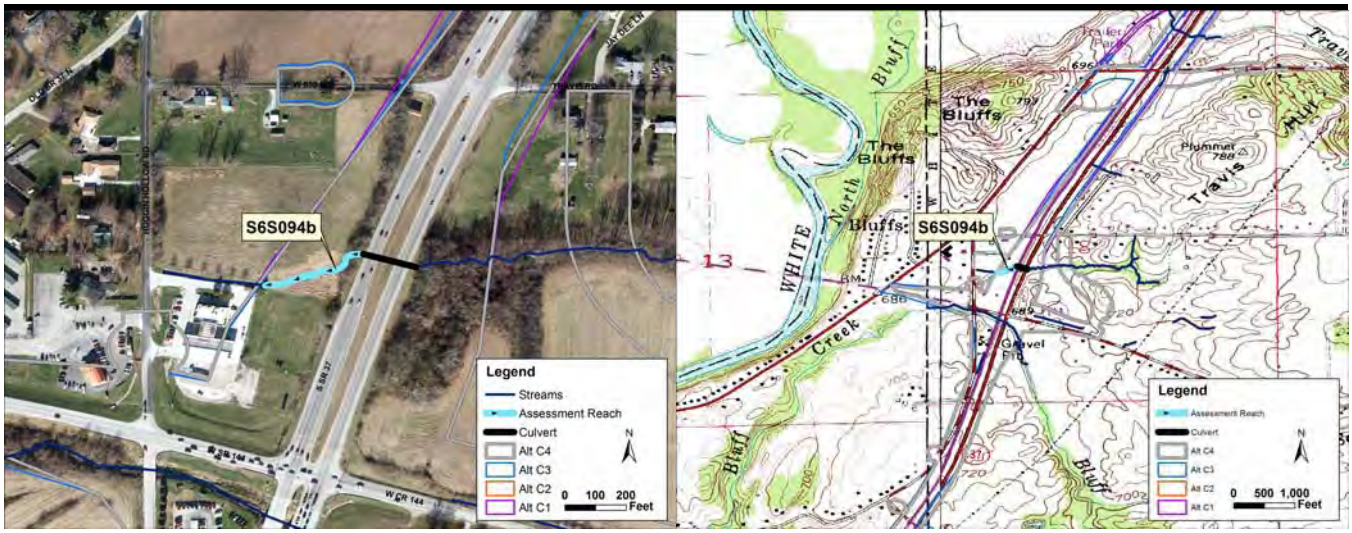
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

DRAWING AMD 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 Reach S6S094b



Stream Location on 2013 Aerial Photograph **Stream Location on Bargersville USGS Quadrangle**

Stream Name:	UNT 8 Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Intermittent	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	sand - hardpan	**Quarter:**	SW
Evaluation Score:	HHEI = 53	**Latitude:**	39.567208
Use Designation:	Class II PHWH	**Longitude:**	-86.246942
OHWM width:	4.6	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	1.0	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.242
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**286**	**0.030**	**0.22**
Aternative C2	**286**	**0.030**	**0.22**
Aternative C3	**286**	**0.030**	**0.22**
Aternative C4 (Preferred)	**286**	**0.030**	**0.22**

Stream Reach S6S094b

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **53**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S094b RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.242

LENGTH OF STEAM REACH (ft) LAT 39.567208 LONG. -86.246942 RIVER CODE N/A RIVER MILE N/A

DATE 1/26/2016 SCORER rh COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☐	CLAY or HARDPAN [0 pts]	70
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☑ ☐	SAND (<2 mm) [6 pts]	30	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

☐ > >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):** **28**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **1.5**

HHEI Metric Points

Substrate Max = 40 **8**

(A+B)

Pool Depth Max = 30 **30**

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
☑	☑	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

☑ Steam 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 ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Bargersville** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Johnson** Township / City: **White River**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **1/26** Quantity **.01**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

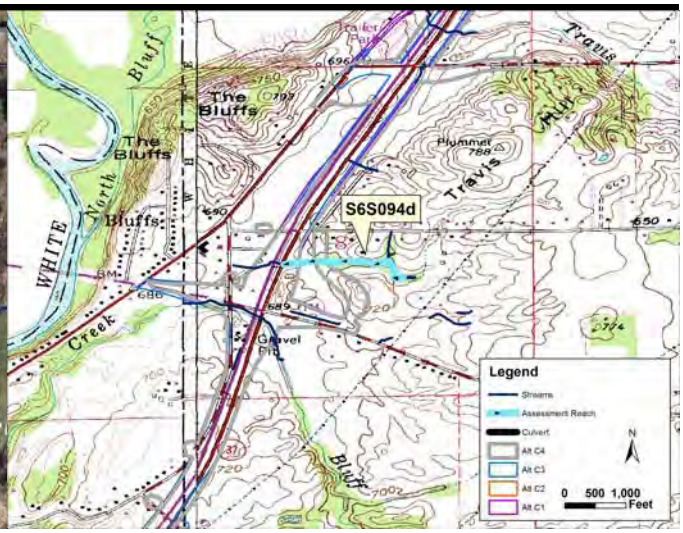
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S094d

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	UNT 8 Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Ephemeral	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	sand - gravel	**Quarter:**	SW
Evaluation Score:	HHEI = 42	**Latitude:**	39.567293
Use Designation:	Class II PHWH	**Longitude:**	-86.245442
OHWM width:	22.0	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	1.2	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.22
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**400**	**0.202**	**1.15**
Aternative C2	**381**	**0.192**	**1.08**
Aternative C3	**385**	**0.194**	**1.09**
Aternative C4 (Preferred)	**381**	**0.192**	**1.08**

Stream Reach S6S094d

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **42**

SITE NAME/LOCATION UNT Bluff Creek

SITE NUMBER S6S094d RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.22

LENGTH OF STEAM REACH (ft) LAT 39.567293 LONG. -86.245442 RIVER CODE N/A RIVER MILE N/A

DATE 10/20/2015 SCORER rc COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☐	COBBLE (65-256 mm) [9 pt	0	☐	CLAY or HARDPAN [0 pts]	0
☑	GRAVEL (2-64 mm) [9 pts]	20	☐	MUCK [0 pts]	0
☐	SAND (<2 mm) [6 pts]	80	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **15** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

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)

- ☐ > >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):** **0**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **0**

HHEI Metric Points

Substrate Max = 40 **17**

(A+B)

Pool Depth Max = 30 **0**

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 (Per Bank)

L	R	
☑	☐	Wide >10 m
☐	☐	Moderate 5-10 m
☐	☑	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☑	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Bargersville** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Johnson** Township / City: **White River**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/03** Quantity **.13**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

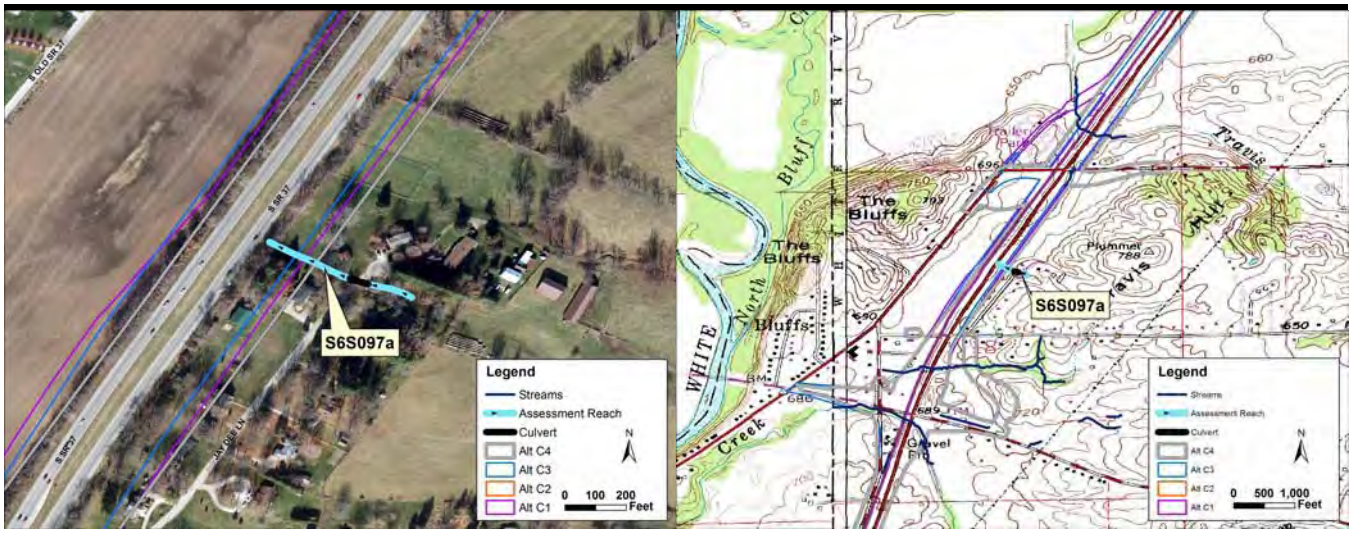
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

DRAWING AMD 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 Reach S6S097a



Stream Location on 2013 Aerial Photograph | **Stream Location on Bargersville USGS Quadrangle**

Stream Name:	UNT 1 Travis Creek	**Quadrangle:**	Bargersville
Flow Regime:	Ephemeral	**County:**	Johnson
Channel Type:	Channelized Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	hardpan	**Quarter:**	NE
Evaluation Score:	HHEI = 6	**Latitude:**	39.571853
Use Designation:	Class I PHWH	**Longitude:**	-86.242959
OHWM width:	11.0	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.3	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**105**	**0.027**	**0.05**
Aternative C2	**136**	**0.034**	**0.05**
Aternative C3	**80**	**0.020**	**0.05**
Aternative C4 (Preferred)	**136**	**0.034**	**0.05**

Stream Reach S6S097a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **6**

SITE NAME/LOCATION UNT Travis Creek

SITE NUMBER S6S097a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.001

LENGTH OF STEAM REACH (ft) _____ LAT 39.571853 LONG. -86.242959 RIVER CODE N/A RIVER MILE N/A

DATE 4/22/2016 SCORER rh COMMENT _____

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☑	CLAY or HARDPAN [0 pts]	100
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **0** **TOTAL NUMBER OF SUBSTRATE TYPES** **1**

2. MAXIMUM POOL DEPTH (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes)

- ☐ > >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):** **0**

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **0**

HHEI Metric Points

Substrate Max = 40 **1**

(A+B)

Pool Depth Max = 30 **0**

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

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

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

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: Distance from Evaluated Stream

☐ CWH Name: Distance from Evaluated Stream

☐ EWH Name: Distance from Evaluated Stream

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Bargersville** NRCS Soil Map Page NRCS Soil Map Stream Order:

County: **Johnson** Township / City: **White River**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/12** Quantity **0.02**

Photograph information:

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) Dissolved oxygen (mg/l): pH: Conductivity (umhos/cm)

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

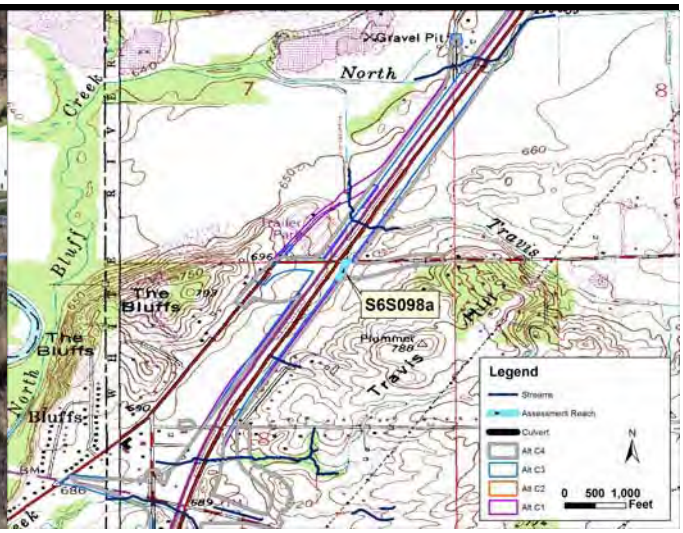
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S098a

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	UNT 2 Travis Creek	**Quadrangle:**	Bargersville
Flow Regime:	Ephemeral	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	T3E
IDEM 303(d) Listed:	No	**Section:**	18
Predominant Substrate:	hardpan	**Quarter:**	NE
Evaluation Score:	HHEI = 6	**Latitude:**	39.575867
Use Designation:	Class I PHWH	**Longitude:**	-86.239927
OHWM width:	2.8	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.4	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	0.247
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**301**	**0.019**	**0.35**
Aternative C2	**301**	**0.019**	**0.37**
Aternative C3	**301**	**0.019**	**0.35**
Aternative C4 (Preferred)	**301**	**0.019**	**0.37**

Stream Reach S6S098a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **6**

SITE NAME/LOCATION UNT Travis Creek

SITE NUMBER S6S098a RIVER BASIN White River - North Bluff/ DRAINAGE AREA (mi) 0.247

LENGTH OF STEAM REACH (ft) _____ LAT 39.575867 LONG. -86.239927 RIVER CODE N/A RIVER MILE N/A

DATE 10/22/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☑ ☑	CLAY or HARDPAN [0 pts]	100
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☑	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **0** **TOTAL NUMBER OF SUBSTRATE TYPES** **1**

HHEI Metric Points

Substrate Max = 40

1

(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)

- ☐ > >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):** **0**

Pool Depth Max = 30

0

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** ####

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 (Per Bank)

L	R	
☐	☐	Wide >10 m
☑	☑	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☑	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Bargersville** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Johnson** Township / City: **White River**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **10/12** Quantity **.02**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

