

LARGE FILING SEPERATOR SHEET

CASE NUMBER: 06-1358-EL-BGN

FILE DATE: 5-4-07

SECTION: 4 of 5

NUMBER OF PAGES: 200

DESCRIPTION OF DOCUMENT: Application
American Municipal Power

SITE NAME/LOCATION AMP-OhioStream SITE NUMBER Bm-513 RIVER BASIN _____ DRAINAGE AREA (mi²) _____LENGTH OF STREAM REACH (ft) 300 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____DATE 12-1-05 SCORER BERM COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>20</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>5</u>
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>25</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>35</u>	<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>15</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock45% (A)

21

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

26

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

25

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

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

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

- ☐ None
- ☐ 0.5
- ☐ 1.0
- ☐ 1.5
- ☐ 2.0
- ☐ 2.5
- ☒ 3.0
- ☐ >3

STREAM GRADIENT ESTIMATE

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

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

BM-S13

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Meigs County Township / City: Retart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: unknown

Photograph Information: Y - Photo # 78 - Concord camera

Elevated Turbidity? (Y/N): N Canopy (% open): 30%

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

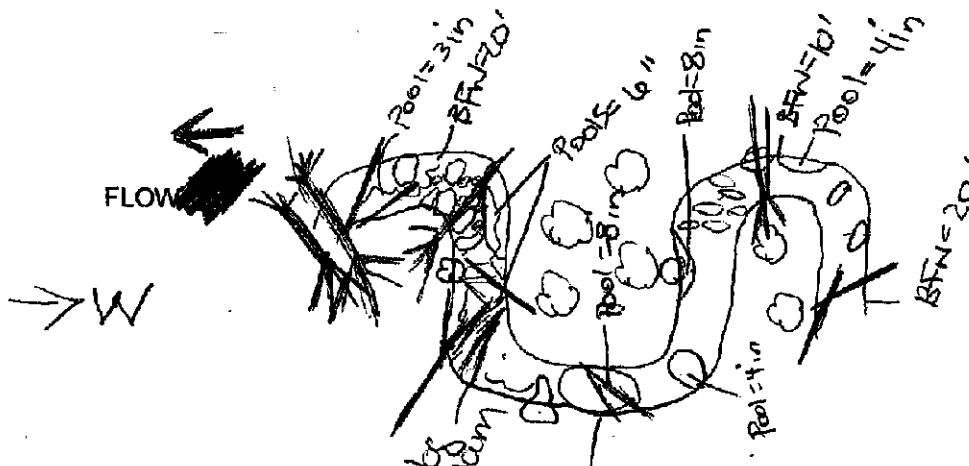
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



SITE NAME/LOCATION AmP Ohio
Stream SITE NUMBER BM-S14 RIVER BASIN _____ DRAINAGE AREA (mi²) < 1 mi²
 LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 12-1-05 SCORER REM COMMENTS drains into stream BM S-13

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>15%</u>	<input type="checkbox"/> LEAF PACK WOODY DEBRIS [3 pts]	<u>15%</u>
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>10%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>35%</u>	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	<u>25%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldg Slabs, Boulder, Cobble, Bedrock 25%

(A)

15

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

8.4

Pool Depth Max = 30

15

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

6.3

Bankfull Width Max = 30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

BM-514

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Meigs County Township / City: Lotant Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 11-29-05 Quantity: unknown
 Photograph Information: Y-Photo #79-Concord camera
 Elevated Turbidity? (Y/N): N Canopy (% open): 30%
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

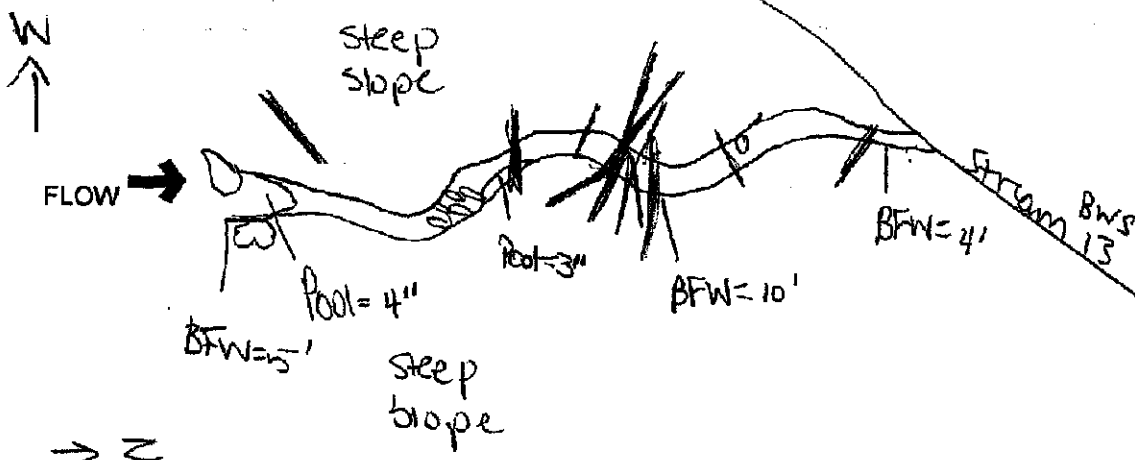
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Class I

Primary Headwater Habitat Evaluation Form

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

23

SITE NAME/LOCATION AMP- Ohio
 SITE NUMBER BIM-SLS RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) 100 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 12/1/05 SCORER Kooser COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.)				HHEI Metric Points
TYPE	PERCENT	TYPE	PERCENT	
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pt]	<u>10</u>	Substrate Max = 40
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____	
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____	18
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>20</u>	<input type="checkbox"/> MUCK [0 pts]	_____	A + B
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>70</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____	
Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock <u>0</u>		(A) <u>15</u>	(B) <u>3</u>	
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:		TOTAL NUMBER OF SUBSTRATE TYPES:		
2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):				
<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> 5 cm - 10 cm [15 pts]	0		
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]			
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]			
COMMENTS _____		MAXIMUM POOL DEPTH (centimeters):		
3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):				
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]	0.6		
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input checked="" type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]			
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]				
COMMENTS _____		AVERAGE BANKFULL WIDTH (meters)		

This information must also be completed
 RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆ NOTE: River Left (L) and Right (R) as looking downstream☆

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

COMMENTS young bur insect woods

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

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

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

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

BM-S15

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Mingo County Township / City: Retart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: #80

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

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

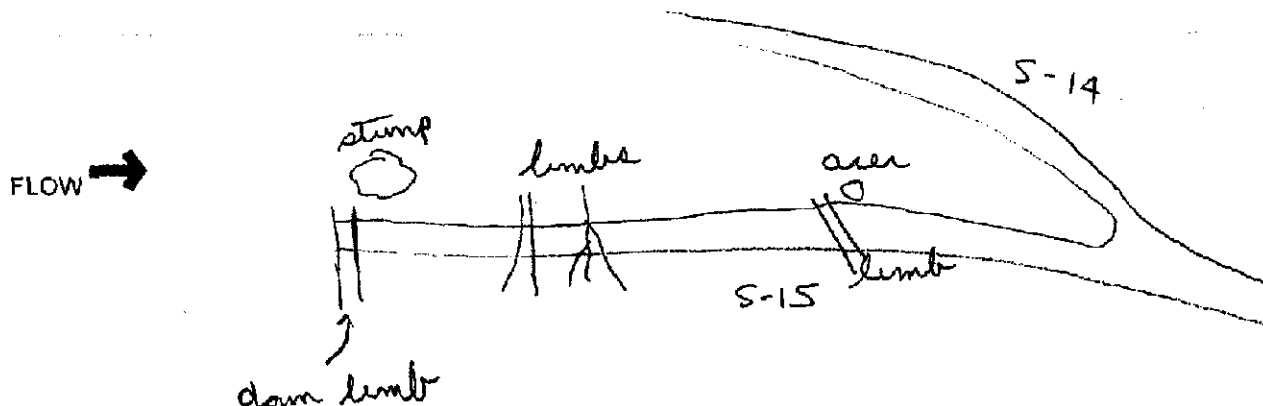
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



SITE NAME/LOCATION AMP - OhioStream SITE NUMBER BM-S16 RIVER BASIN _____ DRAINAGE AREA (mi²) 4LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____DATE 12-1-05 SCORER Ben COMMENTS drains into stream Bm-S-13

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

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

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

(A) 15(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 4020

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

Pool Depth
Max = 300

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

0

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

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

Bankfull
Width
Max=3020

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

6.2'

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

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

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

BM-516

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Morgan County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: unknown
 Photograph Information: Y-Photo #83 - concord camera
 Elevated Turbidity? (Y/N): N Canopy (% open): 40%
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

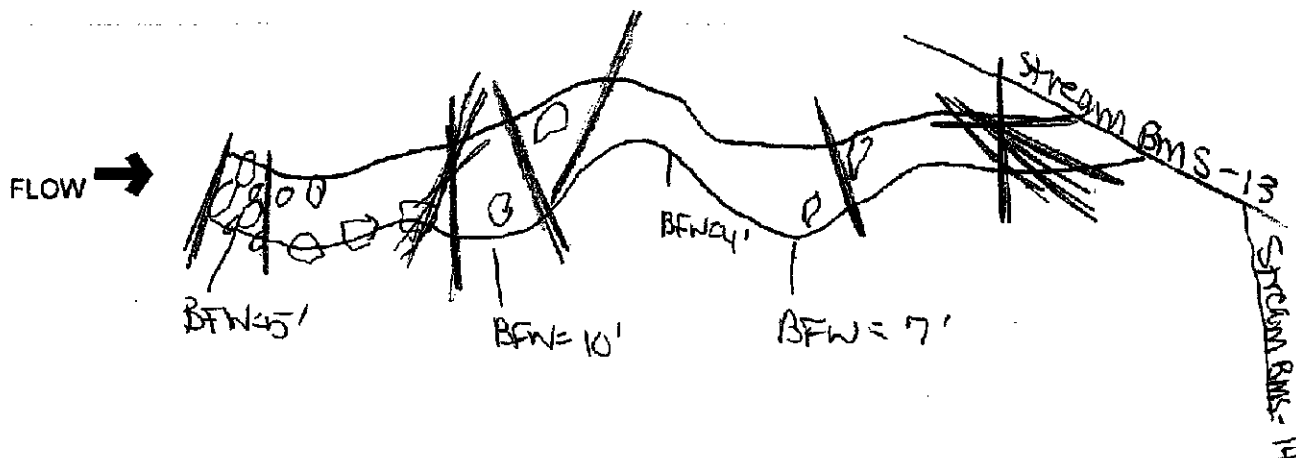
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
 Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
 Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____
 Comments Regarding Biology: _____

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

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



SITE NAME/LOCATION AMP - Ohiostream SITE NUMBER BM-S17 RIVER BASIN _____ DRAINAGE AREA (mi²) 4.1 mi²LENGTH OF STREAM REACH (ft) 200' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____DATE 12-1-05 SCORER BSM COMMENTS drama into stream BMS-13

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

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

MODIFICATIONS _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>15%</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>5%</u>
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>15%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>80%</u>	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>30%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 30%

(A)

15

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

20

A + B

Pool Depth
Max = 30

0

Bankfull
Width
Max=30

15

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

3.7

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

BM-S17

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Meigs County Township / City: Zetser Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: unknown

Photograph Information: Y - photo #82 - Concord camera

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

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

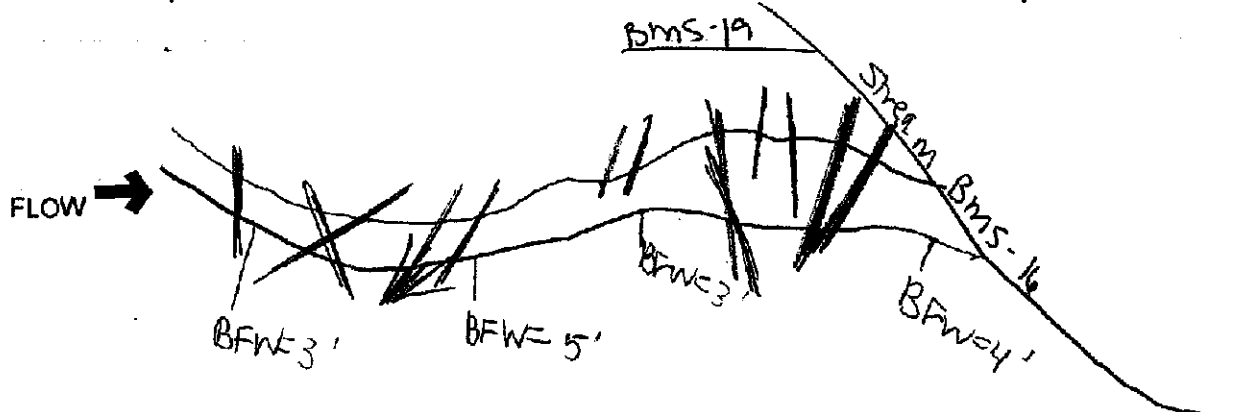
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

24

SITE NAME/LOCATION AMP - Ohio

SITE NUMBER BM-S18 RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 12/1/05

SCORER Kooser

COMMENTS _____

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

STREAM CHANNEL

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

MODIFICATIONS:

Recently exposed, was under ground

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pt]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>5</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>5</u>
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>15</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>75</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A)

15

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [6 pts]
<input type="checkbox"/> > 10 - 22.5 cm [26 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

0.5

HHEI
Metric
Points

Substrate
Max = 40

19

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)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

BM-S18

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Meigs County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown
 Photograph Information: #84
 Elevated Turbidity? (Y/N): N Canopy (% open): 35
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): Y If not, please explain: For open portions

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

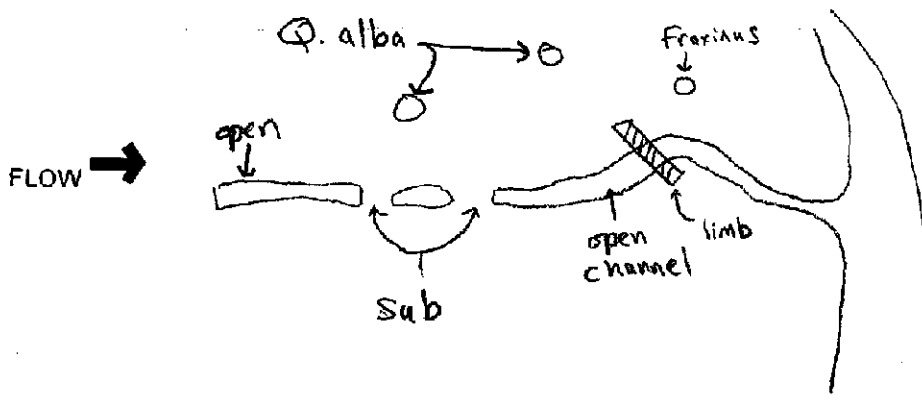
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



SITE NAME/LOCATION Amph Ohio
Stream SITE NUMBER BM-519 RIVER BASIN _____ DRAINAGE AREA (mi²) <1mi²
 LENGTH OF STREAM REACH (ft) 100' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 12-1-05 SCORER BEH COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pts]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>7%</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>3%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [19 pts]	<u>60%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>30%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldg Slabs, Boulder, Cobble, Bedrock 3% (A)

(B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

19

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

0

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

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

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

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

BM-519

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: Meigs County Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: ?

Photograph Information: Y - photo # 81 - concord camera

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

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

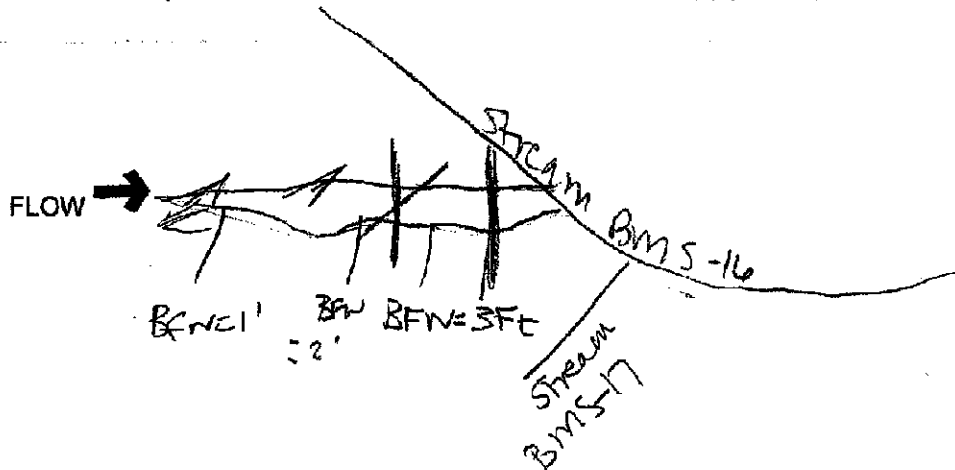
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



SITE NAME/LOCATION AmP Ohio
Stream SITE NUMBER BM-S20 RIVER BASIN _____ DRAINAGE AREA (mi²) 4mi²
 LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11-05 SCORER REM COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pts]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>100%</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>30%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>60%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A)

15

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

-18

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth
Max = 30

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

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

FLOODPLAIN QUALITY

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

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

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

BM-S20

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Meigs County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: unknown
 Photograph Information: Y - Photo #85
 Elevated Turbidity? (Y/N): N Canopy (% open): 40%
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

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

Comments Regarding Biology: _____

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

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



SITE NAME/LOCATION Amph Ohio
Stream SITE NUMBER BMS-21 RIVER BASIN _____ DRAINAGE AREA (mi²) 4.1
 LENGTH OF STREAM REACH (ft) 100' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 12-1-05 SCORER BEM COMMENTS draws into stream BMS-20

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pts]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>100%</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [8 pts]	<u>30%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>60%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A)

15

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

18

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth
Max = 30

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

2.1

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)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/> <input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/> <input type="checkbox"/>	Narrow <5m
<input type="checkbox"/> <input type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
County: Mingo County Township / City: Tetart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: unknown
Photograph Information: 4- photo 86
Elevated Turbidity? (Y/N): N Canopy (% open): 30%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

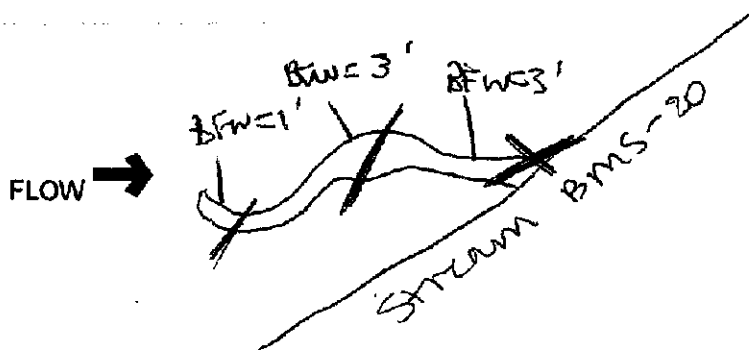
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

28

modified class I

SITE NAME/LOCATION AMP-ON

SITE NUMBER BS-1

RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11/29

SCORER Janet

COMMENTS _____

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

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pt]	<u>40</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>20</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	<u>20</u>
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>20</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A)

9

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

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

COMMENTS raining but no running water

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth Max = 30

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

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)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo Township / City: Retart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): X Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): 25Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) X If not, please explain: _____

Additional comments/description of pollution impacts: _____

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

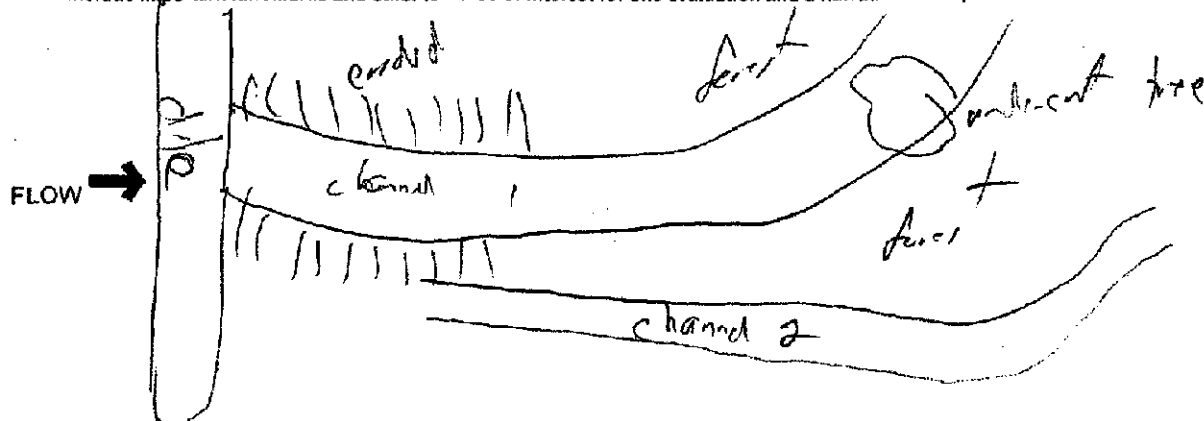
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



modified class II

Primary Headwater Habitat Evaluation Form

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

40

SITE NAME/LOCATION ART - OH

SITE NUMBER BS-1-2 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

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

DATE 11/2/05 SCORER MBL COMMENTS PHG 37

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input checked="" type="checkbox"/> BLDR SLABS [16 pts]		<input checked="" type="checkbox"/> SILT [3 pt]	40
<input checked="" type="checkbox"/> BOULDER (>256 mm) [16 pts]	20	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	10	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	10	<input type="checkbox"/> MUCK [0 pts]	10
<input type="checkbox"/> SAND (<2 mm) [6 pts]	10	<input type="checkbox"/> ARTIFICIAL [3 pts]	

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

20

(A)

19

(B)

6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

25

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth Max = 30

0

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

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)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Meigs Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): 25Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

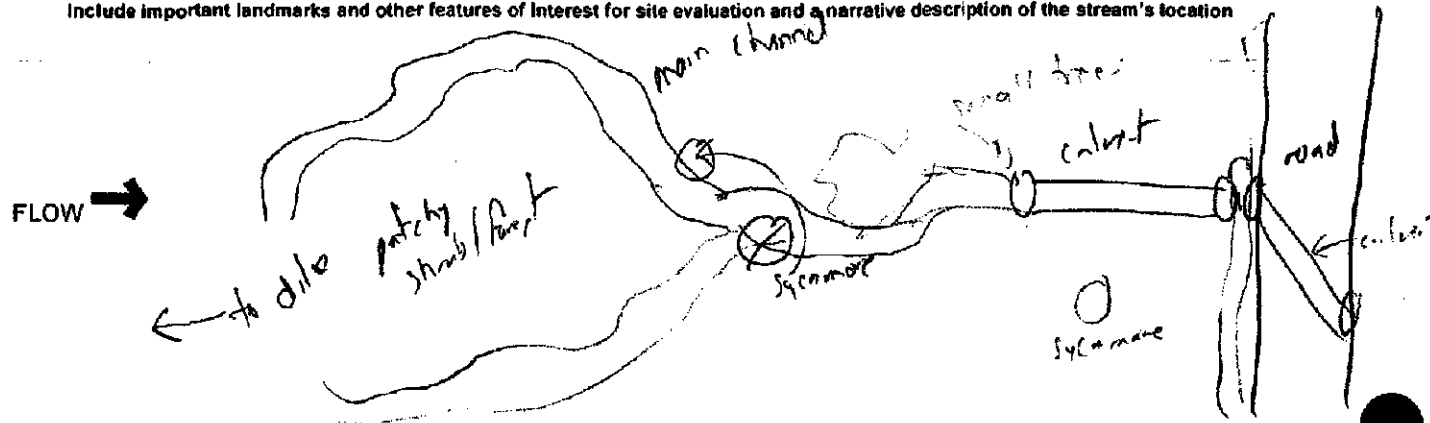
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

29

modified class I

SITE NAME/LOCATION AM-04
 SITE NUMBER BS-1-3 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 1/10/05 SCORER MAL COMMENTS shaded rain

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input checked="" type="checkbox"/> SILT [3 pts]	20
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	10	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	20	<input type="checkbox"/> MUCK [0 pts]	10
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	40	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10

(A) 9

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

14

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

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

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

COMMENTS channel rather straight artificially

AVERAGE BANKFULL WIDTH (meters)

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

FLOODPLAIN QUALITY

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

COMMENTS

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

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

COMMENTS Culvert and storm water not effective

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Meigs Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): 50Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) N If not, please explain: Bottom near road channelized and full of litter

Additional comments/description of pollution impacts: _____

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

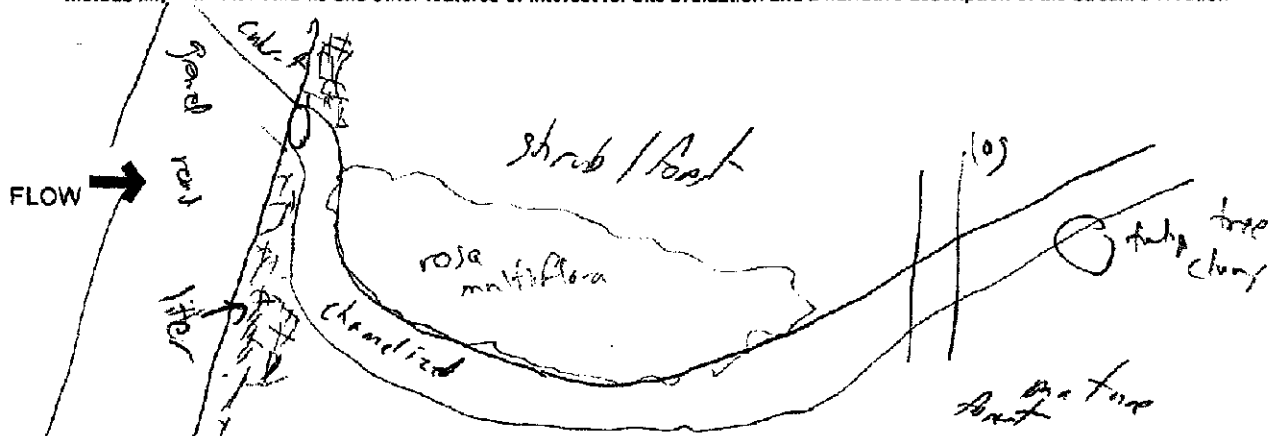
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



modified class II

Primary Headwater Habitat Evaluation Form

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

48

SITE NAME/LOCATION AMP-01

SITE NUMBER B5-2

RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) 100 m

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11/29/95

SCORER Kooser

COMMENTS _____

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

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☐ RECOVERED

☒ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

photos 27-28

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐

BLDR SLABS [16 pts]

☐

BOULDER (>256 mm) [16 pts]

☐

BEDROCK [16 pts]

☐

COBBLE (65-256 mm) [12 pts]

☐

GRAVEL (2-64 mm) [9 pts]

☐

SAND (<2 mm) [6 pts]

PERCENT

10

10

TYPE

☐

SILT [3 pt]

☐

LEAF PACK/WOODY DEBRIS [3 pts]

☐

FINE DETRITUS [3 pts]

☐

CLAY or HARDPAN [0 pt]

☐

MUCK [0 pts]

☐

ARTIFICIAL [3 pts]

PERCENT

75

5

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

20

(A)

24

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes). (Check ONLY one box):

☐

> 30 centimeters [20 pts]

☐

> 22.5 - 30 cm [30 pts]

☐

> 10 - 22.5 cm [25 pts]

☐

> 5 cm - 10 cm [15 pts]

☐

< 5 cm [5 pts]

☒

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

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

☐

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

☐

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

☒

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

☐

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

☐

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

28

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 >10m

☐

☐

Moderate 5-10m

☐

☐

Narrow <5m

☐

☐

None

COMMENTS _____

FLOODPLAIN QUALITY

L

R

(Most Predominant per Bank)

☐

☐

Mature Forest, Wetland

☒

☒

Immature Forest, Shrub or Old Field

☐

☐

Residential, Park, New Field

☐

☐

Fenced Pasture

L

R

Conservation Tillage

☐

☐

Urban or Industrial

☐

☐

Open Pasture, Row Crop

☐

☐

Mining or Construction

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

☐

Stream Flowing

☐

Subsurface flow with isolated pools (Interstitial)

☒

Moist Channel, isolated pools, no flow (Intermittent)

☒

Dry channel, no water (Ephemeral)

COMMENTS _____

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

☐

None

☐

0.5

☒

1.0

☒

1.5

☐

2.0

☐

2.5

☐

3.0

☐

>3

STREAM GRADIENT ESTIMATE

☐

Flat (0.5 m/100 ft)

☒

Flat to Moderate

☐

Moderate (2 m/100 ft)

☐

Moderate to Severe

☐

Severe (10 m/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo Township / City: Retard Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yes (27, 28)Elevated Turbidity? (Y/N): N Canopy (% open): 20Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

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

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

Comments Regarding Biology: _____

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

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

FLOW →

Primary Headwater Habitat Evaluation Form

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

43

SITE NAME/LOCATION AMP-0H

SITE NUMBER BS-2-2 RIVER BASIN _____

DRAINAGE AREA (mi²) _____

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

DATE _____ SCORER _____ COMMENTS _____

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

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

MODIFICATIONS: BS-2-2 HHEI 2 = 34

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input checked="" type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input checked="" type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>35</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>10</u>
<input type="checkbox"/> BEDROCK [16 pts]	<u>20</u>	<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>25</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>10</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]		<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]		<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 80

(A) 28

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

33

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [6 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS shallow rain

MAXIMUM POOL DEPTH (centimeters):

3

Pool Depth Max = 30

5

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

5

Bankfull Width Max=30

This information must also be completed

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R (Per Bank)

☒ Wide >10m

☐ Moderate 5-10m

☐ Narrow <5m

☐ None

COMMENTS Same Channel

L R (Most Predominant per Bank)

☒ Mature Forest, Wetland

☐ Immature Forest, Shrub or Old Field

☐ Residential, Park, New Field

☐ Fenced Pasture

L R

☐ Conservation Tillage

☐ Urban or Industrial

☐ Open Pasture, Row Crop

☐ Mining or Construction

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

☐ Stream Flowing

☐ Subsurface flow with isolated pools (Intermittent)

COMMENTS Heavy Rain

☒ Moist Channel, isolated pools, no flow (Intermittent)

☐ Dry channel, no water (Ephemeral)

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

☐ None

☐ 0.5

☐ 1.0

☐ 1.5

☐ 2.0

☒ 2.5

☐ 3.0

☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Morgan Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yes #34Elevated Turbidity? (Y/N): N Canopy (% open): 10Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

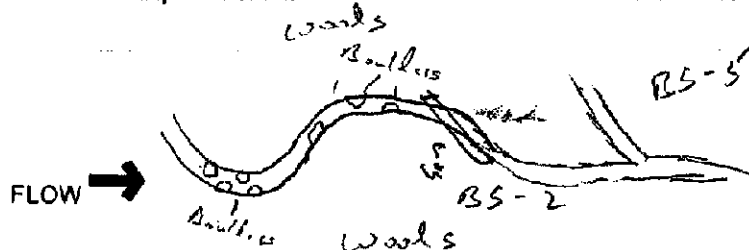
BIOTIC EVALUATIONPerformed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) N Voucher? (Y/N) _____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

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

23

SITE NAME/LOCATION AMP-0H

SITE NUMBER BS-3

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 300 LAT. LONG. RIVER CODE RIVER MILE

DATE 11/29/05 SCORER Kooser COMMENTS

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

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

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

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

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

(A)

15

(B)

3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

18

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS Loss of Rain

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth Max = 30

0

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

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

COMMENTS

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

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

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Meigs Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: yes

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

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

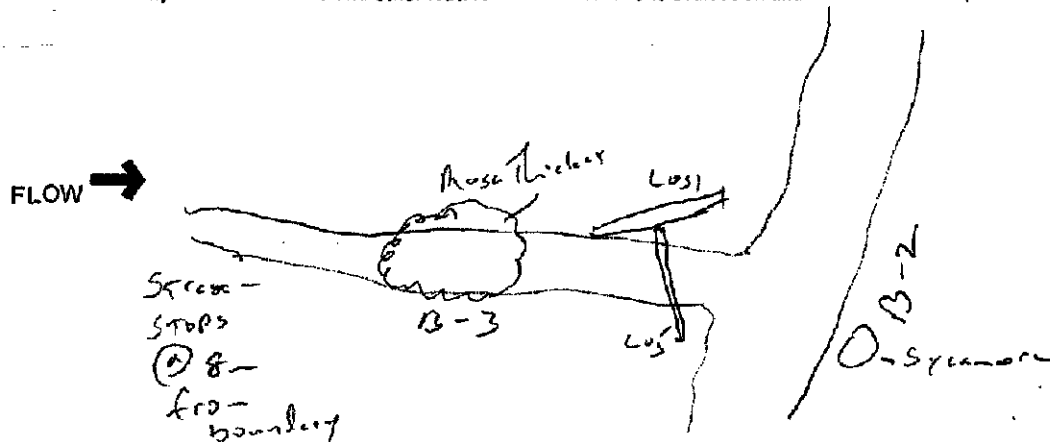
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

15

SITE NAME/LOCATION AMP-04

SITE NUMBER B5-4

RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) 200

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11/29/05

SCORER Kooser

COMMENTS _____

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

STREAM CHANNEL



NONE / NATURAL CHANNEL



RECOVERED



RECOVERING



RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE



BLDR SLABS [16 pts]



BOULDER (>256 mm) [16 pts]



BEDROCK [16 pts]



COBBLE (65-256 mm) [12 pts]



GRAVEL (2-64 mm) [9 pts]



SAND (<2 mm) [6 pts]

PERCENT

5

10

25

TYPE



SILT [3 pts]



LEAF PACK/WOODY DEBRIS [3 pts]



FINE DETRITUS [3 pts]



CLAY or HARDPAN [0 pt]



MUCK [0 pts]



ARTIFICIAL [3 pts]

PERCENT

60

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

0

(A)

6

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):



> 30 centimeters [20 pts]



> 22.5 - 30 cm [30 pts]



> 10 - 22.5 cm [25 pts]



> 5 cm - 10 cm [15 pts]



< 5 cm [5 pts]



NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Long at rain

MAXIMUM POOL DEPTH (centimeters):

0

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



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



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



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



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



≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

5

HHEI Metric Points

Substrate Max = 40

10

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

FLOODPLAIN QUALITY

L R



(Per Bank)



Wide >10m



Moderate 5-10m



Narrow <5m



None

L R



(Most Predominant per Bank)



Mature Forest, Wetland



Immature Forest, Shrub or Old Field



Residential, Park, New Field



Fenced Pasture

L R



Conservation Tillage



Urban or Industrial



Open Pasture, Row Crop



Mining or Construction

COMMENTS

Some tree cutting

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



Stream Flowing



Subsurface flow with isolated pools (Interstitial)



Moist Channel, isolated pools, no flow (Intermittent)



Dry channel, no water (Ephemeral)

COMMENTS



SINUOSITY (Number of bends per 61 m (200 ft) of channel)



(Check ONLY one box):



None



1.0



2.0



3.0



0.5



1.5



2.5



>3

STREAM GRADIENT ESTIMATE



Flat (0.5 ft/100 ft)



Flat to Moderate



Moderate (2 ft/100 ft)



Moderate to Severe



Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV - OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Morgan Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): 10%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

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

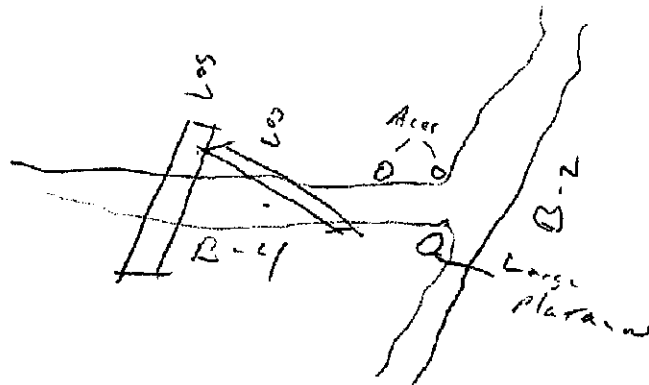
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

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

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

FLOW →



Primary Headwater Habitat Evaluation Form

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

Class I

19

SITE NAME/LOCATION AMP-01

SITE NUMBER B5-5 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) 50 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 11/29/05 SCORER 160050 COMMENTS _____

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

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

MODIFICATIONS: Scrub B55-1

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>5</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]	<u>15</u>	<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>40</u>
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>25</u>	<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>15</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ~20

(A) 9

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

14

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS No water

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth Max = 30

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Mingo Township / City: Gettysburg, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: yes #33

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

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

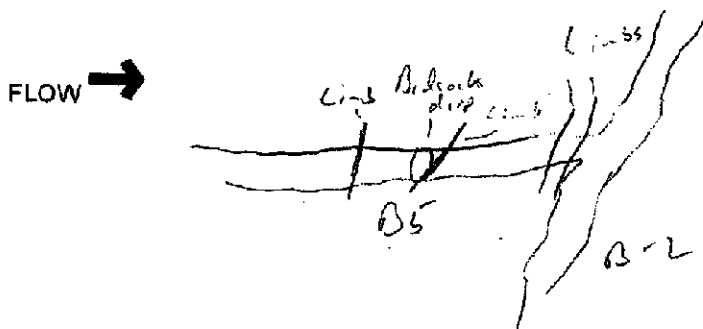
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

Class I

11

SITE NAME/LOCATION AMP-ON

SITE NUMBER BS-6 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

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

DATE _____ SCORER MBL COMMENTS intermittent rain

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

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

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input checked="" type="checkbox"/> SILT [3 pt]	<u>60</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]		<input checked="" type="checkbox"/> MUCK [0 pts]	<u>30</u>
<input type="checkbox"/> SAND (<2 mm) [8 pts]	<u>10</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

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

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

6

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS Very steep, no pools

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth Max = 30

0

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

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

COMMENTS forested

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

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

COMMENTS intermittent rain

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Morgan Township / City: Getart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: photo 35Elevated Turbidity? (Y/N): N Canopy (% open): 25Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____Additional comments/description of pollution impacts: severely eroded banks**BIOTIC EVALUATION**Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

16

SITE NAME/LOCATION ANP-OR
 SITE NUMBER BS-8 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11/24/05 SCORER MB COMMENTS intermittent rain

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

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

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

(A) 3

(B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS moist channel after 50 ft

MAXIMUM POOL DEPTH (centimeters):

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R (Per Bank)

☒ Wide >10m

☐ Moderate 5-10m

☒ Narrow <5m

☐ None

COMMENTS some field to east

L R (Most Predominant per Bank)

☐ Mature Forest, Wetland

☒ Immature Forest, Shrub or Old Field

☐ Residential, Park, New Field

☐ Fenced Pasture

L R

☐ Conservation Tillage

☐ Urban or Industrial

☒ Open Pasture, Row Crop

☐ Mining or Construction

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

☐ Stream Flowing

☐ Subsurface flow with isolated pools (Interstitial)