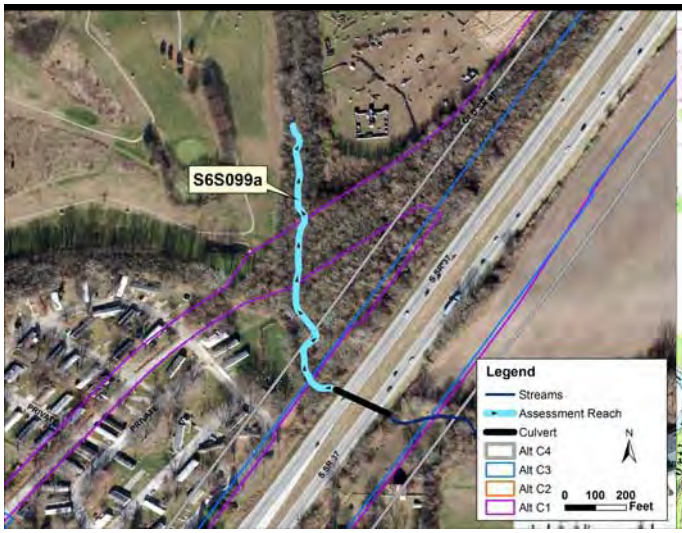
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

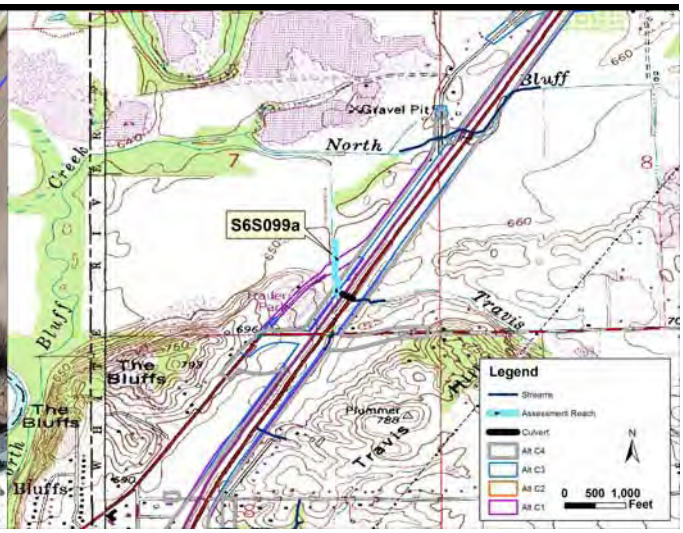
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S099a



Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	Travis Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	7
Predominant Substrate:	gravel - sand	**Quarter:**	SE
Evaluation Score:	QHEI = 51	**Latitude:**	39.578008
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.239404
OHWM width:	9.3	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.4	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	1.905
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**287**	**0.061**	**1.10**
Aternative C2	**258**	**0.055**	**0.75**
Aternative C3	**83**	**0.018**	**0.43**
Aternative C4 (Preferred)	**258**	**0.055**	**0.75**

Stream Reach S6S099a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S099a	N/A	Travis Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
rh	2/19/2016	Johnson	N/A		51

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☑	☐	☐	☐	50
SAND [6]	☐	☑	☐	☐	50
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☑	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

QUALITY
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ NONE [1]

Substrate 14.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	1	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	1	AQUATIC MACROPHYTES [1]
0	1	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☑ MODERATE 25-75% [7]
- ☐ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **13.0**

Comments

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

River right looking downstrea

L	R	EROSION
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE >50m [4]
☐	☑	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☑	☐	VERY NARROW [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
☐	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☑	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **6.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☑ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **4.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☑ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **3.0**

Comments

6] *GRADIENT* (54.5 ft/mi)

DRAINAGE AREA (1.905 ft/m

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

% POOL: **% GLIDE:** **% RUN:** **% RIFFLE:**

Riparian Maximum 10: **4.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [x] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

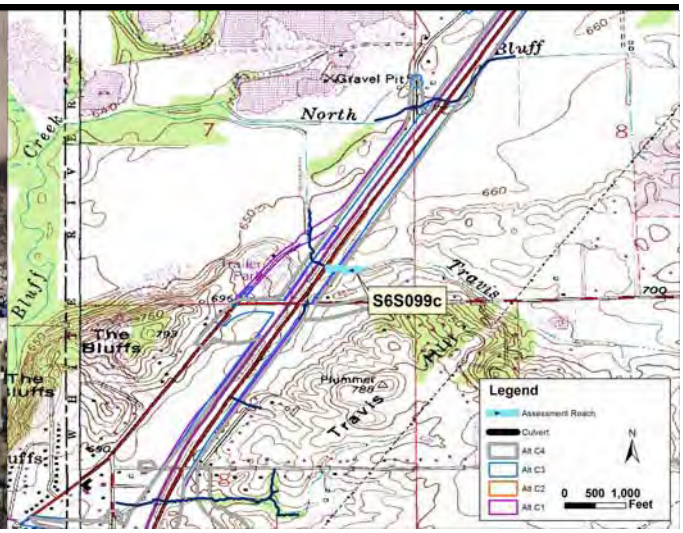
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S099c

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	Travis Creek	**Quadrangle:**	Bargersville
Flow Regime:	Intermittent	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	7
Predominant Substrate:	sand - gravel	**Quarter:**	SE
Evaluation Score:	QHEI = 43	**Latitude:**	39.577716
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.238589
OHWM width:	13.5	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	1.2	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	1.508
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**135**	**0.042**	**0.00**
Aternative C2	**187**	**0.058**	**0.02**
Aternative C3	**120**	**0.037**	**0.00**
Aternative C4 (Preferred)	**187**	**0.058**	**0.02**

Stream Reach S6S099c

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S099c	N/A	Travis Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
rh	10/22/2015	Johnson	N/A		43

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☑	☐	☐	50
SAND [6]	☑	☐	☐	☐	50
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

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

Substrate 13.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	2	UNDERCUT BANKS [1]	0	0	POO0LS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	2	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	0	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	1	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☑ MODERATE 25-75% [7]
- ☐ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **12.0**

Comments

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

River right looking downstrea

EROSION L	EROSION R	
☐	☐	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☑	☑	HEAVY/SEVERE [1]

RIPARIAN WIDTH L	RIPARIAN WIDTH R	
☑	☑	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☐	☐	FOREST, SWAMP [3]
☑	☑	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **7.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☑ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **0.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (56.6 ft/mi)

DRAINAGE AREA (1.512 ft/m

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

% POOL: ____ **% GLIDE:** ____

% RUN: ____ **% RIFFLE:** ____

Riparian Maximum 10: **4.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- ☐ >85% - Open
- ☑ 55% -<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- ☐ Nuisance algae
- ☐ Invasive macrophytes
- ☐ Excess turbidity
- ☐ Discoloration
- ☐ Foam/Scum
- ☐ Oil sheen
- ☐ Trash/Litter
- ☐ Nuisance odor
- ☐ Sludge deposits
- ☐ CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	☐ > 100ft ^{2}	☐ > 3ft

D-MAINTENANCE

- ☐ Public ☐ Private
- ☐ Active ☐ Historic
- Succession: ☐ Young ☐ Old
- ☐ Spray ☐ Islands ☐ Scoured
- Snag: ☐ Removed ☐ Modified
- Leveed: ☐ One sided ☐ Both banks
- ☐ Relocated ☐ Cutoffs
- Bedload: ☐ Moving ☐ Stable
- ☐ Armoured ☐ Slumped
- ☐ Impounded ☐ Desiccated
- ☐ Flood control ☐ Drainage

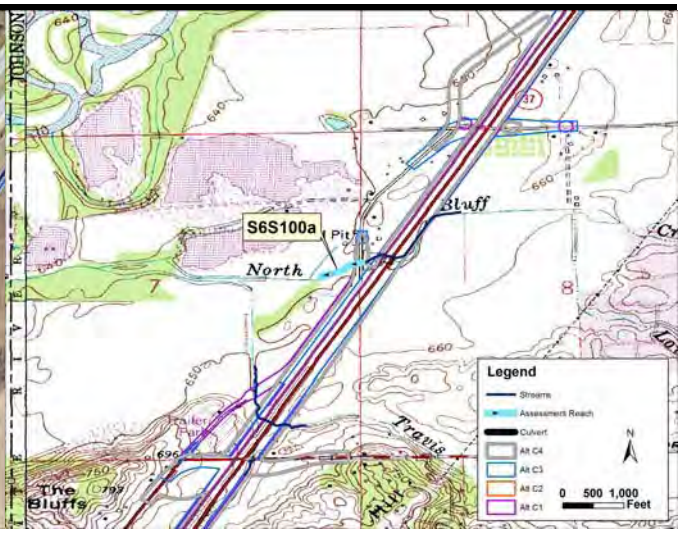
E-ISSUES

- ☐ WWTP ☐ CSO ☐ NPDES
- ☐ Industry ☐ Urban
- ☐ Hardened ☐ Dirt Grime
- ☐ Contaminated ☐ Landfill
- BMPs: ☐ Construction ☐ Sediment
- ☐ Logging ☐ Irrigation ☐ Cooling
- Erosion: ☐ Bank ☐ Surface
- ☐ False bank ☐ Manure ☐ Lagoon
- ☐ Wash H2O ☐ Tile ☐ H2O table
- Mine: ☐ Acid ☐ Quarry
- Flow: ☐ Natural ☐ Stagnant
- ☐ Wetland ☐ Park ☐ Issues: Golf
- ☐ Lawn ☐ Home
- ☐ Atmospheric deposition

Stream Drawing:

Stream Reach S6S100a

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	North Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	7
Predominant Substrate:	sand - gravel	**Quarter:**	NE
Evaluation Score:	QHEI = 45	**Latitude:**	39.584965
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.235063
OHWM width:	4.3	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.6	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	1.57
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**94**	**0.009**	**0.00**
Aternative C2	**91**	**0.009**	**0.00**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**91**	**0.009**	**0.00**

Stream Reach S6S100a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S100a	N/A	North Bluff Creek	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	2/18/2016	Johnson	N/A	☐	45

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R		PRESENT P	PRESENT R	TOTAL %
☐	☐	BLDR/SLABS [10]	☐	☐	
☐	☐	BOULDERS [9]	☐	☐	
☐	☐	COBBLE [8]	☐	☐	
☐	☑	GRAVEL [7]	☐	☐	
☑	☐	SAND [6]	☐	☐	
☐	☐	BEDROCK [5]	☐	☐	

OTHER TYPES

PREDOMINANT P	PREDOMINANT R		PRESENT P	PRESENT R	TOTAL %
☐	☐	HARDPAN [4]	☐	☐	
☐	☐	DETRITUS [3]	☐	☐	
☐	☐	MUCK [2]	☐	☐	
☐	☐	SILT [2]	☐	☐	
☐	☐	ARTIFICIAL [0]	☐	☐	

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

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

ORIGIN

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

QUALITY

- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ NONE [1]

Substrate 14.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	1	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	1	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	0	LOGS OR WOODY DEBRIS [1]
0	1	ROOTMATS [1]						

AMOUNT

Check One (Or 2 and average)

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

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **11.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☑	☑	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☑	☑	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **6.0**

Comments

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

MAXIMUM DEPTH

Check ONE (ONLY!

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

CHANNEL WIDTH

Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **5.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: **2.0**

Comments

6] *GRADIENT* (43.6 ft/mi)

DRAINAGE AREA (1.57 ft/mi)

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

% POOL: 20 **% GLIDE:** 20

% RUN: 50 **% RIFFLE:** 10

Riparian Maximum 10: **4.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

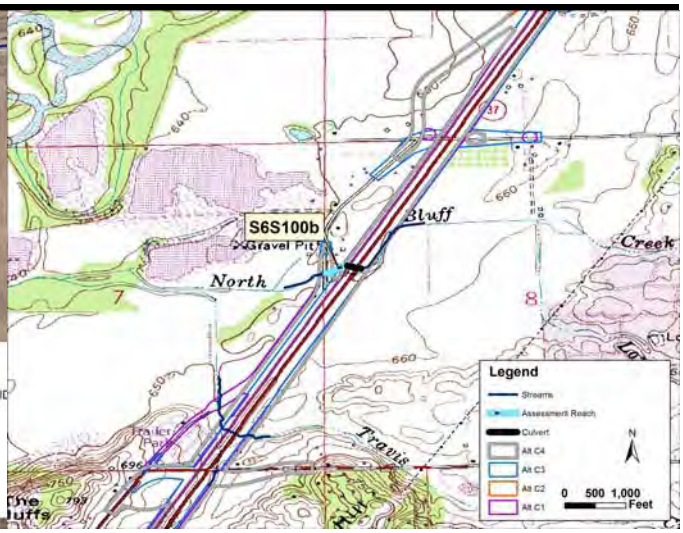
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S100b

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	North Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Natural	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	sand	**Quarter:**	NW
Evaluation Score:	QHEI = 43	**Latitude:**	39.585282
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.234232
OHWM width:	9.5	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.5	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	1.518
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**172**	**0.038**	**0.00**
Aternative C2	**110**	**0.024**	**0.00**
Aternative C3	**92**	**0.020**	**0.00**
Aternative C4 (Preferred)	**110**	**0.024**	**0.00**

Stream Reach S6S100b

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S100b	N/A	North Bluff Creek	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	2/18/2016	Johnson	N/A	☐	43

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
☐	☐	☐	☐	BLDR/SLABS [10]
☐	☐	☐	☐	BOULDERS [9]
☐	☐	☐	☐	COBBLE [8]
☐	☐	☐	☐	GRAVEL [7]
☑	☑	☐	☐	SAND [6] 100
☐	☐	☐	☐	BEDROCK [5]

OTHER TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
☐	☐	☐	☐	HARDPAN [4]
☐	☐	☐	☐	DETRITUS [3]
☐	☐	☐	☐	MUCK [2]
☐	☐	☐	☐	SILT [2]
☐	☐	☐	☐	ARTIFICIAL [0]