COMMENTS

☒ Moist Channel, isolated pools, no flow (Intermittent)

☐ Dry channel, no water (Ephemeral)

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

☐ None

☐ 0.5

☒ 1.0

☐ 1.5

☐ 2.0

☐ 2.5

☐ 3.0

☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Meigs Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown
 Photograph Information: yes #39
 Elevated Turbidity? (Y/N): N Canopy (% open): 50
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

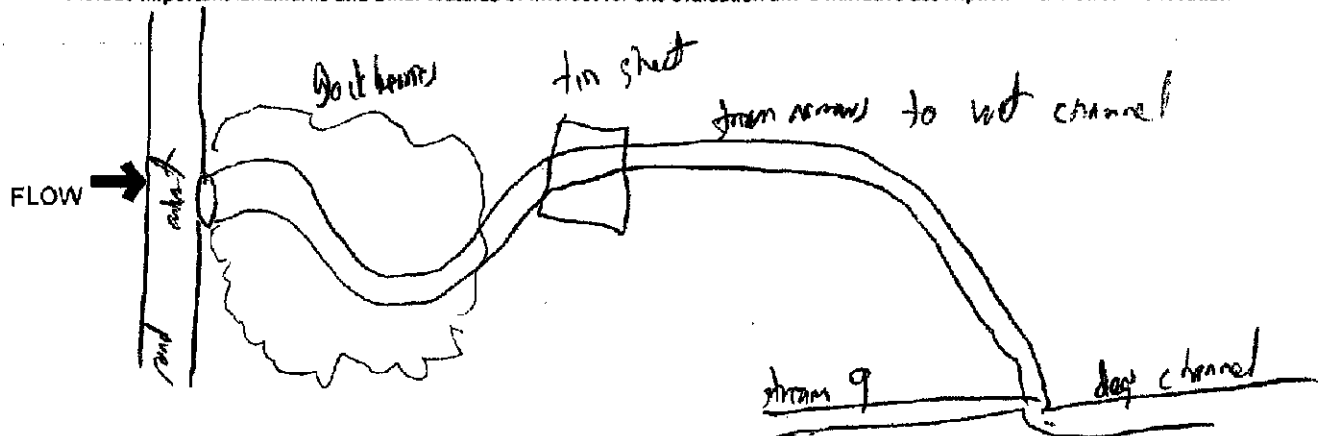
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

13

SITE NAME/LOCATION AMP-0H

SITE NUMBER BS-9

RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11/29/05

SCORER MBL

COMMENTS Intermittent rain

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

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pt]	<u>75</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input checked="" type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	<u>25</u>
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A) 6

(B) 2

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS Very shallow channel

MAXIMUM POOL DEPTH (centimeters):

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

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

FLOODPLAIN QUALITY

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-0 N NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Mpigs Township / City: Litant Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: yes #40

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

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

entire length (~80 ft) in sunny area

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

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

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

54

SITE NAME/LOCATION AMP-OR

SITE NUMBER BS-10

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 200

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 11/29/05 SCORER Kooser COMMENTS

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

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

Culvert, connects to BS-11 north of Road

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types present (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐

BLDR SLABS [16 pts]

☐

BOULDER (>256 mm) [16 pts]

☐

BEDROCK [16 pts]

☐

COBBLE (65-256 mm) [12 pts]

☒

GRAVEL (2-64 mm) [9 pts]

☒

SAND (<2 mm) [6 pts]

PERCENT

20

25

30

TYPE

☐

SILT [3 pt]

☐

LEAF PACK/WOODY DEBRIS [3 pts]

☐

FINE DETRITUS [3 pts]

☒

CLAY or HARDPAN [0 pt]

☐

MUCK [0 pts]

☐

ARTIFICIAL [3 pts]

PERCENT

25

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

20

(A)

15

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

19

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐

> 30 centimeters [20 pts]

☐

> 22.5 - 30 cm [30 pts]

☐

> 10 - 22.5 cm [25 pts]

☒

> 5 cm - 10 cm [15 pts]

☐

< 5 cm [5 pts]

☐

NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth
Max = 30

15

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

15

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

☐

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

☐

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

☒

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

☐

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

☐

≤ 1.0 m (≤ 3' 3") [5 pts]

Bankfull
Width
Max=30

20

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R

☒ ☐

(Per Bank)

Wide >10m

☐ ☒

Moderate 5-10m

☐ ☐

Narrow <5m

☐ ☐

None

L R

☐ ☐

(Most Predominant per Bank)

Mature Forest, Wetland

☒ ☒

Immature Forest, Shrub or Old

☐ ☐

Field

☐ ☐

Residential, Park, New Field

☐ ☐

Fenced Pasture

L R

☐ ☐

Conservation Tillage

☐ ☐

Urban or Industrial

☒ ☒

Open Pasture, Row

☐ ☐

Crop

☐ ☐

Mining or Construction

COMMENTS

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

☒

Stream Flowing

☐

Subsurface flow with isolated pools (Intermittent)

☐

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS

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

☐

None

☐

1.0

☒

2.0

☐

3.0

☐

0.5

☐

1.5

☐

2.5

☐

>3

STREAM GRADIENT ESTIMATE

☒

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Morgan Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: yes

Elevated Turbidity? (Y/N): N Canopy (% open): 45%

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

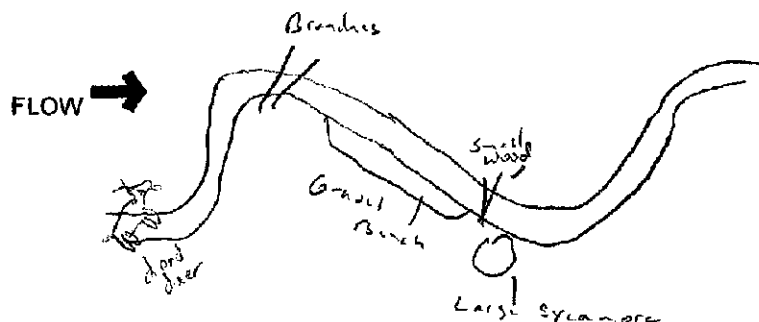
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

55

SITE NAME/LOCATION AMP-OR

SITE NUMBER 38-11

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) 100

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 11/29/05

SCORER Rooser

COMMENTS

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

STREAM CHANNEL



NONE / NATURAL CHANNEL



RECOVERED



RECOVERING



RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE



BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pt]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [8 pts]

SAND (<2 mm) [8 pts]

PERCENT

25

30

TYPE



SILT [3 pt]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pt]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

20

25

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

25

(A)

21

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):



> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]



> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

15

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



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

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

> 1.5 m - 3.0 m (> 9' 7" - 4' 6") [20 pts]



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

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R



(Per Bank)

Wide >10m



Moderate 5-10m



Narrow <5m



None

COMMENTS

L R



(Most Predominant per Bank)

Mature Forest, Wetland



Immature Forest, Shrub or Old Field



Residential, Park, New Field



Fenced Pasture

L R



Conservation Tillage



Urban or Industrial



Open Pasture, Row Crop



Mining or Construction

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



Stream Flowing

Subsurface flow with isolated pools (Interstitial)

COMMENTS



Moist Channel, isolated pools, no flow (Intermittent)

Dry channel, no water (Ephemeral)

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



None

0.5



1.0

1.5



2.0

2.5



3.0

>3

STREAM GRADIENT ESTIMATE



Flat (0.5 ft/100 ft)



Flat to Moderate



Moderate (2 ft/100 ft)



Moderate to Severe



Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo Township / City: Gettysburg, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): 100%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

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

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

43

Class II

SITE NAME/LOCATION AMP-ON
 SITE NUMBER BS-12 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 10/2/05 SCORER MAL COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pt]	<u>30</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	<u>20</u>
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>10</u>	<input checked="" type="checkbox"/> MUCK [0 pts]	<u>30</u>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>10</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A)

3

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [26 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

15

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

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [26 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

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

COMMENTS

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

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

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
County: Meigs Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/21/05 Quantity: unknown
Photograph Information: 90, 91 Cincy
Elevated Turbidity? (Y/N): N Canopy (% open): _____
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

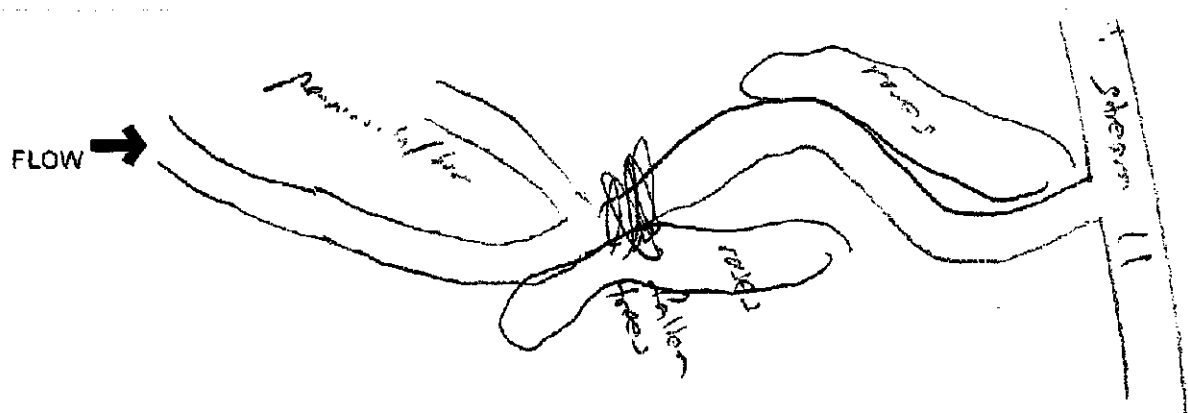
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____
Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

Class III

86

SITE NAME/LOCATION AMP-0H

SITE NUMBER BS-13 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

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

DATE 11/29/05 SCORER JAV COMMENTS _____

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

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

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input checked="" type="checkbox"/> BLDR SLABS [16 pts]	<u>10%</u>	<input type="checkbox"/> SILT [3 pts]	<u>15%</u>
<input checked="" type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>35%</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>10%</u>
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>5%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>25%</u>	<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]		<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ~50% (A) 25

(B) 6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

HHEI Metric Points

Substrate Max = 40

31

A + B

Pool Depth Max = 30

25

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

FLOODPLAIN QUALITY

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUSBase Flow Conditions? (Y/N): N Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): _____Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

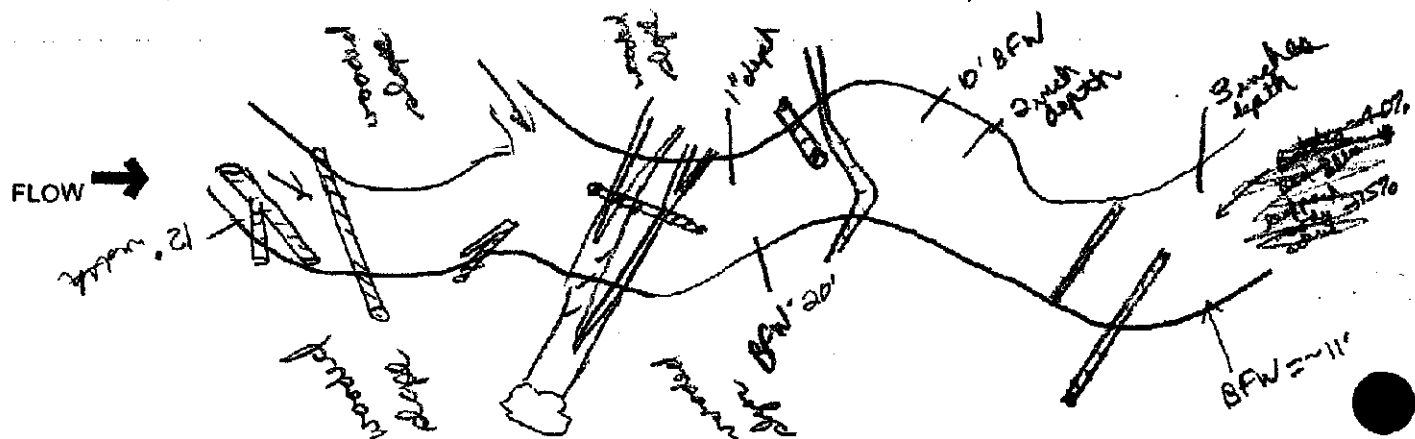
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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





Primary Headwater Habitat Evaluation Form

Class II

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

49

SITE NAME/LOCATION

Stream

SITE NUMBER BS-14

RIVER BASIN

DRAINAGE AREA (mi²) <1 mi²

LENGTH OF STREAM REACH (ft)

300'

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE

11-29-05

SCORER

BEM

COMMENTS

Flows into stream 8

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

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL

☐ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐
☒
☐
☐
☐
☒
☐
☐

BLDR SLABS (16 pts)

BOULDER (>256 mm) (16 pts)

BEDROCK (16 pts)

COBBLE (64-256 mm) (12 pts)

GRAVEL (2-64 mm) (8 pts)

SAND (<2 mm) (8 pts)

PERCENT

140

25

25

TYPE

☐
☐
☐
☐
☐
☐
☐
☐

SILT (3 pts)

LEAF PACK/WOODY DEBRIS (3 pts)

FINE DETRITUS (3 pts)

CLAY or HARDPAN (0 pts)

MUCK (0 pts)

ARTIFICIAL (3 pts)

PERCENT

15

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

66%

(A)

25

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

29

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐
☐
☐
☐

> 30 centimeters (20 pts)

> 22.5 - 30 cm (30 pts)

> 10 - 22.5 cm (25 pts)

☐
☐
☒

> 5 cm - 10 cm (15 pts)

< 5 cm (5 pts)

NO WATER OR MOIST CHANNEL (0 pts)

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth
Max = 30

0

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

☐
☐
☒

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

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

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

☐
☐

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

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

FLOODPLAIN QUALITY

L/R

(Per Bank)

☒

Wide >10m

☐

Moderate 5-10m

☐

Narrow <5m

☐

None

COMMENTS

L/R

(Most Predominant per Bank)

☒

Mature Forest, Wetland

☒

Immature Forest, Shrub or Old Field

☐

Residential, Park, New Field

☐

Fenced Pasture

L/R

☐

Conservation Tillage

☐

Urban or Industrial

☐

Open Pasture, Row Crop

☐

Mining or Construction

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

☐

Stream Flowing

☐

Subsurface flow with isolated pools (Intermittent)

☒

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS

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

☐

None

☐

0.5

☒

1.0

☐

1.5

☐

2.0

☐

2.5

☐

3.0

☐

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.6 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☒ Severe (10 ft/100 ft)

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

BS-14

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, W-V OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Mus County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: unknown
 Photograph Information: Y
 Elevated Turbidity? (Y/N): N Canopy (% open): 40%
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

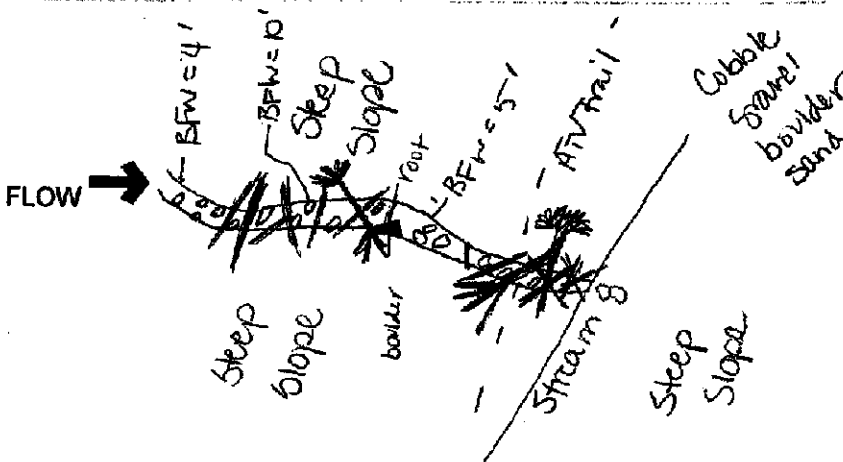
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
 Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
 Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____
 Comments Regarding Biology: _____

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

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



class II

Primary Headwater Habitat Evaluation Form

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

40

SITE NAME/LOCATION AmphibSITE NUMBER BS-15

RIVER BASIN _____

DRAINAGE AREA (mi²) _____LENGTH OF STREAM REACH (ft) 160

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 29 Nov 05 SCORER Kousar/Venkat COMMENTS _____

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

STREAM CHANNEL



NONE / NATURAL CHANNEL



RECOVERED



RECOVERING



RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE



BLDR SLABS [16 pts]



BOULDER (>256 mm) [16 pts]



BEDROCK [16 pts]



COBBLE (65-256 mm) [12 pts]



GRAVEL (2-64 mm) [9 pts]



SAND (<2 mm) [6 pts]

PERCENT

35

20

20

55%

TYPE



SILT [3 pt]



LEAF PACK/WOODY DEBRIS [3 pts]



FINE DETRITUS [3 pts]



CLAY or HARDPAN [0 pt]



MUCK [0 pts]



ARTIFICIAL [3 pts]

PERCENT

25

HHEI
Metric
PointsSubstrate
Max = 40

20

A + B

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

55%

(A)

16

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes). (Check ONLY one box):



> 30 centimeters [20 pts]



> 22.5 - 30 cm [30 pts]



> 10 - 22.5 cm [25 pts]



> 5 cm - 10 cm [15 pts]



< 5 cm [5 pts]



NO WATER OR MOIST CHANNEL [0 pts]

Pool Depth
Max = 30

15

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

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



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



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



> 1.5 m - 3.0 m (> 9' 7" - 4' 6") [20 pts]



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



≤ 1.0 m (≤ 3' 3") [5 pts]

Bankfull
Width
Max=30

5

COMMENTS

AVERAGE BANKFULL WIDTH (meters):

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

L R



(Per Bank)



Wide >10m



Moderate 5-10m



Narrow <5m



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)



Stream Flowing



Subsurface flow with isolated pools (Interstitial)



Moist Channel, isolated pools, no flow (Intermittent)



Dry channel, no water (Ephemeral)

COMMENTS Rain today

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



None



0.5



1.0



1.5



2.0



2.5



3.0



>3

STREAM GRADIENT ESTIMATE



Flat (0.5 ft/100 ft)



Flat to Moderate



Moderate (2 ft/100 ft)



Moderate to Severe



Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo Township / City: Detart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: 58 + 59 Mar's cameraElevated Turbidity? (Y/N): N Canopy (% open): 15%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

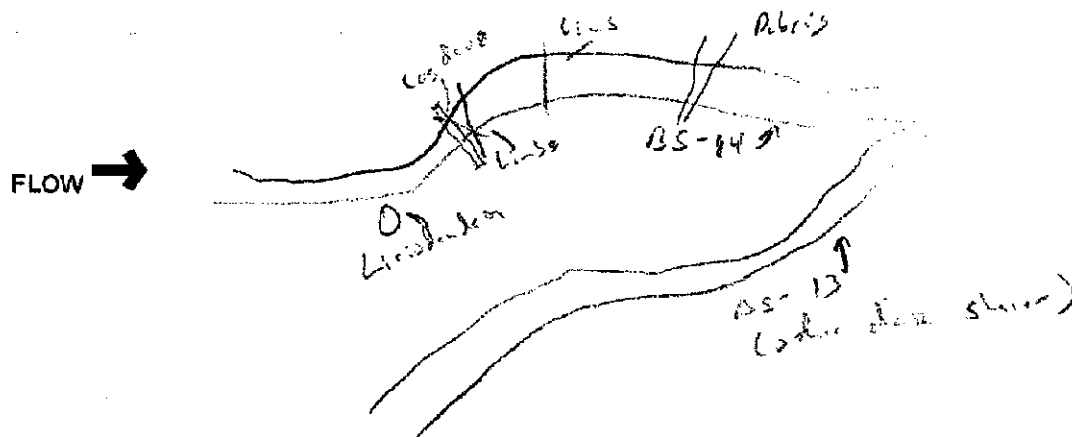
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

47

SITE NAME/LOCATION AMP-04
 SITE NUMBER BS-16 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11/29/05 SCORER NBL COMMENTS _____

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

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

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

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

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

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

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

Pool Depth
Max = 30

15

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

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

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

Bankfull
Width
Max=30

25

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

This information must also be completed

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

RIPARIAN WIDTH

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

FLOODPLAIN QUALITY

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

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

COMMENTS Wetland at head of stream, not near river

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

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

COMMENTS open / permanent

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yes #42, 43Elevated Turbidity? (Y/N): N Canopy (% open): _____Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

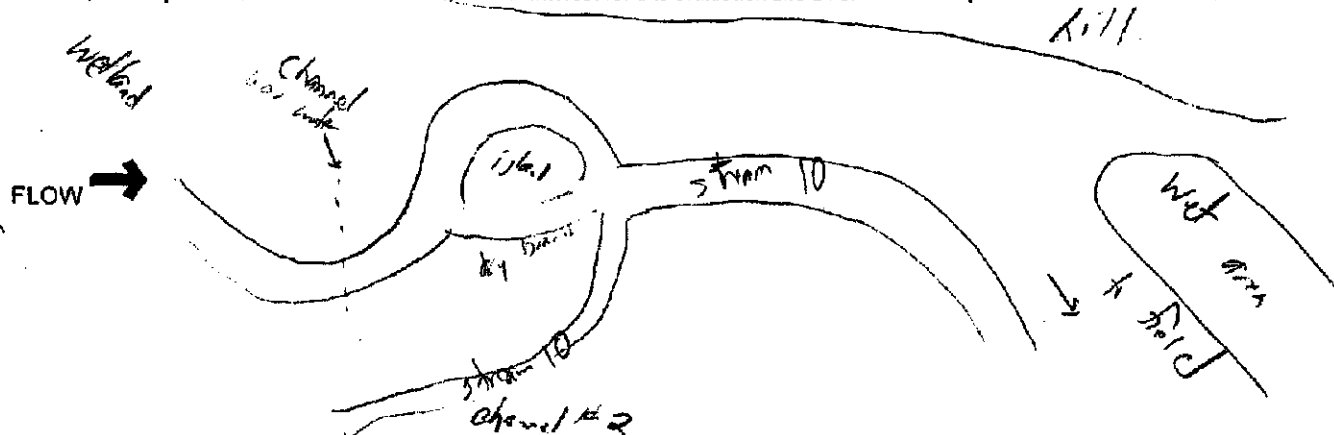
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

Class I

25

SITE NAME/LOCATION AMP-0H

SITE NUMBER CS-1 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

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

DATE 11/30/05 SCORER MBL/JAV COMMENTS _____

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

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

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>5%</u>	<input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>20%</u>
<input type="checkbox"/> BEDROCK [16 pts]		<input checked="" type="checkbox"/> FINE DETRITUS [3 pts]	<u>5%</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>50%</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>5%</u>	<input type="checkbox"/> MUCK [0 pts]	<u>5%</u>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>10%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

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

5%

(A) 3

(B) 7

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

10

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

Bankfull
Width
Max=30

15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN ZONE

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

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: NLS

Elevated Turbidity? (Y/N): N Canopy (% open): ~40% wooded slope, leaves have fallen

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

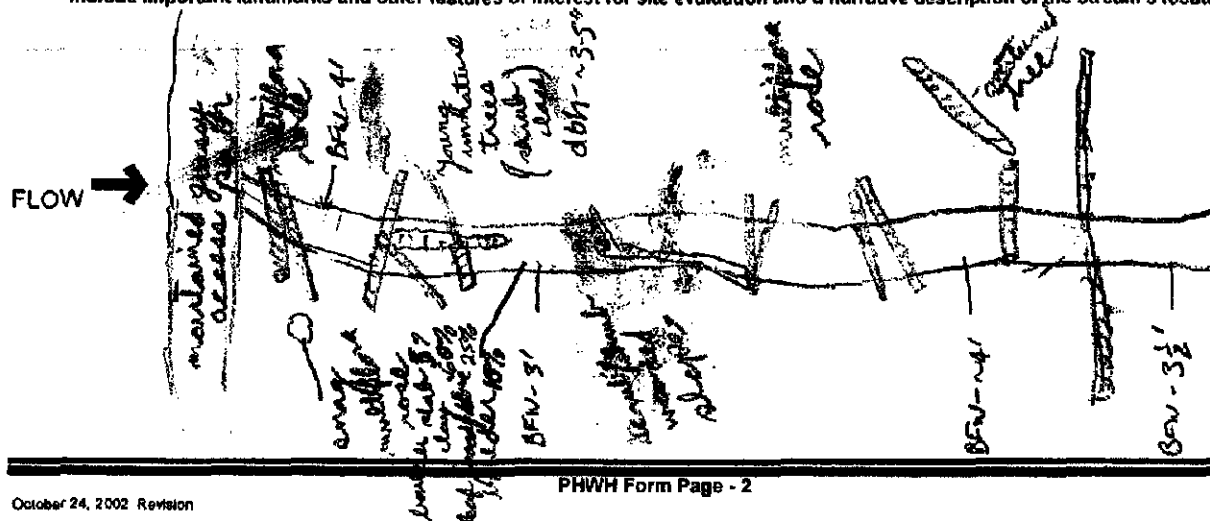
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology:

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

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



Primary Headwater Habitat Evaluation Form

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

69

SITE NAME/LOCATION AMP-CH

SITE NUMBER CS-1-2

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 11/30/05

SCORER JAV

COMMENTS

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

STREAM CHANNEL



NONE / NATURAL CHANNEL



RECOVERED



RECOVERING



RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input checked="" type="checkbox"/> BLDG SLABS [16 pts]	45%	<input type="checkbox"/> SILT [3 pts]	
<input checked="" type="checkbox"/> BOULDER (>256 mm) [16 pts]	25%	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	14%
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	5%	<input type="checkbox"/> CLAY or HARPAN [0 pts]	5%
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	3%	<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]	3%	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
Blr Slabs, Boulder, Cobble, Bedrock ~65%

(A)

32

(B)

7

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

0

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

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 6") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 8" - 9' 8") [20 pts]	

COMMENTS

stream reach starts out narrow and widens quickly

AVERAGE BANKFULL WIDTH (meters)

14'

HHEI
Metric
Points

Substrate
Max = 40

39

A + B

Pool Depth
Max = 30

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

FLOODPLAIN QUALITY

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

COMMENTS

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

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

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: NRCS Soil Map Stream Order

County: Meigs Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: yes

Elevated Turbidity? (Y/N): NO Canopy (% open): ~30% (when trees have leaves)

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

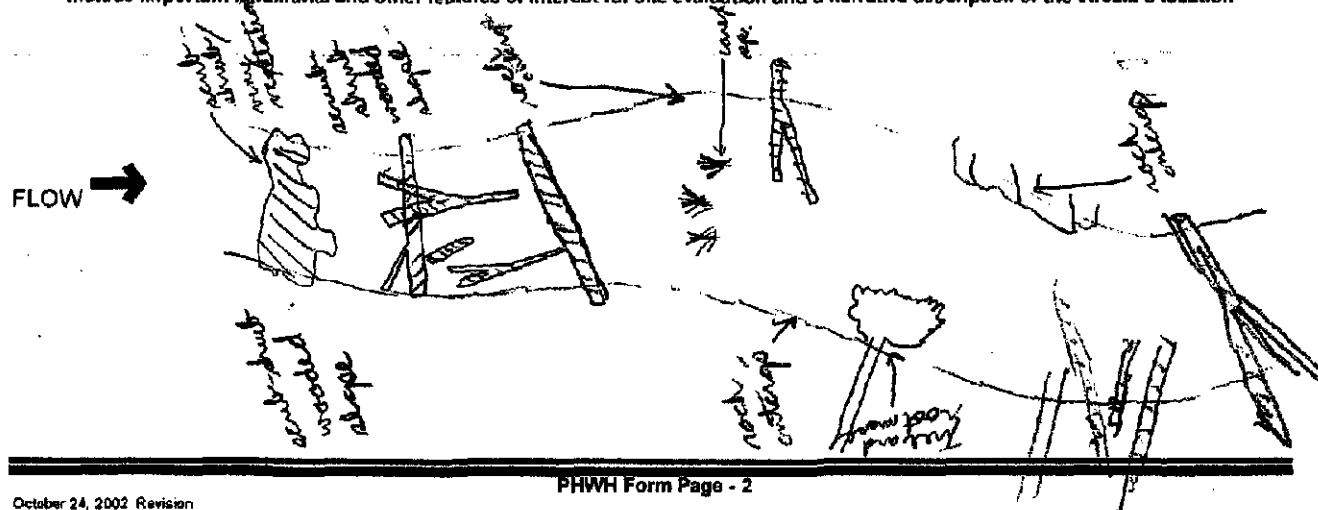
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology:

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

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



Primary Headwater Habitat Evaluation Form

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

42

SITE NAME/LOCATION AMP-01
 SITE NUMBER LS-2 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11/30/05 SCORER MBL COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	10
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	10	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pt]	10	<input type="checkbox"/> FINE DETRITUS [3 pts]	10
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	10	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	35	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	15	<input type="checkbox"/> ARTIFICIAL [3 pts]	

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

30

(A)

15

(B)

7

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

22

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS puddled water 11/2 above exit to CS MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

5

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

Bankfull
Width
Max=30

15

This information must also be completed

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

RIPARIAN WIDTH

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

COMMENTS Area above east pipe mostly timbered

FLOODPLAIN QUALITY

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

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

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

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Meigs Township / City: Retort Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): _____Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: Many timber trees in channel

Head of stream cut off by ATV trail.

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

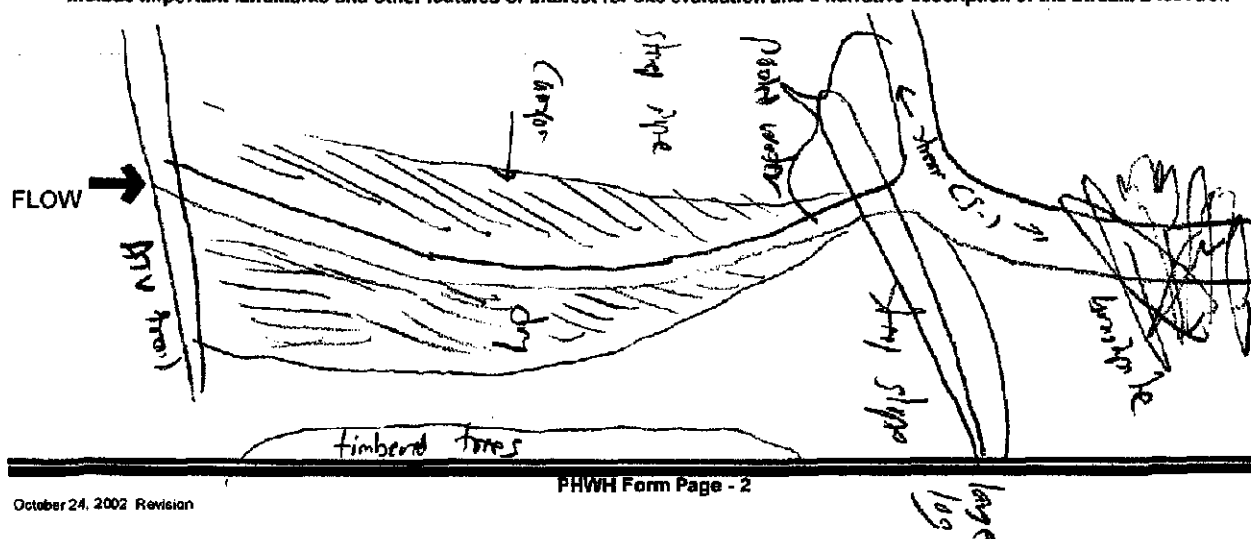
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

Class II

47

SITE NAME/LOCATION AMP-08

SITE NUMBER CS-3-1 RIVER BASIN _____

DRAINAGE AREA (mi²) _____

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

DATE 11/30/05 SCORER JAV COMMENTS _____

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

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

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]	_____	<input type="checkbox"/> SILT [3 pt]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>15%</u>
<input checked="" type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>10%</u>
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>25%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>5%</u>
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>30%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>15%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldg Slabs, Boulder, Cobble, Bedrock ~25%

(A) 21

(B) 6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

- ☐ > 30 centimeters [20 pts] ☐ > 5 cm - 10 cm [15 pts]
- ☐ > 22.5 - 30 cm [30 pts] ☒ < 5 cm [5 pts]
- ☐ > 10 - 22.5 cm [25 pts] ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS moist channels, no flowing water or pools MAXIMUM POOL DEPTH (centimeters):

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

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

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters)

HHEI Metric Points

Substrate Max = 40

27

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

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

- ☐ None ☐ 1.0 ☒ 2.0 ☐ 3.0
- ☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: NRCS Soil Map Stream Order

County: Mingo Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/21/05 Quantity: unknown

Photograph Information: yes

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

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

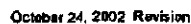
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: no fish or salamanders (larvae) observed

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

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



Primary Headwater Habitat Evaluation Form

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

Class III

58

SITE NAME/LOCATION AMP-01

SITE NUMBER CS-3-2 RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) 200

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11/30/05

SCORER MBL

COMMENTS _____

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

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

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

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

25

(A)

5

(B)

8

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

15

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

Bankfull
Width
Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Meigs Township / City: Letort Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): _____Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

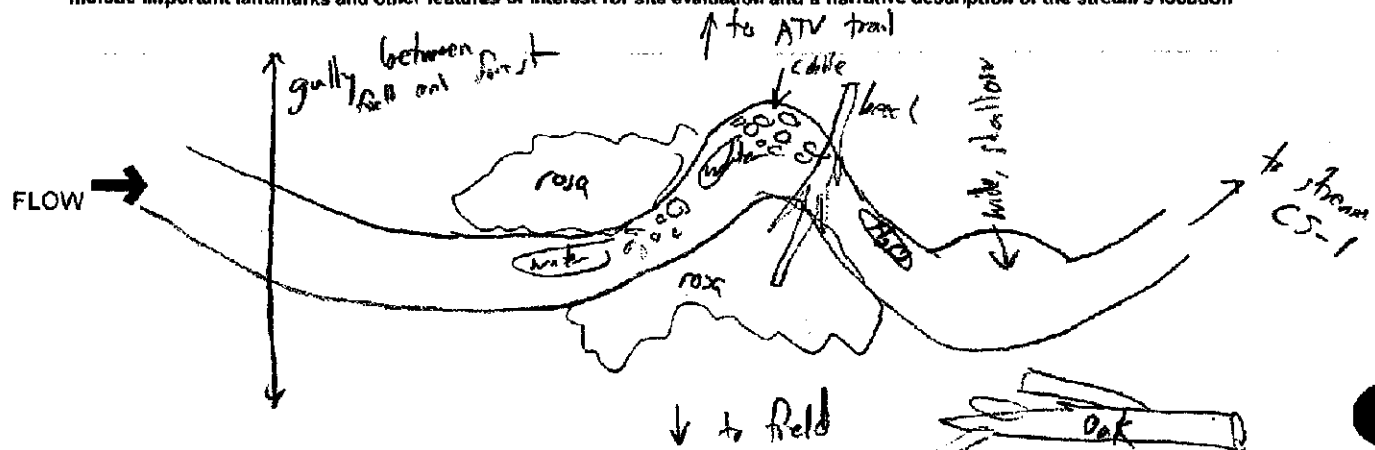
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



Area is beech/oak with shrub/yrn. hawthorn-like tangles

Primary Headwater Habitat Evaluation Form

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

34

modified class II

SITE NAME/LOCATION AM - OR
 SITE NUMBER LS-4 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) 300 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11/30/05 SCORER MBL COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pt]	<u>20</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>15</u>
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (85-256 mm) [12 pts]	<u>5</u>	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>30</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [8 pts]	<u>5</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>5</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of
 Bldr Slabs, Boulder, Cobble, Bedrock 5

(A) 3

(B) 6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

9

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [6 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

5

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

Bankfull
Width
Max=30

20

This information must also be completed

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

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

COMMENTS _____

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

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

COMMENTS no apparent substrate = drier - drier

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Meigs Township / City: Retart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown
 Photograph Information: yes
 Elevated Turbidity? (Y/N): N Canopy (% open): 75
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

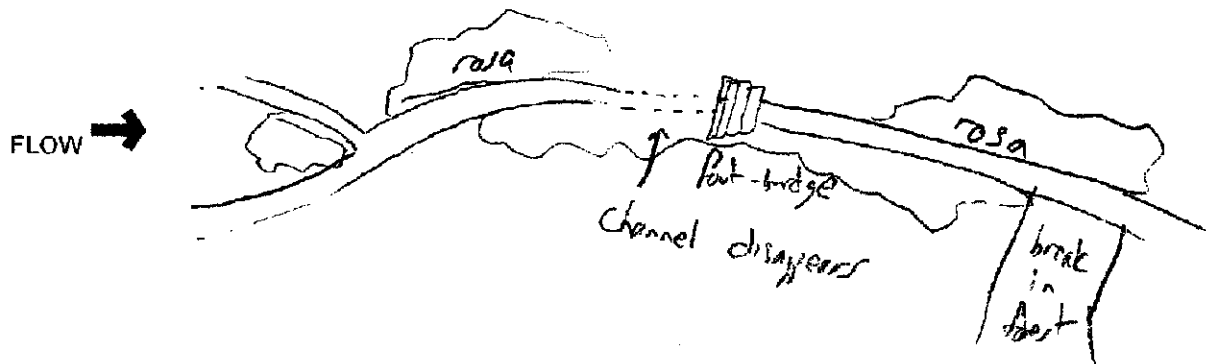
Additional comments/description of pollution impacts: Wooded valley between 2 row-crop fields

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
 Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
 Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____
 Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

77

SITE NAME/LOCATION AMP-ON

SITE NUMBER CS-4-2 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

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

DATE 11/30/05 SCORER JAV COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<u>10%</u>	<input type="checkbox"/> SILT [3 pts]	<u>5%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>5%</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>5%</u>
<input checked="" type="checkbox"/> BEDROCK [16 pts]	<u>45%</u>	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>25%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>5%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ~60%

(A) 25

(B) 7

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

32

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

20.5

Pool Depth Max = 30

25

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters):

~8.2

Bankfull Width Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

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

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Mingo Township / City: Letart Falls, Ohio area

MISCELLANEOUSBase Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): ~40%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

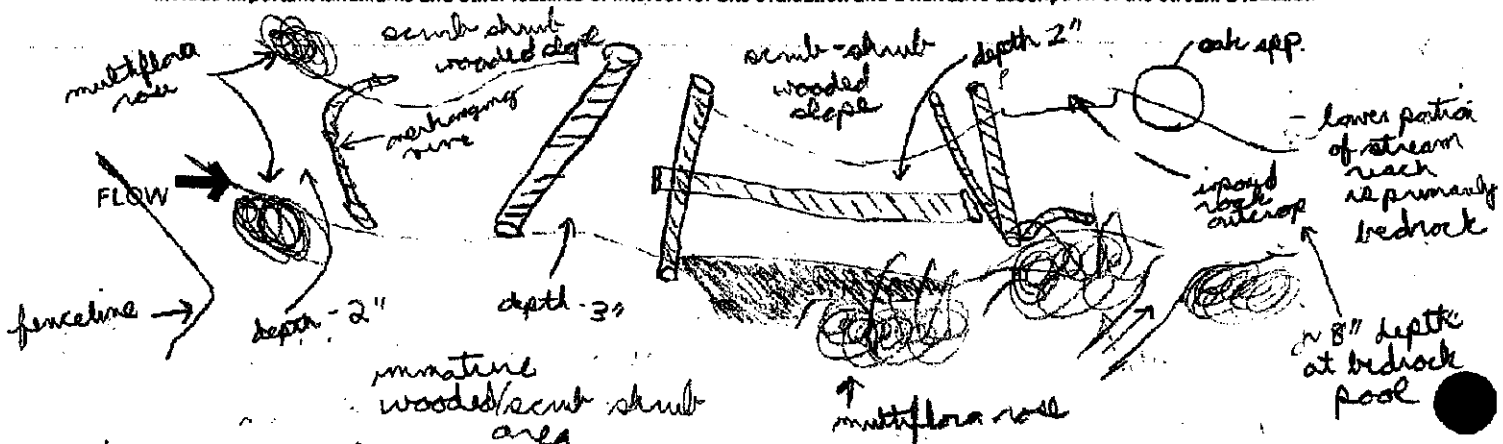
Fish Observed? (Y/N): N Voucher? (Y/N): _____ Salamanders Observed? (Y/N): _____ Voucher? (Y/N): _____

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

23

SITE NAME/LOCATION AMP-04

SITE NUMBER CS-5-2 RIVER BASIN _____ DRAINAGE AREA (mi²) _____

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

DATE 11/30/05 SCORER JAV COMMENTS _____

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

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

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input checked="" type="checkbox"/> SILT [3 pts]	25%
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF PACKWOODY DEBRIS [3 pts]	15%
<input type="checkbox"/> BEDROCK [16 pts]		<input checked="" type="checkbox"/> FINE DETRITUS [3 pts]	5%
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]		<input type="checkbox"/> CLAY or HARDPAN [0 pts]	50%
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]		<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [8 pts]	5%	<input type="checkbox"/> ARTIFICIAL [3 pts]	

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

(A) 3

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

3cm

Pool Depth
Max = 30

0

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

15

Bankfull
Width
Max=30

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Meigs Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): ~40%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: a significant portion of stream reach has been impacted by filling

Additional comments/description of pollution impacts: _____

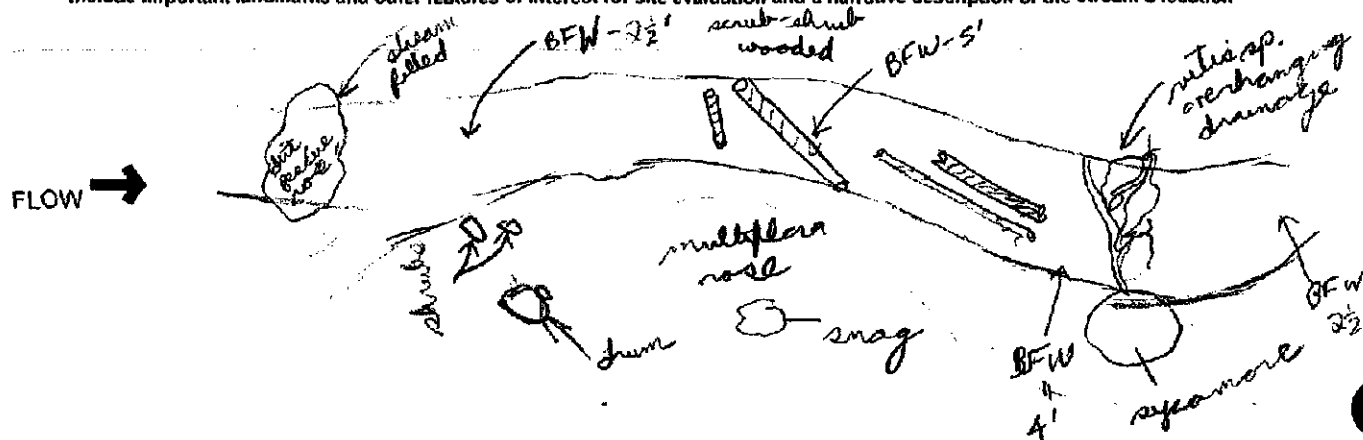
BIOTIC EVALUATIONPerformed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

21

SITE NAME/LOCATION AMP-OR
 SITE NUMBER CS-6 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11/30/05 SCORER JAV COMMENTS _____

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

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

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pts]	<u>45%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input checked="" type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>25%</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>10%</u>
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>10%</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>10%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A)

6

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

11

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [6 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

~1.2

Pool Depth
Max = 30

5

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

~2'

Bankfull
Width
Max=30

5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R (Per Bank)

☐ ☐ Wide >10m

☒ ☒ Moderate 5-10m

☐ ☐ Narrow <5m

☐ ☐ None

COMMENTS _____

L R (Most Predominant per Bank)

☐ ☐ Mature Forest, Wetland

☒ ☒ Immature Forest, Shrub or Old Field

☐ ☐ Residential, Park, New Field

☐ ☐ Fenced Pasture

L R

☐ ☐ Conservation Tillage

☐ ☐ Urban or Industrial

☐ ☐ Open Pasture, Row Crop

☐ ☐ Mining or Construction

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

☒ Stream Flowing

☐ Subsurface flow with isolated pools (Interstitial)

COMMENTS _____

☐ Moist Channel, isolated pools, no flow (Intermittent)

☐ Dry channel, no water (Ephemeral)

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

☐ None

☐ 0.5

☒ 1.0

☐ 1.5

☐ 2.0

☐ 2.5

☐ 3.0

☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☒ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Meigs Township / City: Setant Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph information: yesElevated Turbidity? (Y/N): Y Canopy (% open): 70%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

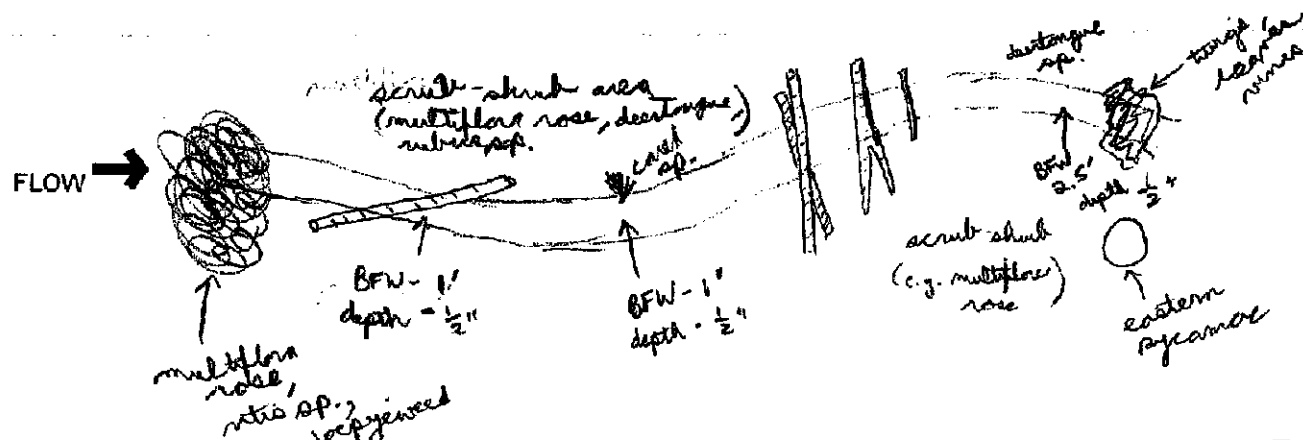
BIOTIC EVALUATIONPerformed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) N Voucher? (Y/N) _____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

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

Comments Regarding Biology: _____

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

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



modified
Class II

Primary Headwater Habitat Evaluation Form

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

45

SITE NAME/LOCATION AMP - 0 H

SITE NUMBER DS-1-5 RIVER BASIN _____

DRAINAGE AREA (mi²) _____

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

DATE 12/1/05 SCORER JAV COMMENTS cinder block dumping, buried pipes possibly used for dewatering

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

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

MODIFICATIONS:

→ stream is currently recovering from Road impacts

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<u>5%</u>	<input type="checkbox"/> SILT [3 pt]	<u>1%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>10%</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>10%</u>
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pt]	<u>40%</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>5%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	<u>5%</u>	<input checked="" type="checkbox"/> ARTIFICIAL [3 pts]	<u>25%</u>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 15%

(A) 3

(B) 7

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

10

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

1"

Pool Depth Max = 30

15

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

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

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

20

Bankfull Width Max=30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

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

COMMENTS _____

FLOODPLAIN QUALITY

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

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

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): ~40%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

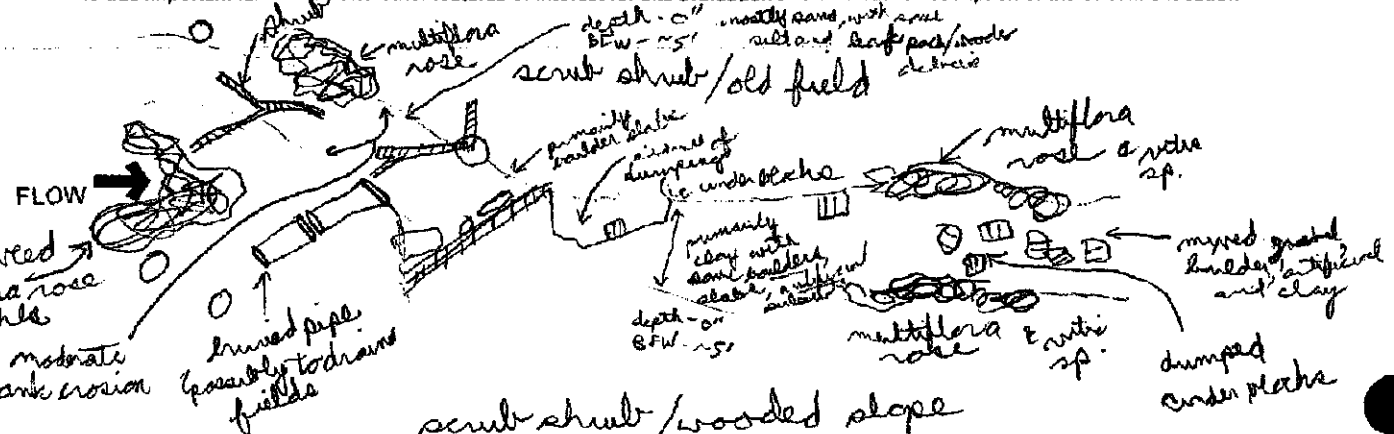
Fish Observed? (Y/N): N Voucher? (Y/N): _____ Salamanders Observed? (Y/N): _____ Voucher? (Y/N): _____

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

22

SITE NAME/LOCATION AMP-0H

SITE NUMBER DS-1-11

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft)

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 12/1/05

SCORER JAV

COMMENTS stream has recovered since culverting

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

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐

BLDR SLABS [16 pts]

PERCENT

☐

BOULDER (>256 mm) [16 pts]

☐

BEDROCK [16 pts]

☐

COBBLE (65-256 mm) [12 pts]

☐

GRAVEL (2-64 mm) [8 pts]

☐

SAND (<2 mm) [6 pts]

☒ 10%

TYPE

☐

SILT [3 pts]

☒

LEAF PACK/WOODY DEBRIS [3 pts]

☐

FINE DETRITUS [3 pts]

☒

CLAY or HARDPAN [0 pts]

☐

MUCK [0 pts]

☐

ARTIFICIAL [3 pts]

PERCENT

☒ 15%

☒ 25%

☐

☒ 60%

☐

☐

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

0%

(A)

3

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐

> 30 centimeters [20 pts]

☐

> 22.5 - 30 cm [30 pts]

☐

> 10 - 22.5 cm [25 pts]

☐

> 5 cm - 10 cm [15 pts]

☐

< 5 cm [5 pts]

☒

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

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

☐

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

☐

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

☐

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

☒

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

☐

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

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 >10m

☐ ☒

Moderate 5-10m

☐ ☒

Narrow <5m

☐ ☐

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)

☐

Stream Flowing

☐

Subsurface flow with isolated pools (Interstitial)

☒

Moist Channel isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS

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

☐

None

☐

1.0

☐

2.0

☐

3.0

☐

0.5

☒

1.5

☐

2.5

☐

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Morgan County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: yes

Elevated Turbidity? (Y/N): N Canopy (% open): ~30%

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

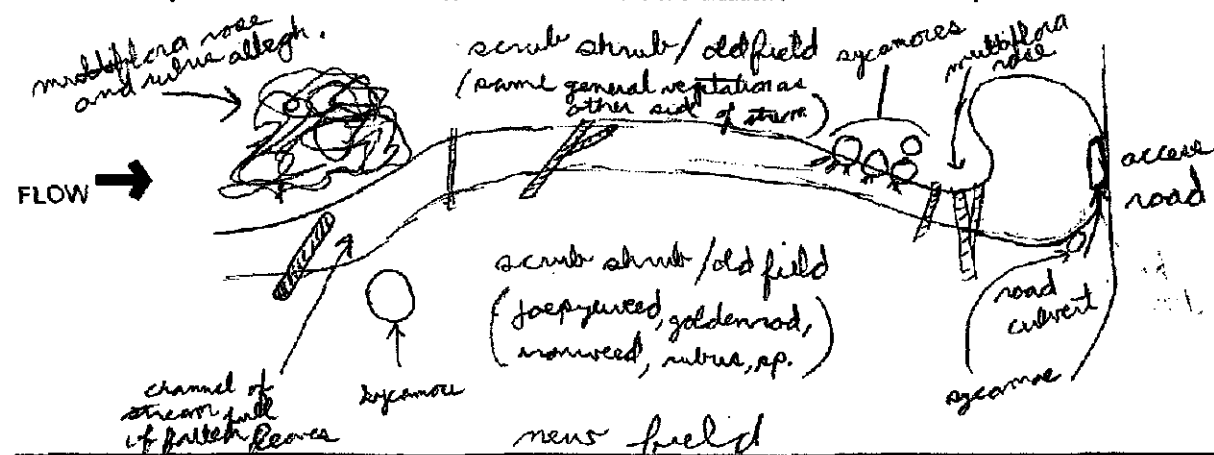
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

Class II

40

SITE NAME/LOCATION AMP-OH

SITE NUMBER DS-2-2

RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 12/1/05 SCORER JAV

COMMENTS stream channel appears to slowly disappear and reappear at end of stream reach

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

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____
<input type="checkbox"/> BEDROCK [16 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	10%
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	25%
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	40%

TYPE	PERCENT
<input type="checkbox"/> SILT [3 pts]	10%
<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	15%
<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

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

(A) 15

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

- ☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]

- ☐ > 5 cm - 10 cm [15 pts]
☒ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS moist channel, no flow or pools

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth Max = 30

0

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

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

- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS bank full width averages approximately 5'

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

- L/R (Per Bank)
☒ Wide >10m
☐ Moderate 5-10m
☐ Narrow <5m
☐ 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)

- ☐ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)

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

COMMENTS _____

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

- ☐ None
☐ 0.5

- ☐ 1.0
☐ 1.5

- ☐ 2.0
☐ 2.5

- ☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

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

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

DOWNSSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Mingo County Township / City: Retort Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/24/05 Quantity: unknown
 Photograph Information: yes
 Elevated Turbidity? (Y/N): N Canopy (% open): ~30% (consider overhanging vines)
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

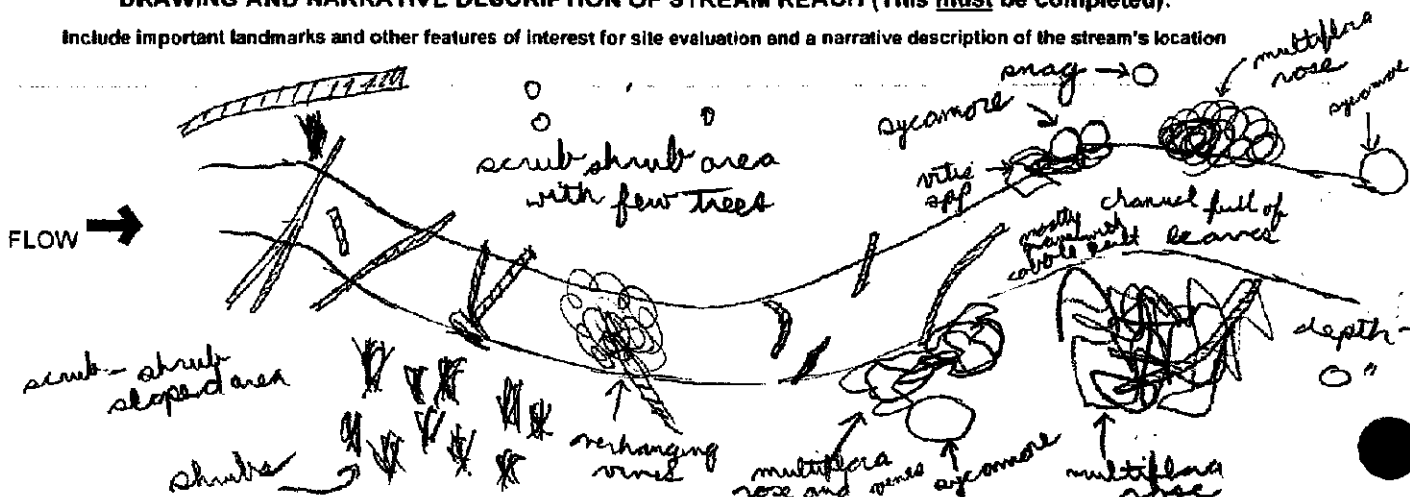
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional! NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
 Fish Observed? (Y/N): N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
 Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____
 Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

Class III

59

SITE NAME/LOCATION AMP-01
 SITE NUMBER DS-2-5 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) 200 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 12/1/05 SCORER MBL COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pt]	10
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	5	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	10
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	80	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	5
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	25	<input type="checkbox"/> MUCK [0 pts]	10
<input type="checkbox"/> SAND (<2 mm) [6 pts]	15	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
 Bldr Slabs, Boulder, Cobble, Bedrock 25

(A) 21

(B) 8

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

29

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):
- | | |
|--|---|
| <input type="checkbox"/> > 30 centimeters [20 pts] | <input checked="" type="checkbox"/> > 5 cm - 10 cm [15 pts] |
| <input type="checkbox"/> > 22.5 - 30 cm [30 pts] | <input type="checkbox"/> < 5 cm [5 pts] |
| <input type="checkbox"/> > 10 - 22.5 cm [25 pts] | <input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts] |

COMMENTS isolated pools

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

15

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

Bankfull
Width
Max=30

15

This information must also be completed

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

RIPARIAN WIDTH

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

FLOODPLAIN QUALITY

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

(Per Bank)
☐ Conservation Tillage
☐ Urban or Industrial
☐ Open Pasture, Row Crop
☐ Mining or Construction

COMMENTS Regrowing stream / rocky bed

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

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

COMMENTS Subsurface flow in gravel

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

☐ None
☐ 0.5
☒ 1.0
☐ 1.5
☐ 2.0
☐ 2.5
☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE

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

DOWNSTREAM DESIGNATED USE(S)

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

MISCELLANEOUS

Photograph Information: _____

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Farmed field approximately 40m from both side s

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

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

Comments Regarding Biology: _____

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

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

October 24, 2002 Revision

Primary Headwater Habitat Evaluation Form

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

52

SITE NAME/LOCATION AMP-08

SITE NUMBER DS-2-10 RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) _____

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 10/1/05

SCORER _____

COMMENTS _____

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

STREAM CHANNEL

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

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐

☐

☐

☒

☒

☐

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [9 pts]

SAND (<2 mm) [6 pts]

PERCENT

5%

5%

-

30%

35%

10%

TYPE

☐

☐

☐

☐

☐

☐

SILT [3 pts]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pts]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

15%

-

-

-

-

-

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

~40%

(A)

21

(B)

6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐

> 30 centimeters [20 pts]

☐

> 22.5 - 30 cm [30 pts]

☐

> 10 - 22.5 cm [25 pts]

☐

> 5 cm - 10 cm [15 pts]

☒

< 5 cm [5 pts]

☒

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

1 1/2

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

☐

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

☐

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

☒

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

☐

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

☐

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

5.6'

HHEI
Metric
Points

Substrate
Max = 40

27

A + B

Pool Depth
Max = 30

5

Bankfull
Width
Max = 30

20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

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

RIPARIAN WIDTH

L R

☒ ☒

(Per Bank)

Wide >10m

☐

Moderate 5-10m

☐

Narrow <5m

☐

None

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)

☐

Stream Flowing

☐

Subsurface flow with isolated pools (interstitial)

☒

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS _____

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

☐

None

☐

1.0

☐

2.0

☐

3.0

☐

0.5

☐

1.5

☒

2.5

☐

>3

STREAM GRADIENT ESTIMATE

☐

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo County Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): ~50% (considered trees and overhanging vines)Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

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

Additional comments/description of pollution impacts: _____

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

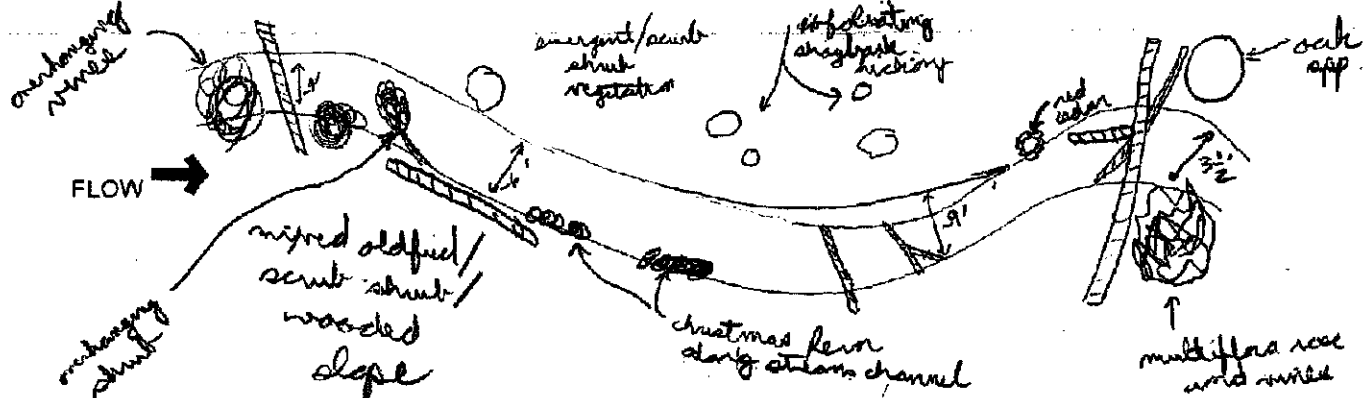
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



Primary Headwater Habitat Evaluation Form

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

17

modified class I

SITE NAME/LOCATION AMP-ON
 SITE NUMBER DS-3a, b, c RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) 100 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 12/1/05 SCORER MBL COMMENTS 2 small stream only 20" apart

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

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

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

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

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

(A)

6

(B)

6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
Points

Substrate
Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS

very dry

MAXIMUM POOL DEPTH (centimeters):

0

Pool Depth
Max = 30

0

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

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

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

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)
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/>	<input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/>	<input type="checkbox"/>	Narrow <5m
<input type="checkbox"/>	<input type="checkbox"/>	None

COMMENTS

agricultural past

FLOODPLAIN QUALITY

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

stream head

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

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

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

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Meigs Township / City: Hartsville, Ohio area

MISCELLANEOUSBase Flow Conditions? (Y/N): Y Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): _____

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

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____Additional comments/description of pollution impacts: Very steep silt/clay channel draining from
row crop field**BIOTIC EVALUATION**Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

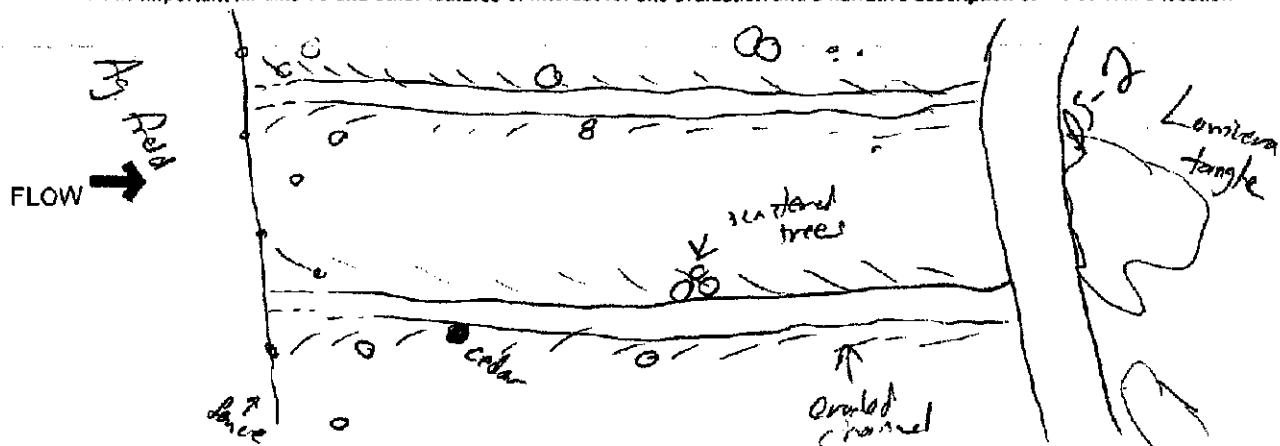
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

Comments Regarding Biology: _____

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

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



modified class II

Primary Headwater Habitat Evaluation Form

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

31

SITE NAME/LOCATION AMP-011 SITE NUMBER 05-4 RIVER BASIN _____ DRAINAGE AREA (mi²) _____
 LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 12/1/05 SCORER MGL COMMENTS _____

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

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

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.)

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input checked="" type="checkbox"/> SILT [3 pts]	<u>20</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>15</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>15</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>30</u>	<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]		<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 30 (A) 12 (B) 4

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

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

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

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 0

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

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 15

HHEI Metric Points

Substrate
Max = 40

16

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		FLOODPLAIN QUALITY	
L R	(Per Bank)	L R	(Most Predominant per Bank)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Wide >10m	<input type="checkbox"/> <input checked="" type="checkbox"/>	Mature Forest, Wetland
<input type="checkbox"/> <input type="checkbox"/>	Moderate 5-10m	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/> <input type="checkbox"/>	Narrow <5m	<input type="checkbox"/> <input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/> <input type="checkbox"/>	None	<input type="checkbox"/> <input type="checkbox"/>	Fenced Pasture
COMMENTS <u>Shrub</u>			

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input type="checkbox"/> Flat to Moderate	<input type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input checked="" type="checkbox"/> Severe (10 ft/100 ft)
---	---	---	---	---

ds-4

ADDITIONAL STREAM INFORMATION (This information must also be completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
County: Meigs Township / City: Retart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 12/1/05 Quantity: unknown
Photograph Information: yes
Elevated Turbidity? (Y/N): N Canopy (% open): _____
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: Head at new-camp fall

BIOTIC EVALUATION

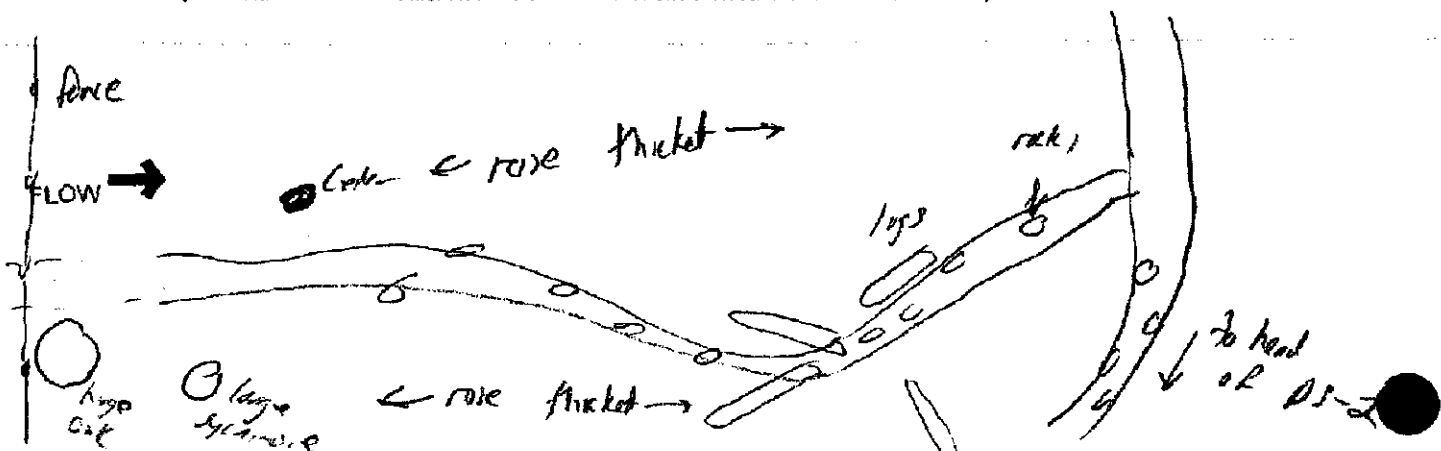
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) :

27

SITE NAME/LOCATION AMP-0H

SITE NUMBER S-1

RIVER BASIN

DRAINAGE AREA (mi²)

LENGTH OF STREAM REACH (ft) ~200'

LAT.

LONG.

RIVER CODE

RIVER MILE

DATE 11/29/05

SCORER JAV

COMMENTS

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE

☐

BLDR SLABS [16 pts]

☐

BOULDER (>256 mm) [16 pts]

☐

BEDROCK [16 pts]

☐

COBBLE (65-256 mm) [12 pts]

☐

GRAVEL (2-64 mm) [9 pts]

☐

SAND (<2 mm) [6 pts]

PERCENT

TYPE

☐

SILT [3 pt]

☒

LEAF PACK/WOODY DEBRIS [3 pts]

☒

FINE DETRITUS [3 pts]

☒

CLAY or HARDPAN [0 pt]

☐

MUCK [0 pts]

☐

ARTIFICIAL [3 pts]

PERCENT

10%

30%

10%

50%

Total of Percentages of
Blldr Slabs, Boulder, Cobble, Bedrock

0%

(A)

3

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐

> 30 centimeters [20 pts]

☐

> 22.5 - 30 cm [30 pts]

☐

> 10 - 22.5 cm [25 pts]

☒

> 5 cm - 10 cm [15 pts]

☒

< 5 cm [5 pts]

☐

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS

MAXIMUM POOL DEPTH (centimeters):

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐

> 4.0 meters (> 13') [30 pts]

☐

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

☐

> 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

☒

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

☐

≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

7

A + B

Pool Depth
Max = 30

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 >10m

☐

Moderate 5-10m

☐

Narrow <5m

☐

None

☐

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 forest shows indication of being mature and immature (i.e. young trees are visible and mature + old trees are as well)

FLOW REGIME (At Time of Evaluation) (Check ONLY one box)

☐

Stream Flowing

☐

Subsurface flow with isolated pools (Interstitial)

☒

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐

None

☐

0.5

☐

1.0

☐

1.5

☐

2.0

☒

2.5

☐

3.0

☐

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☐ Moderate (2 ft/100 ft)

☒ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**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 LOCATIONUSGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Mingo County Township / City: Letart Falls, Ohio area**MISCELLANEOUS**Base Flow Conditions? (Y/N): N Date of last precipitation: 11/29/05 Quantity: unknownPhotograph Information: yesElevated Turbidity? (Y/N): N Canopy (% open): ~30%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

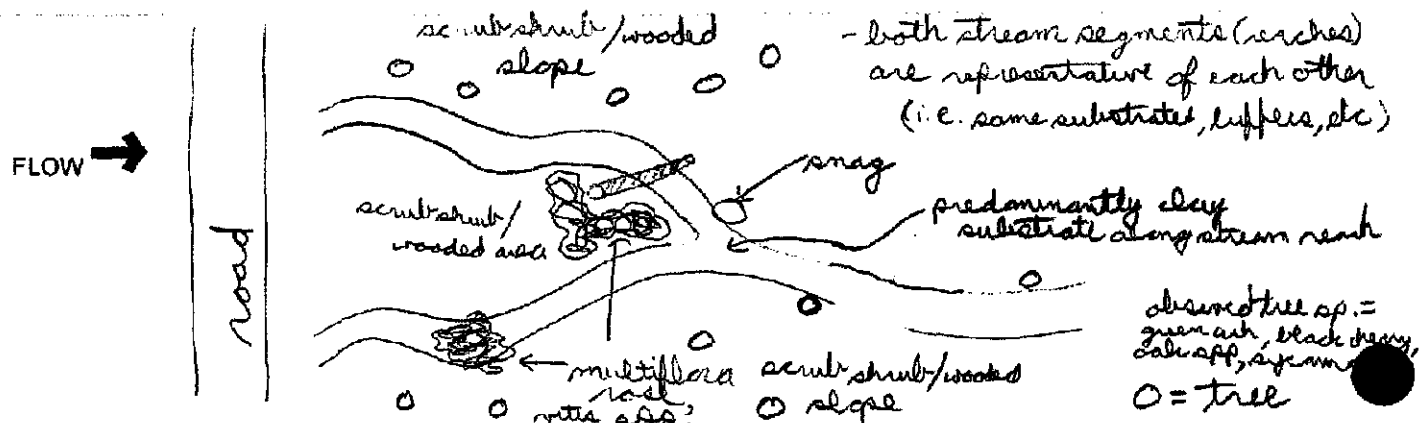
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

Class III

HHEI Score (sum of metrics 1, 2, 3):

68

SITE NAME/LOCATION AMP-01
Stream SITE NUMBER S-2 RIVER BASIN _____ DRAINAGE AREA (mi²) 31
 LENGTH OF STREAM REACH (ft) 200' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11-29-05 SCORER BEM COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY
 MODIFICATIONS: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	<u>5</u>	<input type="checkbox"/> SILT [3 pt]	<u>5</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>12</u>
<input type="checkbox"/> BEDROCK [16 pt]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>30</u>	<input checked="" type="checkbox"/> CLAY or HARDPAN [10 pt]	<u>40</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>70</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock

35%(A) 12(B) 6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 40

18

A + B

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input checked="" type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

70

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input checked="" type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.6 m (> 3' 3" - 4' 8") [16 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 8' 7" - 4' 8") [20 pts]	

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

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 >10m
☐ ☐ Moderate 5-10m
☐ ☐ Narrow <5m
☐ ☐ None

COMMENTS _____

FLOODPLAIN QUALITY

L R (Most Predominant per Bank)
☐ ☐ Mature Forest, Wetland
☒ ☒ Immature Forest, Shrub or Old Field
☐ ☐ Residential, Park, New Field
☐ ☐ Fenced Pasture

L R
☐ ☐ Conservation Tillage
☐ ☐ Urban or Industrial
☐ ☐ Open Pasture, Row Crop
☐ ☐ Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input checked="" type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Meigs County Township / City: Retart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: Unknown

Photograph Information: Y

Elevated Turbidity? (Y/N): N Canopy (% open): 60%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

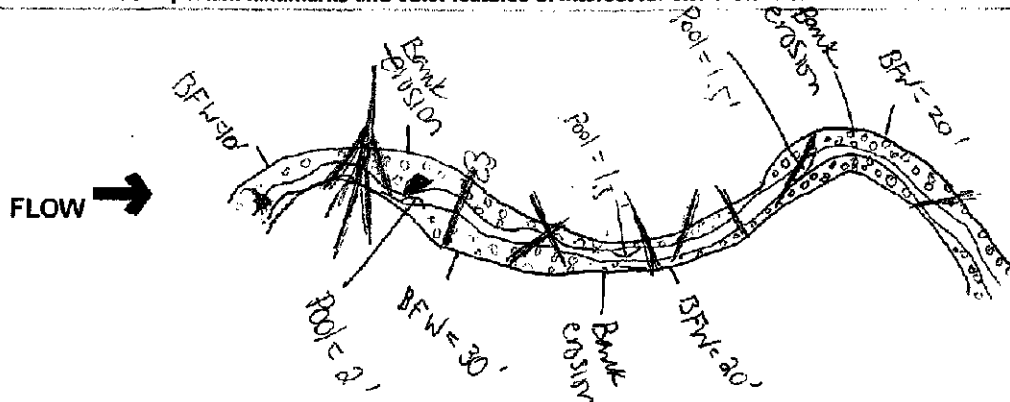
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



SITE NAME/LOCATION AMP-ORStreamSITE NUMBER S-3

RIVER BASIN _____

DRAINAGE AREA (mi²) <1 mi²LENGTH OF STREAM REACH (ft) 200

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11-29-05SCORER BM

COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE
☐
☐
☐
☐
☐
☐
☐

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [8 pts]

SAND (<2 mm) [8 pts]

PERCENT

25100

TYPE

☐☐☐☐☐☐

SILT [3 pts]

LEAF PACK/WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [0 pts]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

7510✓✓✓✓Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 25

(A)

21

(B)

5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐

> 30 centimeters [20 pts]

☐

> 22.5 - 30 cm [30 pts]

☒

> 10 - 22.5 cm [25 pts]

☐

> 5 cm - 10 cm [15 pts]

☐

< 5 cm [5 pts]

☐

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

7

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☒

> 4.0 meters (> 13') [30 pts]

☐

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

☐

> 1.5 m - 3.0 m (> 4' 7" - 9' 7") [20 pts]

☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]

☐

< 1.0 m (< 3' 3") [5 pts]

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

6

HHEI Metric Points

Substrate
Max = 4026

A + B

Pool Depth
Max = 3025Bankfull
Width
Max=3030

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R

(Per Bank)

☒

Wide >10m

☐

Moderate 5-10m

☐

Narrow <5m

☐

None

☐

None

COMMENTS _____

L R

(Most Predominant per Bank)

☒

Mature Forest, Wetland

☒

Immature Forest, Shrub or Old Field

☐

Residential, Park, New Field

☐

Fenced Pasture

L R

☐

Conservation Tillage

☐

Urban or Industrial

☐

Open Pasture, Row Crop

☐

Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒

Stream Flowing

☐

Subsurface flow with isolated pools (Interstitial)