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

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

ORIGIN

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

QUALITY

- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ NONE [1]

Substrate 13.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount	% Amount	% Amount
0 0 UNDERCUT BANKS [1]	0 0 POOOLS>70CM [2]	0 0 OXBOWS, BACKWATERS [1]
0 1 OVERHANGING VEGETATION [1]	0 0 ROOTWADS [1]	0 0 AQUATIC MACROPHYTES [1]
0 1 SHALLOWS (IN SLOW WATER)[1]	0 0 BOULDERS [1]	0 1 LOGS OR WOODY DEBRIS [1]
0 0 ROOTMATS [1]		

AMOUNT

Check One (Or 2 and average)

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

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **10.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☑	☑	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **9.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)

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

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **3.0**

Comments

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

☐ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: **1.0**

Comments

6] *GRADIENT* (44.7 ft/mi)

DRAINAGE AREA (1.518 ft/m

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

% POOL: 30 **% GLIDE:** 20

% RUN: 30 **% RIFFLE:** 20

Riparian Maximum 10: **4.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [x] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic
- Succession: [ ] Young [ ] Old
- [ ] Spray [ ] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [ ] Relocated [ ] Cutoffs
- Bedload: [ ] Moving [ ] Stable
- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

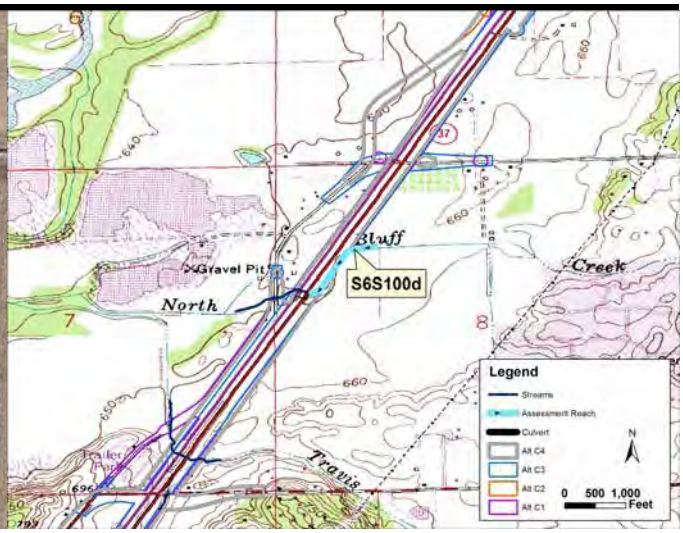
E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [ ] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [ ] Bank [ ] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [ ] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S100d

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	North Bluff Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Channelized Ditch	**Township:**	T13N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	8
Predominant Substrate:	muck - gravel	**Quarter:**	8
Evaluation Score:	QHEI = 27	**Latitude:**	39.586105
Use Designation:	Limited Warm Water Habitat	**Longitude:**	-86.232441
OHWM width:	5.8	**Basin:**	White River - North Bluff/Bluff Cre
OHWM depth:	0.4	**14-digit HUC:**	05120201140030
USACE Jurisdiction:	Yes	**Drainage area:**	1.417
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**860**	**0.114**	**0.00**
Aternative C2	**827**	**0.109**	**0.00**
Aternative C3	**854**	**0.113**	**0.00**
Aternative C4 (Preferred)	**827**	**0.109**	**0.00**

Stream Reach S6S100d

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S100d	N/A	North bluff	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	4/19/2016	Johnson	N/A	☐	27

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☑	☐	☐	☐	60
SAND [6]	☐	☐	☐	☐	
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☑	☐	☐	☐	40
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

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

Substrate 9.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	1	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	0	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	0	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **7.0**

Comments

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

River right looking downstrea

L	R	EROSION
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☑	☑	NONE [0]

L	R	FLOOD PLAIN QUALITY
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☑	☑	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **2.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☑ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **2.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (44.7 ft/mi)

DRAINAGE AREA (1.417 ft/m

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

% POOL: 40 **% GLIDE:** 10 **% RUN:** 40 **% RIFFLE:** 0

Riparian Maximum 10: **4.0**

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

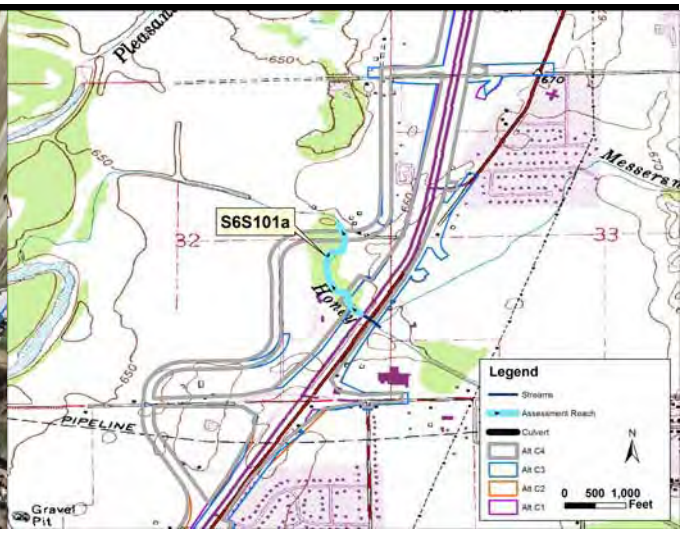
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S101a

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	Honey Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	32
Predominant Substrate:	gravel - sand	**Quarter:**	SE
Evaluation Score:	QHEI = 47.5	**Latitude:**	39.608869
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.217085
OHWM width:	32.0	**Basin:**	Honey Creek -Turkey Pen Creek
OHWM depth:	1.1	**14-digit HUC:**	05120201140010
USACE Jurisdiction:	Yes	**Drainage area:**	17.9
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**416**	**0.306**	**0.87**
Aternative C2	**313**	**0.230**	**0.80**
Aternative C3	**284**	**0.209**	**0.55**
Aternative C4 (Preferred)	**573**	**0.421**	**1.19**

Stream Reach S6S101a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S101a	N/A	Honey Creek	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	2/19/2016	Johnson	N/A	☐	47.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☑	☐	☑	☑	50
SAND [6]	☐	☑	☑	☑	50
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

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

Substrate 13.0 (Maximum 20)

Comments also muck

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	1	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	1	AQUATIC MACROPHYTES [1]
0	1	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **10.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☑	NARROW 5-10m [2]
☑	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☑	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **5.5**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☑ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **7.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☑ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **1.0**

Comments

6] *GRADIENT* (15 ft/mi)

DRAINAGE AREA (17.9 ft/mi)

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

% POOL: 25 **% GLIDE:** 25 **% RUN:** 25 **% RIFFLE:** 25

Riparian Maximum 10: **8.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

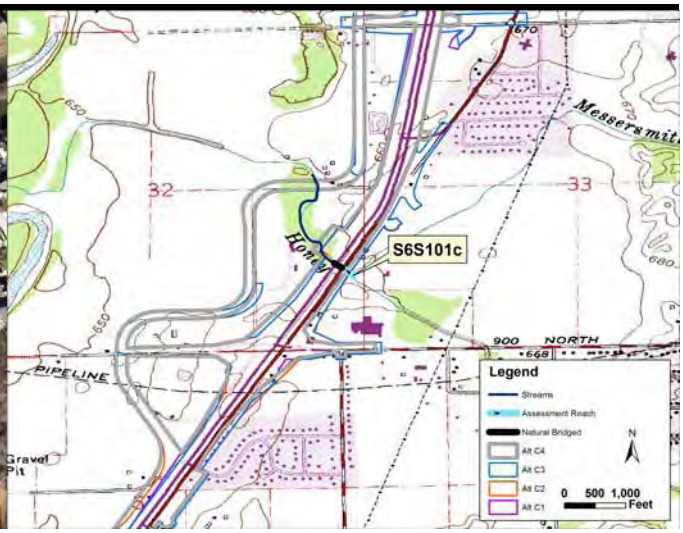
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S101c

Stream Location on 2013 Aerial Photograph



Stream Location on Bargersville USGS Quadrangle

Stream Name:	Honey Creek	**Quadrangle:**	Bargersville
Flow Regime:	Perennial	**County:**	Johnson
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	32
Predominant Substrate:	gravel - sand	**Quarter:**	SE
Evaluation Score:	QHEI = 48	**Latitude:**	39.608308
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.216209
OHWM width:	32.5	**Basin:**	Honey Creek -Turkey Pen Creek
OHWM depth:	5.0	**14-digit HUC:**	05120201140010
USACE Jurisdiction:	Yes	**Drainage area:**	17.86
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**70**	**0.052**	**0.00**
Aternative C2	**133**	**0.099**	**0.17**
Aternative C3	**125**	**0.093**	**0.15**
Aternative C4 (Preferred)	**70**	**0.052**	**0.00**

Stream Reach S6S101c

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S101c	N/A	Honey Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
rh	10/21/2015	Johnson	N/A		48

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☑	☐	☑	☑	50
SAND [6]	☐	☑	☑	☑	50
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

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

Substrate 14.0 (Maximum 20)

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount		
0	1	UNDERCUT BANKS [1]
0	1	OVERHANGING VEGETATION [1]
0	0	SHALLOWS (IN SLOW WATER)[1]
0	0	ROOTMATS [1]
0	1	POOOLS>70CM [2]
0	0	ROOTWADS [1]
0	0	BOULDERS [1]
0	0	OXBOWS, BACKWATERS [1]
0	1	AQUATIC MACROPHYTES [1]
0	1	LOGS OR WOODY DEBRIS [1]

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☑ MODERATE 25-75% [7]
- ☐ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **12.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☑	☑	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☑	☑	URBAN OR INDUSTRIAL [0]
☐	☐	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **3.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☑ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **8.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☑ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **2.0**

Comments

6] *GRADIENT* (0 ft/mi)

DRAINAGE AREA (17.86 ft/m

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

% POOL: 30 **% GLIDE:** 30

% RUN: 30 **% RIFFLE:** 10

Riparian Maximum 10: **2.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [ ] 55% -<85%
- [x] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

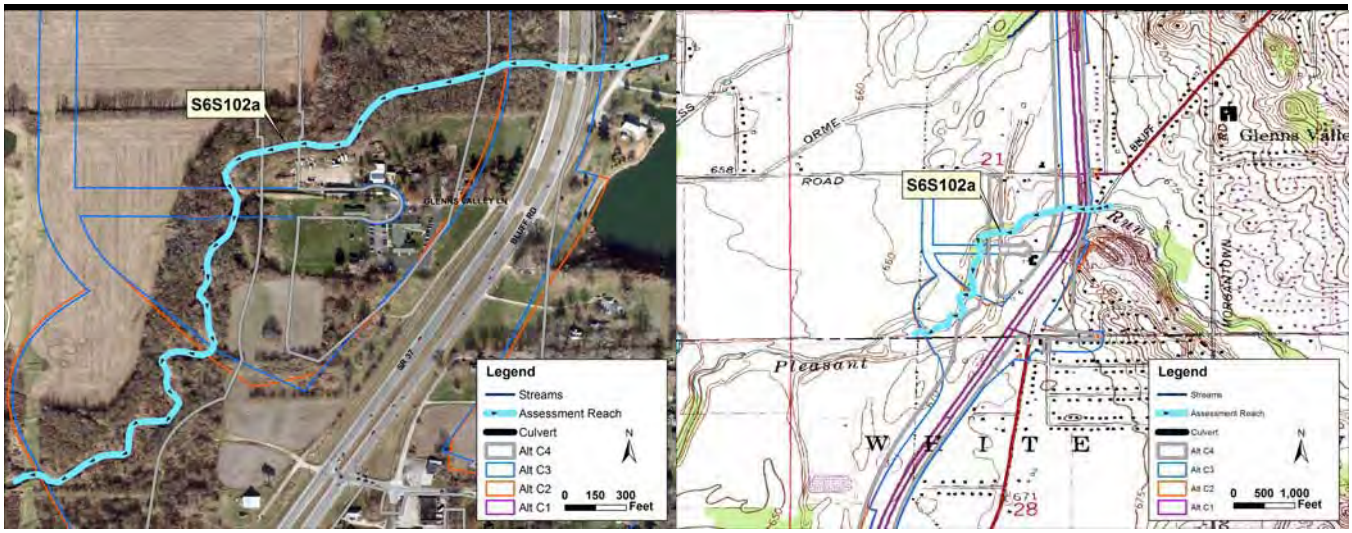
Mine: [ ] Acid [ ] Quarry

Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S102a



Stream Location on 2013 Aerial Photograph **Stream Location on Maywood USGS Quadrangle**

Stream Name:	Pleasant Run Creek	**Quadrangle:**	Maywood
Flow Regime:	Perennial	**County:**	Marion
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	Yes	**Section:**	21
Predominant Substrate:	gravel - sand	**Quarter:**	SE
Evaluation Score:	QHEI = 56	**Latitude:**	39.640024
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.202274
OHWM width:	37.5	**Basin:**	Pleasant Run Creek - Buffalo Cre
OHWM depth:	2.0	**14-digit HUC:**	05120201130110
USACE Jurisdiction:	Yes	**Drainage area:**	20.924
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**440**	**0.379**	**1.64**
Aternative C2	**1565**	**1.347**	**1.29**
Aternative C3	**1588**	**1.367**	**1.26**
Aternative C4 (Preferred)	**440**	**0.379**	**1.64**

Stream Reach S6S102a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S102a	N/A	Pleasant Run Creek	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
rh	10/22/2015	Marion	N/A		56