☐

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS _____

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐

None

☐

0.5

☐

1.0

☐

1.5

☒

2.0

☐

2.5

☐

3.0

☐

>3

STREAM GRADIENT ESTIMATE

☐

Flat (0.5 ft/100 ft)

☐

Flat to Moderate

☐

Moderate (2 ft/100 ft)

☐

Moderate to Severe

☐

Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: New Haven, WV- OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
County: Meigs County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 11-29-05 Quantity: unknown
Photograph Information: Y
Elevated Turbidity? (Y/N): N Canopy (% open): 30%
Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
Is the sampling reach representative of the stream (Y/N) X If not, please explain: _____

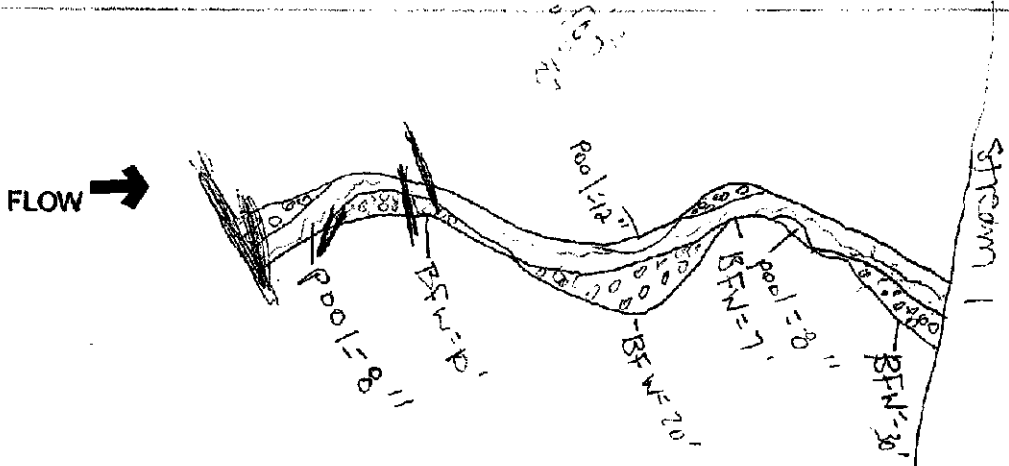
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____
Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3):

37

SITE NAME/LOCATION AMP-OR

SITE NUMBER 5-4

RIVER BASIN _____

DRAINAGE AREA (mi²) _____

LENGTH OF STREAM REACH (ft) ~200'

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11/29/05

SCORER JAV

COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PWH Streams" for instructions

STREAM CHANNEL

☐ NONE / NATURAL CHANNEL

☒ RECOVERED

☐ RECOVERING

☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____
<input type="checkbox"/> BEDROCK [16 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>10%</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	_____
<input checked="" type="checkbox"/> SAND (<2 mm) [6 pts]	<u>45%</u>

TYPE	PERCENT
<input type="checkbox"/> SILT [3 pts]	_____
<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>15%</u>
<input type="checkbox"/> FINE DETRITUS [3 pts]	<u>5%</u>
<input checked="" type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>25%</u>
<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10%

(A)

6

(B)

6

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

12

A + B

2. **Maximum Pool Depth** (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input checked="" type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

1/2"

Pool Depth Max = 30

5

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input checked="" type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 pts]	

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

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)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Wide >10m
<input type="checkbox"/> <input type="checkbox"/>	Moderate 5-10m
<input type="checkbox"/> <input type="checkbox"/>	Narrow <5m
<input type="checkbox"/> <input type="checkbox"/>	None

FLOODPLAIN QUALITY

L/R	(Most Predominant per Bank)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Mature Forest, Wetland
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	Immature Forest, Shrub or Old Field
<input type="checkbox"/> <input type="checkbox"/>	Residential, Park, New Field
<input type="checkbox"/> <input type="checkbox"/>	Fenced Pasture

L/R	
<input type="checkbox"/> <input type="checkbox"/>	Conservation Tillage
<input type="checkbox"/> <input type="checkbox"/>	Urban or Industrial
<input type="checkbox"/> <input type="checkbox"/>	Open Pasture, Row Crop
<input type="checkbox"/> <input type="checkbox"/>	Mining or Construction

COMMENTS floodplain consists of a mixed mature and immature forest area

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input checked="" type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input checked="" type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)

☐ Flat to Moderate

☒ Moderate (2 ft/100 ft)

☐ Moderate to Severe

☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: NRCS Soil Map Stream Order
County: Meigs Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 11/29/05 Quantity: unknown

Photograph Information: yes

Elevated Turbidity? (Y/N): N Canopy (% open): ~40%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

Additional comments/description of pollution impacts:

BIOTIC EVALUATION

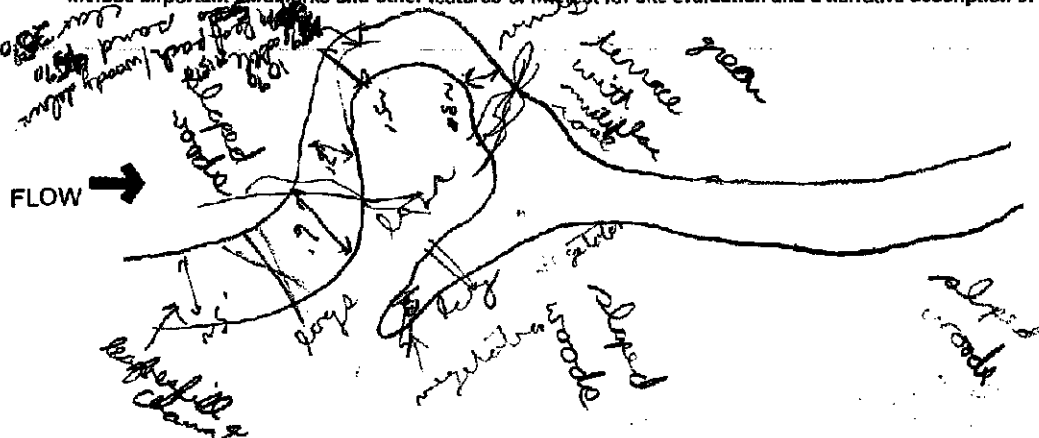
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology:

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



SITE NAME/LOCATION AMP-04
Stream SITE NUMBER S-5 RIVER BASIN _____ DRAINAGE AREA (mi²) <1 mi²
 LENGTH OF STREAM REACH (ft) 200' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11-29-05 SCORER BGM COMMENTS Stream flows into stream 4

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY
 MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]		<input type="checkbox"/> SILT [3 pts]	
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]		<input type="checkbox"/> LEAF LACK/WOODY DEBRIS [3 pts]	
<input type="checkbox"/> BEDROCK [16 pts]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>15%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>15%</u>
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [19 pts]	<u>100%</u>	<input type="checkbox"/> MUCK [0 pts]	
<input checked="" type="checkbox"/> SAND (<2 mm) [8 pts]	<u>20%</u>	<input type="checkbox"/> ARTIFICIAL [3 pts]	

Total of Percentages of
 Bldr Slabs, Boulder, Cobble, Bedrock 5%

(A) 15

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input checked="" type="checkbox"/> > 1.5 m - 3.0 m (> 4' 7" - 9' 7") [20 pts]	

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters)

HHEI
Metric
Points

Substrate
Max = 40

19

A + B

Pool Depth
Max = 30

25

Bankfull
Width
Max=30

6

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

L/R (Per Bank)
☒ Wide >10m
☐ Moderate 5-10m
☐ Narrow <5m
☒ None

COMMENTS _____

FLOODPLAIN QUALITY

L/R (Most Predominant per Bank)
☒ Mature Forest, Wetland
☒ Immature Forest, Shrub or Old Field
☐ Residential, Park, New Field
☐ Fenced Pasture

L/R
☐ Conservation Tillage
☒ Urban or Industrial
☐ Open Pasture, Row Crop
☐ Mining or Construction

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input type="checkbox"/> None	<input checked="" type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☒ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This information must also be completed):

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: MCKAY County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 11-29-05 Quantity: unknown

Photograph Information: Y

Elevated Turbidity? (Y/N): N Canopy (% open): 95%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N): Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

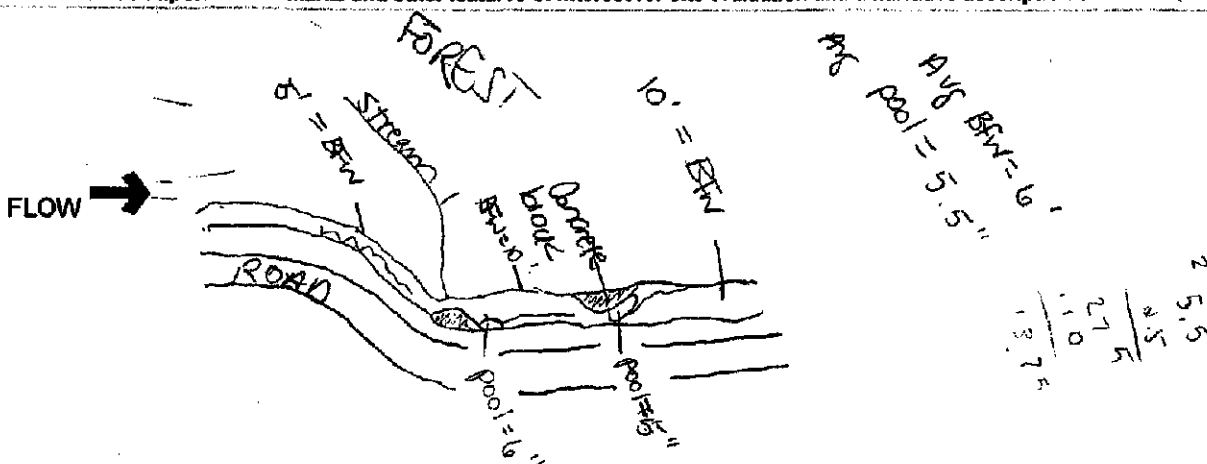
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3):

class I

12

SITE NAME/LOCATION AMP-nhstreamSITE NUMBER S-6

RIVER BASIN _____

DRAINAGE AREA (mi²) <1mi²LENGTH OF STREAM REACH (ft) 200

LAT. _____

LONG. _____

RIVER CODE _____

RIVER MILE _____

DATE 11-29-05SCORER BFMCOMMENTS stream flows through wet 1 + into stream 4

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE/NATURAL CHANNEL☐ RECOVERED☐ RECOVERING☐ RECENT OR NO RECOVERY

MODIFICATIONS: _____

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE
☐
☐
☐
☐
☐
☐
☐

BLDR SLABS [16 pts]

BOULDER (>256 mm) [16 pts]

BEDROCK [16 pts]

COBBLE (65-256 mm) [12 pts]

GRAVEL (2-64 mm) [8 pts]

SAND (<2 mm) [8 pts]

PERCENT

5%

TYPE

☒☐☐☒☐☐

SILT [3 pts]

LEAF PACK WOODY DEBRIS [3 pts]

FINE DETRITUS [3 pts]

CLAY or HARDPAN [10 pts]

MUCK [0 pts]

ARTIFICIAL [3 pts]

PERCENT

16%15%35%Total of Percentages of
Bldr Slabs, Boulder, Cobble, Bedrock0%

(A)

3

(B)

4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI
Metric
PointsSubstrate
Max = 407

A + B

Pool Depth
Max = 300Bankfull
Width
Max = 305

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):

☐
☐
☐

> 30 centimeters [20 pts]

> 22.5 - 30 cm [30 pts]

> 10 - 22.5 cm [25 pts]

☐
☐
☒

> 5 cm - 10 cm [15 pts]

< 5 cm [5 pts]

NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

☐
☐
☐

> 4.0 meters (> 13') [30 pts]

> 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]

> 1.5 m - 3.0 m (> 4' 9" - 9' 8") [20 pts]

☐
☒
☐

> 1.0 m - 1.5 m (> 3' 3" - 4' 9") [15 pts]

< 1.0 m (< 3' 3") [5 pts]

COMMENTS _____

AVERAGE BANKFULL WIDTH (meters):

2.2

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY

☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH

FLOODPLAIN QUALITY

L R

(Per Bank)

☐☒

Wide >10m

☒☐

Moderate 5-10m

☐☐

Narrow <5m

☐☐

None

☐☐

None

COMMENTS _____

L R

(Most Predominant per Bank)

☒☒

Mature Forest, Wetland

☒☒

Immature Forest, Shrub or Old

☐☐

Field

☐☐

Residential, Park, New Field

☐☐

Fenced Pasture

L R

Conservation Tillage

☐☒

Urban or Industrial

☐☐

Open Pasture, Row

☐☐

Crop

☐☐

Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒

Stream Flowing

☐

Subsurface flow with isolated pools (Interstitial)

☐

Moist Channel, isolated pools, no flow (Intermittent)

☐

Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐

None

☐

0.5

☐

1.0

☐

1.5

☒

2.0

☐

2.5

☐

3.0

☐

>3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft)☐ Flat to Moderate☒ Moderate (2 ft/100 ft)☐ Moderate to Severe☐ Severe (10 ft/100 ft)

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

S-6

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Meigs County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 11-27-05 Quantity: unknown
 Photograph Information: Y
 Elevated Turbidity? (Y/N): N Canopy (% open): 50%
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

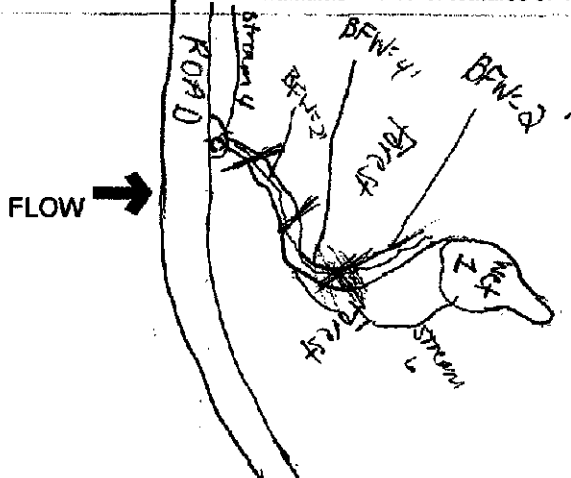
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
 Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
 Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____
 Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



SITE NAME/LOCATION AMP-0H
Stream SITE NUMBER S-7 RIVER BASIN _____ DRAINAGE AREA (mi²) 2.1 mi²
 LENGTH OF STREAM REACH (ft) 150' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 11-29-05 SCORER BEM COMMENTS Drains wet 1 + Flows into stream 5

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR IN RECOVERY
 MODIFICATIONS

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDR SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pts]	<u>4</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	_____
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	<u>4</u>
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>4</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [8 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0%

(A) 3

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

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) (Check ONLY one box):

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [5 pts]
<input type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

Pool Depth
Max = 30

0

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):

<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> < 1.0 m (< 3' 3") [5 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 9' 7" - 4' 8") [20 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		FLOODPLAIN QUALITY			
L	R	L/R	(Most Predominant per Bank)	L	R
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Mature Forest, Wetland	<input type="checkbox"/>	<input type="checkbox"/> Conservation Tillage
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Immature Forest, Shrub or Old Field	<input checked="" type="checkbox"/>	<input type="checkbox"/> Urban or Industrial
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Residential, Park, New Field	<input type="checkbox"/>	<input type="checkbox"/> Open Pasture, Row Crop
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Fenced Pasture	<input type="checkbox"/>	<input type="checkbox"/> Mining or Construction

COMMENTS _____

- FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

<input checked="" type="checkbox"/> Stream Flowing	<input type="checkbox"/> Moist Channel, isolated pools, no flow (Intermittent)
<input type="checkbox"/> Subsurface flow with isolated pools (Interstitial)	<input type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS _____

- SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

<input checked="" type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input type="checkbox"/> 0.5	<input type="checkbox"/> 1.5	<input type="checkbox"/> 2.5	<input type="checkbox"/> >3

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input type="checkbox"/> Flat to Moderate	<input checked="" type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
---	---	--	---	--

ADDITIONAL STREAM INFORMATION (This information Must Also be Completed):

S-7

QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: New Haven, WV-04 NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Meigs County Township / City: Letart Falls, Ohio area

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 11-29-05 Quantity: unknown

Photograph Information: X

Elevated Turbidity? (Y/N): N Canopy (% open): 50%

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

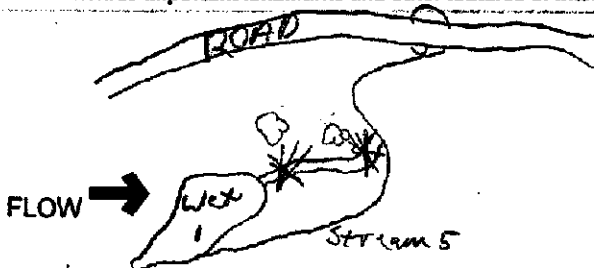
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

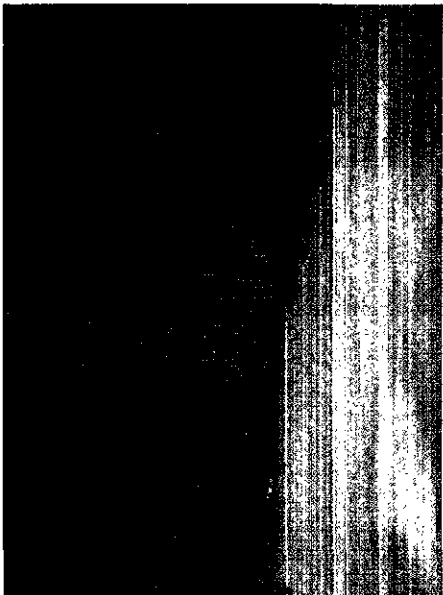
DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



APPENDIX D

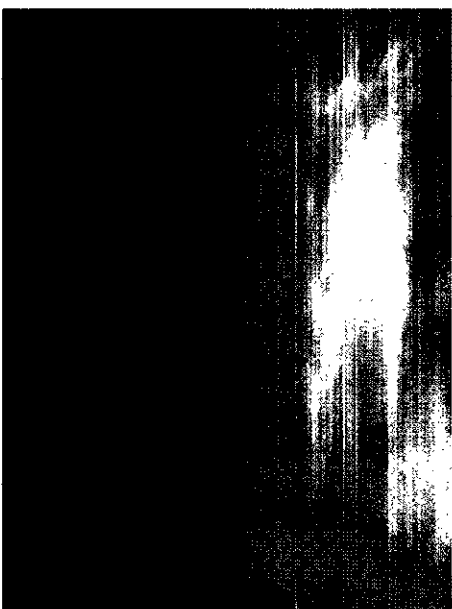
SELECTED PHOTOGRAPHS



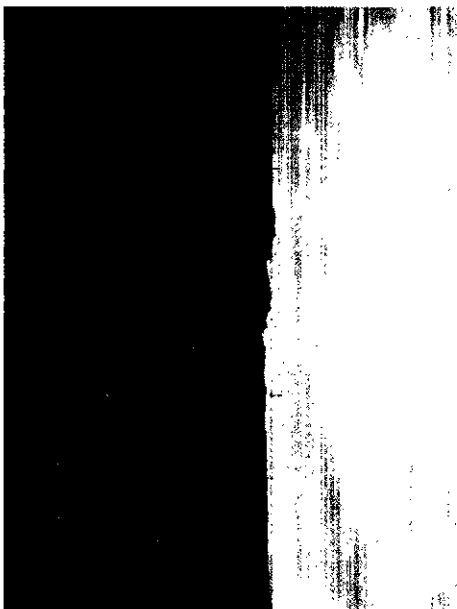
Photograph 1: View of Wetland AFS-W1, looking north.



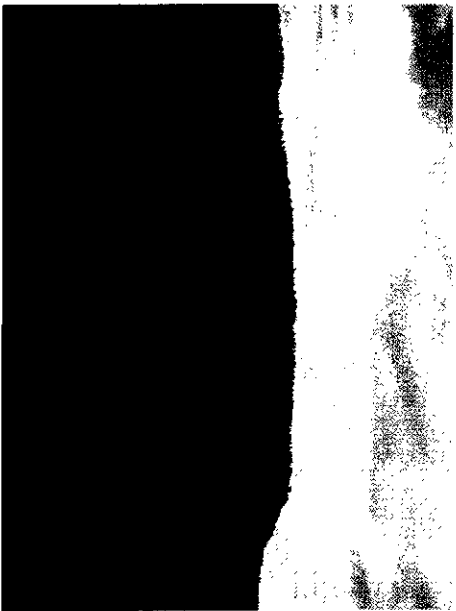
Photograph 2: View of Stream AS-S2, looking east.



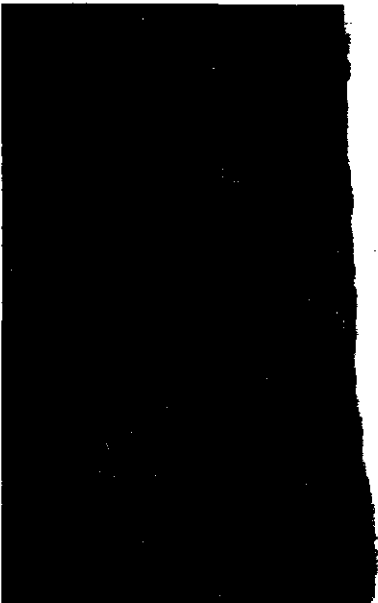
Photograph 3: View of ag-1 and ag-2 site vicinity, looking north.



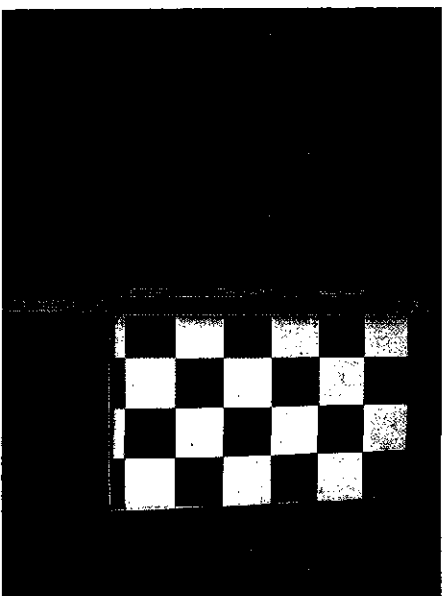
Photograph 4: View of ag-1 and ag-2 site vicinity, looking south.



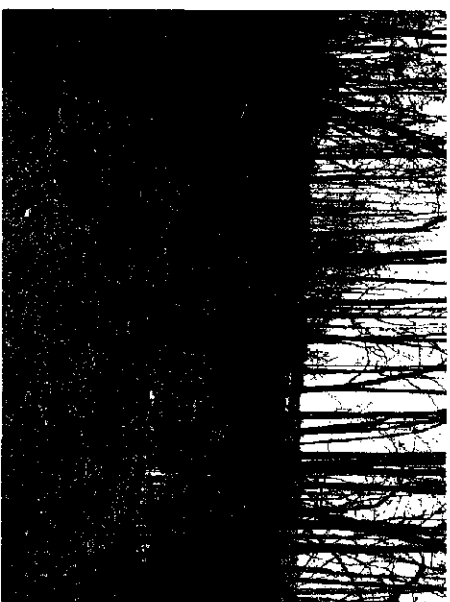
Photograph 5: View of ag-3 and ag-4 site vicinity, looking east.



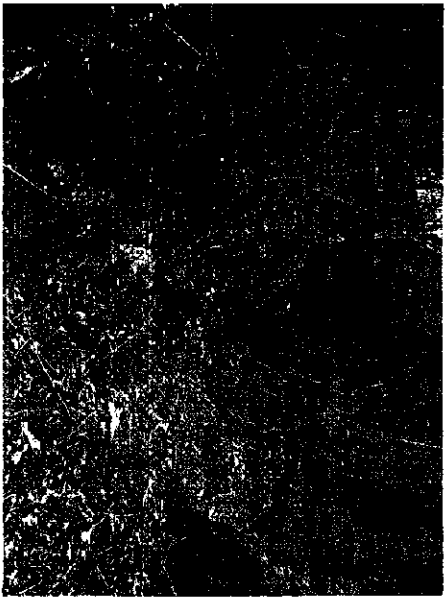
Photograph 6: View of ag-5 and ag-6 site vicinity, looking north.



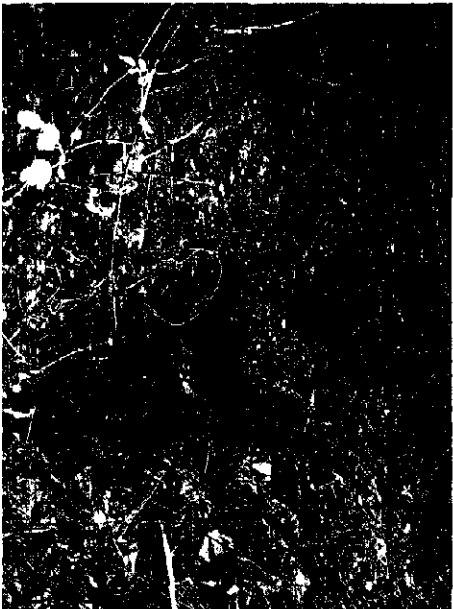
Photograph 7: View of ag-6 soil core.



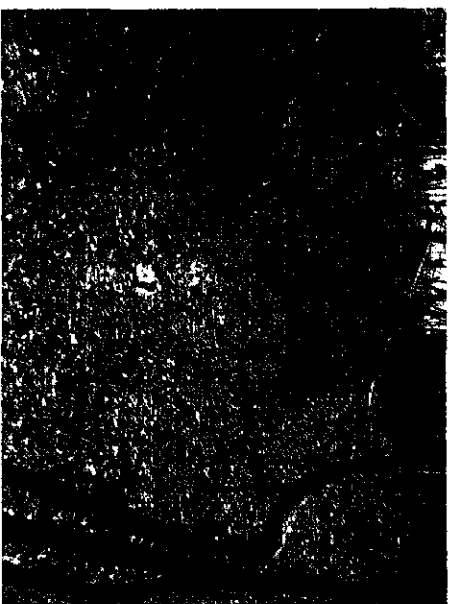
Photograph 8: View of Wetland AN-W1, looking west.



Photograph 9: View of Stream AN-S1, looking west-northwest.



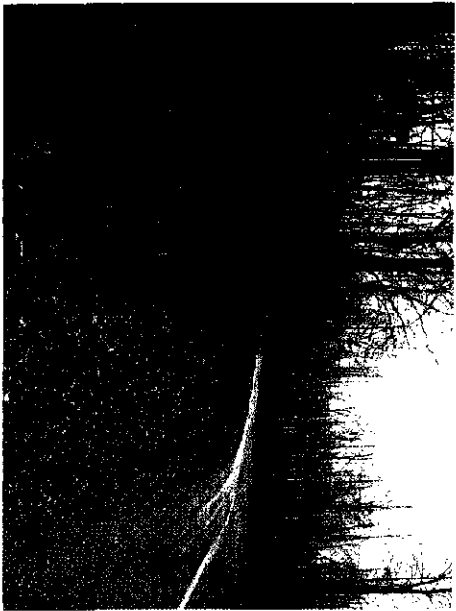
Photograph 10: View of Stream S-1, looking west.



Photograph 11: View of Stream S-2, looking southeast.



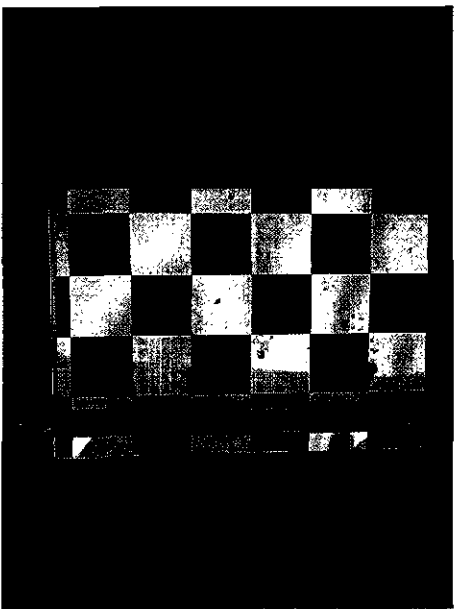
Photograph 12: View of Stream S-3, looking east-northeast.



Photograph 13: View of Stream S-5, looking west.



Photograph 14: View of Wetland W1, looking northeast.



Photograph 15: View of Wetland W1 soil core. Note the extent of mottling in the B-Horizon.



Photograph 16: View of Stream BS-1.



Photograph 17: View of Stream BS-2-2.



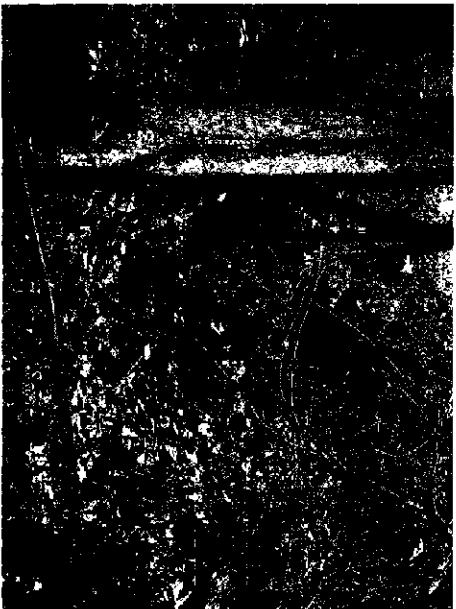
Photograph 18: View of Stream BS-4.



Photograph 19: View of Stream BS-6.



Photograph 20: View of Stream BS-8.



Photograph 21: View of Stream BS-9, slightly upstream from the confluence of BS-8 and BS-9.



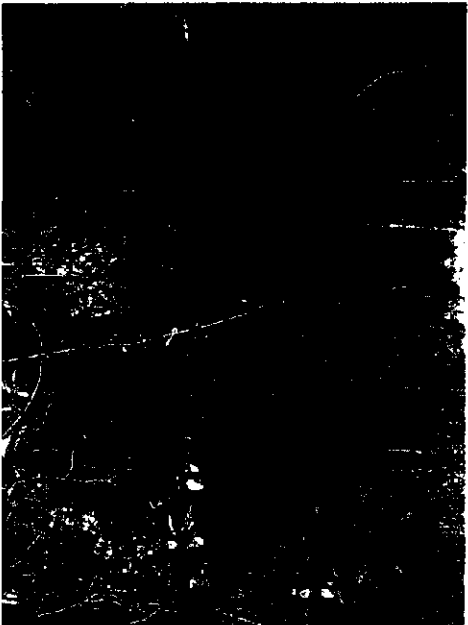
Photograph 22: View of Stream BS-10.



Photograph 23: View of Stream BS-11.



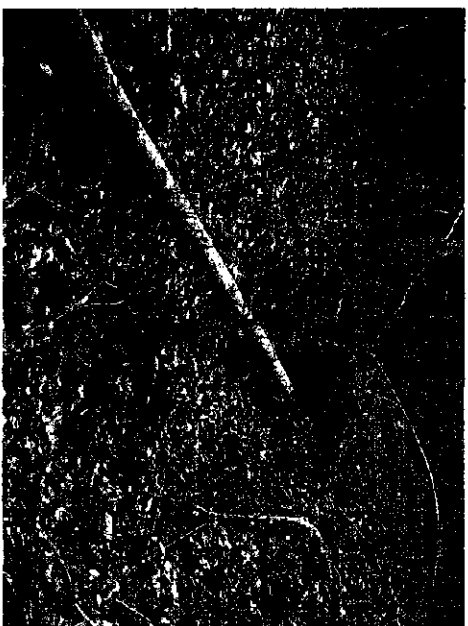
Photograph 24: View of Stream BS-12.



Photograph 25: View of Wetland WB-1.



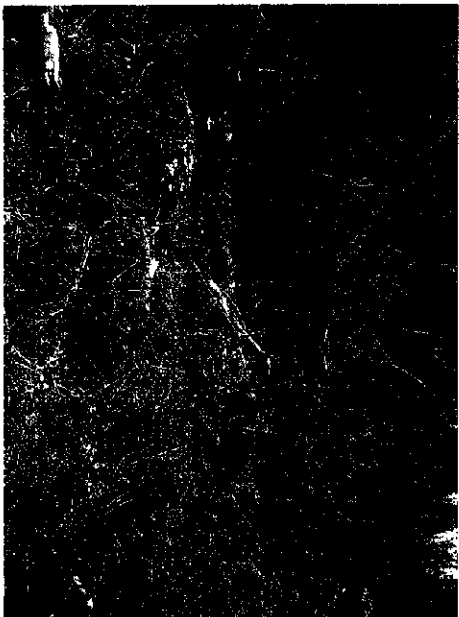
Photograph 26: View of Stream BS-13, looking north.



Photograph 27: View of Stream BS14, looking southwest.



Photograph 28: View of Stream BS15, looking southwest.



Photograph 29: View of Wetland C-1, looking northwest.



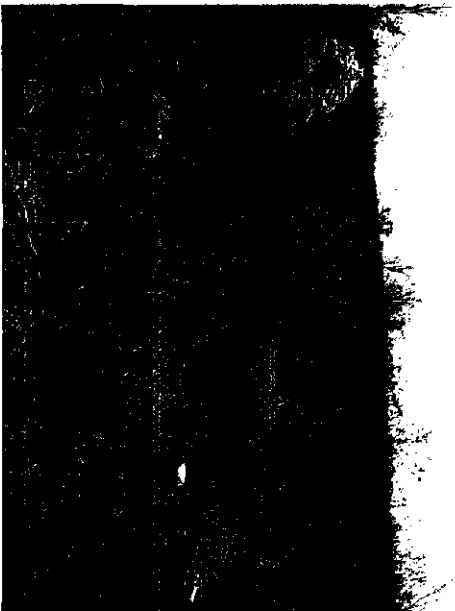
Photograph 30: View of Stream CS-1-2, looking upstream.



Photograph 31: View of Stream CS-2, looking upstream.



Photograph 32: View of Stream CS-3-1, looking upstream.



Photograph 33: View of Wetland C-2, looking east-southeast.



Photograph 34: View of Stream CS-4-2, looking upstream.



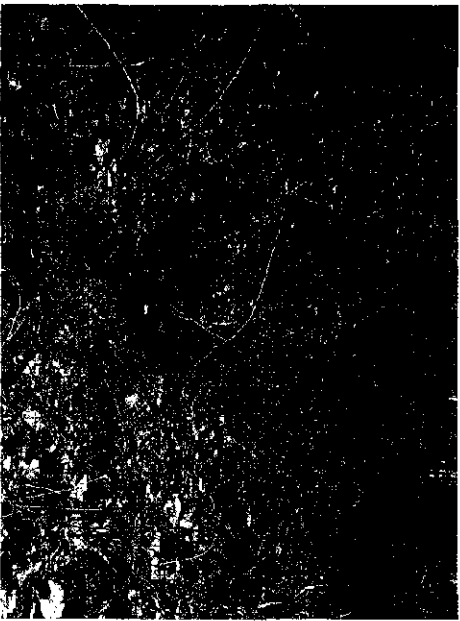
Photograph 35: View of Wetland C-4, looking east.



Photograph 36: View of Stream BM-S1.



Photograph 37: View of Stream BM-S8.



Photograph 38: View of Stream BM-S9.



Photograph 39: View of Wetland BM-W1.



Photograph 40: View of Wetland BM-W2 and its associated Pond.



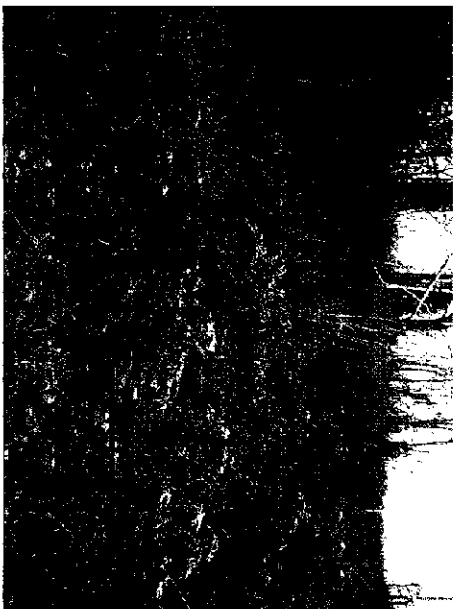
Photograph 41: View of Wetland BM-W3 and its associated Pond.



Photograph 42: View of Stream DS-1-5, looking upstream.



Photograph 43: View of Wetland D-1, looking northwest.



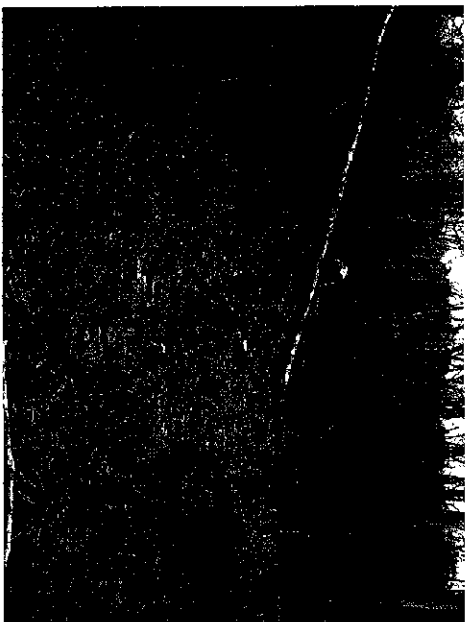
Photograph 44: View of Wetland D-2, looking northwest.



Photograph 45: View of Wetland D-3, looking west.



Photograph 46: View of Wetland D-4.



Photograph 47: View of Wetland D-5, looking southeast.



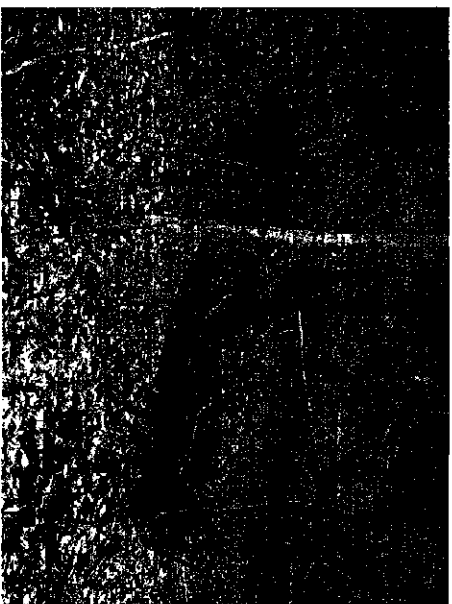
Photograph 48: View of Stream DS-2-10.