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %	
☐	☐	☐	☐		BLDR/SLABS [10]
☐	☐	☐	☐		BOULDERS [9]
☐	☐	☐	☐		COBBLE [8]
☑	☐	☐	☑	60	GRAVEL [7]
☐	☑	☑	☐	40	SAND [6]
☐	☐	☐	☐		BEDROCK [5]

OTHER TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %	
☐	☐	☐	☐		HARDPAN [4]
☐	☐	☐	☐		DETRITUS [3]
☐	☐	☐	☐		MUCK [2]
☐	☐	☐	☐		SILT [2]
☐	☐	☐	☐		ARTIFICIAL [0]

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

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

ORIGIN

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

QUALITY

- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ NONE [1]

Substrate 14.0 (Maximum 20)

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	2	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	1	ROOTWADS [1]	0	0	AQUATIC MACROPHYTES [1]
0	1	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)

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

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **10.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☑	☑	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **9.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☑ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **5.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **3.0**

Comments

6] *GRADIENT* (14.5 ft/mi)

DRAINAGE AREA (20.979 ft/

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

% POOL: 20 **% GLIDE:** 30 **% RUN:** 30 **% RIFFLE:** 20

Riparian Maximum 10: **8.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [ ] 55% -<85%
- [x] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

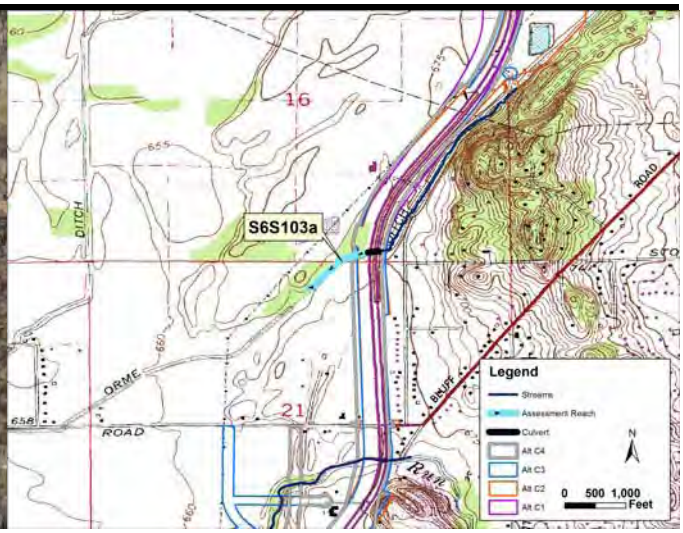
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S103a

Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	Orme Ditch	**Quadrangle:**	Maywood
Flow Regime:	Ephemeral	**County:**	Marion
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	21
Predominant Substrate:	sand	**Quarter:**	SE
Evaluation Score:	QHEI = 48	**Latitude:**	39.649268
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.203264
OHWM width:	6.5	**Basin:**	White River - Mann Creek/Harnes
OHWM depth:	0.3	**14-digit HUC:**	05120201130100
USACE Jurisdiction:	Yes	**Drainage area:**	3.653
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**205**	**0.031**	**0.76**
Aternative C2	**135**	**0.020**	**0.56**
Aternative C3	**146**	**0.022**	**0.58**
Aternative C4 (Preferred)	**205**	**0.031**	**0.76**

Stream Reach S6S103a

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S103a	N/A	Orme Ditch	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	2/19/2016	Marion	N/A	☐	48

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R		PRESENT P	PRESENT R	TOTAL %
☐	☐	BLDR/SLABS [10]	☐	☐	
☐	☐	BOULDERS [9]	☐	☐	
☐	☐	COBBLE [8]	☐	☐	
☐	☐	GRAVEL [7]	☐	☐	
☑	☑	SAND [6]	☐	☐	100
☐	☐	BEDROCK [5]	☐	☐	

OTHER TYPES

PREDOMINANT P	PREDOMINANT R		PRESENT P	PRESENT R	TOTAL %
☐	☐	HARDPAN [4]	☐	☐	
☐	☐	DETRITUS [3]	☐	☐	
☐	☐	MUCK [2]	☐	☐	
☐	☐	SILT [2]	☐	☐	
☐	☐	ARTIFICIAL [0]	☐	☐	

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

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

ORIGIN

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

QUALITY

- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☑ NORMAL [0]
- ☐ NONE [1]

Substrate 13.0 Maximum 20

Comments dry channel

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	1	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	0	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT

Check One (Or 2 and average)

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

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **10.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☑	☑	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **9.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☑ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **1.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (13.6 ft/mi)

DRAINAGE AREA (3.653 ft/m

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

% POOL: 0 **% GLIDE:** 0

% RUN: 0 **% RIFFLE:** 0

Riparian Maximum 10: **8.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [x] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

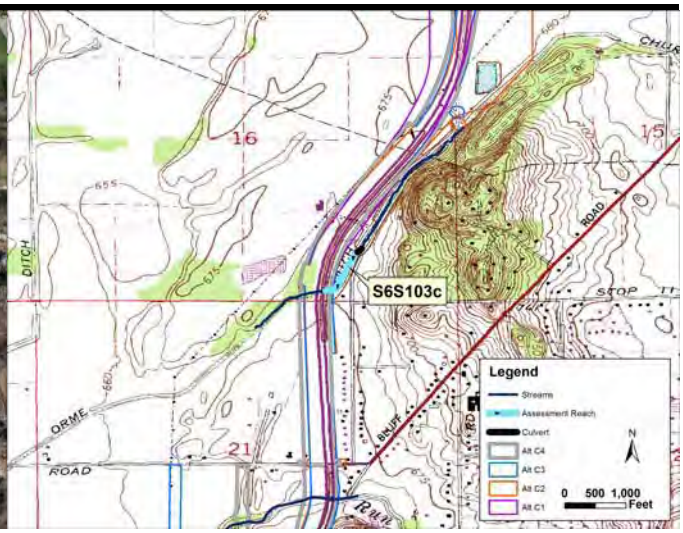
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S103c

Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	Orme Ditch	**Quadrangle:**	Maywood
Flow Regime:	Intermittent	**County:**	Marion
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	16
Predominant Substrate:	cobble - gravel	**Quarter:**	NE
Evaluation Score:	QHEI = 46	**Latitude:**	39.64942
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.202273
OHWM width:	11.5	**Basin:**	White River - Mann Creek/Harnes
OHWM depth:	0.9	**14-digit HUC:**	05120201130100
USACE Jurisdiction:	Yes	**Drainage area:**	3.532
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**71**	**0.019**	**0.29**
Aternative C2	**99**	**0.026**	**0.39**
Aternative C3	**99**	**0.026**	**0.39**
Aternative C4 (Preferred)	**65**	**0.017**	**0.27**

Stream Reach S6S103c

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S103c	N/A	Orme Ditch	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	2/18/2016	Marion	N/A	☐	46

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☑	☐	☐	☑	50
GRAVEL [7]	☐	☑	☑	☐	50
SAND [6]	☐	☐	☐	☐	
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

ORIGIN

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

QUALITY

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

Substrate 15.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	1	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	0	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)

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

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **9.0**

Comments

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

River right looking downstrea

L	R	EROSION
☑	☐	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☑	HEAVY/SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE >50m [4]
☑	☑	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **8.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☑ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **-1.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (13.7 ft/mi)

DRAINAGE AREA (3.5 ft/mi)

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

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

Riparian Maximum 10: **8.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [ ] 55% -<85%
- [x] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

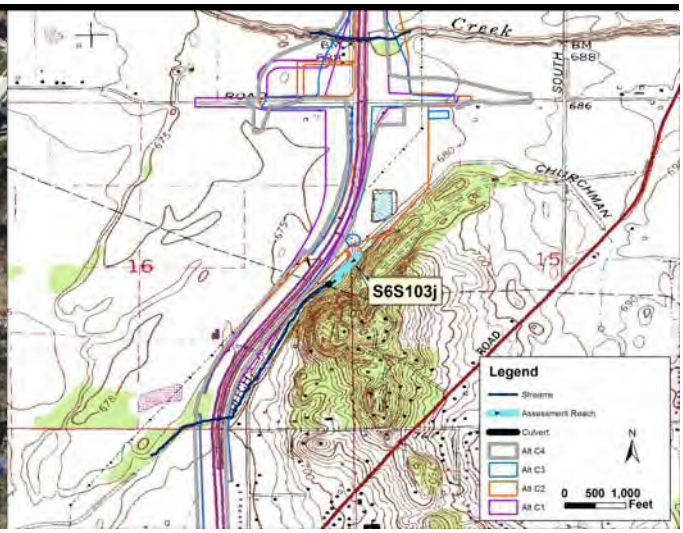
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S103j

Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	Orme Ditch	**Quadrangle:**	Maywood
Flow Regime:	Ephemeral	**County:**	Marion
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	16
Predominant Substrate:	cobble - gravel	**Quarter:**	NE
Evaluation Score:	QHEI = 38.5	**Latitude:**	39.656649
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.19634
OHWM width:	7.0	**Basin:**	White River - Mann Creek/Harnes
OHWM depth:	0.3	**14-digit HUC:**	05120201130100
USACE Jurisdiction:	Yes	**Drainage area:**	3.37
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**0**	**0.000**	**0.00**
Aternative C2	**53**	**0.009**	**0.06**
Aternative C3	**0**	**0.000**	**0.00**
Aternative C4 (Preferred)	**0**	**0.000**	**0.00**

Stream Reach S6S103j

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S103j	N/A	Orme Ditch	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	2/18/2016	Marion	N/A	☐	38.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☑	☐	☐	☐	
GRAVEL [7]	☐	☑	☐	☐	
SAND [6]	☐	☐	☐	☐	
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

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

Substrate 16.0 (Maximum 20)

Comments Also had some sand

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount		
0	1	UNDERCUT BANKS [1]
0	0	OVERHANGING VEGETATION [1]
0	1	SHALLOWS (IN SLOW WATER)[1]
0	0	ROOTMATS [1]
0	0	POOOLS>70CM [2]
0	0	ROOTWADS [1]
0	0	BOULDERS [1]
0	0	OXBOWS, BACKWATERS [1]
0	0	AQUATIC MACROPHYTES [1]
0	1	LOGS OR WOODY DEBRIS [1]

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **3.0**

Comments Stream frozen

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **8.0**

Comments

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

River right looking downstrea

EROSION L	EROSION R	
☐	☐	NONE/LITTLE [3]
☑	☐	MODERATE [2]
☑	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH L	RIPARIAN WIDTH R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☑	☑	NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☑	☑	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **2.5**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☑ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **-1.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (15.4 ft/mi)

DRAINAGE AREA (3.37 ft/mi)

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

% POOL: 30 **% GLIDE:** 30 **% RUN:** 10 **% RIFFLE:** 10

Riparian Maximum 10: **10.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [ ] 55% -<85%
- [x] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

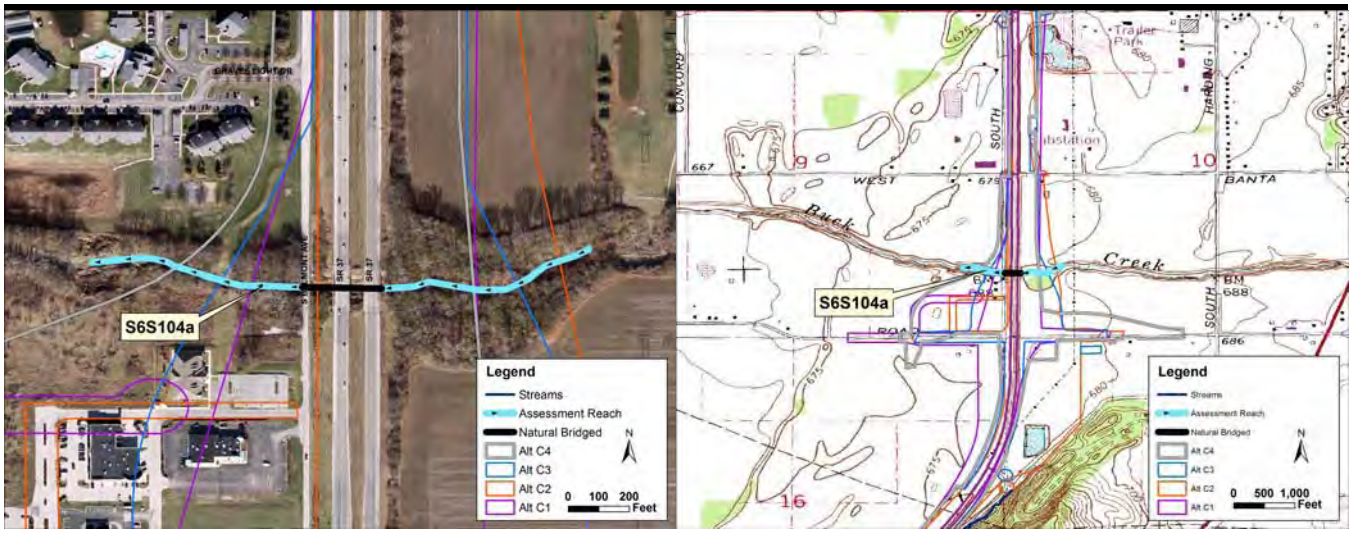
Mine: [ ] Acid [ ] Quarry

Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S104a



Stream Location on 2013 Aerial Photograph **Stream Location on Maywood USGS Quadrangle**

Stream Name:	Little Buck Creek	**Quadrangle:**	Maywood
Flow Regime:	Intermittent	**County:**	Marion
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	9
Predominant Substrate:	sand - gravel	**Quarter:**	SE
Evaluation Score:	QHEI = 49	**Latitude:**	39.666455
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.196221
OHWM width:	38.0	**Basin:**	Little Buck Creek (Southport)
OHWM depth:	1.8	**14-digit HUC:**	05120201130090
USACE Jurisdiction:	Yes	**Drainage area:**	17.063
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**373**	**0.325**	**1.60**
Aternative C2	**484**	**0.422**	**2.17**
Aternative C3	**558**	**0.487**	**2.32**
Aternative C4 (Preferred)	**566**	**0.494**	**1.82**