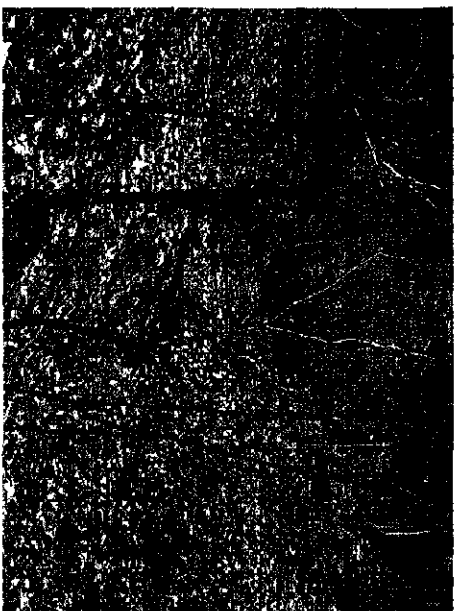
Photograph 49: View of Wetland D-6, looking north.



Photograph 50: View of Stream BM-S11.



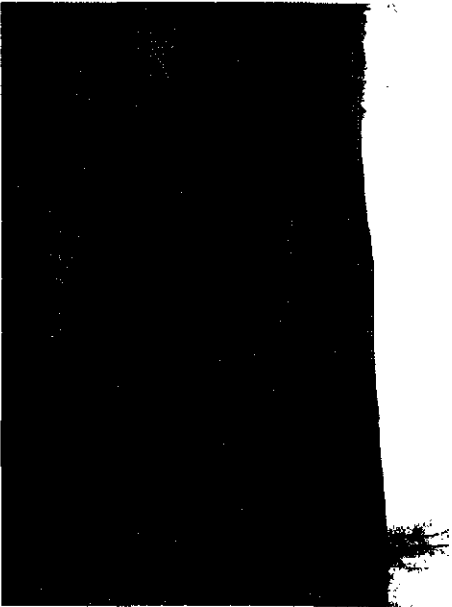
Photograph 51: View of Stream BM-S13.



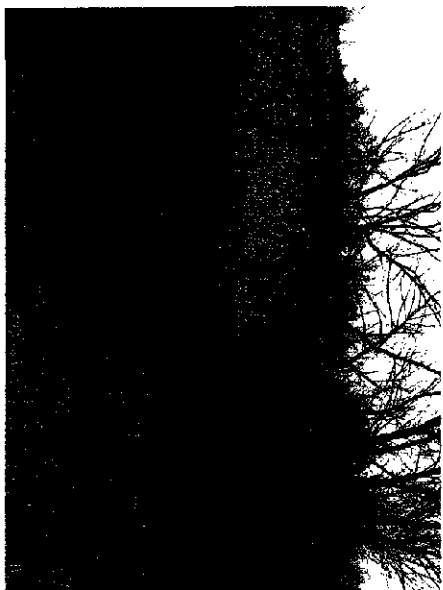
Photograph 52: View of Stream BM-S17.



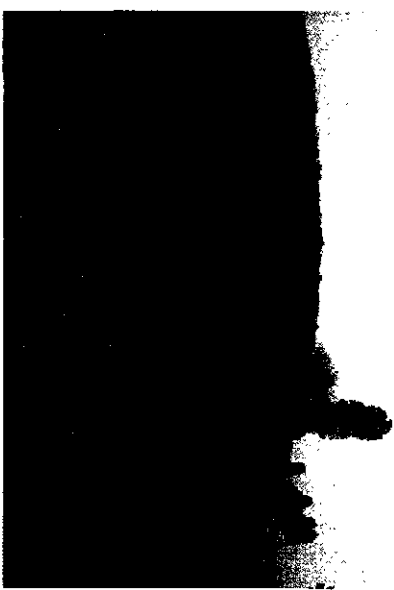
Photograph 53: View of Wetland BM-W4.



Photograph 54: View of Wetland BM-W5.



Photograph 55: View of the ODNR species record location for the Eastern Spadefoot Toad, located immediately north of the Site.



Photograph 56: View of the ODNR species record location vicinity for the Common Prickly Pear, located along the southwest boundary of the Site.

APPENDIX E

AGENCY CORRESPONDENCE



Ohio Department of Natural Resources

BOB TAFT, GOVERNOR

SAMUEL W. SPECK, DIRECTOR

Division of Natural Areas & Preserves

Nancy Strayer, Acting Chief

1889 Fountain Square, Bldg. F-1

Columbus, OH 43224-1388

Phone: (614) 265-6453 Fax: (614) 267-3096

May 10, 2004

Rebecca Wilson
GT Environmental, Inc.
635 Park Meadow Rd., Suite 112
Westerville, OH 43081

Dear Ms. Wilson:

After reviewing our Natural Heritage maps and files, I find the Division of Natural Areas and Preserves has records of rare or endangered species within 5 miles of the GT Environmental, Inc. Ohio 2 project. The site is in Sutton, Lebanon, and Letart Twps., Meigs Co., New Haven and Ravenswood Quadrangles. The maps I have included with this letter display the locations of these records and correspond with the attached list.

There are no existing or proposed state nature preserves at the project site. We are also unaware of any unique ecological sites, geologic features, breeding or non-breeding animal concentrations, champion trees, state parks, state forests, or scenic rivers within the project area. However the search includes the Racine, Old Town Creek, and Lock and Dam 23 Wildlife Areas. Jim Marshall of the Division of Wildlife should be consulted regarding possible impacts to these areas. He can be reached at (614) 594-2211.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although we inventory all types of plant communities, we only maintain records on the highest quality areas. Also we do not have data for all Ohio wetlands. The Division of Wildlife has a statewide wetland inventory that can give you additional data. Their phone number is (614) 265-6300. For National wetlands Inventory maps, please contact Madge Fitak in the Division of Geological Survey at (614) 265-6576. Aerial photos may be obtained from ODOT at (614) 275-1369. USGS maps can be requested directly from the U.S. Geological Survey at 1-888-275-8747.

Please contact me at (614) 265-6409 if I can be of further assistance.

Sincerely,

Butch Grieszmer, Data Specialist
Resource Services Group

GT Environmental, Inc. Ohio 2 Project

	<u>Scientific Name</u>	<u>Common Name</u>	<u>State Status</u>	<u>Federal Status</u>
	<i>Cicindela marginipennis</i>	Cobblestone Tiger Beetle	T	
2	<i>Heteranthera reniformis</i>	Mud-plantain	E	
3	<i>Hiodon alosoides</i>	Goldeye	E	
4	<i>Macrhybopsis aestivalis</i>	Speckled Chub	E	
5	<i>Obliquaria reflexa</i>	Threehorn Wartyback	T	
6	<i>Obliquaria reflexa</i>	Threehorn Wartyback	T	
7	<i>Opuntia humifusa</i>	Common Prickly Pear	P	
8	<i>Percina copelandi</i>	Channel Darter	T	
9	<i>Scaphiopus holbrookii</i>	Eastern Spadefoot	E	
10	<i>Spermacoce glabra</i>	Smooth Buttonweed	P	

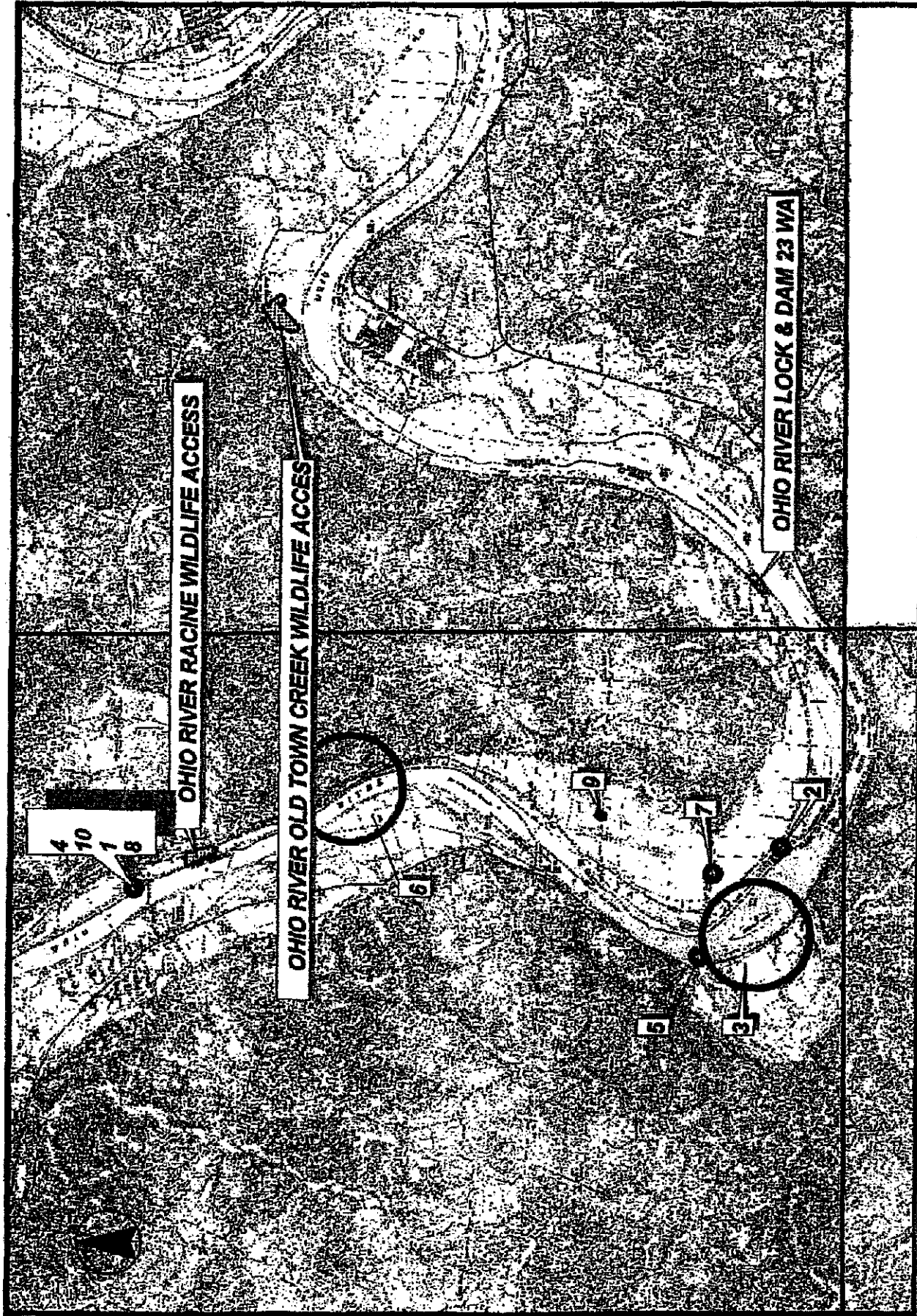
E=Endangered
FE=Federally Endangered

FT=Federally Threatened
P=Potentially Threatened

SC=Special Concern
SI=Special Interest

T=Threatened
Page 1 of 1

Ohio 2



3000 0 3000 6000 Feet



**ADDENDUM TO THE WETLAND DELINEATION, STREAM ASSESSMENT,
AND THREATENED AND ENDANGERED SPECIES HABITAT SURVEY**

July 31, 2006

Lee Pittman
U.S. Army Corps of Engineers- Huntington District
502 Eighth Street
Huntington, WV 25701

Mike Smith
Ohio EPA Division of Surface Water 401 Section
122 South Front Street
Columbus, Ohio 43215



**RE: American Municipal Power Generating Station:
Submittal of Addendum to the Wetland Delineation,
Stream Assessment, and Threatened and Endangered
Species Habitat Survey**

Attached please find an *Addendum to the Wetland Delineation, Stream Assessment, and Threatened and Endangered Species Habitat Survey* ("Report") prepared by URS on behalf of American Municipal Power-Ohio, Inc. ("AMP-Ohio") for AMP-Ohio's American Municipal Power Generating Station project in Meigs County, Ohio.

If you have any comments on this Report, please do not hesitate to contact me at your earliest convenience at 614-337-6222. In addition, if you have specific technical questions, please feel free to contact James Nicholas at URS directly at 513-419-3407.

Sincerely,

Scott Kiesewetter
Manager of New Plant Engineering
American Municipal Power-Ohio, Inc.

Attachment

cc: Jerry Jones, AMP-Ohio, James Nicholas, URS

OHIO: AMHERST • ARCADIA • ARCADUM • BEACH CITY • BLANCHETTER • BLOOMDALE • BOWLING GREEN • BRADNER • BREWSTER • BRYAN • CAMEY • CELINA • CLEVELAND
CLYDE • COLUMBIANA • COLUMBUS • CUSTER • CUYAHOGA FALLS • CYSNET • DESHER • DOVY • EGGERTON • ELICORADO • ELMORE • GALLON • GENOA • GEONSTER • GRAFTON
GREENWICH • HAMILTON • HARRIS • HOUDAY CITY • HUBBARD • HUDSON • HURON • JACKSON • JACKSON CENTER • LAREEVIEW • LEBANON • LODY • LOCKS • MARSHALLVILLE
MENDON • MILAN • MINSTER • MONROEVILLE • MONTPELIER • MARQUETTE • NEW BRUNSWICK • NEW KNOXVILLE • NEWTON FALLS • NILES • OAK HARBOR • OREBIN • OHIO CITY • ORSVILLE
PAINESVILLE • PEMBERTON • PIONEER • PRIMA • RYAN • PROSPECT • REPUBLIC • ST. CLAIRSVILLE • ST. MARYS • SEAR • SHELBY • SHELTON • SOUTH VIENNA • STAMFORD
TATE CITY • VERMILION • WADSWORTH • WAPAKONETA • WAYNESFIELD • WELLINGTON • WESTERVILLE • WHAMON • WOODSFIELD • WOODVILLE • YELLOW SPRINGS
PENNSYLVANIA: BERLIN • BLADEY • CATANESSA • DRUMCANON • EAST CONEMAUGH • GLENDON CITY • GIRARD • GREVE CITY • HARTFORD • MOORESVILLE • BUTZTOWN
LANSDALE • LEBANON • LEWISBURG • MITCHELLTOWN • NITELING • NEW WALNUTTON • OLYMPIA • QUAKERTOWN • TOWSON • ST. CLAIR • SCHUMMIL HAVEN
SUMMIT • WATSON • WEAVER
VIRGINIA: BEDFORD • DANVILLE • MARIETTA • RICHMOND
WEST VIRGINIA: NEW MARTINSVILLE • PHILIP
MICHIGAN: DOWAGIAC • WYANDOTE



June 19, 2006
Ms. Lee Pittman
Regulatory Branch
U.S. Army Corps of Engineers, Huntington District
502 Eighth Street
Huntington, West Virginia 25701-2070

**Re: Comments on Wetland Delineation, AMP-Ohio Coal-Fired Generation Facility,
Letart Falls, Ohio**

Dear Ms. Pittman:

URS is pleased to provide the attached addendum to the wetland delineation, stream assessment, and threatened and endangered species habitat report for the AMP-Ohio project site in the Letart Falls area of Meigs County, Ohio. Each of the comments provided by Ms. Lee Pittman of the USACE and Mr. Mike Smith of OEPA 401 Section during the May 12, 2006 site visit were considered when making changes to the original report. This addendum supersedes the original wetland delineation, stream assessment, and threatened and endangered species habitat report, however, any conclusions drawn from the original report have not changed. A summary list of the changes addressed in the addendum is provided below. Figures, photographs, and data forms are included in the appendix to the attached addendum.

- 1) The jurisdictional limit of Stream bs-1-3 was extended approximately 130 feet west-northwest, as shown on Revision 1, Figure 3B.
- 2) The jurisdictional limit of Stream bs-8 was extended approximately 800 feet northwest, as shown on Revision 1, Figure 3B.
- 3) Ohio EPA observed a salamander in Stream bs-13 during the May 12, 2006 site visit and commented upon the unusual presence of a pool in a headwater stream. Therefore, Ohio EPA believes Stream bs-13 should be classified as a Class III headwater stream. Stream bs-13 was classified as a Class III headwater stream in the original wetland delineation, stream assessment, and threatened and endangered species survey report, dated March 2006.
- 4) URS identified Wetland d-6 in the wetland delineation report, dated March 2006, as a Palustrine open water/emergent (POW/PEM) wetland area. During the May 12, 2006 site visit, it was stated that the jurisdictional limits of this wetland needed to be revised. Pursuant to these comments, the central portion of this previously delineated wetland has been excluded as jurisdictional wetland. An emergent jurisdictional wetland fringe has been identified along the edge of this open water pond, as shown on Revision 1, Figure 3B.



- 5) The jurisdictional limit of Stream bm-s18 was shortened by approximately 200 feet, as shown on Revision 1, Figure 3C.
- 6) During the May 2006 site visit, it was determined that the character and class of Stream bm-s13 changes the Site from Class III to Class II headwater stream. A second HHEI evaluation, identified as bm-s13b, was performed upstream of HHEI sampling location bm-s13 to document this change. Stream bm-s13b scored 55/100, which is indicative of a Class II headwater stream. The HHEI data sheet for this stream and photograph are provided in the appendix to the addendum.
- 7) URS identified an additional wetland (Wetland d-7) during the May 2006 site visit that was not previously identified in the Wetland Delineation Report. Wetland d-7 was identified approximately 220 feet south of Wetland c-2, as shown on Revision 1, Figure 3C. The ORAM score for this wetland was 28/100, which is indicative of a Category 1, or low quality wetland. The USACE and ORAM data sheets for this wetland and accompanying photograph are provided in the appendix to the addendum.

o o o o o

Please review the enclosed materials and call James Nicholas (513-419-3407) if you have any questions pertaining to the attached addendum or to the wetland delineation, stream assessment, and threatened and endangered species habitat survey report.

Sincerely,
URS Corporation

Joey Van Skaik
Environmental Scientist

James Nicholas, Ph.D.
Project Manager

Addendum to the Wetland Delineation, Stream Assessment, and Threatened and Endangered Species Habitat Survey, Proposed AMP-Ohio Coal Fired Generation Power Plant Site, Meigs County, Ohio

This is an addendum to the original wetland delineation report, stream assessment, and threatened and endangered species habitat survey conducted in November and December, 2005. This addendum supersedes the original report and is based on the field review conducted by URS, USACE, and OEPA in May, 2006. Summary tables of the wetlands and streams encountered in the field survey and review follow the text. Figures, photographs, and data forms for the revisions made to the original report are included in the attached appendix. All other figures, photographs, and data forms can be found in the original report, dated March 2006.

URS conducted a jurisdictional wetland delineation, stream assessment, and threatened and endangered species survey of an approximately 1,000-acre site, located in the Letart Falls area, Meigs County, Ohio. AMP Ohio is proposing construction of a 1,000 megawatt (MW), coal fired electric generating facility at the Site along with a coal combustion by-products landfill, and a barge dock and unloading facility. Site delineation and assessment work began November 28, 2005 and was completed December 2, 2005. A field review was conducted on May 12, 2006 by URS, USACE, and OEPA.

Twenty-two wetlands, including 5 different Cowardin wetland types were identified within the project study area, including 15 palustrine emergent wetlands, 2 palustrine emergent/scrub-shrub wetlands, 2 palustrine emergent/forested wetlands, 1 palustrine open water wetland, and 2 palustrine open water/emergent wetlands. Identified wetlands were evaluated utilizing ORAM v5.0 qualitative evaluation method for categorizing wetlands. The ORAM scores for the wetlands indicated the following: 6 Category 1 emergent wetlands, 1 Category 1 wetland with emergent and forested components, 9 Category 2 emergent wetlands, 2 Category 2 wetlands with emergent and scrub-shrub

components, 1 Category 2 wetland emergent and forested components, 1 Category 2 open water wetland, and 2 Category 2 mixed emergent/open water wetlands. No Category 3 wetlands were identified during the November and December field investigation or the May field review.

Sixty-eight primary headwater habitat evaluations (HHEI) were conducted on the sixty-seven streams identified within the limits of the study area. The survey identified the following HHEI stream classes: 23 Class I streams, 7 Modified Class I streams, 20 Class II streams, 7 Modified Class II streams, and 10 Class III streams.

ODNR-DNAP reported 10 records of rare or endangered species within 5 miles of the Site. Of these ten species records, ODNR identified records of the Eastern Spadefoot Toad (*Scaphiopus holbrookii*) and the Common Prickly Pear (*Opuntia humifusa*) in the immediate project vicinity. The USFWS literature review indicated that the proposed project is located within the range of the federally endangered Indiana bat (*Myotis sodalis*) and three federally endangered species of mussels. These mussel species include the pink mucket pearly mussel (*Lampsilis orbiculata*), the fanshell mussel (*Cyprogenia stegaria*), and the sheepnose mussel (*Plethobasus cyphus*). None of these species of concern were identified during the November and December field investigation or the May field review. However, potential habitat for the Indiana Bat, Eastern Spadefoot Toad, and several aquatic species of concern were identified during the field investigation.

**SUMMARY TABLE OF WETLANDS AT THE AMERICAN MUNICIPAL
POWER-OHIO (AMP-OHIO) LETART FALLS, OHIO PROPOSED COAL
FIRED GENERATION POWER PLANT SITE**

Wetland Identifier	Cowardin Wetland Type	Wetland Area (acres)	ORAM Score (Category)	Mapped Soil*	Observed Soil
afs-w1	PEM	0.06	8 (1)	No	sandy loam
an-w1	PEM/PSS	0.18	38 (2)	LaB/LaD	silty clay
bm-w1	PEM	0.07	27 (1)	UgD	silty loam
bm-w2	PEM	0.33	35 (2)	UgE	silty loam
bm-w3	PEM	0.18	39 (2)	UgD/UgE	silty loam
bm-w4	POW/PEM	0.07	43 (2)	UgE	silty clay loam
bm-w5	PEM	0.27	38 (2)	UgD	silty loam
c-1	PEM	0.02	24 (1)	UgD/UgE	loam
c-2	PEM	0.04	37 (2)	UgD	sandy silty loam
c-3	PEM	0.01	32.5 (2)	UgE	silt
c-4	PEM	0.02	23 (1)	UgD	silty clay
d-1	PEM	0.03	39.5 (2)	UgD	silty clay
d-2	PEM	0.15	38 (2)	UgD	loam
d-3	PEM/PFO	0.11	27 (1)	UgD/UgE	loam
d-4	PEM/PFO	0.07	44 (2)	UgD/UgE	clay loam
d-5	PEM	0.02	37 (2)	UgE	silty clay loam
d-6	POW/PEM	0.09	32 (2)	UgE	silty clay
w-1	PEM/PSS	0.07	44 (2)	UgE	silty clay loam
w-2	PEM	0.18	21 (1)	LaD	sandy loam
wb-1	POW	0.18	43.5 (2)	UgE	clay
wb-2	PEM	0.09	33.5 (2)	LaD	silty clay
wd-7	PEM	0.08	28 (1)	UgD/UgC2	silty loam
Total wetland acreage**		2.32			

* soil mapped at wetland location

** total is combined acreage of each wetland type: 1.55 acres (PEM); 0.25 acres (PEM/PSS); 0.16 acres (POW/PEM); 0.18 acres (PEM/PFO); and 0.18 acres (POW).

SUMMARY TABLE OF HEADWATER STREAMS AT THE SITE

Stream Identifier	HHEI Score	HHEI Class	Stream Identifier	HHEI Score	HHEI Class
an-s1	42	Class II	bs-9	13	Class I
as-s1	41	Modified Class II	bs-10	54	Class II
as-s2	41	Modified Class II	bs-11	55	Class III
bm-s1	32	Class II	bs-12	43	Class II
bm-s2	11	Class I	bs-13	86	Class III
bm-s3	11	Class I	bs-14	49	Class II
bm-s4	12	Class I	bs-15	40	Class II
bm-s5	21	Class I	bs-16	47	Class II
bm-s6	41	Class II	cs-1	25	Class I
bm-s7	17	Class I	cs-1-2	69	Class III
bm-s8	11	Class I	cs-2	42	Class II
bm-s9	53	Class II	cs-3-1	47	Class II
bm-s10	16	Class I	cs-3-2	58	Class III
bm-s11	23	Class I	cs-4	34	Modified Class II
bm-s12	36	Class II	cs-4-2	77	Class III
bm-s13b	55	Class II	cs-5-2	23	Modified Class I
bm-s14	55	Class III	cs-6	21	Class I
bm-s15	23	Class I	ds-1-5	45	Modified Class II
bm-s16	40	Class II	ds-1-11	22	Class I
bm-s17	35	Class II	ds-2-2	40	Class II
bm-s18	24	Class I	ds-2-5	59	Class III
bm-s19	24	Class I	ds-2-10	52	Class III
bm-s20	33	Class II	ds-3a	17	Modified Class I
bm-s21	23	Class I	ds-3b	17	Modified Class I
bs-1	28	Modified Class I	ds-3c	17	Modified Class I
bs-1-2	40	Modified Class II	ds-4	31	Modified Class II
bs-1-3	29	Modified Class I	s-1	27	Class I
bs-2	48	Modified Class II	s-2	68	Class III
bs-2-2	43	Class II	s-3	81	Class III
bs-3	23	Class I	s-4	37	Class II
bs-4	15	Class I	s-5	64	Class II
bs-5	19	Class I	s-6	12	Class I
bs-6	11	Class I	s-7	12	Class I
bs-8	16	Modified Class I			

APPENDIX

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: <u>Retard Field area</u> Applicant/Owner: <u>AMP- OH</u> Investigator: <u>JN / JAV</u>	Date: <u>5/12/06</u> County: <u>maize</u> State: <u>Ohio</u>
Do Normal Circumstances Exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No Is the site significantly disturbed (Atypical Situation)? Yes <input type="radio"/> <input checked="" type="radio"/> No Is the area a potential Problem Area? Yes <input type="radio"/> <input checked="" type="radio"/> No (If needed, explain on reverse.)	Community ID: <u>PEM</u> Transect ID: <u>-</u> Plot ID: <u>D-7</u>

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Typha latifolia</u>	<u>H</u>	<u>OBL</u>	9. _____	_____	_____
2. <u>Impatiens capensis</u>	<u>H</u>	<u>FACW</u>	10. _____	_____	_____
3. <u>Juncus effusus</u>	<u>H</u>	<u>FACW+</u>	11. _____	_____	_____
4. <u>Carex sp</u>	<u>H</u>	<u>FAC-OBL</u>	12. _____	_____	_____
5. <u>Lonicera japonica</u>	<u>H</u>	<u>FAC-</u>	13. _____	_____	_____
6. <u>Juncus roemerianus</u>	<u>H</u>	<u>FAC</u>	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 95%

Remarks: wetland vegetation

HYDROLOGY

___ Recorded Data (Describe in Remarks). ___ Stream, Lake, or Tide Gauge ___ Aerial Photographs ___ Other ___ No Recorded Data Available	Wetland hydrology Indicators: Primary Indicators: ___ Inundated <input checked="" type="checkbox"/> Saturated in Upper 12 inches ___ Water Marks ___ Drift Lines ___ Sediment Deposits <input checked="" type="checkbox"/> Drainage Patterns in Wetlands Secondary Indicators (2 or more required): ___ Oxidized Root Channels in Upper 12" ___ Water-Stained Leaves ___ Local Soil Survey Data <input checked="" type="checkbox"/> FAC-Neutral Test ___ Other (Explain in Remarks)
Field Observations: Depth of Surface Water: _____ (in.) Depth to Free Water in Pit: _____ (in.) Depth to Saturated Soil: <u>10"</u> (in.)	Remarks: <u>wetland hydrology</u>

SOILS

D-7

Map Unit Name		UgD - Upshur-Hilpin complex, 15 to 25 % slopes			UgD - well	
(Series and Phase):		UgD - Upshur-Hilpin complex, 2 to 15 % slopes			Drainage Class: UgD - well	
Taxonomy (Subgroup):		Typic haplobudallo			Field Observations	
					Confirm Mapped Type? Yes <input checked="" type="radio"/> No <input type="radio"/>	

Profile Description:		Matrix Color	Mottle Colors	Mottle	Texture, Concretions,
Depth	Horizon	(Munsell Moist)	(Munsell Moist)	Abundance/Contrast	Structure, etc.
(Inches)					
0-5"	A	10YR 6/2	5YR 5/8	c/m	silty loam
5-10"	B	10YR 6/8	5YR 5/8	c/m	silty loam

Hydric Soil Indicators:

<input type="checkbox"/> Histosol <input type="checkbox"/> Histic Epipedon <input type="checkbox"/> Sulfidic Odor <input type="checkbox"/> Aquic Moisture Regime <input checked="" type="checkbox"/> Reducing Conditions <input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Concretions <input type="checkbox"/> High Organic Content in Surface Layer Sandy Soils <input type="checkbox"/> Organic Streaking in Sandy Soils <input type="checkbox"/> Listed on Local Hydric Soils List <input type="checkbox"/> Listed on National Hydric Soils List <input type="checkbox"/> Other (Explain in Remarks)
---	---

Remarks:

hydric soil core

WETLAND DETERMINATION

Hydrophytic Vegetation Present? <input checked="" type="radio"/> Yes <input type="radio"/> No (Circle) Wetland Hydrology Present? <input checked="" type="radio"/> Yes <input type="radio"/> No Hydric Soils Present? <input checked="" type="radio"/> Yes <input type="radio"/> No	(Circle) Is this Sampling Point Within a Wetland? <input checked="" type="radio"/> Yes <input type="radio"/> No
Remarks:	

Site: **D-7** Rater(s): **JAV (URS)** Date: **5/12/06**

0	0
---	---

max 6 pts subtotal

Metric 1. Wetland Area (size).

Select one size class and assign score.

- ☐ >60 acres (>20.2ha) (6 pts)
- ☐ 25 to <60 acres (10.1 to <20.2ha) (5 pts)
- ☐ 10 to <25 acres (4 to <10.1ha) (4 pts)
- ☐ 3 to <10 acres (1.2 to <4ha) (3 pts)
- ☐ 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- ☐ 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- ☒ <0.1 acres (0.04ha) (0 pts)

0.078 acre

5	5
---	---

max 14 pts subtotal

Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- ☐ WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- ☐ MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- ☒ NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- ☐ VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- ☐ VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- ☒ LOW. Old field (>10 years), shrubland, young second growth forest. (5)
- ☒ MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- ☐ HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

11	16
----	----

max 30 pts subtotal

Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- ☐ High pH groundwater (5)
- ☐ Other groundwater (3)
- ☒ Precipitation (1)
- ☐ Seasonal/intermittent surface water (3)
- ☐ Perennial surface water (lake or stream) (5)

3c. Maximum water depth. Select only one and assign score.

- ☐ >0.7 (27.6in) (3)
- ☐ 0.4 to 0.7m (15.7 to 27.6in) (2)
- ☒ <0.4m (<15.7in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- ☐ None or none apparent (12)
- ☒ Recovered (7)
- ☐ Recovering (3)
- ☐ Recent or no recovery (1)

3b. Connectivity. Score all that apply.

- ☐ 100 year floodplain (1)
- ☐ Between stream/lake and other human use (1)
- ☒ Part of wetland/upland (e.g. forest), complex (1)
- ☐ Part of riparian or upland corridor (1)

3d. Duration inundation/saturation. Score one or dbl check.

- ☐ Semi- to permanently inundated/saturated (4)
- ☐ Regularly inundated/saturated (3)
- ☒ Seasonally inundated (2)
- ☐ Seasonally saturated in upper 30cm (12in) (1)

Check all disturbances observed

- ☐ ditch
- ☒ tile
- ☐ dike
- ☐ weir
- ☐ stormwater input

- ☒ point source (nonstormwater)
- ☒ filling/grading
- ☐ road bed/RR track
- ☐ dredging
- ☐ other

9	25
---	----

max 20 pts subtotal

Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- ☐ None or none apparent (4)
- ☒ Recovered (3)
- ☒ Recovering (2)
- ☐ Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- ☐ Excellent (7)
- ☐ Very good (6)
- ☐ Good (5)
- ☐ Moderately good (4)
- ☐ Fair (3)
- ☒ Poor to fair (2)
- ☐ Poor (1)

4c. Habitat alteration. Score one or double check and average.

- ☐ None or none apparent (9)
- ☒ Recovered (8)
- ☒ Recovering (3)
- ☐ Recent or no recovery (1)

Check all disturbances observed

- ☒ mowing
- ☐ grazing
- ☐ clearcutting
- ☒ selective cutting
- ☐ woody debris removal
- ☐ toxic pollutants

- ☐ shrub/sapling removal
- ☐ herbaceous/aquatic bed removal
- ☐ sedimentation
- ☐ dredging
- ☒ farming
- ☐ nutrient enrichment

25

subtotal this page

Site: **D-7** Rater(s): **JAU (URS)** Date: **5/12/06**

25

subtotal this page

0 **25**

max 10 pts.

subtotal

Metric 5. Special Wetlands.

Check all that apply and score as indicated.

- ☐ Bog (10)
☐ Fen (10)
☐ Old growth forest (10)
☐ Mature forested wetland (5)
☐ Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
☐ Lake Erie coastal/tributary wetland-restricted hydrology (5)
☐ Lake Plain Sand Prairies (Oak Openings) (10)
☐ Relict Wet Prairies (10)
☐ Known occurrence state/federal threatened or endangered species (10)
☐ Significant migratory songbird/water fowl habitat or usage (10)
☐ Category 1 Wetland. See Question 1 Qualitative Rating (4-10)

3 **28**

max 30 pts.

subtotal

Metric 6. Plant communities, interspersions, microtopography.

6a. Wetland Vegetation Communities.

Score all present using 0 to 3 scale.

- ☒ Aquatic bed
☐ Emergent
☐ Shrub
☐ Forest
☐ Mudflats
☐ Open water
☐ Other

2

6b. horizontal (plan view) interspersions.

Select only one.

- ☐ High (5)
☐ Moderately high (4)
☐ Moderate (3)
☐ Moderately low (2)
☒ Low (1)
☐ None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- ☐ Extensive >75% cover (-5)
☐ Moderate 25-75% cover (-3)
☒ Sparse 5-25% cover (-1)
☐ Nearly absent <5% cover (0)
☐ Absent (1)

-1

6d. Microtopography.

Score all present using 0 to 3 scale.

- ☐ Vegetated hummocks/mounds
☒ Coarse woody debris >15cm (6in)
☐ Standing dead >25cm (10in) dbh
☐ Amphibian breeding pools

1

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

28

GRAND TOTAL(max 100 pts)

Refer to the most recent ORAM Score Calibration Report for the scoring breakpoints between wetland categories at the following address: <http://www.epa.state.nh.us/dwr/401401.html>

category 1



Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3):

Class II

55

SITE NAME/LOCATION AMP - OhioSITE NUMBER BM - S13 B RIVER BASIN _____DRAINAGE AREA (mi²) 41

LENGTH OF STREAM REACH (ft) _____ LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 5/12/06 SCORER JN/JAV COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL

☒ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

MODIFICATIONS:

1. SUBSTRATE (Estimate percent of every type of substrate present. Check ONLY two predominant substrate TYPE boxes (Max of 32). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.			
TYPE	PERCENT	TYPE	PERCENT
<input type="checkbox"/> BLDG SLABS [16 pts]	_____	<input checked="" type="checkbox"/> SILT [3 pts]	<u>60%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	_____	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>10%</u>
<input type="checkbox"/> BEDROCK [16 pts]	_____	<input type="checkbox"/> FINE DETRITUS [3 pts]	_____
<input type="checkbox"/> COBBLE (63-256 mm) [12 pts]	_____	<input type="checkbox"/> CLAY or HARDPAN [0 pts]	_____
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [8 pts]	<u>30%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [8 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldg Slabs, Boulder, Cobble, Bedrock 0% (A) 12 (B) 3

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES:

2. Maximum Pool Depth (Measure the maximum pool depth within the 61 meter (200 ft) evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check ONLY one box):	
<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [16 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input type="checkbox"/> < 5 cm [8 pts]
<input checked="" type="checkbox"/> > 10 - 22.5 cm [28 pts]	<input type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 5'

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check ONLY one box):	
<input type="checkbox"/> > 4.0 meters (> 13') [30 pts]	<input checked="" type="checkbox"/> > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [16 pts]
<input type="checkbox"/> > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]	<input type="checkbox"/> ≤ 1.0 m (≤ 3' 3") [8 pts]
<input type="checkbox"/> > 1.5 m - 3.0 m (> 4' 7" - 9' 8") [20 pts]	

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 15

HHEI
Metric
PointsSubstrate
Max = 40

15

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

FLOODPLAIN QUALITY

L R (Per Bank)

☒ Wide >10m☐ Moderate 5-10m☐ Narrow <5m☐ None

COMMENTS _____

L R (Most Predominant per Bank)

☒ Mature Forest, Wetland☒ Immature Forest, Shrub or Old Field☐ Residential, Park, New Field☐ Fenced Pasture

L R

☐ Conservation Tillage☐ Urban or Industrial☐ Open Pasture, Row Crop☐ Mining or Construction

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):

☒ Stream Flowing☐ Subsurface flow with isolated pools (interstitial)

COMMENTS _____

☐ Moist Channel, isolated pools, no flow (intermittent)☐ Dry channel, no water (ephemeral)

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):

☐ None☐ 0.5☐ 1.0☐ 1.5☒ 2.0☐ 2.5☐ 3.0☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 m/100 m)☐ Flat to Moderate☐ Moderate (2 m/100 m)☒ Moderate to Severe☐ Severe (10 m/100 m)

ADDITIONAL STREAM INFORMATION (This information must also be completed):QHEI PERFORMED? - ☐ Yes ☒ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)**DOWNSTREAM DESIGNATED USE(S)**

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATIONUSGS Quadrangle Name: New Haven, WV-OH NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____County: Meigs Township / City: _____**MISCELLANEOUS**Base Flow Conditions? (Y/N): Y Date of last precipitation: unknown Quantity: unknownPhotograph information: yesElevated Turbidity? (Y/N): N Canopy (% open): ~15-20%Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____

Is the sampling reach representative of the stream (Y/N) Y If no, please explain: _____

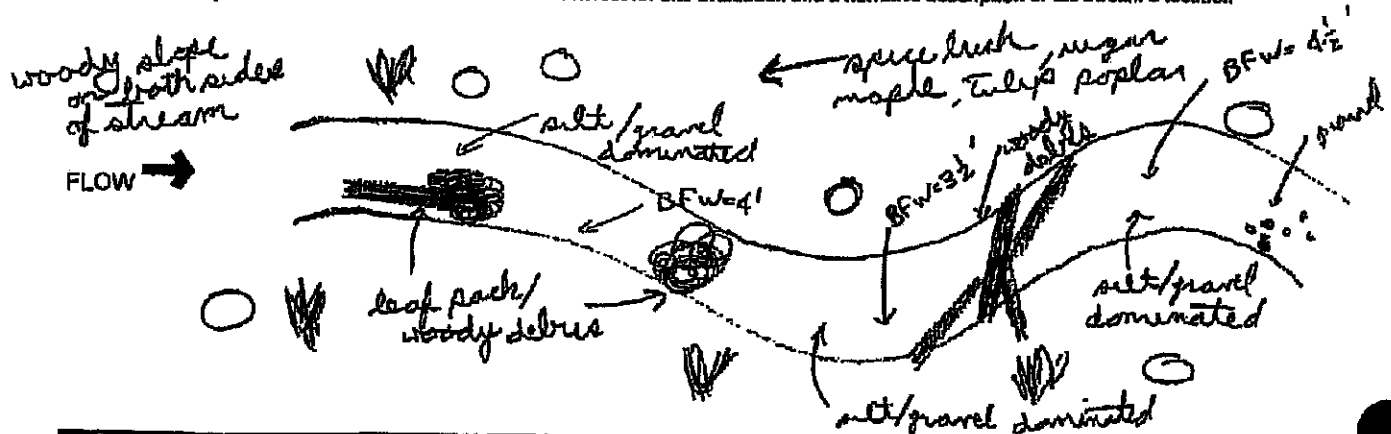
Additional comments/description of pollution impacts: _____

BIOTIC EVALUATIONPerformed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location





Photograph 1: View of Stream bm-s13b, looking east-southeast.



Photograph 2: View of Wetland d-7, looking north-northwest.

BASEMAP SOURCE:
United States Department of Agriculture, Farm Service Agency
National Agricultural Imagery Program, Maing County, Ohio (2004)



APPENDIX 07-3
MUSSEL SURVEY

**Freshwater Mussel Survey of the Ohio River at AMP-Ohio's
Proposed Generating Facility
(Ohio River Mile 236-237)**

FINAL



Prepared for:

URS

**36 East Seventh Street, Suite 2300
Cincinnati, OH 45202**

Prepared by:

**EA Engineering, Science, and Technology
15 Loveton Circle
Sparks, MD 21152**



December 26, 2006

1.0 INTRODUCTION

AMP-Ohio is applying for a Section 10 permit under the Rivers and Harbors Act of 1899 for construction of a proposed generating facility in Meigs County, OH. An assessment of the existing biological conditions in the project area is required as part of the permit application, prior to construction or dredging activities. As part of evaluating the proposed instream construction activities, the U.S. Fish and Wildlife Service (FWS) determined that a qualitative survey of the freshwater mussel fauna in the vicinity of the proposed construction sites was necessary to ensure that activities would pose no harm to federally listed mussel species. Several federally endangered mussel species have been reported by FWS as present in Meigs County Ohio and Mason County West Virginia, where both counties border the project site (FWS 2006, FWS 2002):

Meigs Co., OH

Cyprogenia stegaria (fanshell)

Lampsilis abrupta (pink mucket)

Plethobasus cyphus (sheepnose)

Mason Co., WV

Lampsilis abrupta (pink mucket)

In this reach of the Ohio River, the state of West Virginia has jurisdiction over the natural resources of the river, and tables included in the results section of this report reflect that jurisdiction. This mussel survey was designed to define the presence and abundance of freshwater mussel species within the vicinity of the proposed project site upstream of the Racine Lock and Dam (ORM 236-237).

A study plan was developed and provided to US Fish and Wildlife Service (FWS) and West Virginia Department of Natural Resources (WV DNR) for review and comment. Ms. Janet Clayton (WV DNR), Ms. Barbara Douglas (FWS), and Ms. Patricia Morrison (FWS) provided comment via email or phone calls. Ms. Clayton included the following changes to the study plan: (1) a qualified malacologist should be present, (2) update the definition of fresh dead shells to include those that have shiny nacre and intact hinge, (3) redefine mussel concentration to include 0.5 mussels/m², (4) note that the time limitation for conducting surveys is from May to October, and (5) include minimum visibility requirements (at depth) to be ≥ 20 inches. Ms. Morrison sent minor suggestions, which included similar comments to Ms. Clayton's. However she added that while the ORVEMS (2004) protocol suggests using 100 m long transects, this survey may need to include longer transect lines as needed to account for project-related activities beyond the standard 100 meters. Ms. Douglas had no additional comments beyond what WV DNR and FWS had already provided.

A final study plan was sent to Ms. Clayton in September 2006 along with a scientific collecting permit application. The collection permit was issued to Mr. Alan Christian (Arkansas State University) who accompanied EA during the survey. All comments and changes to the draft study plan were included in the final study plan (Appendix A).

2.0 METHODS

2.1 Mussel Survey

During October 11-12, 2006, the area proposed for use by AMP-Ohio was surveyed for unionid mussels in the mainstem Ohio River. Riverine conditions during the survey were typical for flow conditions (22,000 cfs) and gauge heights (25 ft) during the month of October (USGS 2005). The station is located on the Ohio bank between Ohio River Mile (ORM) 236-237, just upstream of the US Army Corps of Engineer's Racine Lock and Dam (Figure 2-1).

A qualitative survey was conducted to establish baseline conditions and determine the presence of live mussels in the project area. Mainstream Commercial Divers, Inc. (MCDI) provided a professional dive crew that was certified to meet OSHA requirements. The divers used surface supplied diving equipment with voice communications to conduct this survey. Dr. Alan Christian of Arkansas State University was retained by EA to provide additional taxonomic expertise while onsite. Prior to conducting field activities, Dr. Christian obtained scientific collecting permits from the state of West Virginia. Substrate characterization and water quality measurements were also conducted throughout the project reach.

This qualitative survey was designed to meet the following conditions:

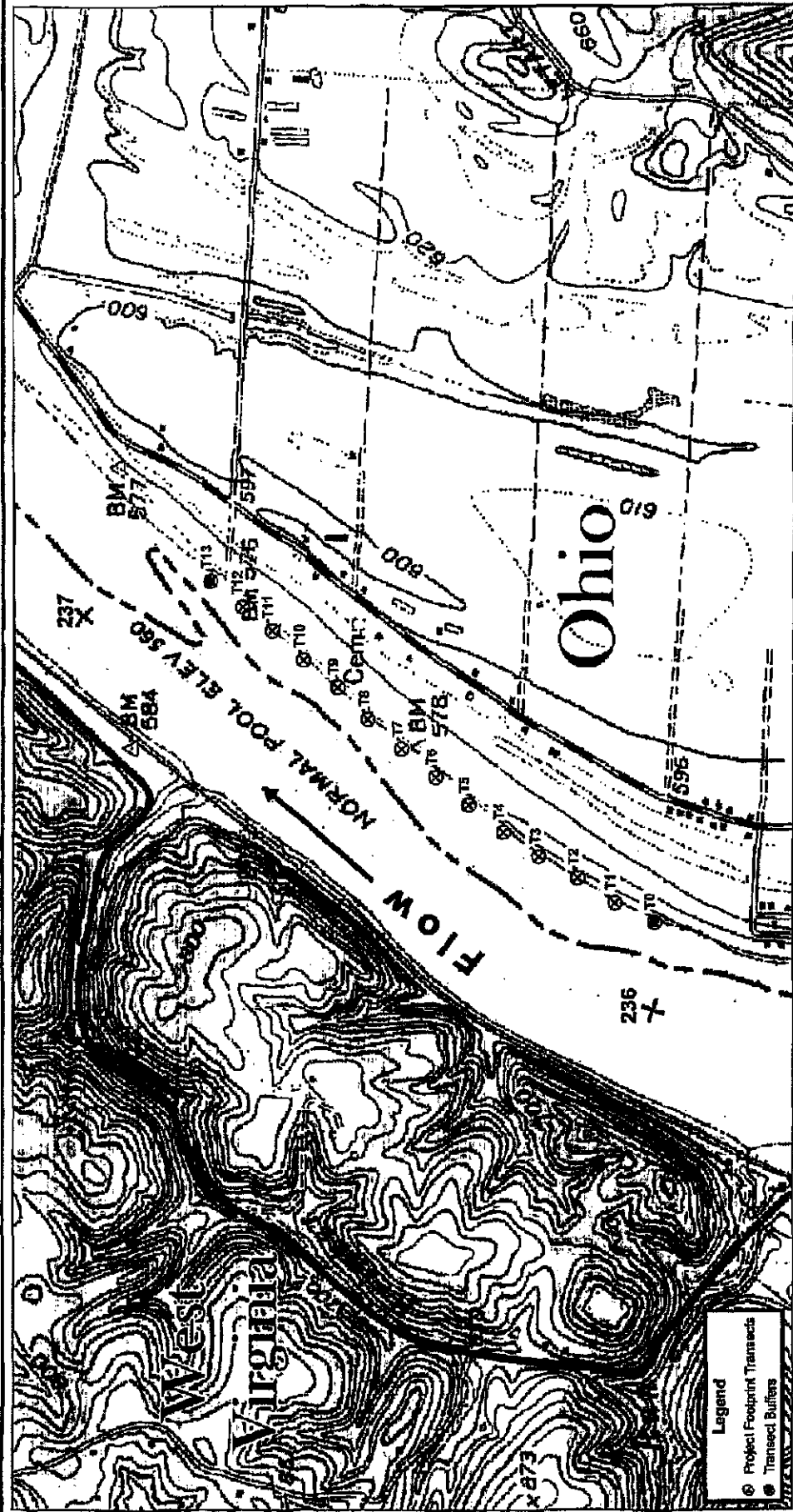
- collect and identify live mussels adjacent to the proposed generating facility,
- collect and identify fresh dead¹ mussels located at the proposed generating facility,
- estimate the abundance and density of live species collected from the survey site, and
- compartmentalize live/fresh dead individuals using external annuli into two age groups: <3 years of age and >3 years of age.

Qualitative Sampling of Mussels

The shoreline footprint of the proposed power station is approximately 1,200 m (3,936 ft) in length. Activities within the project footprint include the construction of an offshore intake structure (~40 m in length from the shoreline) located near the center of the project, and numerous mooring cells located near the most upstream reach of the project. Because these project-related activities were less than 100 m from the shoreline, transects used in this study were not extended beyond the standard 100 m length. Mussel concentrations (i.e. defined as 0.5 animals per square meter; see Appendix A Study Plan) at this project were not high enough to require extended (3-4 additional transects) upstream and downstream buffer zones, however, we did include one additional transect at the upstream and downstream ends of the project boundary.

All methods were conducted using the Ohio River Valley Ecosystem Mollusk Subgroup (ORVEMS) protocol for sampling mussels in the Ohio River (ORVEMS 2004). A series of transects were established throughout the project area to survey for live mussels (Figure 2-1). A total of 14 transects were surveyed for the project (Table 2-1). The first transect (T1) was located at the upstream project boundary and all subsequent transects (T2-T12) were positioned downstream of the first transect, 100 m apart. Two additional transects (T0 and T13) were included as buffers for the upstream and downstream boundaries, both positioned 100 m apart

¹Fresh dead shells in this study will be defined as any shell that has shiny nacre and intact hinge.



Study Area

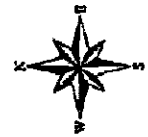


Figure 2-1. Location of mussel transects in the Ohio River (Meigs, Co.), upstream of Racine Lock and Dam

Amp Ohio, Qualitative Mussel Survey,
Ohio River Miles 236-237



from the existing survey transects. Each transect was established perpendicular to flow and marked at every 10 m segment. For each 100 m transect length, there were ten, 10-m segments along each transect. Each 10-m segment was sampled individually by the divers, and any mussels collected in that segment were maintained as a separate replicate. Some excavation (~10 cm) and disturbance of the surface sediments occurred during the survey to collect mussels for species identification.

Table 2-1. Transect numbers for mussel surveys at AMP-Ohio Project (ORM 236-237).

AMP-Ohio Station (~1,200 m shoreline)	
Project area =	12 transects (T1-12)
Upstream Buffer =	1 transect (T0)
Downstream Buffer=	1 transect (T13)
TOTAL = 14 transects	

All live individuals were identified to species, and while the study plan suggested that each individual be grouped into two age classes (those that were <3 years of age and those that were >3 years of age) all six live mussels were specifically aged using external annuli. During the identification process, mussels were held outside of water less than five minutes then returned to the Ohio River at the same location. The taxonomic key, *Freshwater Mussels of the Midwest*, was used for all species identifications (Cummings and Mayer 1992).

2.2 Water Quality and Substrate Composition

Water quality was measured several times a day, typically once in the morning, midday, and late afternoon. Measurements were taken in the river channel at the surface, middle, and at depth. Water quality measurements included temperature, pH, dissolved oxygen, conductivity, and secchi depth. Visibility at depth was also noted during the survey with diver communication.

Substrate composition was visually estimated to determine the range of particle sizes within the survey areas. The Wentworth (1922) scale was used to characterize substrate at all transect segments.

Additional data collected at the survey area included weather conditions and GPS locations of each transect line used for surveying.

3.0 RESULTS

3.1 Station Transects and Survey Conditions

All transects at each station were located using GPS and latitude/longitude coordinates. A photo log of the survey is provided in Appendix B. Weather during the survey ranged from rain showers to sunny conditions, and daytime air temperatures ranged from 55 to 65°F.

3.2 Freshwater Mussel Results

A total of six live individuals comprising five species were collected during the October survey (Table 3-1; Figure 3-1). Relic shell material was not found in the project area. Species density of live mussels did not exceed 0.1/m² throughout the 1,400 meters surveyed, and therefore did not

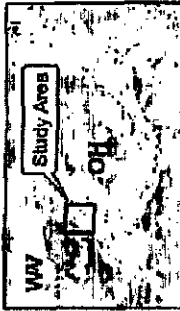
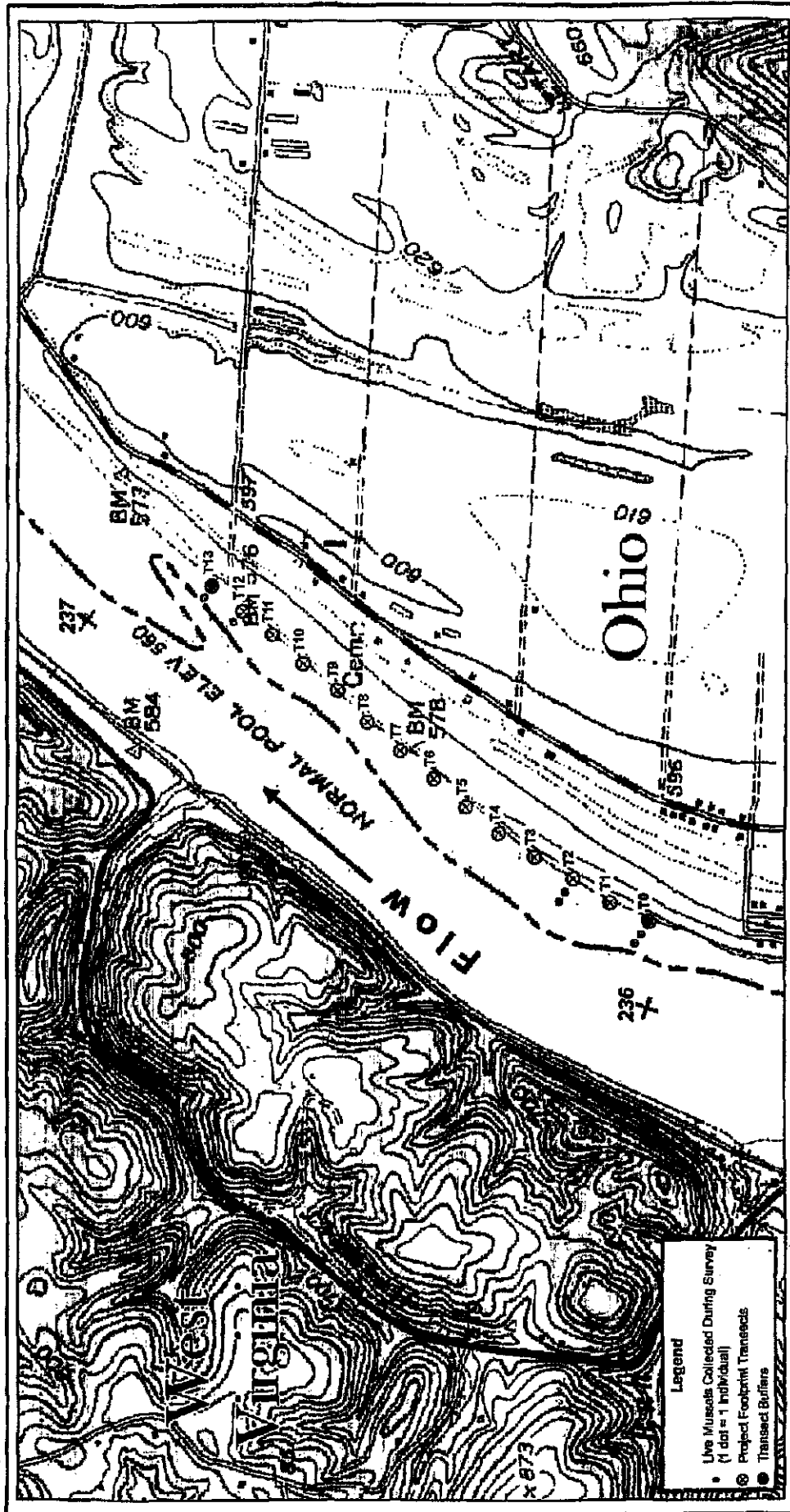


Figure 3-1. Location of live mussels collected along 14 transects, October 2006

Amp Ohio, Qualitative Mussel Survey,
Ohio River Miles 236-237



qualify as a mussel concentration (e.g. 0.5 mussels/m²). Two *Amblema plicata* were collected from the upstream buffer transect (T0) at 20-40 meters from the shoreline. *Lampsilis siliquoidea* and *Lasnigona complanata* were both collected at Transect 2 at 0-10 meters and 20-30 meters, respectively. Two species were collected at the downstream end of the project footprint, one *Potamilus alatus* was collected at Transect 12 at 10-20 meters, and one *Obliquaria reflexa* was collected at Transect 13 at 20-30 meters from shoreline. There were no other live mussels collected between Transect 2 and Transect 12 (nearly 1,000 meters).

Table 3-1. Composition, abundance, and status of mussel species collected during a qualitative survey at ORM 236-237, October 2006

Species	Common Name	Quantity	Transects Collected	WV Status*
<i>Amblema plicata</i>	threeridge	2	T0 (upstream buffer)	common
<i>Lampsilis siliquoidea</i>	fat mucket	1	T2	common
<i>Lasnigona complanata</i>	white heelsplitter	1	T2	S2/G5*
<i>Obliquaria reflexa</i>	threehorn wartyback	1	T13 (downstream buffer)	S2/G5*
<i>Potamilus alatus</i>	pink heelsplitter	1	T12	common
Total Abundance		6		
Total Species		5		

*Category S2/G5: Indicates a species that is considered "very rare and imperiled" (S2)/ and considered very common and demonstrably secure" (G5) (West Virginia DNR 2006).

Mussel Survey Summary

No federally listed threatened or endangered species were collected during the survey within the 1,200 m project footprint or the additional 200 meters of upstream and downstream buffer transects (USFWS 2004). No mussel concentrations [as defined by ORVEMS (2004) as 0.5 mussels/m²] were identified during the survey and therefore did not require additional transects. A total of six live mussels was collected during the survey comprising five species. Four of these species are considered common by the state of West Virginia. Two species, *Obliquaria reflexa* and *Lasnigona complanata*, collected during the survey are considered rare by the West Virginia Natural Heritage (WVNH). While West Virginia does not have state threatened or endangered legislation, it assigns all rare species a ranking that is defined by WVNH. Both species are categorized as S2 by the state of West Virginia, which is considered "very rare and imperiled". However, on a global ranking, both species are categorized as G5, which is considered "very common and demonstrably secure, though rare in parts of its range". *Obliquaria reflexa* and *L. complanata* have been reported throughout the Ohio River, and a 10-year monitoring effort conducted just 30 river miles upstream of the proposed AMP-Ohio site indicates that both species were collected annually from 1993-2004 (EA 2005). While total abundance for *L. complanata* was somewhat low (n= 290) during the 10-year monitoring program, *O. reflexa* had the second highest abundance (N>5,700) of all species collected at this site, second only to *Amblema plicata*.

In the present survey, no single species dominated the small collection, and all but one species, *A. plicata*, had only one individual collected. No relic shells or fresh dead shells were collected during the survey either. Few exotic species were identified, two Asian clams (*Corbicula fluminea*)

were collected at Transect 1 and no zebra mussels (*Dreissena polymorpha*) were collected throughout the survey footprint. Age estimates of live specimens were all greater than three years of age and ranged from 5-12 years. Shell quality for all species was considered good with very little erosion of the periostracum layer. All raw data, including shell age, substrate composition, water depths are provided in Appendix C.

3.3 Water Quality and Substrate Composition

Water quality was measured twice daily at randomly selected transects to determine whether conditions were suitable for accurate survey assessments (i.e. increased turbidity can inhibit underwater line of sight). Water quality conditions during the survey did not change substantively during the survey (Table 3-2). Secchi depth measurements ranged from 61 to 70 cm and water temperatures ranged from 18.2 to 19.5°C (surface to depth) during the survey. Audio communications with the diver during the survey indicated that the diver could see approximately 22 inches ("arms length") with the assistance of underwater lights.

Table 3-2. Water quality measurements for AMP-Ohio Station October 11-12, 2006

Transact	Date	Time	Level	Temp (C)	Secchi (cm)	DO (mg/L)	Cond. (uS/cm)	pH
T2	10-11-06	1035-1100	Surface	18.7	62.5	7.09	337	5.67
			Middle	18.7		7.02	336	6.24
			Depth (28')	18.7		7.00	336	6.67
T5	10-11-06	1239-1306	Surface	19.5	68.0	7.19	327	*
			Middle	18.9		7.20	336	*
			Depth (29')	18.7		7.24	339	*
T9	10-11-06	1532-1558	Surface	18.3	69.5	7.67	341	*
			Middle	18.3		7.48	343	*
			Depth (35')	18.4		7.28	342	*
T10	10-12-06	0930-0952	Surface	18.3	64.5	7.57	329	6.19
			Middle	18.3		7.30	329	6.42
			Depth (35')	18.3		7.18	330	6.58
T0	10-12-06	1226-1248	Surface	18.2	60.5	7.15	329	6.85
			Middle	18.3		7.00	329	7.03
			Depth (28')	18.3		6.97	329	7.13
Average				18.5	65.0	7.22	334	6.53

*pH probe malfunctioned, no data collected at these transects.

Average substrate composition at each of the transects is presented in Table 3-3. While substrate was visually estimated at each 10-m segment, all segments within each transects were averaged together for a single value. Substrate at all transects varied slightly, but consisted primarily of mud/clay (41%) and sand (51%), with smaller percentages of silt, gravel, and cobble at some transects. Mussels collected during this survey generally prefer substrates with a mud/sand/gravel mixture (Cummings and Mayer 1992), however, the few individuals collected indicate that while substrate may be suitable, other factors are contributing to the low abundances in this reach of the Ohio River.

4.0 Recommendations

We consider this qualitative survey sufficient to provide the data needed to establish baseline conditions for the Ohio River near AMP-Ohio's proposed generating facility at ORM 236-237. The very low abundance (n=6) of freshwater mussels within the project footprint as well as the lack of mussel concentrations calculated at the site support going forward with the proposed in-stream construction activities. Additionally, the lack of federally listed species in the project area offers additional evidence that these areas are likely void of such species.

Table 3-3. Average percent composition of surficial sediments collected from AMP-Ohio Station (ORM 236-237), October 2006

Transect	Clay/Mud (%)	Silt (%)	Sand (%)	Gravel/ Pebble (%)	Cobble (%)
T0 (US buffer)	30	8	54	0	8
T1	36	0	64	0	0
T2	40	0	60	0	0
T3	60	0	40	0	0
T4	60	0	40	0	0
T5	50	0	50	0	0
T6	65	0	35	0	0
T7	44	0	56	0	0
T8	42	0	53	0	5
T9	42	0	56	0	2
T10	29	0	51	10	10
T11	29	4	44	17	6
T12	21	8	55	4	12
T13 (DS buffer)	26	6	53	8	8
Average	41	2	51	3	4

Clay/Mud: <0.004 mm; Silt: 0.004 – 0.06 mm; Sand: 0.06 – 2 mm; Gravel/Pebble: 2 – 64 mm;
Cobble: 64 - 256 mm (Wentworth 1922)

5.0 Literature Cited

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<http://www.fws.gov/northeast/endangered/>.

Wentworth, CK. 1922. A scale of grade and class terms for clastic sediments. *J Geol* 30:377-392.

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<http://www.wvdnr.gov/Wildlife/Endangered.shtm>

Appendix A

**Mussel Study Plan: AMP-Ohio Qualitative Mussel Survey
(ORM 236-237)**



FINAL STUDY PLAN

Qualitative Mussel Survey at AMP Ohio's Proposed Generating Facility (Ohio River Mile 236-237)

Prepared for:

URS
36 East Seventh Street, Suite 2300
Cincinnati, OH 45202

Prepared by:

EA Engineering, Science, & Technology, Inc.
15 Loveton Circle
Sparks, MD 21152

28 August 2005

INTRODUCTION AND PURPOSE

At the request of URS and AMP Ohio, EA Engineering, Science & Technology, Inc. (EA) has developed a study plan to conduct a qualitative freshwater mussel survey in the Ohio River mainstem near Letart, WV. AMP Ohio is applying for a Section 10 permit under the Rivers and Harbors Act of 1899 for a proposed generating facility in Meigs County, OH. An assessment of the existing biological conditions in the project area is required as part of the permit application, prior to construction or dredging activities. EA will conduct a freshwater mussel survey at the proposed generating facility to determine the presence and abundance of live native mussels.

This qualitative survey is designed to meet the following conditions:

- collect and identify live mussels adjacent to the generating facility,
- collect and identify fresh dead¹ mussels located at the generating facility,
- estimate the abundance and density of live species collected from the survey site, and
- compartmentalize live/fresh dead individuals using external annuli into two age groups: <3 years of age and >3 years of age.

US Fish and Wildlife Service (FWS) is increasingly concerned with the potential collection of threatened or endangered (T&E) species in this reach of the Ohio River. While we do not expect to collect any federal or state listed species, we will take necessary precautions to limit their exposure out of water if any are collected during the survey. A list of all state- and federally-listed species is provided in Table 1, and three of the species are known to occur in Meigs County, OH. Additional data will be collected for state or federal T&E species including shell length, specific age of individual, shell condition, and photographic documentation of representative species.

Other tasks that will be completed during the survey include substrate characterization and water quality. *No voucher specimens of any live unionids will be preserved for this project.*

DESCRIPTION OF WORK

Field Design and Mussel Collection

All methods in a finalized project study plan will be approved by ODNR and FWS biologist prior to any fieldwork.

One station will be surveyed (in the vicinity of ORM 236-237) in the mainstem Ohio River (Meigs County) in the summer of 2006 during low-flow conditions. Ohio guidance suggests that mussel surveys be conducted between May and October, and we plan to meet these conditions. The station is located on the Ohio bank near Letart, WV.

There is little existing information about mussel populations in the vicinity of this proposed station, therefore a qualitative survey will be conducted to establish baseline conditions and determine the presence of live unionids in the project area. Mainstream Commercial Divers, Inc. (MCDI) has been retained by EA to conduct the diving effort. Additional tasks will also be conducted during the survey,

Table 1. List of state and federal threatened or endangered mussel species throughout the state of Ohio.

Scientific Name	Common Name	Status
<i>Cyprogenia stegaria</i>	fanshell*	FE
<i>Ellipsaria lineolata</i>	butterfly	SE
<i>Elliptio crassidens</i>	elephant ear	SE
<i>Epioblasma obliquata obliquata</i>	purple catspaw	FE
<i>Epioblasma obliquata perobliqua</i>	white catspaw	FE
<i>Epioblasma torulosa rangiana</i>	Northern riffleshell	FE
<i>Epioblasma triquetra</i>	snuffbox	SE
<i>Fusconaia ebena</i>	ebonyshell	SE
<i>Fusconaia maculata</i>	long-solid	SE
<i>Lampsilis ovata</i>	sharp-ridged pocketbook	SE
<i>Lampsilis teres</i>	yellow sandshell	SE
<i>Lampsilis orbiculata</i>	pink mucket*	FE
<i>Ligumia nasuta</i>	Eastern pondmussel	SE
<i>Ligumia recta</i>	black sandshell	ST
<i>Megalonias nervosa</i>	washboard	SE
<i>Obliquaria reflexa</i>	threehorn wartyback	ST
<i>Plethobasus cyphus</i>	sheepnose*	SE, FC
<i>Pleurobema clava</i>	clubshell	FE
<i>Pleurobema cordatum</i>	Ohio pigtoe	SE
<i>Pleurobema rubrum</i>	pyramid pigtoe	SE
<i>Quadrula cylindrical</i>	rabbitsfoot	SE
<i>Quadrula metanevra</i>	monkeyface	SE
<i>Quadrula nodulata</i>	wartyback	SE
<i>Toxolasma lividus</i>	purple lilliput	SE
<i>Truncilla donaciformis</i>	fawns foot	ST
<i>Unio merus tetralasmus</i>	pondhorn	ST
<i>Villosa fabalis</i>	rayed bean	SE, FC
<i>Villosa lienosa</i>	little spectacle case	SE

* Species known to occur in Meigs County, OH.

FE: federally endangered

FC: federal candidate species

SE: state (OH) endangered

ST: state (OH) threatened

* Fresh dead shells in this study will be defined as any shell that has shiny nacre and intact hinge.

which include substrate characterization and water quality measurements. Only voucher specimens of *relic shells* will be collected for verification of species identification.

Qualitative Sampling

One station will be surveyed for the presence of live unionid mussels, since the presence of dead shells at the site is often from upstream sources and have no relevance on the existing project. The survey area is approximately 0.7 river miles in length (1,097 meters of shoreline).

A series of transects (12-14 transects) will be established throughout the project area at each station to survey for freshwater mussels (Table 2). Each transect will be established 100 m apart, located perpendicular to flow along the bank, and marked at 10 m segments. While the Ohio River guidance document (ORVEMS 2004²) suggests that transects be spaced 100 m apart and 100 m in length throughout the project footprint (including buffer zones), we will interpret this guidance as required to ensure the health and safety of the divers. Our goal is to meet the specifications outlined in the guidance; however unexpected conditions (e.g. barge traffic, water depths greater than 45', instream hazards, etc.) may require us to modify these for diver safety.

If mussel concentrations in the project area exceed 0.5 animals per square meter (or 5 animals collected from any 10 m segment), which is considered by the state of Ohio as a "mussel bed", we will extend the downstream survey to include a buffer zone at each station that will consist of three additional transects. Additional transects are proposed downstream because the majority of potential effects would be seen downstream of the project area. If we do not identify mussel concentrations in the project vicinity, we will include only one transect upstream and downstream of the station and survey for live mussels.

Table 2. Transect scenarios for mussel surveys at one Ohio River station (ORM 236-237).

AMP Ohio Station (1,097 m shoreline)	
No mussel concentrations*	Mussel concentrations identified**
Upstream = 1 transect	Upstream = 1 transect
Project area = 10 transects	Project area = 10 transects
Downstream = 1 transect	Downstream = 3 transects
TOTAL = 12 transects	TOTAL = 14 transects

*Number of transects if no mussel concentrations are identified in the project area.

**Number of transects if mussel concentrations ($\geq 1/m^2$) are identified in the project area.

Qualitative sampling will be conducted at each 10 m segment and targeted transect lengths will be 100 m from the shoreline. After review of the proposed project construction, the footprint of construction activities (e.g. intake structure, mooring cells, discharge pipe) do not exceed the 100 m distance into the channel and therefore, no additional areas beyond this distance will need to be surveyed. Live mussels collected during the qualitative sampling will be identified to species and counted for abundance and relative density. Dr. Alan Christian of Arkansas State University has been retained by EA to oversee all mussel taxonomy and we will be utilizing his WV collecting permit for this project. All live and fresh dead

individuals will be grouped into two age classes using external annuli: those that are <3 years of age and those that are >3 years of age. EA is aware of the debate surrounding the accuracy of aging specimens from external growth rings or annuli and will use this method only as an estimate of age. During the identification process, mussels will be held in floatable fish baskets and left in the river water; some containers may be supplemented with battery-powered aerators to assure that dissolved oxygen doesn't decline below acceptable limits (<4 mg/L). All live specimens will be returned immediately following identification and aging. Relic shell material (of non-listed species) will be collected for species validation and taxonomic keys of the Ohio River (Cumplings and Mayer 1992)³ will be used for all species identification. Any federal or state listed mussel collected during the survey will undergo additional measurements including shell length measurements, shell condition, specific age determinations, and photographic documentation.

Water Quality

Water quality measurements will be conducted at each station. Water quality will include measurements of temperature, pH, dissolved oxygen, conductivity, and secchi depth. Mussel surveys will be conducted under water quality conditions that meet the minimum visibility of 20 inches at depth. All water quality data, including the required minimum visibility measurements will be provided in the final report.

Additional data will be collected at each station including weather conditions and GPS locations of each transect line used for surveying.

Substrate Characterization

Substrate composition will be visually estimated to determine the range of particle sizes within the survey areas. The Wentworth (1922)⁴ scale, which has been approved by the state of Ohio as the most appropriate method, will be used to characterize substrate at the survey site.

SUMMARY REPORT AND DELIVERABLES

Within 10 days of the survey completion, EA will provide URS with a list of species collected during the survey and their state and federal status.

EA will prepare a draft written report within 30 days of the survey completion that summarizes the study's methodology, technical findings (mussel species and abundance, water quality, and substrate characterization), and recommendations from the mussel survey. No statistical analyses will be required for this program because it is a baseline existing conditions survey. All comments from the draft report by URS, AMP Ohio, and other agencies will be addressed and a final report will be completed. Detailed appendices will be prepared that document the results of the field survey including mussel species and abundance, field data sheets, substrate, water quality, and photo log.

² Ohio River Valley Ecosystem Mollusk Subgroup (ORVEMS). 2004. Draft Protocol for Mussel Surveys in the Ohio River where Dredging/Disposal/Development Activity is Proposed.

³ Cummings KS and Mayer CA. 1992. Field guide to freshwater mussels of the Midwest. Illinois Natural History Survey Manual 5. 194 pp.

⁴ Wentworth, CK. 1922. A scale of grade and class terms for clastic sediments. *J Geol* 30:377-392.

A table summarizing the mussel species identified during the survey and their abundances will be sent to Ohio DNR and West Virginia DNR by the end of the calendar year (Dec. 31, 2006) in compliance with the requirements for state collecting permits.

Appendix B

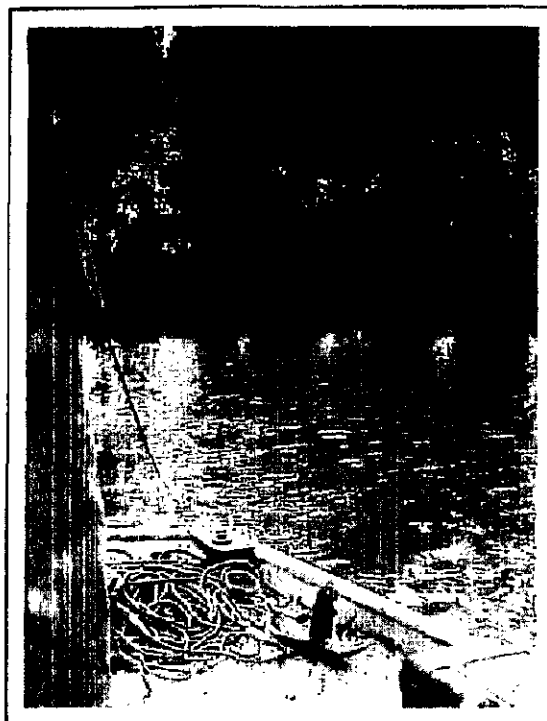
**Photolog – AMP-Ohio Mussel Survey
(ORM 236-237)**

Photographic Record

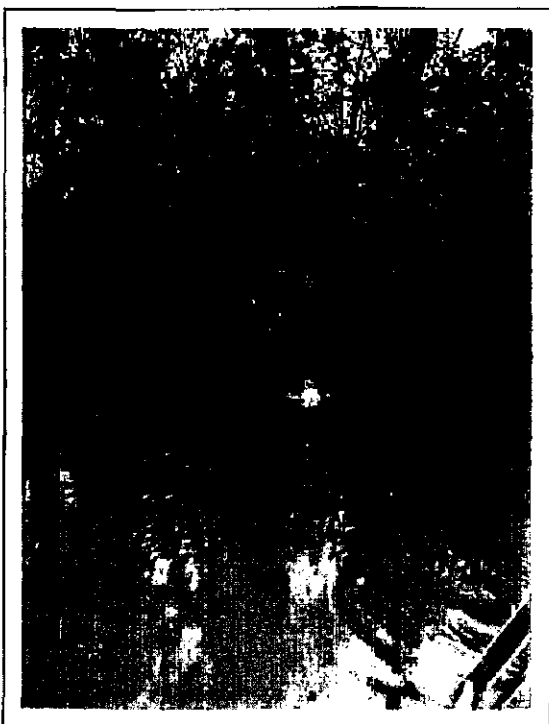
Amp Ohio Proposed Generating Station (ORM 236-237)
 Letart Falls, OH (Meigs County)
 October 11-12, 2006



Preparing diver



Laying weighted transect lines for survey. Orange buoy located on shoreline.



Diver surveying shallow depths near shoreline.
 Nuisance aquatic plants located along OH bank.



Audio communications with diver

Photographic Record

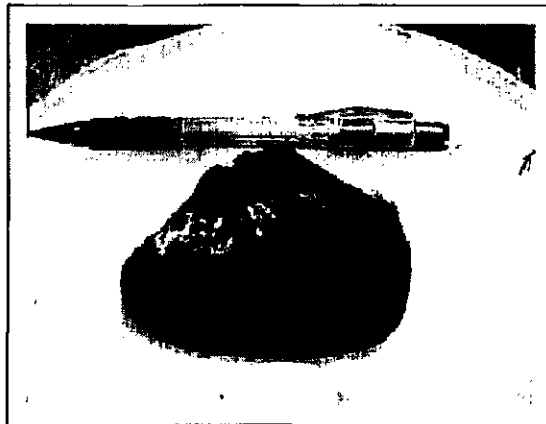
Amp Ohio Proposed Generating Station (ORM 236-237)
 Letart Falls, OH (Meigs County)
 October 11-12, 2006



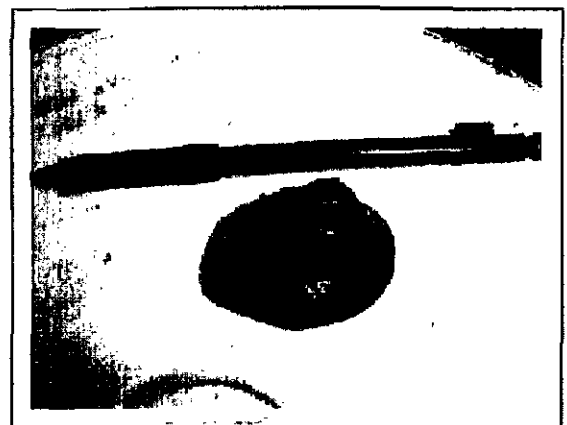
Diver surveying near shoreline. Orange buoy used to mark the weighted transect line.



Diver preparing for a dive. Mesh bags were used to hold mussels collected at each 10 m segment.



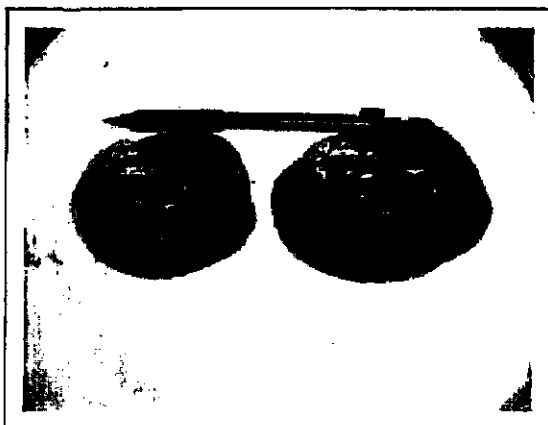
Pink heelsplitter (*Potamilus alatus*) collected at Transect 12,



Threehorn wartyback (*Obliquaria reflexa*) collected at Transect 13.

Photographic Record

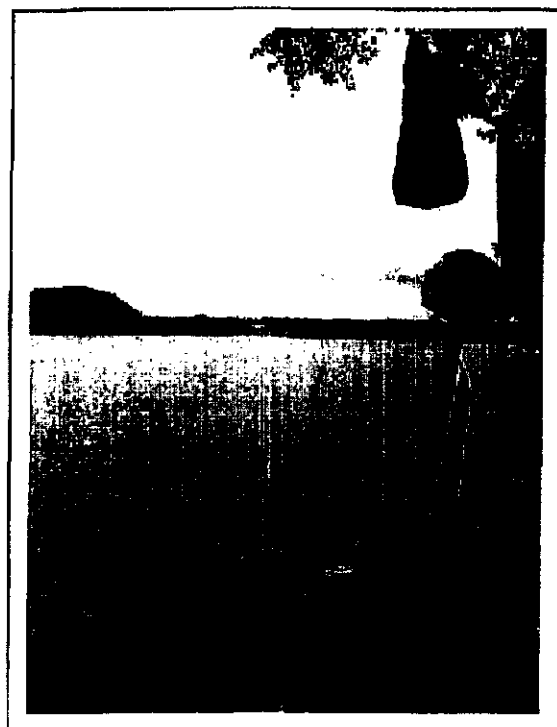
Amp Ohio Proposed Generating Station (ORM 236-237)
 Letart Falls, OH (Meigs County)
 October 11-12, 2006



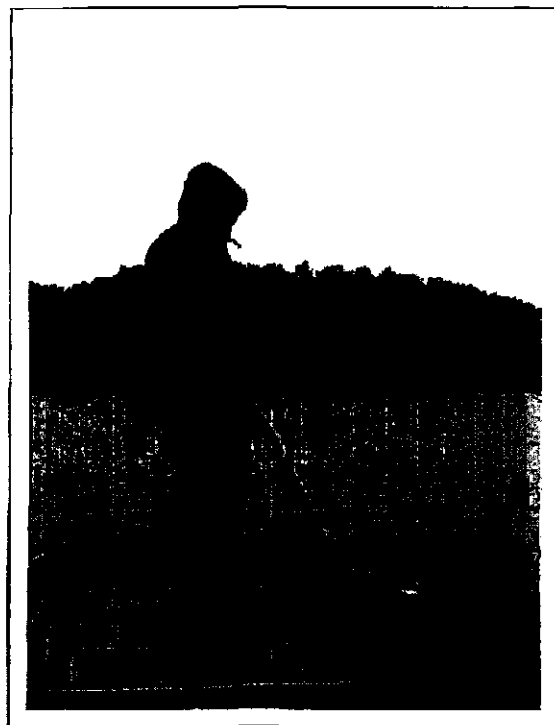
Threeeridge (*Amblema plicata*) collected at the upstream buffer transect (T0).



Diver preparing to survey a transect near the shoreline.



Ohio River looking downstream toward Racine Lock and Dam.



Dive tender holding umbilical line to diver.

Appendix C

**Raw Data – AMP-Ohio Mussel Survey
(ORM 236-237)**

Appendix C - Raw Data of Meigs Co. (OH) Mussel Survey (ORM 236-237)

Transect	Transect Segment	Date	Mussels	Age (yr)	Clay/Mud	Silt	Sand	Gravel/ Pebble	Cobble	Water Depth (ft)	Comments
T0 - US buffer	10	10/12/2006	none		100	0	0	0	0	6	
	20	10/12/2006	none		100	0	0	0	0	8	
	30	10/12/2006	<i>A. plicata</i>	5-7	80	20	0	0	0	14	live; pictures
	40	10/12/2006	<i>A. plicata</i>	5-7	20	0	0	0	80	23	live; good shell condition
	50	10/12/2006	none		0	0	100	0	0	26	
	60	10/12/2006	none		0	20	80	0	0	27	
	70	10/12/2006	none		0	20	80	0	0	28	
	80	10/12/2006	none		0	20	80	0	0	28	
	90	10/12/2006	none		0	0	100	0	0	29	
	100	10/12/2006	none		0	0	100	0	0	28	
T1	10	10/11/2006	none		10	0	90	0	0	-	
	20	10/11/2006	none		100	0	0	0	0	6	
	30	10/11/2006	none		100	0	0	0	0	12	
	40	10/11/2006	none		50	0	50	0	0	23	
	50	10/11/2006	none		100	0	0	0	0	25	2 live <i>C. fluminea</i> collected
	60	10/11/2006	none		0	0	100	0	0	26	
	70	10/11/2006	none		0	0	100	0	0	26	
	80	10/11/2006	none		0	0	100	0	0	27	
	90	10/11/2006	none		0	0	100	0	0	28	
	100	10/11/2006	none		0	0	100	0	0	29	
T2	10	10/11/2006	<i>L. silquidea</i>	12	0	0	100	0	0	-	live, gravid female; good shell condition
	20	10/11/2006	none		100	0	0	0	0	5	
	30	10/11/2006	<i>L. complanata</i>	5-6	100	0	0	0	0	12	live; good shell condition
	40	10/11/2006	none		100	0	0	0	0	20	
	50	10/11/2006	none		100	0	0	0	0	23	
	60	10/11/2006	none		0	0	100	0	0	24	
	70	10/11/2006	none		0	0	100	0	0	25	
	80	10/11/2006	none		0	0	100	0	0	26	
	90	10/11/2006	none		0	0	100	0	0	27	
	100	10/11/2006	none		0	0	100	0	0	28	
T3	10	10/11/2006	none		100	0	0	0	0	-	
	20	10/11/2006	none		100	0	0	0	0	4	
	30	10/11/2006	none		100	0	0	0	0	14	
	40	10/11/2006	none		100	0	0	0	0	19	
	50	10/11/2006	none		100	0	0	0	0	22	
	60	10/11/2006	none		100	0	0	0	0	23	

Appendix C - Raw Data of Meigs Co. (OH) Mussel Survey (ORM 236-237)

Transect	Transect Segment	Date	Mussels	Age (yr)	Clay/Mud	Silt	Sand	Gravel/ Pebble	Cobble	Water Depth (ft)	Comments
T3	70	10/11/2006	none		0	0	100	0	0	24	
	80	10/11/2006	none		0	0	100	0	0	25	
	90	10/11/2006	none		0	0	100	0	0	26	
	100	10/11/2006	none		0	0	100	0	0	28	
T4	10	10/11/2006	none		100	0	0	0	0	--	
	20	10/11/2006	none		100	0	0	0	0	7	
	30	10/11/2006	none		100	0	0	0	0	17	
	40	10/11/2006	none		100	0	0	0	0	20	
	50	10/11/2006	none		100	0	0	0	0	23	
	60	10/11/2006	none		100	0	0	0	0	25	
	70	10/11/2006	none		0	0	100	0	0	25	
	80	10/11/2006	none		0	0	100	0	0	27	
	90	10/11/2006	none		0	0	100	0	0	28	
	100	10/11/2006	none		0	0	100	0	0	29	
	10	10/11/2006	none		0	0	100	0	0	--	
	20	10/11/2006	none		100	0	0	0	0	6	
T5	30	10/11/2006	none		100	0	0	0	0	18	
	40	10/11/2006	none		100	0	0	0	0	23	
	50	10/11/2006	none		100	0	0	0	0	24	
	60	10/11/2006	none		100	0	0	0	0	26	
	70	10/11/2006	none		0	0	100	0	0	27	
	80	10/11/2006	none		0	0	100	0	0	28	
	90	10/11/2006	none		0	0	100	0	0	29	
	100	10/11/2006	none		0	0	100	0	0	29	
	10	10/11/2006	none		50	0	50	0	0	--	
	20	10/11/2006	none		100	0	0	0	0	--	
	30	10/11/2006	none		100	0	0	0	0	16	
	40	10/11/2006	none		100	0	0	0	0	22	
T6	50	10/11/2006	none		100	0	0	0	0	25	
	60	10/11/2006	none		100	0	0	0	0	27	
	70	10/11/2006	none		100	0	0	0	0	29	
	80	10/11/2006	none		0	0	100	0	0	30	
	90	10/11/2006	none		0	0	100	0	0	31	
	100	10/11/2006	none		0	0	100	0	0	31	
	10	10/11/2006	none		50	0	50	0	0	--	
	20	10/11/2006	none		100	0	0	0	0	--	
	30	10/11/2006	none		100	0	0	0	0	10	
	40	10/11/2006	none		100	0	0	0	0	22	
	50	10/11/2006	none		100	0	0	0	0	25	
	60	10/11/2006	none		100	0	0	0	0	27	
T7	70	10/11/2006	none		100	0	0	0	0	29	
	80	10/11/2006	none		0	0	100	0	0	30	
	90	10/11/2006	none		0	0	100	0	0	31	
	100	10/11/2006	none		0	0	100	0	0	31	
	10	10/11/2006	none		100	0	0	0	0	--	
	20	10/11/2006	none		100	0	0	0	0	10	
	30	10/11/2006	none		100	0	0	0	0	22	

Appendix C - Raw Data of Meigs Co. (OH) Mussel Survey (ORM 236-237)

Transect	Transect Segment	Date	Mussels	Age (yr)	Clay/Mud	Silt	Sand	Gravel/ Pebble	Cobble	Water Depth (ft)	Comments
T7	40	10/11/2006	none		20	0	80	0	0	23	
	50	10/11/2006	none		40	0	60	0	0	27	
	60	10/11/2006	none		40	0	60	0	0	29	
	70	10/11/2006	none		40	0	60	0	0	30	
	80	10/11/2006	none		0	0	100	0	0	31	
	90	10/11/2006	none		0	0	100	0	0	32	
	100	10/11/2006	none		0	0	100	0	0	33	
	10	10/11/2006	none		100	0	0	0	0	5	
	20	10/11/2006	none		100	0	0	0	0	21	
	30	10/11/2006	none		50	0	0	0	50	28	
T8	40	10/11/2006	none		20	0	80	0	0	30	
	50	10/11/2006	none		40	0	60	0	0	31	
	60	10/11/2006	none		30	0	70	0	0	32	
	70	10/11/2006	none		40	0	60	0	0	33	
	80	10/11/2006	none		40	0	60	0	0	33	
	90	10/11/2006	none		0	0	100	0	0	34	
	100	10/11/2006	none		0	0	100	0	0	34	
	10	10/11/2006	none		100	0	0	0	0	8	
	20	10/11/2006	none		100	0	0	0	0	22	
	30	10/11/2006	none		80	0	0	0	20	27	
T9	40	10/11/2006	none		20	0	80	0	0	32	
	50	10/11/2006	none		20	0	80	0	0	33	
	60	10/11/2006	none		20	0	80	0	0	33	
	70	10/11/2006	none		20	0	80	0	0	33	
	80	10/11/2006	none		20	0	80	0	0	34	
	90	10/11/2006	none		20	0	80	0	0	34	
	100	10/11/2006	none		20	0	80	0	0	35	
	10	10/11/2006	none		100	0	0	0	0	17	
	20	10/11/2006	none		0	0	0	50	50	27	
	30	10/11/2006	none		0	0	0	50	50	32	
T10	40	10/11/2006	none		20	0	80	0	0	33	
	50	10/11/2006	none		20	0	80	0	0	34	
	60	10/11/2006	none		20	0	80	0	0	34	
	70	10/11/2006	none		40	0	60	0	0	34	
	80	10/11/2006	none		40	0	60	0	0	35	
	90	10/11/2006	none		30	0	70	0	0	35	
	100	10/11/2006	none		20	0	80	0	0	35	
	10	10/11/2006	none		100	0	0	0	0	17	
	20	10/11/2006	none		0	0	0	50	50	27	
	30	10/11/2006	none		0	0	0	50	50	32	

Appendix C - Raw Data of Meigs Co. (OH) Mussel Survey (ORM 23B-237)

Transect	Transect Segment	Date	Mussels	Age (yr)	Clay/Mud	Silt	Sand	Gravel/ Pebble	Cobble	Water Depth (ft)	Comments
T11	10	10/12/2006	none		100	0	0	0	0	12	
	20	10/12/2006	none		0	0	0	50	50	24	
	30	10/12/2006	none		0	0	0	100	0	32	
	40	10/12/2006	none			no data - large debris pile					
	50	10/12/2006	none		0	40	60	0	0	32	
	60	10/12/2006	none		40	0	60	0	0	33	
	70	10/12/2006	none		20	0	80	0	0	34	
	80	10/12/2006	none		40	0	60	0	0	34	
	90	10/12/2006	none		30	0	70	0	0	35	
	100	10/12/2006	none		30	0	70	0	0	35	
T12	10	10/12/2006	none		20	0	80	0	0	8	
	20	10/12/2006	<i>P. alatus</i>	8-10	100	0	0	0	0	23	live; picture; shell in good condition
	30	10/12/2006	none		20	0	0	0	80	27	
	40	10/12/2006	none		0	20	0	40	40	33	
	50	10/12/2006	none		0	20	80	0	0	34	
	60	10/12/2006	none		20	0	80	0	0	34	
	70	10/12/2006	none		20	0	80	0	0	35	
	80	10/12/2006	none		0	20	80	0	0	34	
	90	10/12/2006	none		0	20	80	0	0	32	
	100	10/12/2006	none		30	0	70	0	0	34	
T13 - DS buffer	10	10/12/2006	none		100	0	0	0	0	23	
	20	10/12/2006	none		30	0	0	35	35	28	
	30	10/12/2006	<i>O. reflexa</i>	6	0	20	0	40	40	28	live; picture
	40	10/12/2006	none		20	0	80	0	0	33	
	50	10/12/2006	none		20	0	80	0	0	32	
	60	10/12/2006	none		20	0	80	0	0	34	
	70	10/12/2006	none		0	20	80	0	0	35	
	80	10/12/2006	none		0	20	80	0	0	35	
	90	10/12/2006	none		40	0	60	0	0	35	
	100	10/12/2006	none		30	0	70	0	0	33	

APPENDIX 07-4
ARCHAEOLOGY REPORT

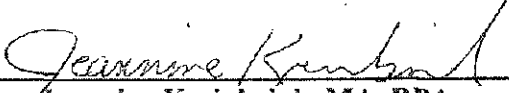
**REPORT FOR
PHASE I ARCHAEOLOGY SURVEY
PROPOSED BASELOAD GENERATING FACILITY,
LETART TOWNSHIP, MEIGS COUNTY, OHIO**

Submitted to:

**URS Corporation
36 East 7th Street, Suite 2300
Cincinnati, Ohio 45202**

Submitted by:

**Natural & Ethical Environmental Solutions
8857 Cincinnati-Dayton Road, Suite 203
West Chester, Ohio 45069**


**Jeannine Kreinbrink, MA, RPA
Principal Investigator**

September 11, 2006

ABSTRACT

URS Corporation requested a Phase I cultural resources survey of an approximately 1,000 acre project area for a proposed Baseload Generating Facility, located in Letart Township, Meigs County, Ohio. The project area includes both upland terrain and terraces of the Ohio River. The project area lies in the Unglaciaded Plateau of southern Ohio. The project area includes approximately 1,000 acres, of which approximately 495 acres constitutes the Upper Landfill Portion of the project area, and 505 acres the Lower Terrace Portion of the project area. This report includes the overall background sections such as Literature Review and Methods for the entire project. Also included in this report is the Results Section for the survey of the Lower Terrace Portion of the project. The archaeological survey of the Upper Landfill Portion of the project will be described in a separate Addendum report. The Area of Potential Effect (APE) for the archaeological study equals the 1,000 acre parcel that comprises the project area. Non-archaeological impacts such as visual impact on surrounding properties will be defined and discussed in a separate Visual Impact/Historic Resources Report.

The project, a proposed baseload electric generating facility, requires review in accordance with regulations of the Ohio Power Siting Board (OPSB). The archaeological investigations are carried out in accordance with regulations put forth by the Ohio Historic Preservation Office and attendant regulations of Section 106 (National Historic Preservation Act, 1966, as amended).

The archaeological survey of the Lower Terrace Portion of the Project Area documented one previously recorded site (33MS288) and 69 previously undocumented sites (33MS474 through 33MS542). Phase II evaluation testing is recommended for site 33MS288 if it cannot be avoided.

Of the overall catalog of previously undocumented sites, 46 are isolated finds that are not considered eligible for the National Register and no further investigation is recommended for these 46 sites: 33MS475-476, 33MS478-481, 33MS483-485, 33MS487-491, 33MS493-508, 33MS510, 33MS513, 33MS515-519, 33MS523-526, 33MS532, 33MS534, and 33MS537-539.

Of the remaining 23 previously undocumented sites, Phase II evaluation testing is recommended for seven sites; 33MS474, 33MS477, 33MS486, 33MS531, 33MS540, 33MS541, and 33MS542.

No further investigation is recommended for sites 33MS482, 33MS492, 33MS509, 33MS511, 33MS512, 33MS514, 33MS520, 33MS521, 33MS522, 33MS527, 33MS528, 33MS529, 33MS530, 33MS533, 33MS535, and 33MS536.

With the exception of the eight sites (33MS288, 33MS474, 33MS477, 33MS486, 33MS531, 33MS540, 33MS541, and 33MS542) recommended for Phase II evaluation, no further investigation is recommended for the 505 acre Lower Terrace Project Area.

The geomorphology of the Lower Terrace Project Area was evaluated through a record search, geotechnical drilling results, and comparison with archaeological results. Little potential for buried archaeological sites has been found based on the presence of Early Archaic period projectile points on the ground surface and the evaluation of the geomorphological setting. No systematic deep testing is recommended for the Lower Terrace Project Area.

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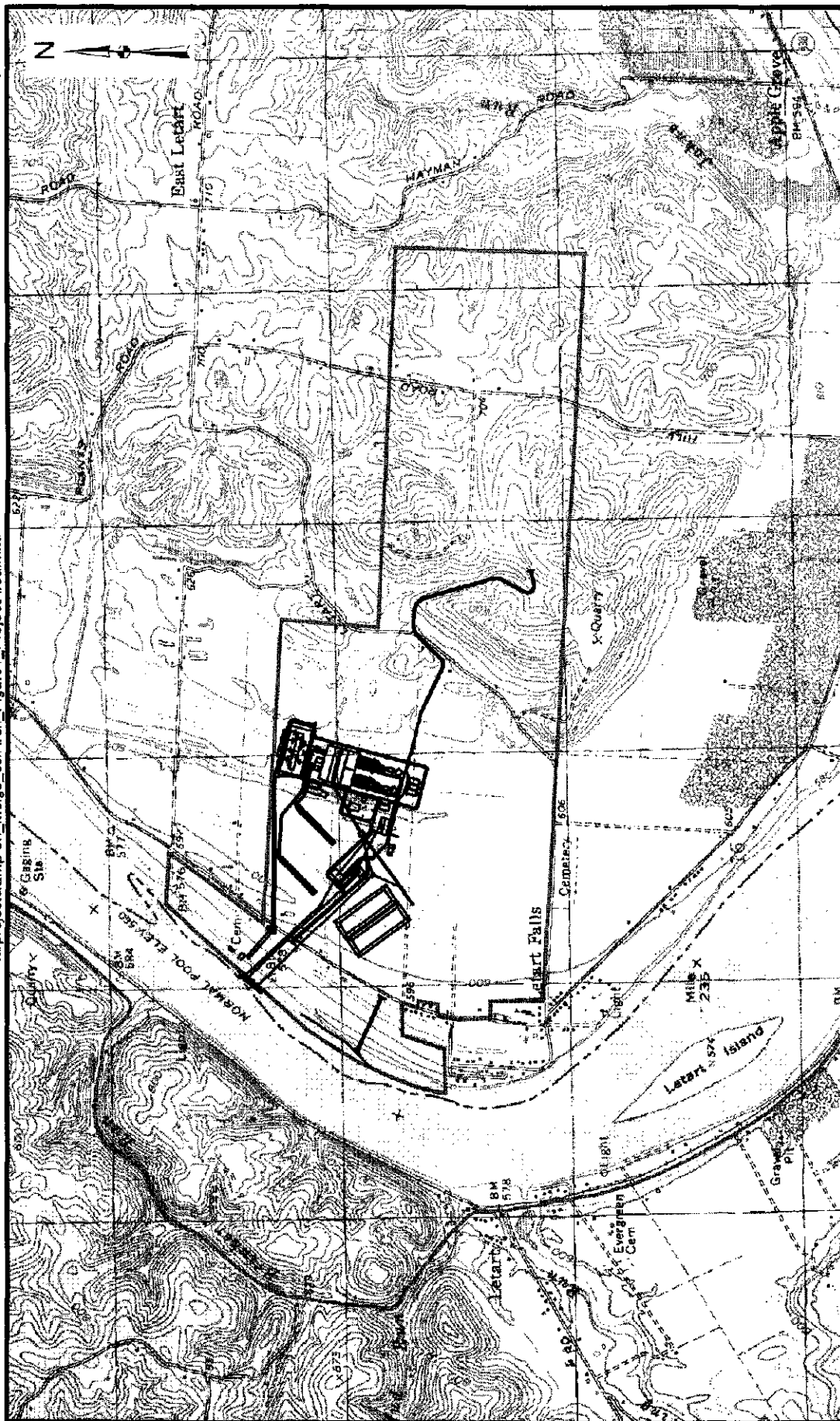
INTRODUCTION

URS Corporation (URS) requested a Phase I archaeology survey of approximately 1,000 acres located in Letart Township, Meigs County, Ohio. The project area is situated in the Allegheny Plateau physiographic region and includes both upland and river terrace settings. The Lower Terrace project area consists of approximately 505 acres. The Upper Landfill Area includes 495 acres and will be discussed in an Addendum Report. This volume describes the archaeological survey of the Lower Terrace region that includes approximately 505 acres of agricultural, fallow, and wooded land. AMP Ohio requested the survey through URS in anticipation of coordination with the OPSB. The project is conducted in accordance with both federal (36CFR800, NHPA 1966, as amended) and Ohio Historic Preservation Office (OHPO 1994, as amended) regulations regarding the conduct of cultural resources investigations.

Ms. Jeannine Kreinbrink, of Natural & Ethical Environmental Solutions, serves as Principal Investigator and Field Director for the project. Fieldwork took place between March and the end of June 2006. She was assisted by crew chiefs Mr. Doug Von Strohe and Mr. Jason Hutchinson. Field crew included Ms. Angie Paolucci, Mr. Shawn Fahrenbach, and Mr. Baird Ullrey. Ms. Kreinbrink conducted the literature review at the Ohio Historic Preservation Office in Columbus, Ohio over several occasions between December 2005 and January 2006. Fieldwork methodology was worked out with the OHPO at a meeting on December 14, 2005.

The Lower Terrace project area consists of approximately 505 acres of agricultural, fallow, and wooded land located on a sweeping bend of the Ohio River. At this location, the Ohio River flows north along the western edge of the project area (Figures 1 and 2). The Lower Terrace project area has been divided into 14 survey sections for ease of discussion. The Upper Landfill project area will be described in a separate Addendum to this report.

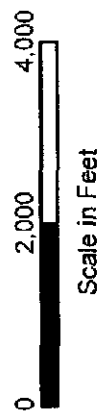
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 **AMP - OHIO**
BASELOAD GENERATING FACILITY

FIGURE 1
TOPOGRAPHIC MAP SHOWING
OVERVIEW OF ENTIRE PROJECT AREA

JOB NO. 14946376 



LEGEND:

-  Power Plant
-  Project Area

BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangle
New Haven, WV-OH (1968, photorevised 1987)



LEGEND:

- Project Area
- Terrace Boundary
- Contours (5ft)
- 33MS288

0 500 1,000 2,000
Scale in Feet



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FIGURE 2
TOPO OVERLAIN ONTO AERIAL
SHOWING PROJECT BOUNDARIES

JOB NO. 14946376

URS

RESEARCH DESIGN

A Phase I survey is designed to assess the presence or absence of archaeological sites within a project area using sampling procedures approved by the Ohio Historic Preservation Office (OHPO) and federal guidelines. The sampling procedure includes such techniques as shovel testing, and surface reconnaissance when possible.

Much debate has taken place on the efficacy of shovel test sampling as a site discovery technique (for example, Shott 1989). However, others have illustrated that, although flawed as a sampling technique, shovel testing may be a useful tool when combined with other search methods (Nance and Ball 1989; Lightfoot 1989). Other search methods include examination of ground surface when possible, other subsurface examination techniques (auguring, backhoe testing for example), and using literature reviews to synthesize predictive models that deal with landform, relationship to water sources, slope, and other locational variables. While these methods do not provide 100 percent certainty in intersecting the boundaries of sites, they have been consistently successful in locating archaeological sites in both surface and subsurface contexts. Approaching a project with a clear understanding of the local physiography, cultural setting, and environmental factors such as soils, slope, and water resources, will greatly increase the results of field reconnaissance techniques.

For this project, knowledge of local cultural and environmental variables was synthesized to form a research design aimed at intersecting site boundaries. Techniques planned included a surface reconnaissance of the plowed fields in transects of 5 meters or less. The literature review included a search of references on previous archaeological work in Meigs County, and a review of state site files. Historical research included a review of local historic references and maps, the Ohio Historic Inventory and the National Register files. In addition, the scope of work was discussed with the OHPO in a meeting that took place in December 2005.

Physical Setting

Physiography-Geomorphology-Geology

Meigs County is situated in the unglaciated Allegheny Plateau in Ohio (USDA 1998). The bedrock dates to the Pennsylvanian Age and includes primarily sandstone, shale, coal, iron ore, and limestone. Coal, limestone, and gravel have historically been mined throughout the county.

The project area is situated on both riverine and upland settings along a sharp bend in the Ohio River (Figure 1). The Ohio River flows generally north along the western edge of the project area. Please see the Results Section for a more detailed discussion of the geomorphology of the project area.

Soils

The soils in the project area form a complex arrangement that correspond to high and low areas on the terraces, older and more recent alluvium, and drainage. Soils found at the site can be divided into two areas. Soils that are found along the alluvial terrace of the site are predominately friable silty loam with large sand or gravel units that truncate abruptly (USDA 2001). The color is typically dark brown to brownish-yellow at the surface and grades towards a yellow-brown below approximately 10 inches. Soils located within the upland forested area of the site are predominantly friable silty loam to silty clay loam (USDA 2001). The color typically ranges from dark brown to yellowish-brown at the surface and grades towards a yellow-brown to red below approximately 10 inches.

Soils on the alluvial terrace of the property are classified as part of the Cidermill, Conotton and Lakin series (USDA 2001). The Cidermill and Conotton series have smooth boundaries and are often mapped together within the same area. The Lakin series is dominantly mapped on the leeward side of major stream valleys. The Conotton series is reported to have 0 to 2% slope variability, while the Cidermill series is reported to have 0% to 6% slope variability. The Lakin series is reported to have the greatest variability where slopes can range from 1% to 40%. Outwash or water-laden materials usually along stream terraces or valleys formed these soils. Each of the mapped soil units in the site area are very deep, well to excessively draining, and with slow to moderate water runoff.

Soils on the upland forested area of the property are classified by the USDA (2001) as part of the Omulga and Vandalia series and the Upshur-Gilpin complex. The Omulga series consists of very deep, moderately well drained soils formed in loess, colluvium, or old alluvium, and in most areas by underlying lacustrine sediments. These soils are on valley fills in abandoned preglacial drainage systems in the Allegheny Plateau that lack glacial influence. The Upshur-Gilpin complex series consists of very deep to moderately deep, well-drained soils formed in residuum derived from siltstone, sandstone, and shale. They are typically located on strongly sloping or steep uplands (ridgetops and hillsides). The Vandalia series consists of very deep, well-drained soils formed in colluvium from shale, siltstone, and some sandstone. They are on foot slopes and colluvial fans.

The Omulga series is reported to have a 2 to 12% slope variability, while the Vandalia series is reported to have 8% to 25% slope variability. The Upshur-Gilpin complex is reported to have the greatest variability where slopes can range from 8% to 50%. Each of the mapped soil units in the site area are very to moderately deep with medium to rapid water runoff.

The USDA NRCS (2001) has described the soil types on the alluvial terrace of the property as the following: The Conotton series is Type IIIs, which indicates special conservation needs with regard to root zone limitation. The Cidermill series soils are Type IIe and Type I. Type IIe indicates moderate conservation needs with regard to erosion, and Type I indicates there are few limitations restricting use. The Lakin series soils are divided as Types IVs, VIs, and VIIs. All these types indicate severe conservation needs with regard to root zone limitations. Reported

building site development information indicates frost action as a limitation for the use of Conotton and Cidermill soils especially for local roads and streets due to low strength. Lakin soils have moderate to severe limitations of all building site development due to slope.

The USDA (2001) has described the soil types in the upland forest of the property range from Type IIe to Type VIIe. This indicates that all soils types in this area have moderate to severe limitations and conservation needs with regard to erosion. Reported building site development information indicates slope, wetness, shrink-swell, and slippage as a moderate to severe limitation for the use of these soils in all aspects of building development.

Climate and Vegetation/Wildlife Patterns

Climactic changes have influenced the patterns of vegetation and wildlife in Meigs County and southeastern Ohio throughout its past history. The effects of the Pleistocene glaciation on Ohio valley flora and fauna have been well documented (Shane 1994; McDonald 1994; Delcourt and Delcourt 1981; Walker and Hartman 1960; Guilday 1967; USDA 1998; and others). Although Meigs County is below the southern extremes of the glaciers themselves, the climactic changes influenced the patterns of vegetation and faunal life along the Ohio River. Once Native Americans moved into the area, they experienced these changes and adapted over time to the northward movement of colder weather vegetation and animals, and the influx of temperate zone flora/fauna. The increasingly continental climate that has developed in the region is characteristically humid and temperate (USDA 1998).

By the end of the Native American habitation of the region and the beginnings of European migration to Meigs County, the region was included in the Eastern Deciduous Forest Province. Much of Meigs County was covered with virgin, mixed hardwood forest (USDA 1998).

Literature Review

The literature review for this project took place in December 2005. Cultural resources files reviewed at the Ohio Historic Preservation Office (OHPO) in Columbus, Ohio include the National Register of Historic Places (NRHP), Ohio Historic Inventory (OHI), Ohio Archaeological Inventory (OAI), and Cultural Resource Management (CRM) report files. Local historical research was conducted at the Meigs County Library in Pomeroy and at the Public Library of Cincinnati and Hamilton County, a regional history and genealogy center.

The review found that no NRHP properties are located within the project area boundary. Meigs County only has ten properties listed on the NRHP and none are within at least ten kilometers of the project area. Based on the most current data available on the National Park Service NRHP website, two properties are in Chester, one in Alfred, one in Rocksprings, three in Middleport, two in Pomeroy, plus the Buffington Island Civil War site, upriver from the project area near Portland in Lebanon Township.

The OAI site file check documents one archaeological site (33MS288) located inside the project area boundary (Figure 2). The site is located on the Ohio River floodplain, between Route 124 (old Rt 338) and the river, on property associated with an historic period house (now gone, see below) (the Cross House, MEG 384-12). The house had been previously documented by OHS personnel perhaps in 1984, although the OHI form does not list a specific year. Sprague (1992) documented site 33MS288 during a survey for a proposed sand and gravel barge loading facility. The site produced Native American artifacts that date to the Early and Late Archaic, and Adena (Early Woodland) time periods. The Sprague (1992) report does not include a site boundary size, but based on an illustration in that report, the site size measures at least 800 ft (244 m) in diameter. The site produced a continuous scatter of artifacts and apparently encompasses most of the area between Rt 338 and the Ohio River. They conducted some deep testing toward the river side of the site and did not find any evidence of buried archaeological sites (Sprague 1992). The presence of Early Archaic diagnostic artifacts (over 6,000 years old) on the ground surface indicates that at least in this area, the ground surface has been stable for thousands of years. No followup reports are documented at the OHPO and the barge facility was not built in this location. Please see the Results Section for further discussion of this site.

A review of the OAI files for the surrounding area finds that most of the documented archaeological sites are located on the floodplains and terraces of the Ohio River, or along drainages with adjacent terraces. This is more likely because greater attention has been given to the river drainage than the adjacent uplands. Similar terrace/upland settings both up and down river were reviewed.

Only one other archaeological site has been documented along the same floodplain/terrace setting as the project area. Site 33MS005 is landowner reported site located about a mile downstream of the project area. The OAI form does not include any data on artifact types, site size, or time period. Just downstream from the project area, the hills close in on the river and the floodplain shifts to the Kentucky side of the river. Further downstream, but still in Letart Township, the floodplain opens up again on the Ohio side of the Ohio River at Racine. At least eight sites are documented in the Racine vicinity. They include several sites found on upper terraces along a stream that joins the Ohio River at this point, plus several sites on the terraces and floodplain of the Ohio River. These sites include a range of Native American time periods from Paleoindian through Ft Ancient. Site types include a mound, small camp sites and at least one probable village site.

On the first terrace of this downstream area, Graybill (1976) documented Fort Ancient period cultural material (post 1000AD) eroding out of the river bank (33MS31). He examined buried deposits that appear to range from just below plowzone to several feet in depth (less than one meter). These deposits included Late Archaic, Late Woodland, and Ft Ancient material (OAI form).

In the same section of floodplain as site 33MS31, Keener and Pecora (2003) conducted Phase II excavations at site 33MS29. This site is located between Route 124 and the Ohio River on a terrace. The cultural deposits at this site were confined to within one meter of the ground

surface. Similarly to site 33MS31, they encountered a midden/cultural zone between 30 and 70 cm deep. The site produced Late Archaic and Late Woodland artifacts and pottery, along with two radiocarbon date ranges (calibrated intercepts at 1430 and 1520 BC, or Late Archaic in origin).

Upstream of the project area in the Great Bend section of Lebanon Township, several archaeological studies have documented both riverine and upland archaeological sites. Documented during a variety of CRM projects, sites include all Native American time periods from Paleoindian through Fort Ancient (cf. Sewell 2004; Bush et al 1995; Koller 1995; or Merry 1980).

Table 1 tabulates the data from the above referenced areas, the Great Bend, the current project area, and downstream of the project area. A total of 80 archaeological sites documented in these three areas are reviewed for relevant data. The 80 sites contain at least 141 individual components. Archaeological components are listed by site type in Table 1 and by setting and time period in Table 2. Table 2 excludes isolated finds and historical period components. Any particular site may have more than one archaeological component. Components are tabulated by quantifying the diagnostic time periods represented at each location.

Table 1. Archaeological components by site type.

TIME PERIOD	MOUND	LITHIC SCATTER	ISOLATED FIND	TOTAL
Paleoindian		3		3
Early Archaic		8		8
Middle Archaic		5		5
Late Archaic/Terminal Archaic		14		14
Early Woodland		7		7
Middle Woodland		4		4
Late Woodland		6		6
Undifferentiated Woodland*	5	7		12
Late Prehistoric		6		6
Unknown Prehistoric		43	19	62
Historic, non-aboriginal		14		14
TOTAL	5	117	19	141

*Undifferentiated Woodland includes unexcavated mounds and sites with untyped pottery sherds.

Table 2. Archaeological components sorted by topographic setting.

TIME PERIOD	FLOODPLAIN	TERRACES (ALL)	UPLAND/RIDGES
Paleoindian	1	1	1
Early Archaic	2	6	0
Middle Archaic	2	2	1
Late Archaic/Terminal Archaic	3	9	2
Early Woodland	1	6	0
Middle Woodland	2	1	1
Late Woodland	1	4	1
Undifferentiated Woodland Mounds	0	3	2

TIME PERIOD	FLOODPLAIN	TERRACES (ALL)	UPLAND/RIDGES
Undifferentiated Woodland-lithic scatter	4	2	1
Late Prehistoric	2	3	1
Unknown Prehistoric	2	38	3
TOTAL	20	75	13

A review of Tables 1 and 2 provides important data for evaluating the potential of the Project Area to contain significant archaeological sites. Data on site setting is also important as listed in Table 2. It is important to keep in mind that upland/ridge top data is very likely missing due to lack of studies conducted in those settings. The information is very likely skewed somewhat toward the valley settings. However, the presence of artifacts from almost all the prehistoric cultural time periods in the upland settings indicates that the relative presence is probably accurate, but quantity of sites is lacking.

All Native American time periods are represented in this section of Ohio River valley. Three sites have produced artifacts from the Paleoindian period, the first period of occupation by the Native Americans with dates older than at least 10,000 years ago. These three sites are spread out among all three major topographic settings in the area, floodplain, terrace, and upland/ridge top. This fits well with the overall view of Paleoindians as opportunistic hunters and gatherers.

The Archaic period, represented by three divisions, Early, Middle, and Late, is also well represented in the region with an emphasis on the late Archaic. Middle and Late Archaic components have been found on both river and upland settings.

Woodland period sites are found more commonly on the upper terraces, this includes both mounds and open sites. Mounds and lithic scatter Woodland period sites have also been documented on the nearby ridge tops.

Except for two sites as noted above (33MS29 and 33MS31), all the above referenced archaeological sites are surface sites. Site 33MS31 is situated near the confluence of a stream channel and the Ohio River and was buried just below plowzone level. Reworking of this stream entrance into the Ohio River may have buried this site over time by the accumulation of alluvial material. Site 33MS29 is situated nearby and also has a stream channel that crosses near the site edge.

Components from Paleoindian through Fort Ancient have been found on the ground surface, or within the plowzone, on both floodplain and terrace settings both upstream and downstream of the Project Area. The presence of ancient artifacts, over 5,000 years old (Archaic and Paleo) on the ground surface indicates the stable nature of this section of the Ohio River. Areas with Archaic and Paleoindian components on or near the surface are unlikely to contain deeply buried human occupation levels. Site 33MS288 is located within the project area. That site is an extensive surface artifact scatter that has produced Early and Late Archaic, and Adena (Early Woodland) period artifacts from the surface. Project area soils appear stable, although in-depth

analysis of micro-environmental settings will be required to identify areas with possible overbank deposits, buried stream channels, and so forth that may have contributed to the overlay of alluvial deposits in sections of the floodplains and terraces. The Project Area is highly likely to contain both upland and riverine archaeological sites from the Native American occupation of the region. These may range from isolated finds to intensive village sites. It is unlikely that previously unrecorded mounds will be documented.

Historic Properties

Historically, the project area lies within Letart Township of Meigs County. Primarily a rural area, Meigs County was originally part of the Ohio Company's purchase. The Letart Falls area was settled as early as 1780 and Letart Township was one of the original townships in the county. Truck farming became an important part of the agricultural system for Letart Falls beginning late in the nineteenth century (Ervin 1949, MCPHS 1979). Additional historical context on Letart Falls is included in the Cultural Overview section. Figure 3 illustrates a tracing of the Hayes 1877 *Illustrated Atlas of the Upper Ohio River Valley from Pittsburgh to Cincinnati, Ohio*. Found at the Public Library of Cincinnati and Hamilton County, photographs and copying of the image were not allowed.

The community of Letart Falls was well established by the late 1870s. Only two structures illustrated in the 1877 map fall within the project area (Figure 3). The more southern building corresponds with one historical site (33MS486 discussed in the Results Section). No standing building is currently located in this spot, and no OHI was completed for any property in this immediate vicinity in the early 1980s when the properties listed in Table 3 were documented. Review of the 1908 and 1920 topographic maps for the project area vicinity (Figures 4 and 5) show that the building was still standing at that time. However, a review of the 1950 aerial photo (Figure 6) finds no standing building in that location.




AMP - OHIO

BASELOAD GENERATING FACILITY

0 500 1,000 2,000
Scale in Feet

LEGEND:

 Project Area

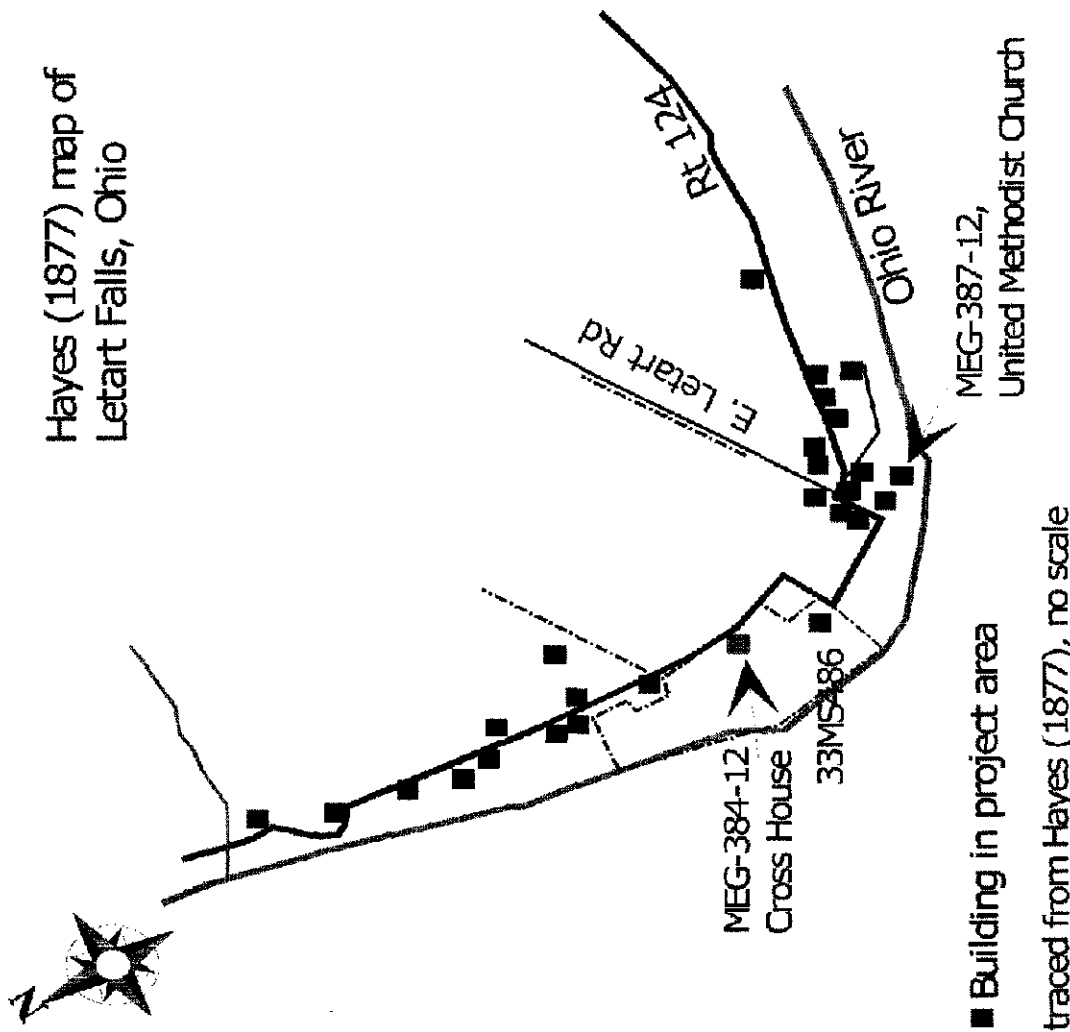
BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangle
New Haven, WV-OH (1908)

FIGURE 4
1908 TOPOGRAPHICAL MAP
AND HISTORIC BUILDINGS

JOB NO. 14946376

URS

Hayes (1877) map of Letart Falls, Ohio



LEGEND:

fig3.jpg

RGB

Red: Band_1

Green: Band_2

Blue: Band_3



AMP - OHIO

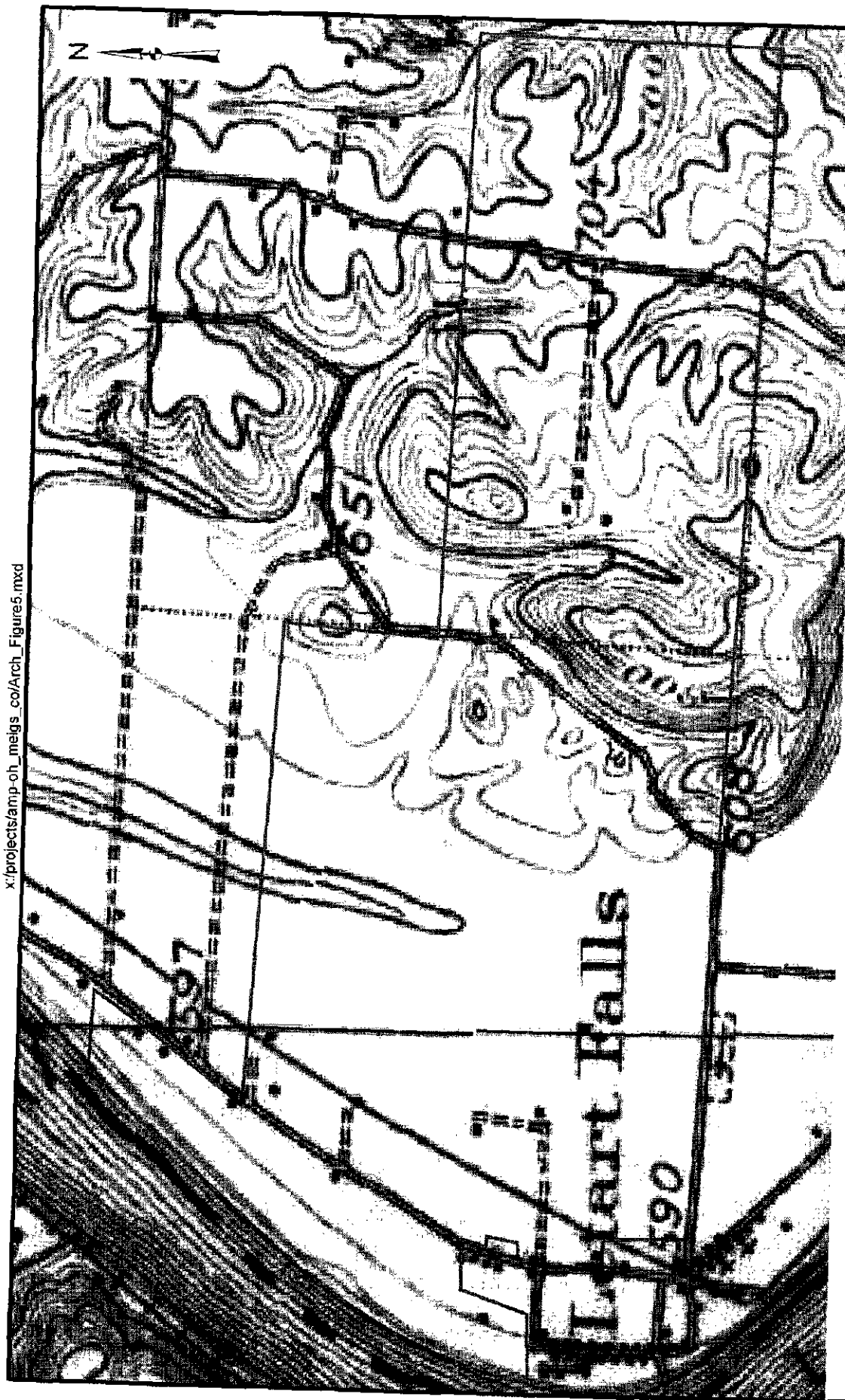
BASELOAD GENERATING FACILITY

BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangle
New Haven, WV-OH (1968, photorevised 1987)

FIGURE 3
HAYES (1877) MAP SHOWING
PROJECT AREA VICINITY

JOB NO. 14946376

URS



AMP - OHIO
BASELOAD GENERATING FACILITY

FIGURE 5
1920 TOPOGRAPHIC MAP
SHOWING STANDING BUILDINGS

JOB NO. 14948376

URS

LEGEND:

☐ Project Area

Scale in Feet

0 500 1,000 2,000

BASE MAP SOURCE:
USGS 7.5-minute topographic quadrangle
New Haven, WV-OH (1920)

The second building shown in red on Figure 3 (the more northern building) is most likely the Cross House (MEG-384-12) as documented on an OHI (Table 3 below). This was a brick house that sat adjacent to Route 124 at the same elevation as the road. The house is visible on Figures 4-6). Local informants indicate that this house was torn down and the site mechanically leveled after the 1997 Ohio River flood (Hill family, 2006 personal communication). Today this location is a graveled and graded parking area for farm access along the west side of Route 124.

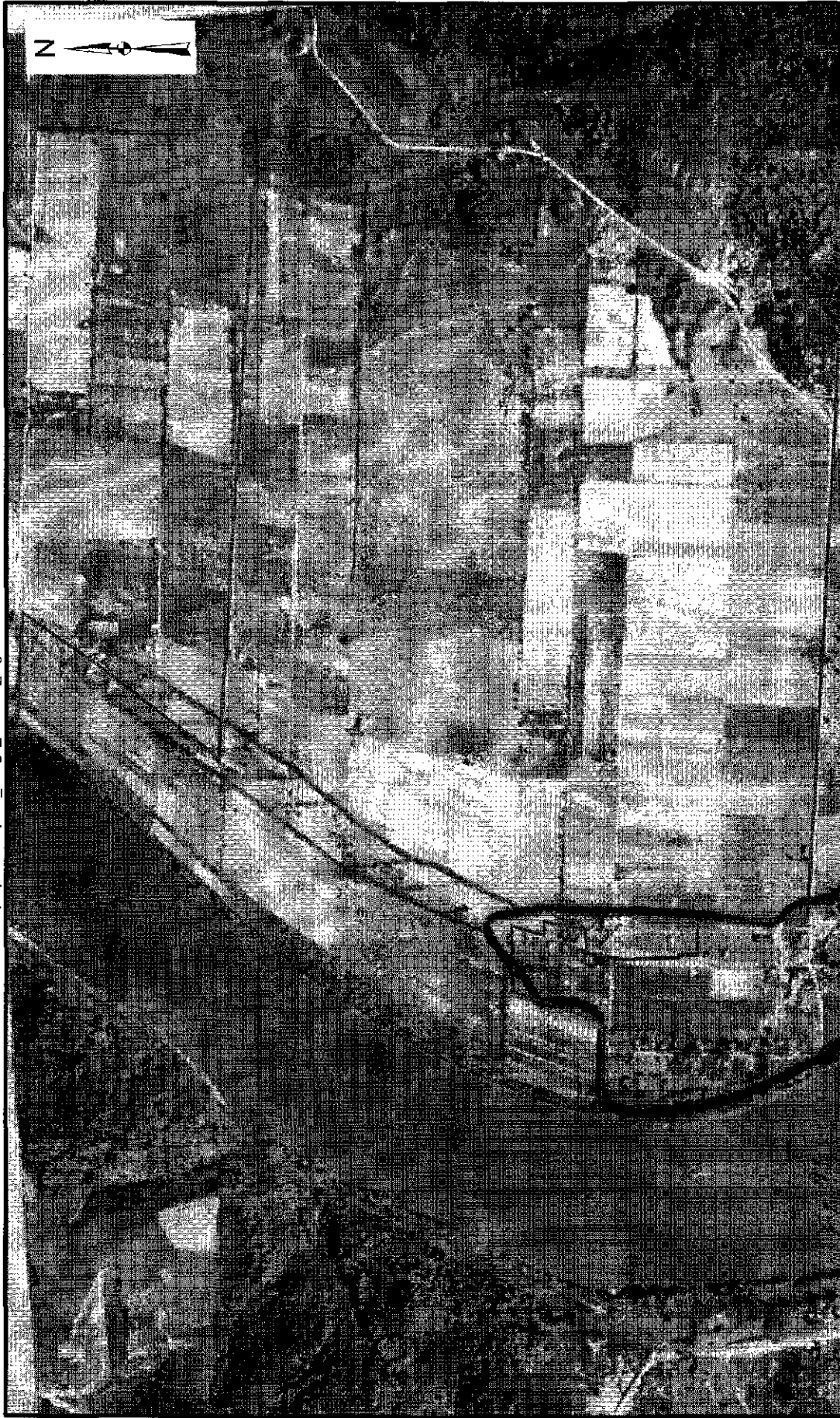
Further review of the 1908 and 1920 topographic maps and the 1950 aerial photography (Figures 4-6) finds additional properties within the project area. Hill family members have stated that these were small tenant houses that 'came and went in the twentieth century'. Several of these correspond with archaeological sites documented during this survey (See Results Section).



A total of 17 properties (standing buildings) in the Letart Falls vicinity have been documented on OHI forms at the OHPO. The historical resources review is documented in a separate report. That report documents the current status of the OHI listed properties and of other undocumented properties over 50 years old that still stand in the vicinity of the project area. Visual impacts from construction of the facility to those properties are also evaluated in that separate report. Of the 17 OHI properties, 13 are summarized in Table 3. They are the closest listed properties to the project area.


Most of the older buildings in Letart Falls are gone. Many have been replaced by trailers or small prefabricated homes. The Cross House (MEG-384-12, bolded in Table 3) was the only standing structure in the project area. However, as noted above, it was removed and any potential archaeological site destroyed after the 1997 flood.

The OHPO mapping system shows OHI property MEG-387-12 within the project area. However, the original site of this church was named on the Hayes (1877) map (Figure 3). The church was later moved up onto Route 124 but has since been torn down (Patty Pickens, personal communication July 2006).

Historically, the project area is likely to contain archaeological sites that may date to the nineteenth and twentieth centuries. These may include house and outbuilding sites related to the agricultural community of Letart Falls and their related commercial activities.



	AMP - OHIO
	BASELOAD GENERATING FACILITY
FIGURE 6	
1950 AERIAL PHOTO OF LOWER TERRACE PROJECT AREA	
JOB NO. 14946376	
	

LEGEND:  Project Area

Scale in Feet
0 500 1,000 2,000

BASE MAP SOURCE:
1950 Aerial Photography

Table 3. OHI properties within or near the project area.

OHI #	STYLE/DESIGN	DATE/PERIOD	COMMENTS	CURRENT STATUS
MEG-370-12	Vernacular	Not listed	On Bucktown Rd	Poor condition, vacant
MEG-371-12	Vernacular, hall and parlor	Not listed	On Bucktown Rd	Gone
MEG-372-12	Vernacular, 'Georgian plan'	Circa 1850	On Bucktown Rd	Gone
MEG-373-12	Vernacular 'Cumberland house' wraparound porch	Not listed	On Bucktown Rd	Poor condition, vacant
MEG-374-12	Vernacular, I house	Circa 1830	On Bucktown Rd, reportedly oldest house in Letart Falls	Gone
MEG-375-12	Vernacular, board and batten	Not listed	On Bucktown Rd	Gone
MEG-376-12	Vernacular, pyramidal roof	Circa 1890	Off Bucktown Rd	Gone
MEG-383-12	Vernacular, saltbox roof line	Circa 1850	On Rt124	Fair condition, occupied
MEG-384-12	Vernacular, brick I house	Circa 1860s	Cross House, site	Gone
MEG-387-12	Vernacular, 'Greek Revival touches'	Circa 1865	Letart Falls United Methodist Church	Gone
MEG-388-12	Vernacular, commercial	Not listed	Had been store and post office	Gone
MEG-389-12	Vernacular, end gable	Not listed	Remodeled	Good
MEG-390-12	Vernacular, school	Circa 1930	Brick school building	Poor condition, vacant

Cultural Overview

The prehistoric and historical period occupations of the upper Ohio River valley are briefly examined in regard to changing settlement patterns, and cultural and chronological changes.

Paleoindian Period (c. ?10,000+ - 8,000 BC)

Paleoindian peoples entered the eastern United States after the Wisconsin glacial retreat, during a time of rapid environmental shifting (Seeman et al. 1994; Tankersley 1994). The initial, recognized Paleoindian tradition was the Clovis period, typified by characteristic projectile points and tool kits. Artifact types within the tool kit remained consistent from the western United States into eastern sites (Fitting et al. 1966; MacDonald 1968; Frison 1991).

During the late Paleoindian period, after approximately 10,800-10,000 years Before Present (BP), regional archaeological complexity increased (Ellis and Deller 1988). Regionally specific projectile point styles such as Quad, Dalton, and Hardaway-Dalton replaced the Clovis type (Justice 1987).

Extensive research through the 1980s and 1990s has increased the amount of information available with which to interpret the subsistence strategies, settlement patterns and changing culture of the Paleoindian peoples (c.f. Dancey 1994; Roper and Lepper 1991; Tankersley and Isaac 1990; Ellis and Lothrop 1989). However, the influx of data has led to conflicting interpretations of subsistence and settlement changes in the Ohio valley (Seeman et al. 1994).

What can be agreed upon is that the late Paleoindian sites in the Ohio valley included evidence of a shift toward smaller game with greater regional specialization of tool kits (Tankersley 1994; Seeman et al. 1994). Larger sites such as Welling, Nobles Pond and Sandy Spring have been identified that may indicate aggregation of smaller families or populations at some period during the year (Seeman et al. 1994).

The sites served to illustrate the changing nature of the Paleoindian occupation of the Ohio valley. The ensuing Archaic period continued the shift from an emphasis on larger game pursued in a migratory pattern, to a reliance on more locally available plant and animal resources.

Archaic Period (c. 8,000 BC-1,500 BC)

The Archaic Period continued the development of region-specific adaptations to local environments begun in the late Paleoindian period. Site investigations indicated that they made use of seasonal camps, often using a base camp with outlying activity/procurement camps, and extractive sites for periodic use throughout the year (Dragoo 1976; Chapman and Otto 1976). Recent excavations at sites such as Henderson (Kozarek et al. 1994) and Manning (Roper and Lepper 1991) indicate that many Archaic sites were utilized repeatedly during this period. They provided base camps situated on stable terraces from which to disperse in search of specific resources (Kozarek et al. 1994:163).

Throughout the Archaic period, the types and quantities of processing tools of all types increased in variety and form. Wood and plant processing tools including groundstone items were plentiful by the Middle Archaic period (generally placed after 6,000 BC). Most artifact data from this time period, however, is based on typological data rather than intact, datable sites (Dragoo 1976).

The Late Archaic period represented a time frame of increasing local complexity and specialization among the various regional groups (Dragoo 1976; Winters 1969; Vickery 1980). Through the Late Archaic period, many aspects of what is called the Woodland period were already becoming apparent by 2,000 BC (Griffin 1978; Winters 1969). Evidence included expanded trade networks, evidence of status differentiation, and possible horticultural activities (Griffin 1978; Driskell 1979; Cowan et al. 1981).

Woodland Period (c. 1500 BC - AD 1000)

The Woodland period was marked by significant shifts in subsistence strategy, technological changes, and changing settlement patterns. Divided traditionally into the Early Woodland, Middle Woodland, and Late Woodland periods, those periods have been assigned the time frames: 1500 BC-AD 100, 200BC - AD 500, and AD 500 - AD 1000, respectively. Note that the Early and Middle Woodland periods overlap. Some cultures have been identified as Middle Woodland (ex. Hopewell) while evidence exists that cultures identified as Early Woodland (ex. Adena) continued in other parts of the Ohio Valley.

The Early Woodland period represented a shift in subsistence and settlement strategies by the Native American occupants of the Ohio Valley. Developing horticultural strategies by the Late Archaic peoples led to a significant increase in their use after that time (Yarnell 1973; Cowan et al. 1981). A related development was the use of clay pottery for cooking and storage vessels.

Some burial mounds included significant evidence of social status differentiation. The presence of copper and shell ornaments in burial contexts provided evidence for extensive trade networks among the eastern woodlands and southeast. Referred to as the Adena culture in the Ohio Valley, researchers have found evidence for their settlements on river and stream terraces, with possible winter upland resource extraction. Most research on Adena during the greater part of the twentieth century was on the burial and ceremonial earthworks. Increasing interest in their culture as a whole has increased our knowledge of the Adena (Farnsworth and Emerson 1986).

The Middle Woodland period is defined by the Hopewell complex, probably centered near Chillicothe, Ohio on the Scioto River. Another focus of development was in Illinois (Griffin 1978). The Hopewellian period was characterized by elaborate geometric earthworks, burial mounds, an extensive trade network producing exotic goods, flint bladelets of a particular type, distinctive pottery and other artifacts, and a complex mortuary system. Much of the early research centered on the elaborate earthworks and burial mounds, producing extensive information about the mortuary practices, but little about subsistence or settlement. Recent research has found evidence of smaller habitations in the Ohio Valley, but larger villages such as seen in Illinois have not been identified as yet in Ohio (Genheimer 1994). Subsistence strategies for the Middle Woodland period are still being researched and little substantive interpretation has been agreed upon.

Mound building as a mortuary custom continued throughout the late Woodland period, although on a smaller scale and possibly of a different nature (Seeman 1981; Kreinbrink 1992). Regional settlement patterns become better understood during this time period.

Subsistence strategies included a growing reliance on domesticated plants including squash, seed plants, and maize agriculture by the end of the Late Woodland period (Seeman 1981; Wymer 1992). Wymer (1992) found an intensification and diversity in Late Woodland deposits from a number of Ohio valley sites for this time period. Toward the end of the late Woodland, however, she noted a decrease in diversity as maize increased in importance (Wymer 1992:67).

Much of the identification of Late Woodland manifestations in the upper Ohio Valley have so far been based on ceramic assemblages. Several different pottery types, distinguished primarily by the tempering agent, characterize these assemblages. Southern Ohio is characterized by two cordmarked pottery types, Peters, which can be grit, limestone, or chert tempered; and Chesser which is limestone tempered (Prufer and McKenzie 1966:241; Prufer 1967:12). The Late Woodland lithic assemblage is represented by triangular side notched points, triangular blades, Raccoon side-notched, and Chesser notched points (Seeman 1992; 1981). Chert material was generally obtained from local sources as opposed to higher quality, distant flint sources.

Fort Ancient Period (AD 1000-AD 1600+)

By 800-900 AD, the bow and arrow may have been introduced into the Ohio Valley (Seeman et. al. 1994). Other changes in settlement and subsistence soon changed the character of the Late Woodland archaeological record. By 1000 AD, the local Native American inhabitants of southwest Ohio practiced maize agriculture, used the bow and arrow, and tempered their pottery with shell instead of grit or limestone. Social and political changes may have also accompanied the technological changes.

The Mississippian period as seen in the Mississippi Valley included large town and mound complexes that influenced and controlled many of their neighbors. Influence reached the Ohio Valley in terms of technological change as mentioned above, and perhaps social changes as well, although those are not as well documented.

During the Fort Ancient period, permanently occupied villages have been documented along most of the major streams and rivers in southern Ohio. Divided into three time frames by many researchers, the Fort Ancient period saw changes in pottery styles and village layout/plans through the more than 600 year period (Griffin 1943; Essenpreis 1982; Cowan 1986; Henderson 1992).

Historic Period Euro-American Settlement

During the Iroquoian wars of the seventeenth century, many Native groups were pushed or moved out of their traditional homelands. Conflicts among the French, English, the fledgling Colonies, and the Iroquois caused much of Ohio to be depopulated during this period (Hunter 1978). European trade goods are known from some sites in the upper Ohio Valley, including two sites in Greenup County, Kentucky (Pollack and Henderson 1984), down river from the Meigs County, Ohio project area.

At the beginning of the eighteenth century, most of what is now the United States, from the Mississippi River east, had been explored. The Atlantic seaboard was held under the British crown, Florida was controlled by Spain, and the French were established along the Mississippi and St. Lawrence River Valleys (Buck and Buck 1939). However, the upper Ohio Valley still remained relatively unexplored.

Throughout the first half of the eighteenth century, colonial land agents, as well as traders, maintained steadily growing interests in the Ohio area, interests that served to further strain Anglo-French relations. In the latter half of the eighteenth century, after the area was once again populated by Indian groups governed by the Iroquois, it became apparent that control of the mid-continent would rest with whomever controlled its primary east-west access, the Ohio Valley. As a result, in the late 1740s, the Ohio Land Company was organized, and subsequently requested a grant of 500,000 acres from the British crown, part of which included southeastern Ohio. French retaliatory actions included sending Celeron de Blenville to the upper Ohio Valley to reassert French authority in 1749.

Prior to the formal declaration of war between England and France in 1756, the relationship between the two countries continued to deteriorate. Various skirmishes broke out in the early 1750s, culminating in the French and Indian Wars of 1756-1763. The Treaty of 1763 granted the victorious English Canada and the eastern half of the continental United States. The authority of the British over the area was, however, relatively short-lived, since the upper Ohio Valley was shortly embroiled in the American Revolution, which led to a general rising of most of the Ohio tribes. Because Ohio remained largely unsettled by Euro-Americans, Indian hostilities were directed primarily against white strongholds in neighboring states. Although the 1783 Treaty of Paris finalized the American colonists' victory, it did not end the British inspired Indian raids. Furthermore, since the frontier was continually being forced back by land speculators, traders, woodsmen, and settlers, Indian territorial rights, even though nominally protected by the government, were openly ignored by the citizenry.

Following the American Revolution, the peace treaty signed with the British granted the new American nation a boundary that extended not just to the Appalachians, but all the way to the Mississippi River. Along with this territory, the British abandoned their native allies as well, and it was within this context that post-war Indian policy was formulated. The treaty signed at Fort Stanwix in 1784, for example, reflected the notion that the Iroquois has forfeited all claim to their land by fighting with the British against the emerging American nation (Johnson et al. 1979). Prior to the Treaty of Fort Stanwix, the area was still claimed by the Iroquois Confederacy.

Also in the aftermath of the Revolutionary War, several of the original colonies pressed claims on the Ohio territory. In 1794, Virginia relinquished rights to Eastern Ohio, but retained privileges over the land between the Scioto and Little Miami Rivers. Indian title to the balance of the territory was purchased by Congress in 1787, although not until General Mad Anthony Wayne's 1794 victory at the Battle of Fallen Timbers were Indian-settler conflicts somewhat dampened. Wayne's triumphant march defined the Indian treaty boundary spelled out in the 1795 Treaty of Greenville. The line ran roughly on the diagonal from Lake Erie to a point opposite the Kentucky River embouchure (Roseboom and Weisenburger 1973).

This treaty formally marked the beginning of American and Euro-American permanent inhabitation of most of the lands north and west of the Ohio River, although several settlements like Marietta and Losantiville (Cincinnati) were founded as early as 1788. Likewise, the Land Ordinance of 1785 and the 1787 Northwest Ordinance had already delineated how the western lands would be

surveyed and governed, respectively. In fact, as early as 1785, a survey of the first seven ranges (vertical rows of townships) of eastern Ohio was undertaken, tracts of which were sold in 1787 (Sherman 1925:52).

Meigs County – Letart Township

Primarily a rural area, Meigs County was originally part of the Ohio Company's purchase. In 1819, the county was formed out of portions of Athens and Gallia counties (Gerlach and Parker 1977). Letart Township was first organized in 1803 while it was still part of Gallia County. The Letart Falls area was settled as early as 1780 and Letart Township was one of the original townships in the county. The earliest settlers included farmers and flat boat men (Ervin 1949). By 1810, the Sayre family had started the first grist mill, on the Ohio River southwest of Bucktown Road (out of the project area) (Gerlach and Parker 1979). During most of the nineteenth century, local farming remained a subsistence activity with surpluses sold in the local market (MCPHS 1979).

By the late nineteenth century, the coal and salt industries and river transportation work drew away young men from the farms. Local farmers began to shift to increased production in order to produce a livable income. On the terraces around Letart Falls, the light sandy loam was very well suited to certain vegetables and fruits. Strawberries, potatoes and cabbage were the first commercial crops grown in the valley (MCPHS 1979). By the early twentieth century, the farmers were producing good harvests of fruits and vegetables. Strawberries were the major crop in the early twentieth century. Harvesters consisted of primarily local children, paid a few cents per quart to pick the berries. The last strawberries were grown about 1965 (MCPHS 1979). At least some of the smaller houses noted on the 1908 and 1920 topographic maps were probably the homes of sharecroppers and their families during the early boom period of cash/truck farming in the valley (MCPHS 1979).

Modern labor laws and other considerations ended the use of children in the farm fields. Today, immigrant and migrant labor is used to plant, tend, and harvest the fields in the region. By the 1950s-1960s most of the small tenant houses were gone. Some have been replaced by trailers but most have disappeared from the landscape.

Many of the major farms were sold in the 1950s to a coal company, who still hold much of the property in the valley. They leased out the terraces for farming to some of the same families who had previously owned the land. Cash farming is still the major industry, although currently, tomatoes, peppers, watermelon, and squash are the major crops. However, growth of these crops involves major soil movement as the soil is gathered into long, raised platforms in which the plants are grown. Repeated gathering and tilling has impacted the integrity of any sites found in the central portion of the project area, especially east of Route 124 and north of East Letart Road.

METHODS

Field Methods

The field methods employed general techniques recommended by the Ohio Historic Preservation Office (OHPO) Guidelines (1994) and amended recommendations provided at an OHPO meeting with Ohio consultants in early 1998. Survey of the project area included a combination of surface reconnaissance survey and shovel testing. The scope of work was discussed in a meeting with the OHPO on December 15, 2005. As determined in that meeting, the survey of the Lower Terrace included three main tasks. Each is discussed below regarding methodology.

TASK 1: Relocate previously recorded 33MS288 and reassess its horizontal boundary along the Ohio River bank. As recorded, the site encompasses a large field located between Route 124 and the Ohio River (see Results Section). The survey of the site included a surface reconnaissance because the field had been plowed/disked. Transects were walked at less than 5 meter intervals. Artifact locations were marked with pin flags. Additional transects were then walked in the areas that produced artifacts to refine site boundaries. A lathe stake or pin flag marker was placed at the approximate center point of the artifact distribution and marked "Cluster A", and so forth. Surveyors provided by URS then used a GPS unit to map in several of the site clusters within site 33MS288. All observed artifacts were collected, except for modern historic debris, brick fragments, or fire cracked rock.

TASK 2: Conduct an archaeological survey of the Lower Terrace Portion of the Project Area, document the presence/absence of previously unrecorded archaeological sites, and make recommendations regarding their eligibility for the National Register of Historic Places.

The Lower Terrace project area was divided into 14 Survey Sections (see Results Section). These sections are based on a combination of field, road, and natural boundaries. In fields with sufficient surface visibility (more than 30%), the crew conducted a surface reconnaissance. Transects were walked at less than 5 meter intervals. Artifact locations were marked with pin flags. Additional transects were then walked in the areas that produced artifacts to refine site boundaries. A lathe stake or pin flag marker was placed at the approximate center point of the artifact distribution and marked "Site 1", and so forth. The diameter of the artifact scatter was noted. Surveyors provided by URS then used a GPS unit to map in the locations of documented sites and several individual datums used during field mapping. The site locations were then accurately plotted onto the figures used in this report.

Where ground surface visibility was insufficient, the crew conducted shovel testing based on a 15 meter (50 foot) grid system. In the Lower Terrace project area, Survey Section 11 was shovel tested. Small portions of Sections Each test was 50 cm in diameter and excavated 10 cm into subsoil or 50 cm in depth. All soil was sifted through 1/4 inch wire mesh. Data on each test including soil profile (depth, Munsell soil color, soil type), location, setting, and

presence/absence of artifacts were noted on shovel test forms. Artifacts were bagged by shovel test coordinate.

A shovel test was excavated at each archaeological site that had more than two artifacts. These tests followed the test parameters described above and recorded data on stratigraphy and depth of plowzone for the recorded sites.

TASK 3: Evaluate the Lower Terrace project area regarding geomorphological setting and potential for buried archaeological sites.

URS personnel including Dr. James Nicholas and John Hurd conducted a literature review that included topographic maps, aerial photographs, published geological and soil data, internet resources, and other references in order to best characterize the terrace system in the Lower Terrace Project Area. N&E provided shovel test results to aid in their review. Their results are described in the Results Section.

Artifact Analysis

Prehistoric Artifacts: Artifact analysis included several steps; washing and sorting, catalog preparation, and analysis. Artifacts are listed in the Results Section text. Analysis of the lithic artifacts includes the following tasks:

- identification of raw materials when possible,
- description of morphological characteristics,
- macroscopic examination for evidence of utilization, and
- artifact type description based on physical attributes and assigned functional names such as drill, scraper, and so forth.

In-depth debitage analysis was not included at this level of investigation. References such as Justice (1987) were used for identification of diagnostic projectile points. DeRegnaucourt and Georgiady (1998) provided reference information on chert raw material types.

Analysis of prehistoric artifact assemblages may be used to infer site function, seasonality of occupation settlement patterns and other aspects of prehistoric activities. However, at a Phase I level of investigations, assemblages typically include small amounts of material from spatially separated shovel tests or surface collection transects. At the Phase I level, prehistoric materials provide some information about chronological/cultural affiliation when possible, raw materials usage, and some data on site function. The resulting information is combined with data on site integrity and regional comparisons to make recommendations on potential eligibility for inclusion on the National Register of Historic Places.

Historic Period Artifacts: Historic archaeologists have begun to use material culture to discern how patterns in the archaeological record may provide data on cultural patterns such as economics,

social change, ethnicity, and human choices and behavior (Miller 1991; Cheek and Friedlander 1990; Spencer-Wood 1987).

Phase I artifact recovery methods at rural historic sites routinely include artifacts recovered from surface reconnaissance or from patterned shovel testing. These techniques are designed to provide a sample from which to make inferences about site function, chronology, and to answer research questions designed to determine whether further investigation is warranted.

Artifacts recovered during this project were washed and sorted at the Natural & Ethical Environmental Solutions laboratory. In general, material, morphology and decoration define each artifact. This type of analysis serves to define temporal site affiliation, site function, and assist in answering research questions. References include archaeological manuals, books, and articles such as Jones and Sullivan (1985), Majewski and O'Brien (1987), Samford 1997, Miller et al (2000), Ball (1983), and many others listed individually as needed. The historical archaeological community relies on a large number of books and manuals compiled by collectors and identification experts. These include excellent and well known references such as Godden (1964), McKearin and Wilson (1978), Laidacker (1954 v1 and 2), Camehl (1916), Spargo (1926), McAllister (2001), Hughes (1961), Ketchum (1991), or Gaston (2002). References compiled by or for archaeologists include Jones and Sullivan (1985), Majewski and O'Brien (1987), Miller et al (2000), (Hunter 2001), Samford (1997), and the contents of the Society for Historical Archaeology Journal; *Historical Archaeology*, published quarterly each year. These and many other references provide source material for historic artifact typological and morphological descriptions.

A taxonomic classification system is used to sort and identify the historic artifact assemblage. This system uses the following hierarchical categories: Category, Type, Form, Style, and Description. Each item is defined briefly below.

Category: This is the primary sorting column. Items are sorted based on material type. This includes metal, ceramic, faunal, glass, or stone.

Type: The Type column subdivides the items by either physical or cultural characteristics. Metal and stone objects are further sorted by type of raw material such as ferrous (containing iron), brass, silver, chert/flint, or limestone. Categories that consist of culturally produced objects such as glass and ceramic are sorted based on physical characteristics and and/or form. Glass artifacts are divided in this column by flat or curved. This sets up the further classification of glass by Form in the next column. Ceramics are defined by type of ware such as Stoneware, Whiteware, Pearlware, or Porcelain. The definition of these types is based on physical characteristics such as firing temperature, and type and color of clay (fabric). The identification of ceramic ware type is based on experience and use of a reference library of both archaeological and collector pictorial resources.

Form: Form defines each object morphologically. Ceramics are defined by form when possible, hollow or flat, plate, bowl, etc. Glass is classified by whether it is a container or tableware, or window glass for example. If the container type is identifiable, such as bottle or jar, that is listed here. For metal, terms such as nail, bolt, etc, provide information on morphology.

Style: This column provides further detailed information and generally constitutes a subset of the Form column. For example, in the style category, nails (Form category) may be broken down into cut, wire, or wrought. Ceramic styles include decorative techniques such as transfer print or hand painted.

Description: The Description Column provides the opportunity to add significant details such as decoration color, size for nails or buttons, or presence of makers' marks or other imprint/embossing.

The overall artifact catalog also records vital information such as provenience, bag number, minimum vessel number for ceramics, artifact dimensions when appropriate, and quantity. The artifact catalog is included in Appendix 1 in its entirety. Individual site collections may also be summarized in the Results Section.