Stream Reach S6S104a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S104a	N/A	Little Buck Creek	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	10/22/2015	Marion	N/A	☐	49

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %	
☐	☐	☐	☐		BLDR/SLABS [10]
☐	☐	☐	☐		BOULDERS [9]
☐	☐	☐	☐		COBBLE [8]
☐	☑	☑	☐		GRAVEL [7]
☑	☐	☐	☑		SAND [6]
☐	☐	☐	☐		BEDROCK [5]

OTHER TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %	
☐	☐	☐	☐		HARDPAN [4]
☐	☐	☐	☐		DETRITUS [3]
☐	☐	☐	☐		MUCK [2]
☐	☐	☐	☐		SILT [2]
☐	☐	☐	☐		ARTIFICIAL [0]

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

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

ORIGIN

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

QUALITY

- ☐ HEAVY [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

- ☐ EXTENSIVE [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 12.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	2	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	1	ROOTWADS [1]	0	0	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	1	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)

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

Cover Maximum 20: **7.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **12.0**

Comments

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

River right looking downstrea

L	R	EROSION
☐	☐	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☑	☑	HEAVY/SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☑	☑	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **6.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☑ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **4.0**

Comments

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (14.3 ft/mi)

DRAINAGE AREA (17.1 ft/mi)

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

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

Riparian Maximum 10: **8.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- ☐ >85% - Open
- ☑ 55% -<85%
- ☐ 30%-<55%
- ☐ 10%-<30%
- ☐ <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- ☐ Nuisance algae
- ☐ Invasive macrophytes
- ☐ Excess turbidity
- ☐ Discoloration
- ☐ Foam/Scum
- ☐ Oil sheen
- ☐ Trash/Litter
- ☐ Nuisance odor
- ☐ Sludge deposits
- ☐ CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	☐ > 100ft ^{2}	☐ > 3ft

D-MAINTENANCE

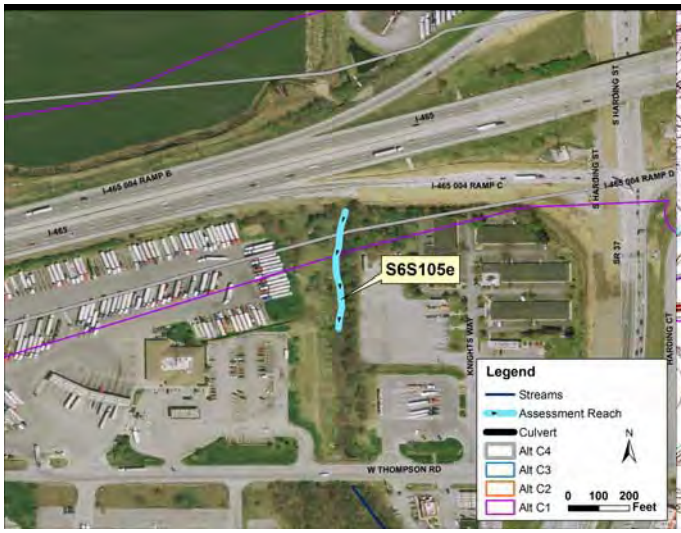
- ☐ Public ☐ Private
- ☐ Active ☐ Historic
- Succession: ☐ Young ☐ Old
- ☐ Spray ☐ Islands ☐ Scoured
- Snag: ☐ Removed ☐ Modified
- Leveed: ☐ One sided ☐ Both banks
- ☐ Relocated ☐ Cutoffs
- Bedload: ☐ Moving ☐ Stable
- ☐ Armoured ☐ Slumped
- ☐ Impounded ☐ Desiccated
- ☐ Flood control ☐ Drainage

E-ISSUES

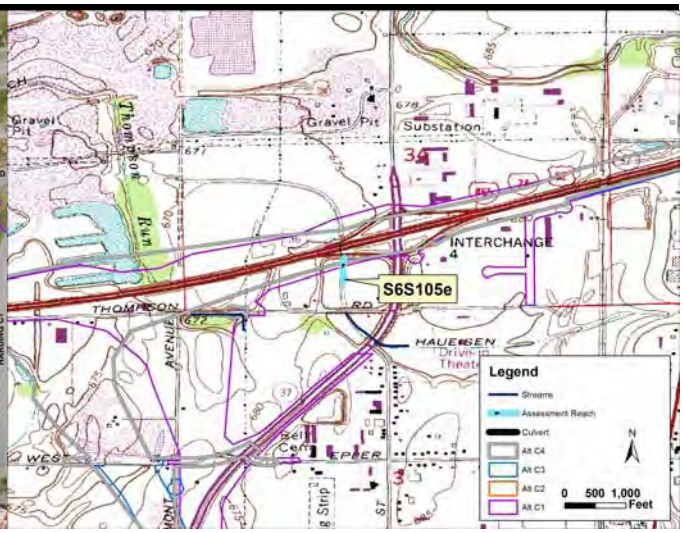
- ☐ WWTP ☐ CSO ☐ NPDES
- ☐ Industry ☐ Urban
- ☐ Hardened ☐ Dirt Grime
- ☐ Contaminated ☐ Landfill
- BMPs: ☐ Construction ☐ Sediment
- ☐ Logging ☐ Irrigation ☐ Cooling
- Erosion: ☐ Bank ☐ Surface
- ☐ False bank ☐ Manure ☐ Lagoon
- ☐ Wash H2O ☐ Tile ☐ H2O table
- Mine: ☐ Acid ☐ Quarry
- Flow: ☐ Natural ☐ Stagnant
- ☐ Wetland ☐ Park ☐ Issues: Golf
- ☐ Lawn ☐ Home
- ☐ Atmospheric deposition

Stream Drawing:

Stream Reach S6S105e



Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	Haueisen Ditch	**Quadrangle:**	Maywood
Flow Regime:	Ephemeral	**County:**	Morgan
Channel Type:	Natural	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	32
Predominant Substrate:	sand - hardpan	**Quarter:**	SE
Evaluation Score:	QHEI = 37	**Latitude:**	39.69458
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.189128
OHWM width:	2.0	**Basin:**	White River - Hide Creek
OHWM depth:	1.8	**14-digit HUC:**	05120201130080
USACE Jurisdiction:	Yes	**Drainage area:**	2.304
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**146**	**0.007**	**0.00**
Aternative C2	**76**	**0.003**	**0.00**
Aternative C3	**76**	**0.003**	**0.00**
Aternative C4 (Preferred)	**76**	**0.003**	**0.00**

Stream Reach S6S105e

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S105e	N/A	Haueisen Ditch	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
rh	11/20/2015	Morgan	N/A	☐	37

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES PREDOMINANT P	BEST TYPES PREDOMINANT R	BEST TYPES PRESENT P	BEST TYPES PRESENT R	BEST TYPES TOTAL %	OTHER TYPES PREDOMINANT P	OTHER TYPES PREDOMINANT R	OTHER TYPES PRESENT P	OTHER TYPES PRESENT R	OTHER TYPES TOTAL %
☐ BLDR/SLABS [10]	☐	☐	☐		☐	☑ HARDPAN [4]	☐	☐	
☐ BOULDERS [9]	☐	☐	☐		☐	☐ DETRITUS [3]	☐	☐	
☐ COBBLE [8]	☐	☐	☐		☐	☐ MUCK [2]	☐	☐	
☐ GRAVEL [7]	☐	☐	☐		☐	☐ SILT [2]	☐	☐	
☑ SAND [6]	☐	☐	☐		☐	☐ ARTIFICIAL [0]	☐	☐	
☐ BEDROCK [5]	☐	☐	☐						

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

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

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

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

Substrate 11.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	0	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	1	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	0	1	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	1	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **3.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **7.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☑	☑	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☑	☑	URBAN OR INDUSTRIAL [0]
☐	☐	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **5.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☑ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **1.0**

Comments dry channel

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

☑ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (21.5 ft/mi)

DRAINAGE AREA (2.304 ft/m

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

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

Riparian Maximum 10: **10.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- ☐ >85% - Open
- ☐ 55% -<85%
- ☑ 30%-<55%
- ☐ 10%-<30%
- ☐ <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- ☐ Nuisance algae
- ☐ Invasive macrophytes
- ☐ Excess turbidity
- ☐ Discoloration
- ☐ Foam/Scum
- ☐ Oil sheen
- ☐ Trash/Litter
- ☐ Nuisance odor
- ☐ Sludge deposits
- ☐ CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	☐ > 100ft ^{2}	☐ > 3ft

D-MAINTENANCE

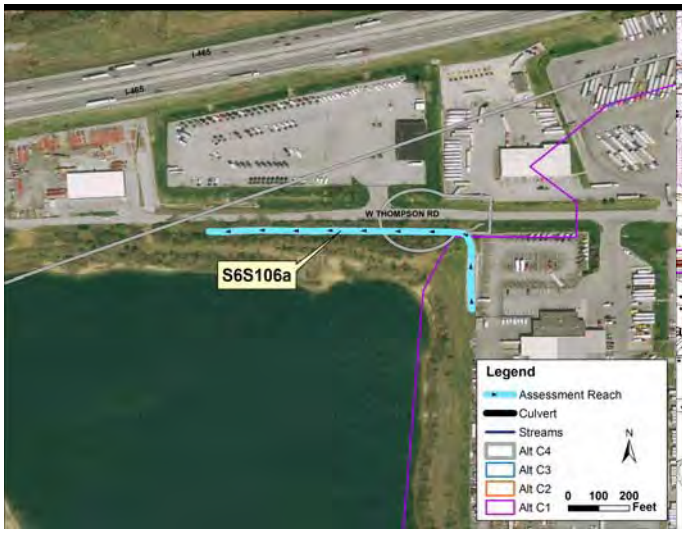
- ☐ Public ☐ Private
- ☐ Active ☐ Historic
- Succession: ☐ Young ☐ Old
- ☐ Spray ☐ Islands ☐ Scoured
- Snag: ☐ Removed ☐ Modified
- Leveed: ☐ One sided ☐ Both banks
- ☐ Relocated ☐ Cutoffs
- Bedload: ☐ Moving ☐ Stable
- ☐ Armoured ☐ Slumped
- ☐ Impounded ☐ Desiccated
- ☐ Flood control ☐ Drainage

E-ISSUES

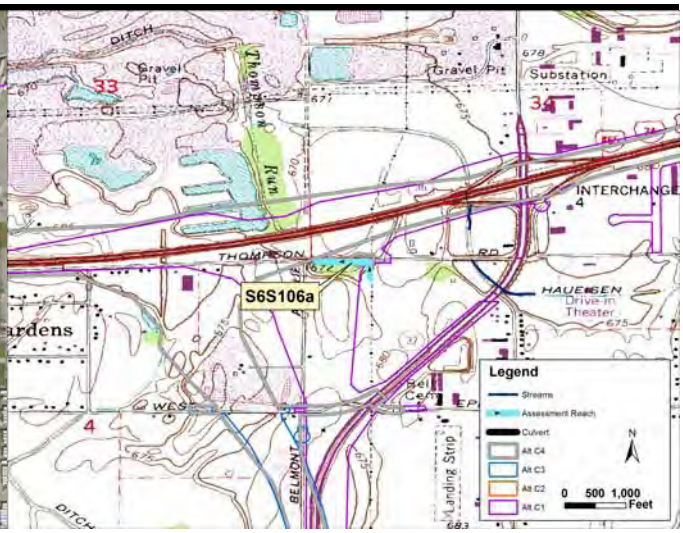
- ☐ WWTP ☐ CSO ☐ NPDES
- ☐ Industry ☐ Urban
- ☐ Hardened ☐ Dirt Grime
- ☐ Contaminated ☐ Landfill
- BMPs: ☐ Construction ☐ Sediment
- ☐ Logging ☐ Irrigation ☐ Cooling
- Erosion: ☐ Bank ☐ Surface
- ☐ False bank ☐ Manure ☐ Lagoon
- ☐ Wash H2O ☐ Tile ☐ H2O table
- Mine: ☐ Acid ☐ Quarry
- Flow: ☐ Natural ☐ Stagnant
- ☐ Wetland ☐ Park ☐ Issues: Golf
- ☐ Lawn ☐ Home
- ☐ Atmospheric deposition

Stream Drawing:

Stream Reach S6S106a



Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	UNT to 1 Little Buck Creek	**Quadrangle:**	Maywood
Flow Regime:	Ephemeral	**County:**	Marion
Channel Type:	Roadside Ditch	**Township:**	T14N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	3
Predominant Substrate:	sand - cobble	**Quarter:**	NW
Evaluation Score:	HHEI = 50	**Latitude:**	39.692267
Use Designation:	Class II PHWH	**Longitude:**	-86.194788
OHWM width:	2.0	**Basin:**	White River - Hide Creek
OHWM depth:	0.3	**14-digit HUC:**	05120201130080
USACE Jurisdiction:	Yes	**Drainage area:**	0.109
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**663**	**0.030**	**0.00**
Aternative C2	**199**	**0.009**	**0.00**
Aternative C3	**199**	**0.009**	**0.00**
Aternative C4 (Preferred)	**199**	**0.009**	**0.00**

Stream Reach S6S106a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **50**

SITE NAME/LOCATION UNT to Buck Creek

SITE NUMBER S6S106a RIVER BASIN White River - Hide Creek DRAINAGE AREA (mi) 0.109

LENGTH OF STEAM REACH (ft) _____ LAT 39.692267 LONG. -86.194788 RIVER CODE N/A RIVER MILE N/A

DATE 11/20/2015 SCORER rh COMMENT _____

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0	☐	SILT [3 pt]	0
☐	BOULDER (>256 mm) [16 pts	0	☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐	BEDROCK [16 pts]	0	☐	FINE DETRITUS [3 pts]	0
☑	COBBLE (65-256 mm) [9 pt	30	☐	CLAY or HARDPAN [0 pts]	0
☐	GRAVEL (2-64 mm) [9 pts]	0	☐	MUCK [0 pts]	0
☑	SAND (<2 mm) [6 pts]	70	☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **30.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **18** **TOTAL NUMBER OF SUBSTRATE TYPES** **2**

HHEI Metric Points

Substrate Max = 40

20

(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)

- ☐ > >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):** **0**

Pool Depth Max = 30

0

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

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

COMMENTS: _____ **AVERAGE BANKFULL WIDTH (Meters):** **12**

Bankfull Width Max = 30

30

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)

L	R	
☐	☐	Wide >10 m
☑	☑	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☑	☐	Immature Forest, Shrub or Old Field	☐	☑	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☐	Mining or Construction

Comments: _____

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☐ Steam 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	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Maywood** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Marion** Township / City: **Perry**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: **11/18** Quantity **0.39**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

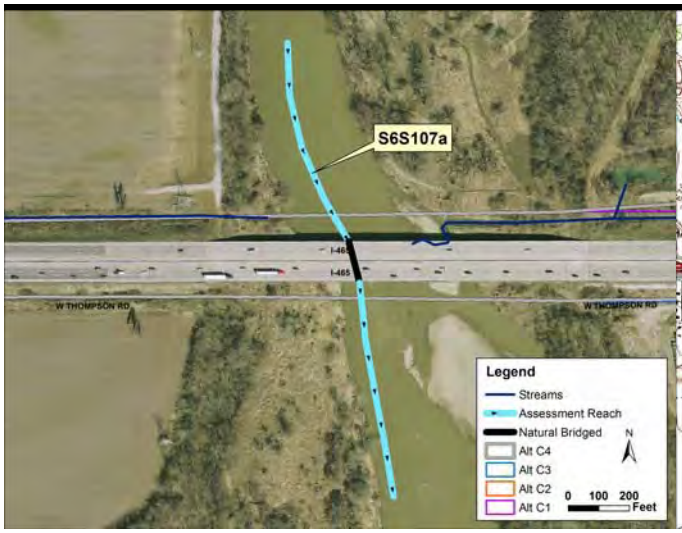
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

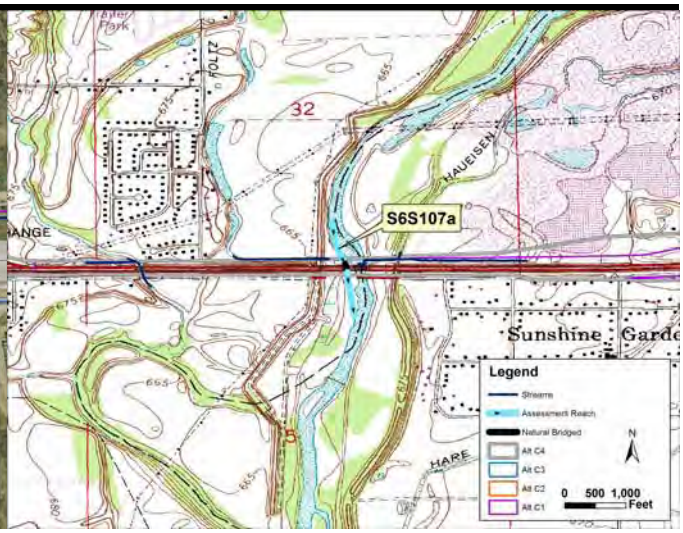
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S107a



Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	White River	**Quadrangle:**	Maywood
Flow Regime:	Perennial	**County:**	Marion
Channel Type:	Natural	**Township:**	T14N,T15N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	Yes	**Section:**	5,32
Predominant Substrate:	cobble	**Quarter:**	NE,SE
Evaluation Score:	QHEI = 64.5	**Latitude:**	39.692483
Use Designation:	Warm Water Habitat	**Longitude:**	-86.2232
OHWM width:	313.3	**Basin:**	White River - Hide Creek
OHWM depth:		**14-digit HUC:**	05120201130080
USACE Jurisdiction:	Yes	**Drainage area:**	1904
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**145**	**1.043**	**0.02**
Aternative C2	**145**	**1.043**	**0.02**
Aternative C3	**145**	**1.043**	**0.02**
Aternative C4 (Preferred)	**145**	**1.043**	**0.02**

Stream Reach S6S107a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S107a	N/A	White River	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
kl	5/20/2016	Marion	N/A		64.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☑	☑	☐	☐	
GRAVEL [7]	☐	☐	☑	☑	
SAND [6]	☑	☑	☑	☑	
BEDROCK [5]	☐	☐	☑	☑	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

ORIGIN

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

QUALITY

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

Substrate 16.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

% Amount		
0	0	UNDERCUT BANKS [1]
0	0	OVERHANGING VEGETATION [1]
0	0	SHALLOWS (IN SLOW WATER)[1]
0	0	ROOTMATS [1]
10	2	POO0LS>70CM [2]
0	0	ROOTWADS [1]
0	0	BOULDERS [1]
0	0	OXBOWS, BACKWATERS [1]
0	0	AQUATIC MACROPHYTES [1]
5	1	LOGS OR WOODY DEBRIS [1]

AMOUNT Check One (Or 2 and average)

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

Cover Maximum 20: **6.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **10.0**

Comments

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

River right looking downstrea

EROSION L	EROSION R	
☑	☐	NONE/LITTLE [3]
☐	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH L	RIPARIAN WIDTH R	
☑	☑	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

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

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **9.5**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)

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

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **8.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: **5.0**

Comments

6] *GRADIENT* (3.5 ft/mi)

DRAINAGE AREA (1904 ft/mi

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

% POOL: 10 **% GLIDE:** 5

% RUN: 60 **% RIFFLE:** 25

Riparian Maximum 10: **10.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [x] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [x] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [x] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

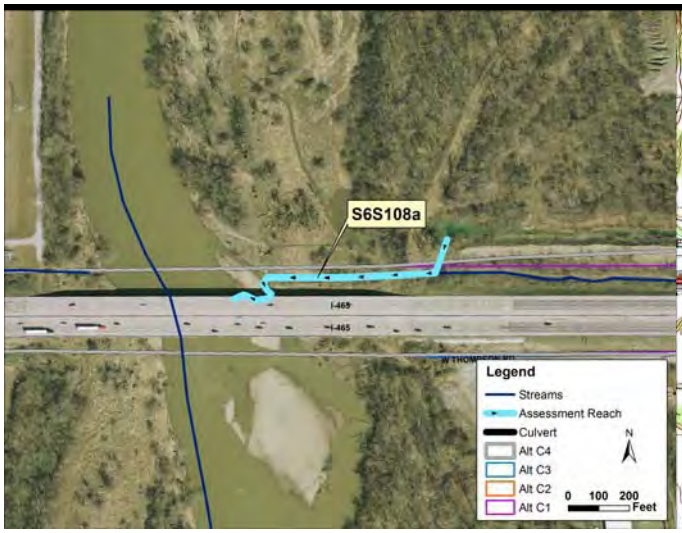
Mine: [ ] Acid [ ] Quarry

Flow: [ ] Natural [ ] Stagnant

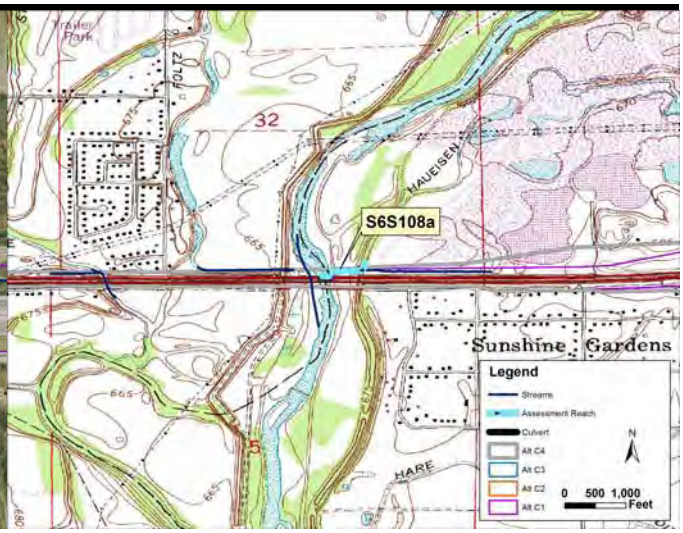
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S108a



Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	UNT 23 White River	**Quadrangle:**	Maywood
Flow Regime:	Perennial	**County:**	Marion
Channel Type:	Channelized Ditch	**Township:**	T15N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	32
Predominant Substrate:	sand - silt	**Quarter:**	SE
Evaluation Score:	QHEI = 28.5	**Latitude:**	39.692532
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.22175
OHWM width:	20.0	**Basin:**	White River - Hide Creek
OHWM depth:	1.7	**14-digit HUC:**	05120201130080
USACE Jurisdiction:	Yes	**Drainage area:**	4.082
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**621**	**0.285**	**0.07**
Aternative C2	**634**	**0.291**	**0.09**
Aternative C3	**634**	**0.291**	**0.09**
Aternative C4 (Preferred)	**634**	**0.291**	**0.09**

Stream Reach S6S108a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S108a	N/A	UNT White River	

Surveyor	Sample Date	County	Macro Sample Type	☐ Habitat Complete	QHEI Score:
kl	4/22/2016	Marion	N/A		28.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☐	☐	
SAND [6]	☑	☐	☑	☐	30
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☑	☐	☑	☐	70
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

QUALITY
- ☑ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

- ☑ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 5.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	0	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	0	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	25	2	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	0	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT

Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **4.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **11.0**

Comments

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

River right looking downstrea

EROSION L	EROSION R	
☐	☐	NONE/LITTLE [3]
☑	☑	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH L	RIPARIAN WIDTH R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☑	☑	NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☑	☑	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☐	☐	URBAN OR INDUSTRIAL [0]
☑	☑	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **3.5**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☑ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **2.0**

Comments

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

☐ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☑ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **-1.0**

Comments

6] *GRADIENT* (80 ft/mi)

DRAINAGE AREA (4 ft/mi)

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

% POOL: 5 **% GLIDE:** 5

% RUN: 10 **% RIFFLE:** 80

Riparian Maximum 10: **4.0**

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

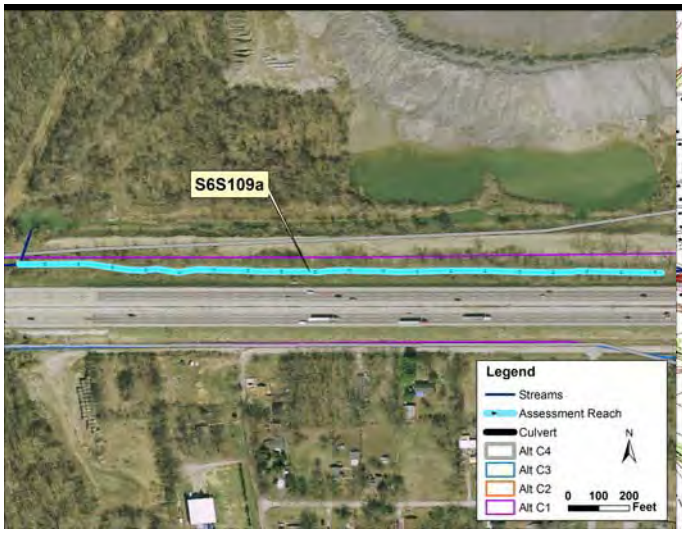
Mine: [ ] Acid [ ] Quarry

Flow: [ ] Natural [ ] Stagnant

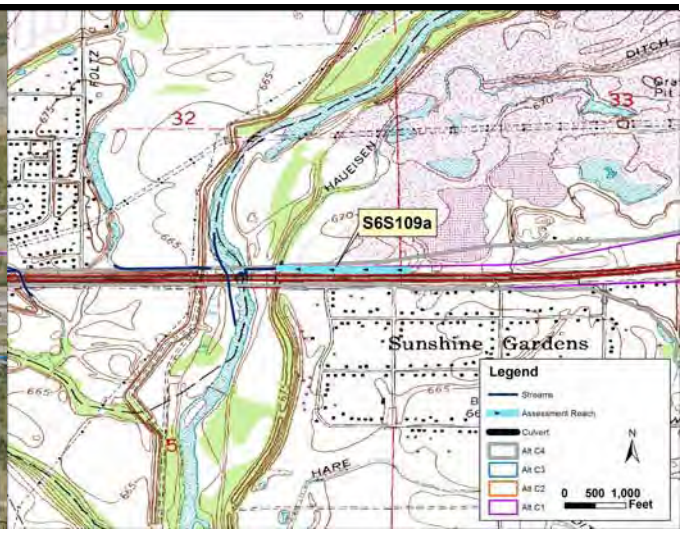
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S109a



Stream Location on 2013 Aerial Photograph

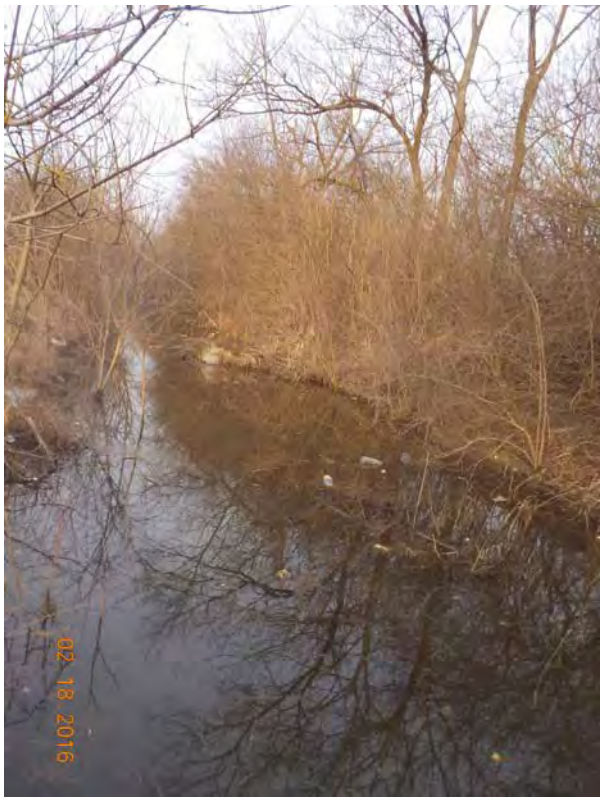


Stream Location on Maywood USGS Quadrangle

Stream Name:	UNT 24 White River	**Quadrangle:**	Maywood
Flow Regime:	Ephemeral	**County:**	Marion
Channel Type:	Roadside Ditch	**Township:**	T15N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	32
Predominant Substrate:	sand - muck	**Quarter:**	SE
Evaluation Score:	HHEI = 58	**Latitude:**	39.692517
Use Designation:	Rheocrene Potential	**Longitude:**	-86.217884
OHWM width:	14.0	**Basin:**	White River - Hide Creek
OHWM depth:	1.3	**14-digit HUC:**	05120201130080
USACE Jurisdiction:	Yes	**Drainage area:**	0.001
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**1626**	**0.523**	**1.14**
Aternative C2	**1626**	**0.523**	**1.33**
Aternative C3	**1626**	**0.523**	**1.33**
Aternative C4 (Preferred)	**1626**	**0.523**	**1.33**

Stream Reach S6S109a



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **58**

SITE NAME/LOCATION: UNT to White River

SITE NUMBER: S6S109a | RIVER BASIN: White River - Hide Creek | DRAINAGE AREA (mi): 0.001

LENGTH OF STEAM REACH (ft): | LAT: 39.692517 | LONG.: -86.217884 | RIVER CODE: N/A | RIVER MILE: N/A

DATE: 2/18/2016 | SCORER: rh | COMMENT:

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☑	MUCK [0 pts]	50
☑ ☐	SAND (<2 mm) [6 pts]	50	☐ ☐	ARTIFICIAL [3 pts]	0

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock: **0.00%** **(A)**

Substrate Percentage Check: **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE: **6** **TOTAL NUMBER OF SUBSTRATE TYPES:** **2**

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)

- ☑ > >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: Constructed trap ditch **MAXIMUM POOL DEPTH (centimeters):** **4**

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

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

COMMENTS: Constructed trap ditch **AVERAGE BANKFULL WIDTH (Meters):** **4.9**

HHEI Metric Points

Substrate Max = 40: **8**

(A+B)

Pool Depth Max = 30: **20**

Bankfull Width Max = 30: **30**

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)

L	R	
☐	☐	Wide >10 m
☑	☑	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☐	None

FLOODPLAIN QUALITY (Most Predominant Per Bank)

L	R		L	R	
☐	☐	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Immature Forest, Shrub or Old Field	☑	☐	Urban or Industrial
☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	Fenced Pasture	☐	☑	Mining or Construction

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam 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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Maywood** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Marion** Township / City: **Perry**

MISCELLANEOUS

Base flow conditions? (Y/N) **No** Date of last precipitation: **2/14** Quantity **2.3**

Photograph information: _____

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

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

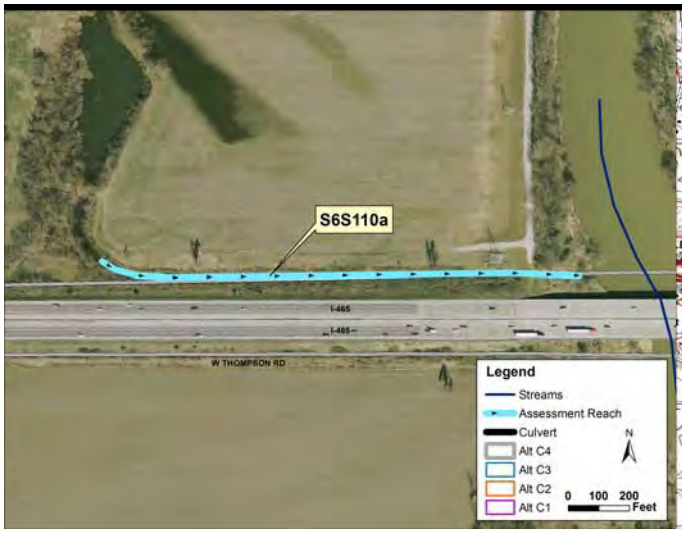
Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

Comments Regarding Biology:

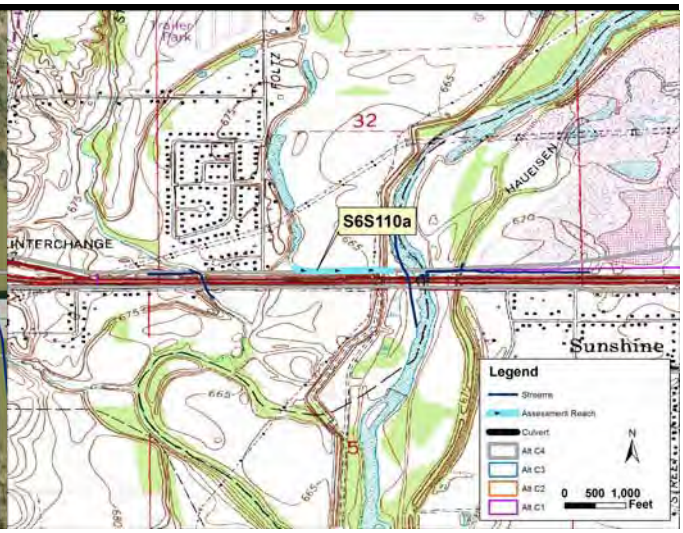
DRAWING AMD NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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

Stream Reach S6S110a



Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	UNT 25 White River	**Quadrangle:**	Maywood
Flow Regime:	Intermittent	**County:**	Marion
Channel Type:	Roadside Ditch	**Township:**	T15N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	32
Predominant Substrate:	muck - silt	**Quarter:**	SW
Evaluation Score:	QHEI = 24.5	**Latitude:**	39.692581
Use Designation:	Limited Warm Water Habitat	**Longitude:**	-86.224049
OHWM width:	5.0	**Basin:**	White River - Hide Creek
OHWM depth:	0.9	**14-digit HUC:**	05120201130080
USACE Jurisdiction:	Yes	**Drainage area:**	1.353
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**105**	**0.012**	**0.19**
Aternative C2	**105**	**0.012**	**0.19**
Aternative C3	**105**	**0.012**	**0.19**
Aternative C4 (Preferred)	**105**	**0.012**	**0.19**

Stream Reach S6S110a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S110a	N/A	UNT White River	N side of I-465

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
kl	4/22/2016	Marion	N/A	☐	24.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☐	☐	
GRAVEL [7]	☐	☐	☐	☐	
SAND [6]	☐	☐	☐	☐	
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☑	☐	☑	☐	40
SILT [2]	☐	☑	☐	☑	60
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

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

QUALITY
- ☐ HEAVY [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

- ☑ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 2.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	0	UNDERCUT BANKS [1]	0	0	POO0LS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	0	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	10	1	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	0	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT Check One (Or 2 and average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **4.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **6.0**

Comments

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

River right looking downstrea

EROSION L	EROSION R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH L	RIPARIAN WIDTH R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☑	VERY NARROW [1]
☑	☐	NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☑	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☐	☑	URBAN OR INDUSTRIAL [0]
☐	☐	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **3.5**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☐ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☑ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **1.0**

Comments

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

☐ NO RIFFLE [METRIC=0]

Check One (Or 2 and average)

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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☑ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **0.0**

Comments

6] *GRADIENT* (12 ft/mi)

DRAINAGE AREA (1.4 ft/mi)

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

% POOL: 5 **% GLIDE:** 5

% RUN: 5 **% RIFFLE:** 85

Riparian Maximum 10: **8.0**

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [x] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [x] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	☐ > 100ft ^{2}	☐ > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic
- Succession: [ ] Young [ ] Old
- [ ] Spray [ ] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [ ] Relocated [ ] Cutoffs
- Bedload: [ ] Moving [ ] Stable
- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

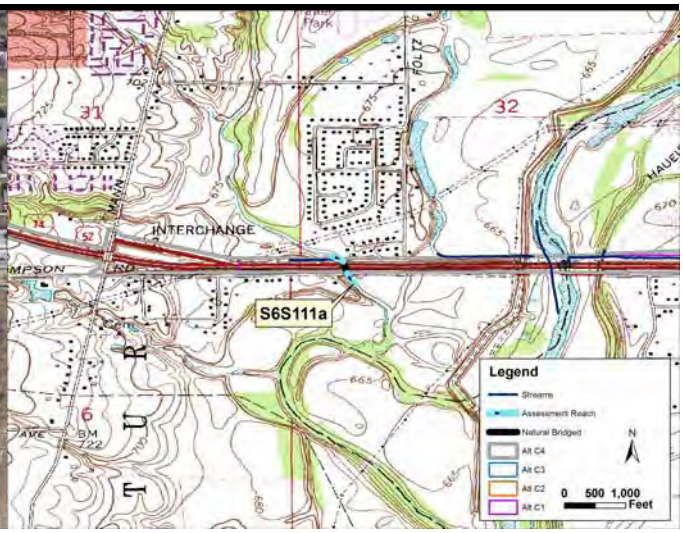
E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [ ] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [ ] Bank [ ] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [ ] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S111a

Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	State Ditch	**Quadrangle:**	Maywood
Flow Regime:	Perennial	**County:**	Marion
Channel Type:	Natural	**Township:**	T15N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	Yes	**Section:**	32
Predominant Substrate:	sand - gravel	**Quarter:**	SW
Evaluation Score:	QHEI = 56.5	**Latitude:**	39.692433
Use Designation:	Probable Warm Water Habitat	**Longitude:**	-86.232461
OHWM width:	32.2	**Basin:**	State Ditch
OHWM depth:	4.1	**14-digit HUC:**	05120201130070
USACE Jurisdiction:	Yes	**Drainage area:**	9.171
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**75**	**0.055**	**0.00**
Aternative C2	**75**	**0.055**	**0.00**
Aternative C3	**75**	**0.055**	**0.00**
Aternative C4 (Preferred)	**75**	**0.055**	**0.00**

Stream Reach S6S111a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S111a	N/A	State Ditch	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
kl	4/22/2016	Marion	N/A	☐	56.5

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

BEST TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
BLDR/SLABS [10]	☐	☐	☐	☐	
BOULDERS [9]	☐	☐	☐	☐	
COBBLE [8]	☐	☐	☑	☑	10
GRAVEL [7]	☑	☐	☑	☑	30
SAND [6]	☑	☐	☑	☐	60
BEDROCK [5]	☐	☐	☐	☐	

OTHER TYPES	PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %
HARDPAN [4]	☐	☐	☐	☐	
DETRITUS [3]	☐	☐	☐	☐	
MUCK [2]	☐	☐	☐	☐	
SILT [2]	☐	☐	☐	☐	
ARTIFICIAL [0]	☐	☐	☐	☐	

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

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

ORIGIN (Check ONE (Or 2 and average))
- ☐ LIMESTONE [1]
- ☑ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACSTRINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY (Check ONE (Or 2 and average))
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☑ FREE [1]
- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☑ NONE [1]

Substrate 16.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	0	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	0	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	5	1	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	5	1	LOGS OR WOODY DEBRIS [1]
5	1	ROOTMATS [1]						

AMOUNT (Check One (Or 2 and average))
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE -<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: **6.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **11.0**

Comments

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

River right looking downstrea

L	R	EROSION
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

L	R	RIPARIAN WIDTH
☐	☐	WIDE >50m [4]
☑	☑	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☐	☐	NONE [0]

L	R	FLOOD PLAIN QUALITY
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☑	☑	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☑	☑	URBAN OR INDUSTRIAL [0]
☐	☐	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **6.5**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)
- ☐ >1 m [6]
- ☑ 0.7 - <1m [4]
- ☐ 0.4 - <0.7m [2]
- ☐ 0.2 - <0.4m [1]
- ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)
- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **6.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES
- ☐ NONE [2]
- ☑ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Riffle/ Run Maximum 8: **3.0**

Comments

6] *GRADIENT* (19 ft/mi)

DRAINAGE AREA (9.17 ft/mi)

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

% POOL: 5 **% GLIDE:** 10 **% RUN:** 60 **% RIFFLE:** 25

Riparian Maximum 10: **8.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [ ] >85% - Open
- [x] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	____ %	____ %	____ %	____ %

B-AESTHETICS

- [ ] Nuisance algae
- [ ] Invasive macrophytes
- [ ] Excess turbidity
- [ ] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [ ] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

Area Depth

Pool: [ ] > 100ft ^{2} [ ] > 3ft

D-MAINTENANCE

- [ ] Public [ ] Private
- [ ] Active [ ] Historic

Succession: [ ] Young [ ] Old

- [ ] Spray [ ] Islands [ ] Scoured

Snag: [ ] Removed [ ] Modified

Leveed: [ ] One sided [ ] Both banks

- [ ] Relocated [ ] Cutoffs

Bedload: [ ] Moving [ ] Stable

- [ ] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [ ] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [ ] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill

BMPs: [ ] Construction [ ] Sediment

- [ ] Logging [ ] Irrigation [ ] Cooling

Erosion: [ ] Bank [ ] Surface

- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table

Mine: [ ] Acid [ ] Quarry

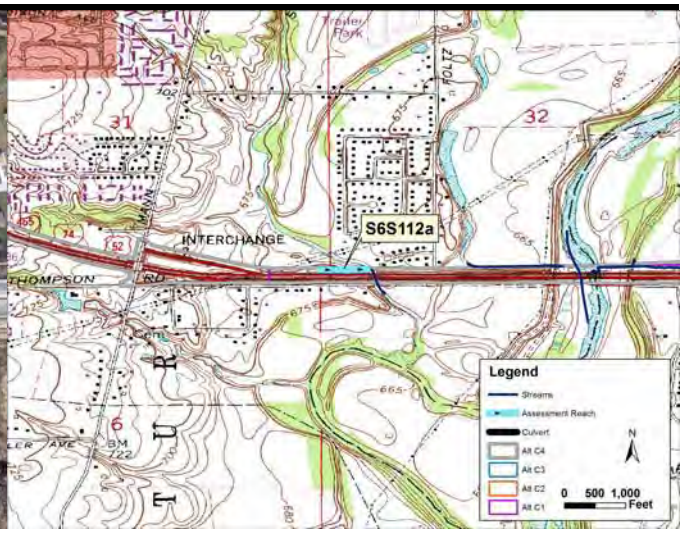
Flow: [ ] Natural [ ] Stagnant

- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing:

Stream Reach S6S112a

Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	UNT1 State Ditch	**Quadrangle:**	Maywood
Flow Regime:	Ephemeral	**County:**	Marion
Channel Type:	Concrete Gutter	**Township:**	T15N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	32
Predominant Substrate:	artificial	**Quarter:**	SW
Evaluation Score:	HHEI = 32	**Latitude:**	39.69242
Use Designation:	Modified Class II PHWH	**Longitude:**	-86.233684
OHWM width:	5.1	**Basin:**	State Ditch
OHWM depth:	0.5	**14-digit HUC:**	05120201130070
USACE Jurisdiction:	Yes	**Drainage area:**	1.345
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**601**	**0.070**	**0.00**
Aternative C2	**601**	**0.070**	**0.00**
Aternative C3	**601**	**0.070**	**0.00**
Aternative C4 (Preferred)	**601**	**0.070**	**0.00**

Stream Reach S6S112a

Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) **32**

SITE NAME/LOCATION UNT State Ditch

SITE NUMBER S6S112a RIVER BASIN State Ditch DRAINAGE AREA (mi) 1.345

LENGTH OF STEAM REACH (ft) LAT 39.69242 LONG. -86.233684 RIVER CODE N/A RIVER MILE N/A

DATE 4/22/2016 SCORER kl COMMENT

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

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

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 subsrate types found (Max of 8). Final metric score is sum of boxes A and B.)

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]	0	☐ ☐	SILT [3 pt]	0
☐ ☐	BOULDER (>256 mm) [16 pts	0	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts	0
☐ ☐	BEDROCK [16 pts]	0	☐ ☐	FINE DETRITUS [3 pts]	0
☐ ☐	COBBLE (65-256 mm) [9 pt	0	☐ ☐	CLAY or HARDPAN [0 pts]	0
☐ ☐	GRAVEL (2-64 mm) [9 pts]	0	☐ ☐	MUCK [0 pts]	0
☐ ☐	SAND (<2 mm) [6 pts]	0	☑ ☑	ARTIFICIAL [3 pts]	100

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock **0.00%** **(A)**

Substrate Percentage Check **100 %** **(B)**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPE **6** **TOTAL NUMBER OF SUBSTRATE TYPES** **1**

HHEI Metric Points

Substrate Max = 40 **7** **(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)

- ☐ > >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):** **0**

Pool Depth Max = 30 **5**

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

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

COMMENTS: **AVERAGE BANKFULL WIDTH (Meters):** **0**

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 >10 m
☑	☐	Moderate 5-10 m
☐	☐	Narrow <5 m
☐	☑	None

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

Comments:

FLOW REGIME *(At time of evaluation)* (Check ONLY one box):

- ☑ Steam flowing
- ☐ Subsurface flow with isolated pools (interstitial)
- ☐ Moist channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

Comments: Storm water flowing at time of survey

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
- ☐ >3.0

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 complete

QHEI PERFORMED ☐ Yes ☑ No QHEI Score: **0** (If yes, attach completed QHEI form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name **Maywood** NRCS Soil Map Page _____ NRCS Soil Map Stream Order: _____

County: **Marion** Township / City: **Decatur**

MISCELLANEOUS

Base flow conditions? (Y/N) **Yes** Date of last precipitation: _____ Quantity _____

Photograph information: _____

Elevated Turbidity? (Y/N) **No** Canopy (% open): **95**

Were samples collected for water chemistry? (Y/N) **No** (Note lab sample no. or id. and attach results) Lab number: **N/A**

Field Measures: Temp (C) _____ Dissolved oxygen (mg/l): _____ pH: _____ Conductivity (umhos/cm) _____

Is the sampling reach representative of the stream? (Y/N) **Yes** If not, please explain:

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

Performed? (Y/N) No (If Yes, record all observations. Voucher collections optional. Note: all voucher samples must be labeled with the site ID number. Include apropriate field data sheets from the Primary Headwater Habitat Assessment Manual.)

Fish observed? (Y/N) **No** Voucher? (Y/N) **No** Salamanders observed? (Y/N) **No** Voucher? (Y/N) **No**

Frogs or tadpoles observed? (Y/N) **No** Voucher? (Y/N) **No** Aquatic Macroinvertebrates observed? (Y/N) **No** Voucher? (Y/N) **No**

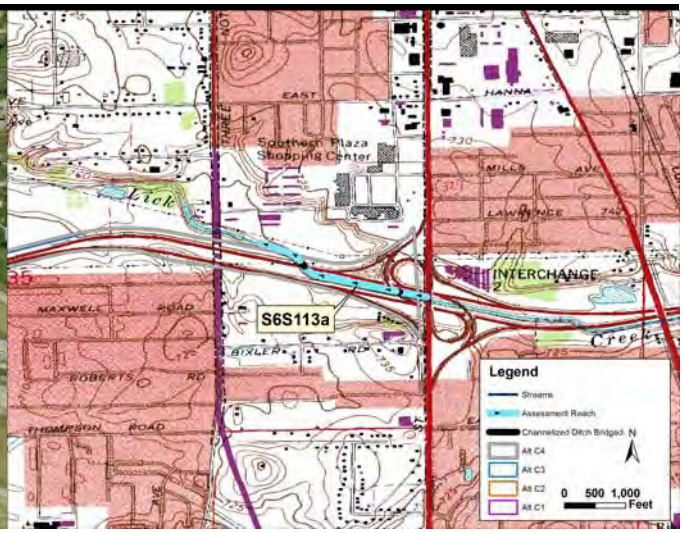
Comments Regarding Biology:

DRAWING AMD 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 Reach S6S113a

Stream Location on 2013 Aerial Photograph



Stream Location on Maywood USGS Quadrangle

Stream Name:	Lick Creek	**Quadrangle:**	Maywood
Flow Regime:	Perennial	**County:**	Marion
Channel Type:	Channelized Ditch	**Township:**	T15N
Legal Drain:	No	**Range:**	R3E
IDEM 303(d) Listed:	No	**Section:**	36
Predominant Substrate:	sand - cobble	**Quarter:**	W
Evaluation Score:	QHEI = 43	**Latitude:**	39.699737
Use Designation:	Modified Warm Water Habitat	**Longitude:**	-86.152514
OHWM width:	35.0	**Basin:**	Lick Creek - Beech Creek
OHWM depth:	3.0	**14-digit HUC:**	05120201130060
USACE Jurisdiction:	Yes	**Drainage area:**	21.3
IDEM Jurisdiction:	Yes		

Alternatives	Length of Impact (feet)	Area of Impact (acres)	Riparian Area Impact (ac)
Aternative C1	**1581**	**1.270**	**0.05**
Aternative C2	**1581**	**1.270**	**0.05**
Aternative C3	**1581**	**1.270**	**0.05**
Aternative C4 (Preferred)	**1581**	**1.270**	**0.05**

Stream Reach S6S113a

OWO Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
S6S113a	N/A	Lick Creek	

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
ry	6/25/2016	Marion	N/A	☐	43

1] *SUBSTRATE* Check ONLY Two predominant substrate TYPE BOXES; estimate % and check every type present

Check ONE (Or 2 and average)

BEST TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %	
☐	☐	☐	☐		BLDR/SLABS [10]
☐	☐	☐	☐		BOULDERS [9]
☐	☑	☑	☑		COBBLE [8]
☐	☐	☐	☐		GRAVEL [7]
☑	☐	☑	☑		SAND [6]
☐	☐	☐	☐		BEDROCK [5]

OTHER TYPES

PREDOMINANT P	PREDOMINANT R	PRESENT P	PRESENT R	TOTAL %	
☐	☐	☐	☐		HARDPAN [4]
☐	☐	☐	☐		DETRITUS [3]
☐	☐	☐	☐		MUCK [2]
☐	☐	☐	☐		SILT [2]
☐	☐	☑	☑		ARTIFICIAL [0]

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

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

ORIGIN

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

QUALITY

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

Substrate 16.0 Maximum 20

Comments

2] *INSTREAM COVER* Indicate presence 0 to 3 and estiamte percent: 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 root wad in deep/fast water, or deep, well-defined, functinoal pools.)

%	Amount		%	Amount		%	Amount	
0	0	UNDERCUT BANKS [1]	0	0	POOOLS>70CM [2]	0	0	OXBOWS, BACKWATERS [1]
0	0	OVERHANGING VEGETATION [1]	0	0	ROOTWADS [1]	15	2	AQUATIC MACROPHYTES [1]
0	0	SHALLOWS (IN SLOW WATER)[1]	0	0	BOULDERS [1]	0	0	LOGS OR WOODY DEBRIS [1]
0	0	ROOTMATS [1]						

AMOUNT

Check One (Or 2 and average)

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

Cover Maximum 20: **4.0**

Comments

3] *CHANNEL MORPHOLOGY* Check ONE in each category (Or 2 and 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]

Channel Maximum 20: **8.0**

Comments

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

River right looking downstrea

EROSION

L	R	
☑	☑	NONE/LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY/SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE >50m [4]
☐	☐	MODERATE 10-50m
☐	☐	NARROW 5-10m [2]
☐	☐	VERY NARROW [1]
☑	☑	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SCRUB OR OLD FIELD [2]
☐	☐	RESIDENTIAL, PRK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☐	☐	OPEN PASURE, ROWCROP [0]

L	R	
☐	☐	CONSERVATION TILLAGE [1]
☑	☑	URBAN OR INDUSTRIAL [0]
☐	☐	MINING/CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian

Riparian Maximum 10: **3.0**

Comments

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

MAXIMUM DEPTH Check ONE (ONLY!)

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

CHANNEL WIDTH Check ONE (Or 2 and 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 (Circle one and comment on back)

- ☐ Primary Contact
- ☐ Secondary Contact

Pool/ Current Maximum 12: **3.0**

Comments

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

Check One (Or 2 and 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 Frvel, Sand) [0]

RIFFLE/RUN EMBEDDEDNES

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

Riffle/ Run Maximum 8: **3.0**

Comments

6] *GRADIENT* (21.5 ft/mi)

DRAINAGE AREA (21.3 ft/mi)

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

% POOL: 10 **% GLIDE:** 5 **% RUN:** 65 **% RIFFLE:** 20

Riparian Maximum 10: **6.0**

OWO Biological Studies OHEI (Qualitative Habitat Evaluation Index)

Comment

A-CANOPY

- [x] >85% - Open
- [ ] 55% -<85%
- [ ] 30%-<55%
- [ ] 10%-<30%
- [ ] <10% - Closed

Looking upstream (>10m, 3 readings, <10m reading in middle); Round to the nearest whole percent

	Left	Middle	Right	Total Average
% open	_____ %	_____ %	_____ %	_____ %

B-AESTHETICS

- [ ] Nuisance algae
- [x] Invasive macrophytes
- [ ] Excess turbidity
- [x] Discoloration
- [ ] Foam/Scum
- [ ] Oil sheen
- [x] Trash/Litter
- [ ] Nuisance odor
- [ ] Sludge deposits
- [ ] CSOs/SSOs/Outfalls

C-RECREATION

	Area	Depth
Pool:	[ ] > 100ft ^{2}	[ ] > 3ft

D-MAINTENANCE

- [x] Public [ ] Private
- [x] Active [ ] Historic
- Succession: [x] Young [ ] Old
- [ ] Spray [ ] Islands [ ] Scoured
- Snag: [ ] Removed [ ] Modified
- Leveed: [ ] One sided [ ] Both banks
- [x] Relocated [ ] Cutoffs
- Bedload: [x] Moving [ ] Stable
- [x] Armoured [ ] Slumped
- [ ] Impounded [ ] Desiccated
- [x] Flood control [ ] Drainage

E-ISSUES

- [ ] WWTP [ ] CSO [ ] NPDES
- [ ] Industry [ ] Urban
- [x] Hardened [ ] Dirt Grime
- [ ] Contaminated [ ] Landfill
- BMPs: [ ] Construction [ ] Sediment
- [ ] Logging [ ] Irrigation [ ] Cooling
- Erosion: [ ] Bank [ ] Surface
- [ ] False bank [ ] Manure [ ] Lagoon
- [ ] Wash H2O [ ] Tile [ ] H2O table
- Mine: [ ] Acid [ ] Quarry
- Flow: [ ] Natural [ ] Stagnant
- [ ] Wetland [ ] Park [ ] Issues: Golf
- [ ] Lawn [ ] Home
- [ ] Atmospheric deposition

Stream Drawing: