

Large Filing Separator Sheet

Case Number: 08-289-GA-BTX

Date Filed: 9/26/2008

Section: 3 of 4

Number of Pages: 105

Description of Document: Application for certificate

APPENDIX 07-1D

**SUPPLEMENTAL OHIO EPA QUALITATIVE HABITAT EVALUATION INDEX (QHEI) AND
PRIMARY HEADWATER HABITAT EVALUATION INDEX (HHEI)
STREAM ASSESSMENT FORMS FROM GAI FIELD SURVEYS**

Stream & Location: S-1-UT to Chippewa River

RM: Date: 04/15/08

DEO Franklin 20" Project

Scorers Full Name & Affiliation: Joey Van Schaik (GAI)

River Code:

STORET #:

Lat./Long.:

18°

Office verified location

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

Check ONE (Or 2 & average)

- BEST TYPES: BLD, BOUL, COBB, GRAVEL, SAND, BEDROCK
POOL RIFFLE
OTHER TYPES: HARDPAN, DETRITUS, MUCK, SILT, ARTIFICIAL

- ORIGIN: LIMESTONE, TILLS, WETLANDS, HARDPAN, SANDSTONE, RIP/RAP, LACUSTURINE, SHALE, COAL FINES

- QUALITY: HEAVY, MODERATE, NORMAL, FREE, EXTENSIVE, MODERATE, NORMAL, NONE

Substrate Maximum 20

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

Comments: all or over 80% dominant

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts... quality; 3-Highest quality in moderate or greater amounts

AMOUNT

Check ONE (Or 2 & average)

- UNDERCUT BANKS, OVERHANGING VEGETATION, SHALLOWS, ROOTMATS, POOLS, ROOTWADS, BOULDERS, OXBOWS, AQUATIC MACROPHYTES, LOGS OR WOODY DEBRIS

- EXTENSIVE >75%, MODERATE 25-75%, SPARSE 5-25%, NEARLY ABSENT <5%

Cover Maximum 20

Comments: majority of functional instream cover is limited to aquatic macrophytes

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

- SINUOSITY: HIGH, MODERATE, LOW, NONE
DEVELOPMENT: EXCELLENT, GOOD, FAIR, POOR
CHANNELIZATION: NONE, RECOVERED, RECOVERING, RECENT OR NO RECOVERY
STABILITY: HIGH, MODERATE, LOW

Channel Maximum 20

Comments: eroding pipeline Row with exposed pipeline in channel

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

- EROSION: NONE/LITTLE, MODERATE, HEAVY/SEVERE
RIPARIAN WIDTH: WIDE, MODERATE, NARROW, VERY NARROW, NONE
FLOOD PLAIN QUALITY: FOREST/SWAMP, SHRUB/OLD FIELD, RESIDENTIAL/PARK, FENCED PASTURE, OPEN PASTURE, CONSERVATION TILLAGE, URBAN/INDUSTRIAL, MINING/CONSTRUCTION

Riparian Maximum 10

Comments: mowed/maintained field along RPA must closely resemble next field located on maintained

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

- MAXIMUM DEPTH: >1m, 0.7-1m, 0.4-0.7m, 0.2-0.4m, <0.2m
CHANNEL WIDTH: POOL WIDTH > RIFFLE WIDTH, POOL WIDTH = RIFFLE WIDTH, POOL WIDTH < RIFFLE WIDTH
CURRENT VELOCITY: TORRENTIAL, VERY FAST, FAST, MODERATE, SLOW, INTERSTITIAL, INTERMITTENT, EDDIES

Recreation Potential Primary Contact Secondary Contact

Pool / Current Maximum 12

Comments

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

Check ONE (Or 2 & average)

NO RIFFLE [metric=0]

- RIFFLE DEPTH: BEST AREAS >10cm, 5-10cm, <5cm
RUN DEPTH: MAXIMUM >50cm, MAXIMUM <50cm
RIFFLE / RUN SUBSTRATE: STABLE, MOD. STABLE, UNSTABLE
RIFFLE / RUN EMBEDDEDNESS: NONE, LOW, MODERATE, EXTENSIVE

Riffle / Run Maximum 8

Comments

- 6] GRADIENT (~4.7 ft/mi) VERY LOW-LOW, MODERATE, HIGH-VERY HIGH
DRAINAGE AREA (~65 mi^2)

%POOL: 6% %GLIDE: 5% %RUN: 80% %RIFFLE: 5%

Gradient Maximum 10

Comment RE: Reach consistency/Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.
 Photographs 8-9 (wastewater), #10 (drainage), #10 (drainage), existing maintenance gas
 ROW, exposed pipeline noted in channel. Heavy siltation throughout
 stream reach. Max pool depth exceeded 40 cm during flood
 assessment

A) SAMPLED REACH

Check ALL that apply

METHOD

- BOAT
- WADE
- L. LINE
- OTHER

DISTANCE

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

CLARITY

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

CANOPY

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

CJ RECREATION

AREA DEPTH
 POOL: > 100cm > 3R

BJAESTHETICS

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

DJ MAINTENANCE

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

EJ ISSUES

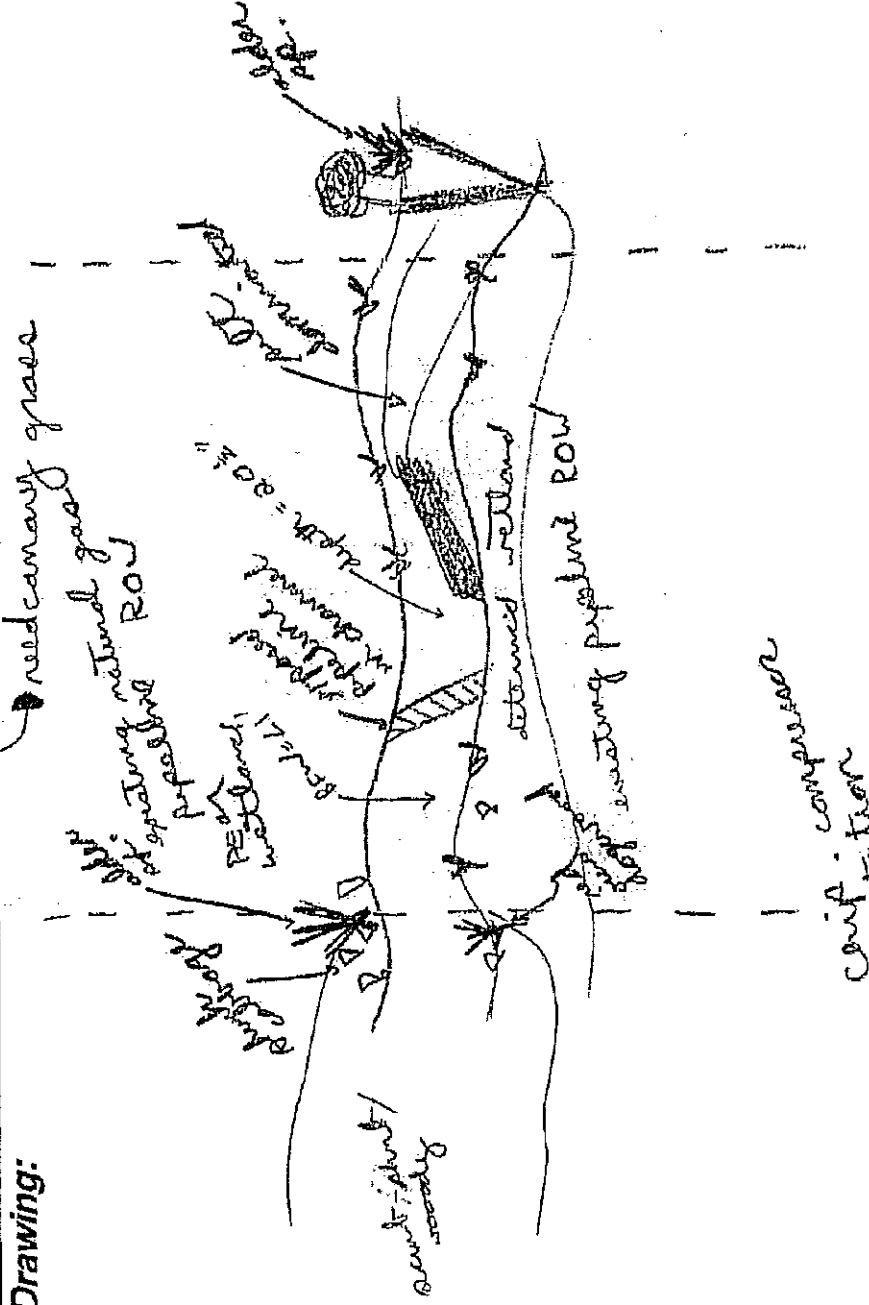
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H₂O / TILE / H₂O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT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

FJ MEASUREMENT:

- \bar{x} width
- \bar{x} depth
- max. depth
- \bar{x} bankfull width
- bankfull \bar{x} depth
- W/D ratio
- bankfull max. depth
- floodprone \bar{x} width
- entrench. ratio

Legacy Tree:

Stream Drawing:



S-1

Stream & Location: S-2-Silver Creek

RM: Date: 04/15/08

DEO Franklin 20" Project Scorers Full Name & Affiliation: Joey Tom, Mark GAT

River Code: STORET #: Lat./ Long.: Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average) ORIGIN QUALITY. Includes categories like BEST TYPES, OTHER TYPES, LIMESTONE, TILLS, WETLANDS, etc. Comments: cobble slightly more dominant than gravel for secondary substrate.

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts. Includes categories like UNDERCUT BANKS, OVERHANGING VEGETATION, SHALLOWS, ROOTMATS, POOLS, OXBOWS, AQUATIC MACROPHYTES, LOGS OR WOODY DEBRIS. Comments: moderate in-stream cover, dominant macrophytes include largely reed canopy w/ scattered grasses.

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). Includes categories like SINUOSITY, DEVELOPMENT, CHANNELIZATION, STABILITY. Comments: channelization includes recovery and more. The recovery portion is within the existing ROW while remaining portion of reach is modified.

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). Includes categories like EROSION, RIPARIAN WIDTH, FLOOD PLAIN QUALITY. Comments: River right looking downstream.

5) POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH CHANNEL WIDTH CURRENT VELOCITY Recreation Potential Primary Contact Secondary Contact. Includes categories like POOL WIDTH > RIFFLE WIDTH, TORRENTIAL, SLOW, VERY FAST, INTERSTITIAL, FAST, INTERMITTENT, MODERATE, EDDIES. Comments: Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species.

6) GRADIENT (~34 ft/mi) DRAINAGE AREA (mi^2) VERY LOW - LOW, MODERATE, HIGH - VERY HIGH. Includes categories like RIFFLE DEPTH, RUN DEPTH, RIFFLE / RUN SUBSTRATE, RIFFLE / RUN EMBEDDEDNESS. Comments: Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species.

19/5280 29 10/29 = 34

AJ SAMPLED REACH

Check ALL that apply

- METHOD**
- BOAT
 - WADE
 - L. LINE
 - OTHER
- DISTANCE**
- 0.5 Km
 - 0.2 Km
 - 0.15 Km
 - 0.12 Km
 - OTHER

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

- CANOPY** 1st _____ cm
- 2nd _____ cm
- CJ RECREATION** AREA DEPTH
- POOL: >100ft? >3ft

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

Photograph # 20 (upstream), # 21 (downstream), # 25 (upstream), # 26 (downstream). Existing pipeline Row. dig. at field along RBB likely source of nonpoint.

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

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

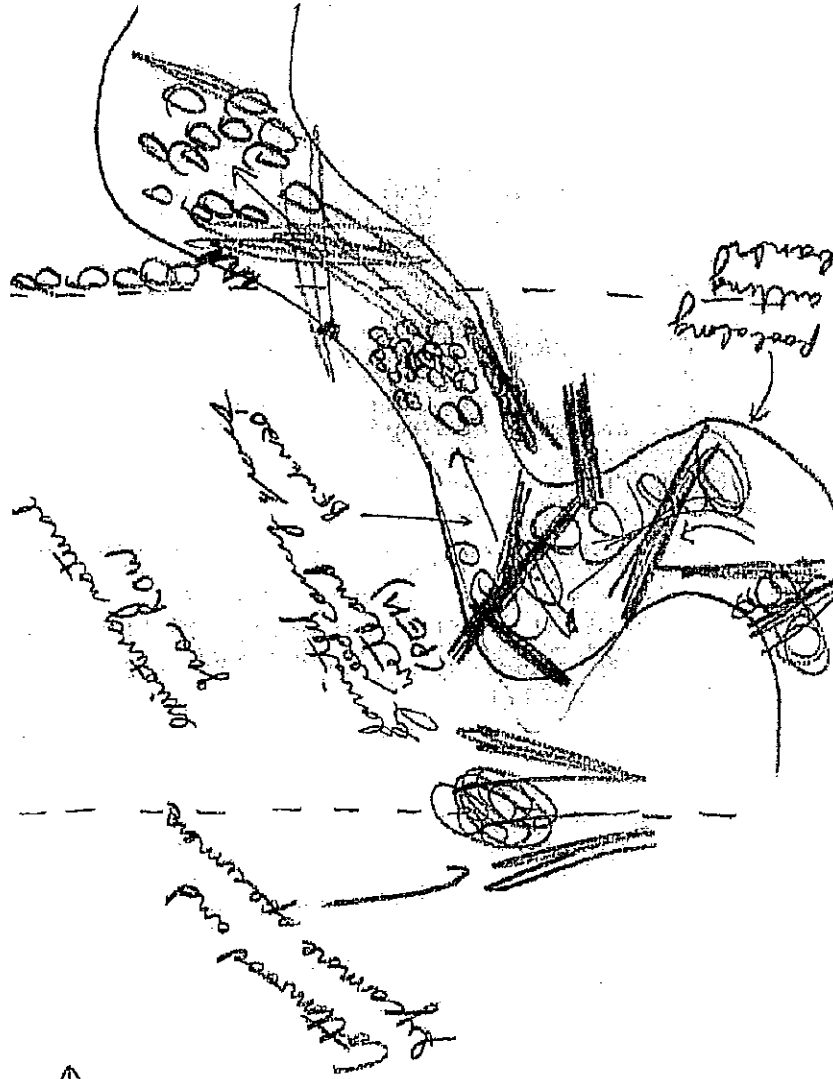
Circle some & COMMENT

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

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

Stream Drawing:

flow →



S-2



Primary Headwater Habitat Evaluation Form

modified class I

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

23

SITE NAME/LOCATION DED Franklin 20" Project
 SOH-JEN-01 SITE NUMBER S2a RIVER BASIN _____ DRAINAGE AREA (mi²) 41
 LENGTH OF STREAM REACH (ft) ~80 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 4/15/08 SCORER JAV(GAI) COMMENTS channel is likely still no covering for part modification

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]	<u>1%</u>	<input type="checkbox"/> SILT [3 pt]	<u>80%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>1%</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>5%</u>
<input type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>1%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>12%</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 ~3% (A) 12 (B) 6

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

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 dry channel 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 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) ~3'

HHEI Metric Points

Substrate Max = 40 18

A + B 6

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	L	R	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wide >10m		Mature Forest, Wetland		Conservation Tillage	
<input checked="" 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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" 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 dry channel

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

S-2a

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: Doylertown, Ohio NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Wayne Township: Chippewa City: _____

MISCELLANEOUS

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

Photograph Information: #34 (upstream), #35 (downstream @ end of channel)

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

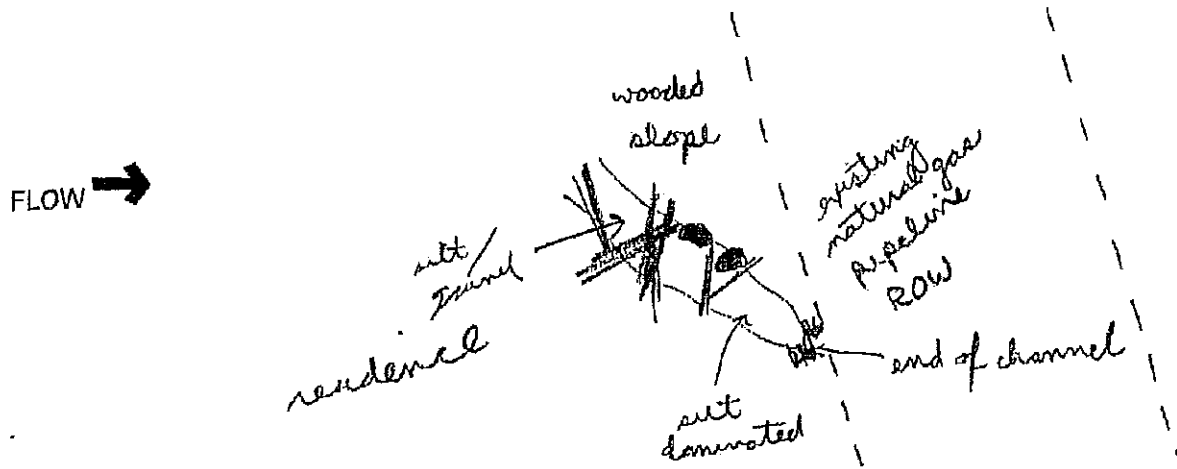
Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: No biota observed along stream reach

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 DEO Franklin 20" Project
 SOH-LFS-001 SITE NUMBER S-2b RIVER BASIN _____ DRAINAGE AREA (mi²) 21

LENGTH OF STREAM REACH (ft) 150 LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 4/15/08 SCORER JAV(GAI) COMMENTS filling of portion of channel, culverting for 200 ft

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>70%</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 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>3%</u>	<input type="checkbox"/> MUCK [0 pts]	_____
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	<u>2%</u>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0 (A) **6** (B) **4**

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **6** TOTAL NUMBER OF SUBSTRATE TYPES: **4**

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 dry channel 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 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) 2.5 **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	L	R	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" 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"/>

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 dry channel

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

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

STREAM GRADIENT ESTIMATE

<input type="checkbox"/> Flat (0.5 ft/100 ft)	<input checked="" type="checkbox"/> Flat to Moderate	<input type="checkbox"/> Moderate (2 ft/100 ft)	<input type="checkbox"/> Moderate to Severe	<input type="checkbox"/> Severe (10 ft/100 ft)
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ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

S-2b

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: Doylestown, Ohio NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Wayne Township/City: Chippewa

MISCELLANEOUS

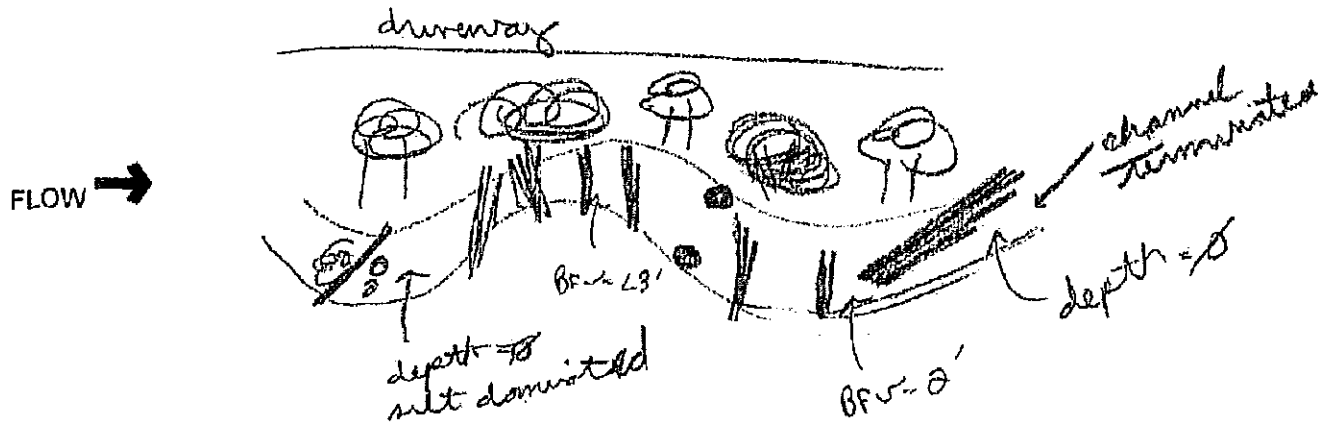
Base Flow Conditions? (Y/N): Y Date of last precipitation: unknown Quantity: unknown
 Photograph Information: # 47 (downstream), # 48 (upstream)
 Elevated Turbidity? (Y/N): N Canopy (% open): ~80%
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or Id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): N If not, please explain: culverting and filling within stream reach, channel ends within proposed ROW
 Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

Performed? (Y/N): Y (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)
 Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____
 Frogs or Tadpoles Observed? (Y/N) N Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) N Voucher? (Y/N) _____
 Comments Regarding Biology: dry channel, not biota observed in channel

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 DEO Franklin 20" Project
 SOH-JEN-002 SITE NUMBER S-20 RIVER BASIN _____ DRAINAGE AREA (mi²) 21
 LENGTH OF STREAM REACH (ft) ~100' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 4/15/08 SCORER JAV(GAI) COMMENTS dry channel adj. To existing DEO ROW

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]	<u>1%</u>	<input checked="" type="checkbox"/> SILT [3 pt]	<u>60%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>2%</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]	<u>2%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<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 ~5% (A) 12 (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 type="checkbox"/> > 10 - 22.5 cm [25 pts]	<input checked="" type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS dry channel 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 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

HHEI Metric Points
 Substrate Max = 40
18
 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	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wide >10m		Mature Forest, Wetland	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Moderate 5-10m		Immature Forest, Shrub or Old Field	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Narrow <5m		Residential, Park, New Field	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture	
COMMENTS _____		<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 checked="" type="checkbox"/> Dry channel, no water (Ephemeral)

COMMENTS dry channel

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

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

STREAM GRADIENT ESTIMATE

<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):

S-2C

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: Doylstown, Ohio NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Wayne Township/ City: Chippewa

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: unknown Quantity: unknown
 Photograph Information: #63 (downstream), #64 (upstream)
 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: _____

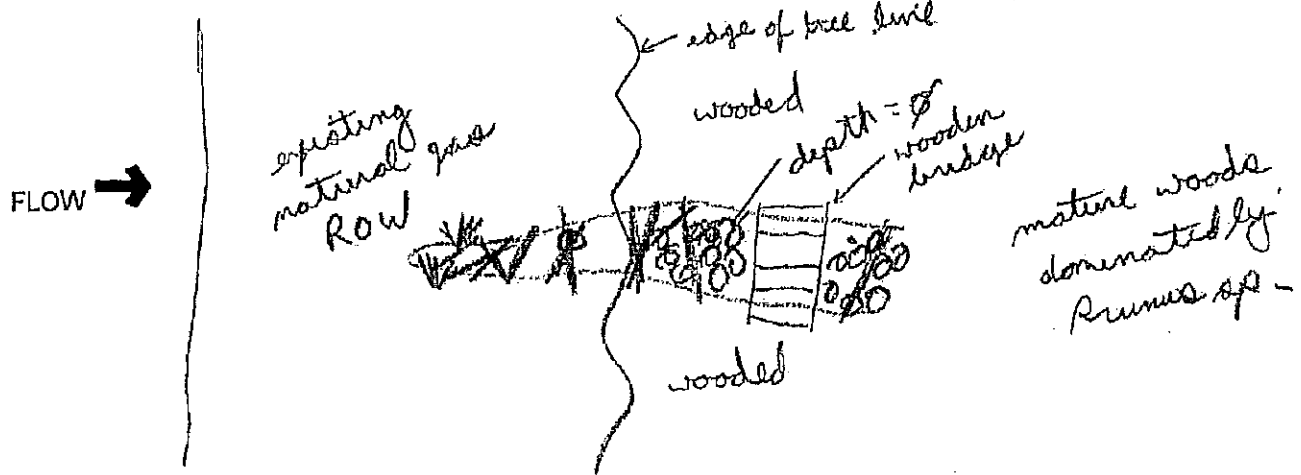
Additional comments/description of pollution impacts: _____

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



30

Stream & Location: S-5-UT to Tuscarawas River RM: Date: 4/15/08 DEO Finambelin 20" Project Scorers Full Name & Affiliation: Joey Van Schaik (GA) River Code: STORE# Lat./ Long.: 18 Office verified location

1) SUBSTRATE Check ONLY Two substrate TYPE BOXES, estimate % or note every type present. Check ONE (Or 2 & average). BEST TYPES: BLDR/SLABS [10], BOULDER [9], COBBLE [8], GRAVEL [7], SAND [6], BEDROCK [5]. OTHER TYPES: HARDPAN [4], DETRITUS [3], MUCK [2], SILT [2], ARTIFICIAL [0]. ORIGIN: LIMESTONE [1], TILLS [1], WETLANDS [0], HARDPAN [0], SANDSTONE [0], RIP/RAP [0], LACUSTURINE [0], SHALE [-1], COAL FINES [-2]. QUALITY: HEAVY [-2], MODERATE [-1], NORMAL [0], FREE [1], EXTENSIVE [-2], MODERATE [-1], NORMAL [0], NONE [1]. Substrate Maximum 20. Comments: not slightly more dominant than cobble as secondary substrate.

2) INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. AMOUNT: Check ONE (Or 2 & average). UNDERCUT BANKS [1], OVERHANGING VEGETATION [1], SHALLOWS (IN SLOW WATER) [1], ROOTMATS [1]. POOLS > 70cm [2], ROOTWADS [1], BOULDERS [1]. OXBOWS, BACKWATERS [1], AQUATIC MACROPHYTES [1], LOGS OR WOODY DEBRIS [1]. Channel Maximum 20. Comments: moderate instream cover outside of existing Row.

3) CHANNEL MORPHOLOGY Check ONE in each category (Or 2 & average). SINUOSITY: HIGH [4], MODERATE [3], LOW [2], NONE [1]. DEVELOPMENT: EXCELLENT [7], GOOD [5], FAIR [3], POOR [1]. CHANNELIZATION: NONE [6], RECOVERED [4], RECOVERING [3], RECENT OR NO RECOVERY [1]. STABILITY: HIGH [3], MODERATE [2], LOW [1]. Channel Maximum 20. Comments: portion of stream reach is an existing pipeline Row.

4) BANK EROSION AND RIPARIAN ZONE Check ONE in each category for EACH BANK (Or 2 per bank & average). River right looking downstream. EROSION: NONE/LITTLE [3], MODERATE [2], HEAVY/SEVERE [1]. RIPARIAN WIDTH: WIDE > 50m [4], MODERATE 10-50m [3], NARROW 5-10m [2], VERY NARROW < 5m [1], NONE [0]. FLOOD PLAIN QUALITY: FOREST, SWAMP [3], SHRUB OR OLD FIELD [2], RESIDENTIAL, PARK, NEW FIELD [1], FENCED PASTURE [1], OPEN PASTURE, ROWCROP [0]. CONSERVATION TILLAGE [1], URBAN OR INDUSTRIAL [0], MINING / CONSTRUCTION [0]. Riparian Maximum 10. Comments: along Row.

5) POOL / GLIDE AND RIFFLE / RUN QUALITY MAXIMUM DEPTH: > 1m [6], 0.7-1m [4], 0.4-0.7m [2], 0.2-0.4m [1], < 0.2m [0]. CHANNEL WIDTH: POOL WIDTH > RIFFLE WIDTH [2], POOL WIDTH = RIFFLE WIDTH [1], POOL WIDTH < RIFFLE WIDTH [0]. CURRENT VELOCITY: TORRENTIAL [-1], VERY FAST [1], FAST [1], MODERATE [1], SLOW [1], INTERSTITIAL [-1], INTERMITTENT [-2], EDDIES [1]. Recreation Potential: Primary Contact, Secondary Contact. Pool / Current Maximum 12. Comments: Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species.

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species. Check ONE (Or 2 & average). RIFFLE DEPTH: BEST AREAS > 10cm [2], BEST AREAS 5-10cm [1], BEST AREAS < 5cm [0]. RUN DEPTH: MAXIMUM > 50cm [2], MAXIMUM < 50cm [1]. RIFFLE / RUN SUBSTRATE: STABLE (e.g., Cobble, Boulder) [2], MOD. STABLE (e.g., Large Gravel) [1], UNSTABLE (e.g., Fine Gravel, Sand) [0]. RIFFLE / RUN EMBEDDEDNESS: NONE [2], LOW [1], MODERATE [0], EXTENSIVE [-1]. Riffle / Run Maximum 8. Comments:

6) GRADIENT (> 40 ft/mi) DRAINAGE AREA (m^2). VERY LOW - LOW [2-4], MODERATE [6-10], HIGH - VERY HIGH [10-6]. %POOL: 10%, %GLIDE: 0, %RUN: 15%, %RIFFLE: 75%. Gradient Maximum 10.

A) SAMPLED REACH

Check ALL that apply

- METHOD**
- BOAT
 - WADE
 - L. LINE
 - OTHER
- STAGE**
- 1st - sample pass - 2nd
- HIGH
 - SUP
 - NORMAL
 - LOW
 - DRY
- DISTANCE**
- 0.5 Km
 - 0.2 Km
 - 0.15 Km
 - 0.12 Km
 - OTHER

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

- CANOPY**
- 1st _____ cm
- 2nd _____ cm
- > 85% - OPEN
 - 55% - 85%
 - 30% - 55%
 - 10% - 30%
 - < 10% - CLOSED

C) RECREATION

AREA DEPTH

POOL: > 100RZ > 3R

B) AESTHETICS

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

D) MAINTENANCE

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

E) ISSUES

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

F) MEASUREMENTS

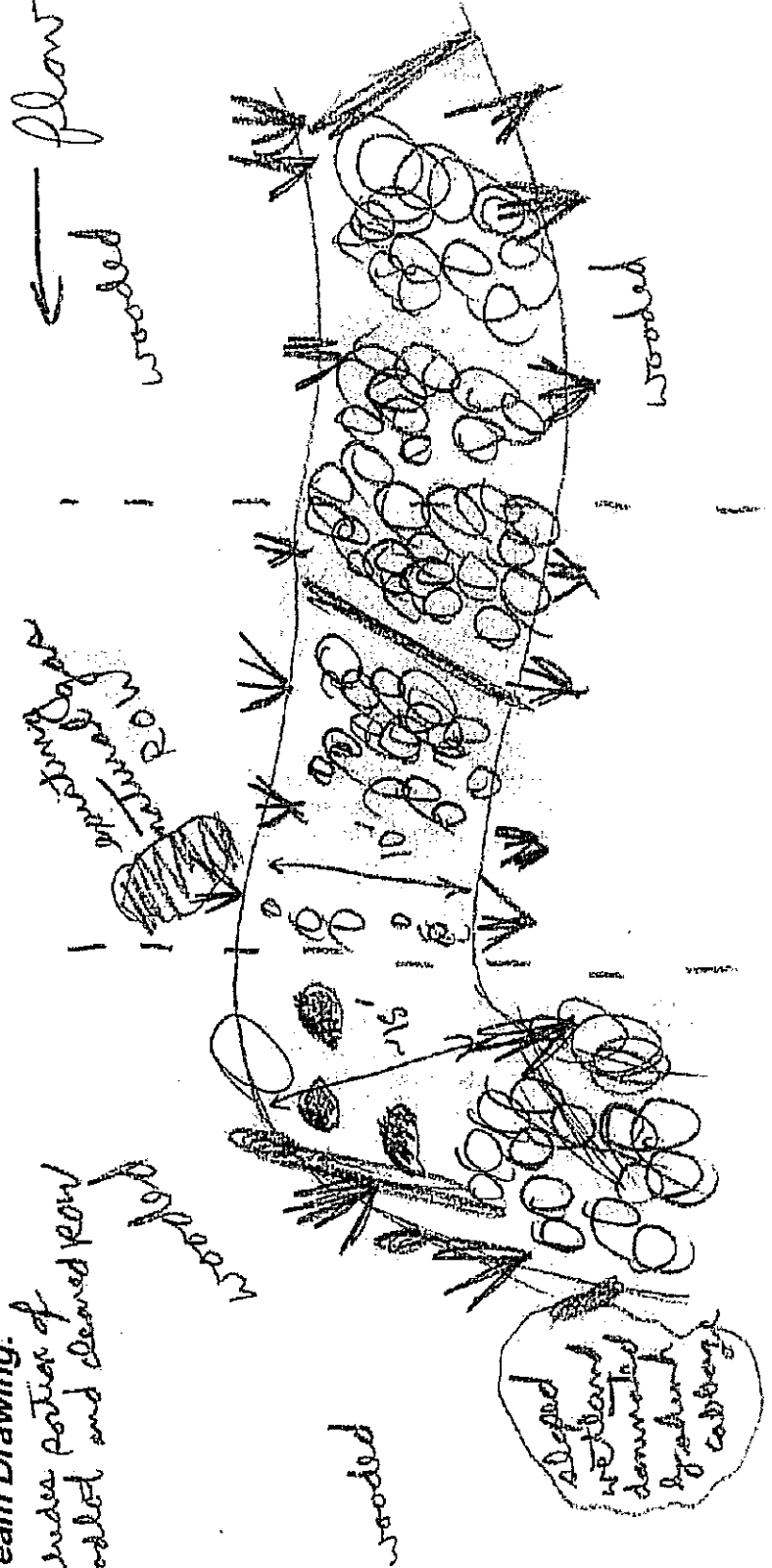
- \bar{x} width
- \bar{x} depth
- max. depth
- \bar{x} bankfull width
- bankfull \bar{x} depth
- W/D ratio
- bankfull max. depth
- floodprone \bar{x}^2 width
- entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/Is reach typical of stream? - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.
 Photograph # 77 (upstream), # 78 (downstream). Existing natural gas pipeline Row. Moderate alterations noted along stream reach.

Stream Drawing:

→ includes portion of wooded and cleared ROW



S-3a

S3b



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 47

Stream & Location: SOH-CRE-007-UT to Inacarawal River RM: _____ Date: 04/15/08
 DEO Franklin 20" Project Scorers Full Name & Affiliation: Jay Tom State (GAI)
 River Code: _____ STORET #: _____ Lat./ Long.: _____ Office verified location

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

BEST TYPES	POOL RIFFLE	OTHER TYPES	POOL RIFFLE	ORIGIN	QUALITY
<input type="checkbox"/> BLDR /SLABS [10]	<input checked="" type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/>	<input checked="" type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input checked="" type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/>	<input checked="" type="checkbox"/> TILLS [1]	<input checked="" type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input checked="" type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> SILT [2]	<input checked="" type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input checked="" type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input checked="" type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input checked="" type="checkbox"/> MODERATE [-1]

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

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

Comments: _____

Check ONE (Or 2 & average)

EMBEDDEDNESS

SILT

LACUSTURINE [0]

SHALE [-1]

COAL FINES [-2]

Substrate 10
Maximum 20

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

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

Comments: sparse instream cover

Cover 9
Maximum 20

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

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

Comments: low sinuosity along stream reach

Channel 10
Maximum 20

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

River right looking downstream

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

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

Comments: _____

Riparian 6
Maximum 10

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

Indicate for reach - pools and riffles.

Comments: _____

Pool / Current 5
Maximum 12

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

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

Comments: → riffle/run complexity range of size particulates

Riffle / Run 3
Maximum 8

6] GRADIENT (>40 ft/mi) VERY LOW - LOW [2-4] MODERATE [6-10] HIGH - VERY HIGH [10-6]

DRAINAGE AREA (~ 1/2 mi²)

%POOL: 20% %GLIDE: 0

%RUN: 40% %RIFFLE: 40%

Gradient 4
Maximum 10

AJ SAMPLED REACH

Check ALL that apply

METHOD

- BOAT
- WADE
- L-LINE
- OTHER

DISTANCE

- 0.5 Km
- 0.2 Km
- 0.15 Km
- 0.12 Km
- OTHER

~50 meters

CANOPY

- > 95% - OPEN
- 55% - 85%
- 30% - 55%
- 10% - 30%
- < 10% - CLOSED

GJ RECREATION

AREA DEPTH POOL: > 100ft > 3ft

BJ AESTHETICS

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

DJ MAINTENANCE

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

EJ ISSUES

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

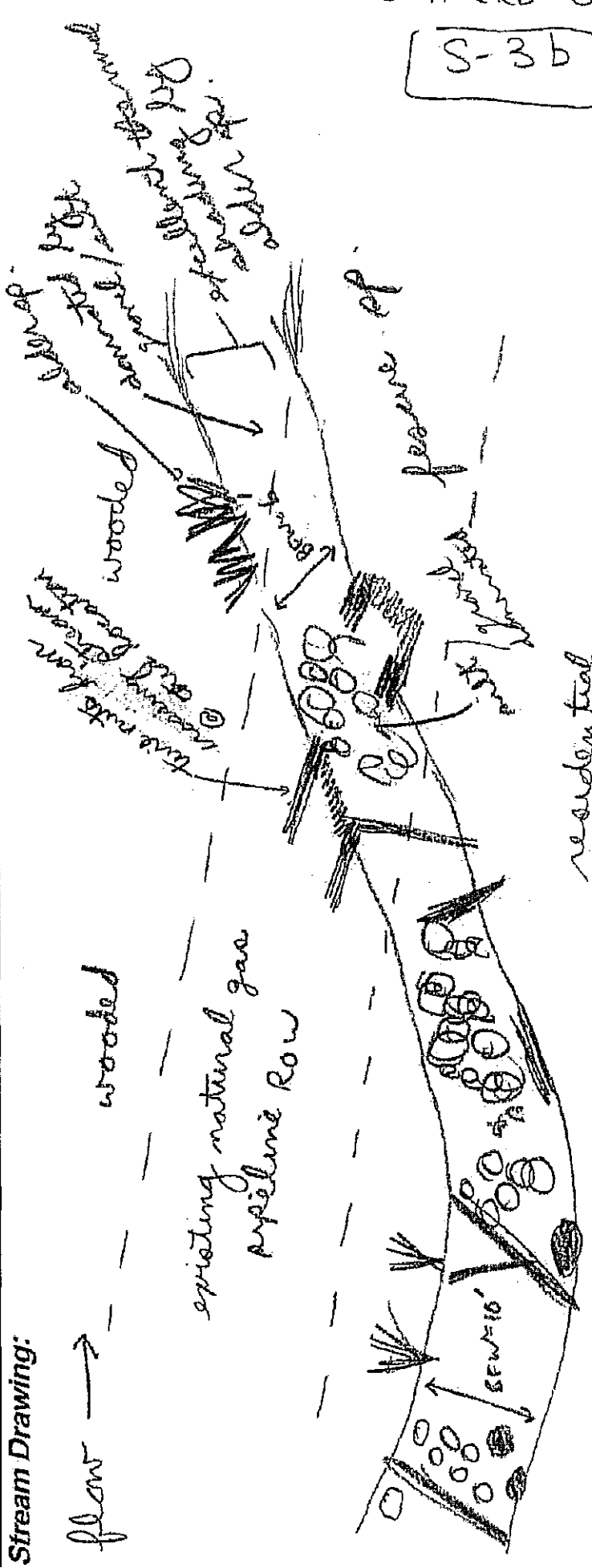
FJ MEASUREMENTS

- \bar{x} width
- \bar{x} depth
- max. depth
- \bar{x} bankfull width
- bankfull \bar{x} depth
- W/D ratio
- bankfull max. depth
- floodprone \bar{x} width
- entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.
 Photograph # 92 (upstream), # 93 (downstream). Existing riparian ROW.
 Embedded noted throughout stream reach as a consequence of the amount of silt

Stream Drawing:



S-3b

3-30

DEPA WDC #077



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 44

Stream & Location: SOH-CRE-0078-VT To Tuscarawas River RM: Date: 04/16/08
DEO Franklin 20" Project Scorers Full Name & Affiliation: Jon Van Shank (GAT)
 River Code: _____ STORET #: _____ Lat./Long.: 18 Office verified location

1] SUBSTRATE Check ONLY Two substrate TYPE BOXES; estimate % or note every type present. Check ONE (Or 2 & average)

BEST TYPES	POOL RIFFLE	OTHER TYPES	POOL RIFFLE	ORIGIN	QUALITY
<input type="checkbox"/> BLDG / SLABS [10]	<input checked="" type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/>	<input checked="" type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> HEAVY [-2]
<input type="checkbox"/> BOULDER [9]	<input checked="" type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> TILLS [1]	<input checked="" type="checkbox"/> MODERATE [-1]
<input type="checkbox"/> COBBLE [8]	<input checked="" type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input checked="" type="checkbox"/>	<input type="checkbox"/> WETLANDS [0]	<input type="checkbox"/> NORMAL [0]
<input checked="" type="checkbox"/> GRAVEL [7]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> SILT [2]	<input checked="" type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> FREE [1]
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input checked="" type="checkbox"/> EXTENSIVE [-2]
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>			<input type="checkbox"/> RIP/RAP [0]	<input checked="" type="checkbox"/> MODERATE [-1]

NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources 3 or less [0]

Comments: moderate to heavy silt along stream reach

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools. Check ONE (Or 2 & average)

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

Comments: need canopy along both banks, sparse to nearly absent instream

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

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

Comments: channelization at road crossing, low to no sinuosity along stream reach

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

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

Comments: _____

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

Comments: _____

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average)

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

Comments: _____

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

DRAINAGE AREA (~ 1/2 mi²)

% POOL: 20 % GLIDE: 0
 % RUN: 50 % RIFFLE: 30

Comments: _____

A) SAMPLED REACH

Check ALL that apply

- METHOD**
- BOAT
 - WADE
 - L. LINE
 - OTHER
- DISTANCE**
- 0.5 Km
 - 0.2 Km
 - 0.15 Km
 - 0.12 Km
 - OTHER

- CLARITY**
- 1st - sample pass - 2nd
- < 20 cm
 - 20-40 cm
 - 40-70 cm
 - > 70 cm
- SECCHI DEPTH**
- 1st _____ cm
 - 2nd _____ cm
- CANOPY**
- > 85% - OPEN
 - 55% - 85%
 - 30% - 55%
 - 10% - 30%
 - < 10% - CLOSED

CJ RECREATION

AREA DEPTH

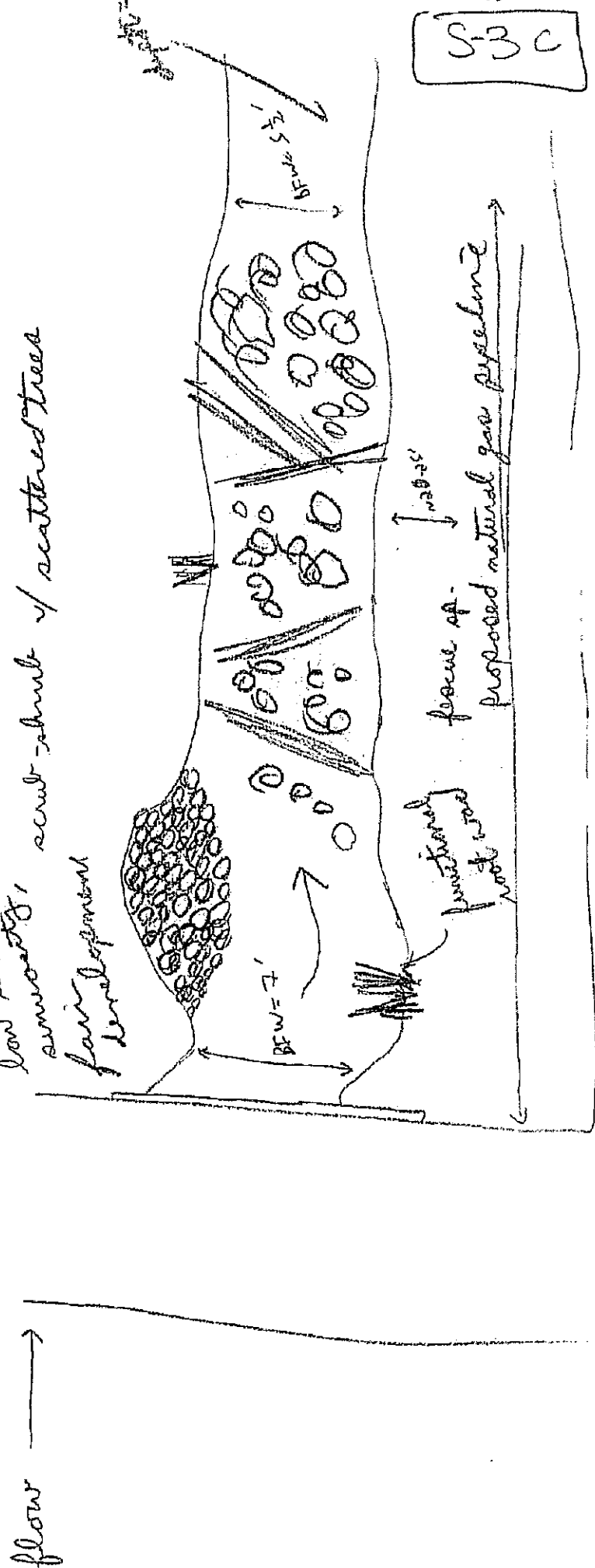
POOL: > 100ft² > 3ft

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

Photograph # 4 (upstream), # 5 (downstream). Moderate amount of silt noted along stream reach. Proposed pipeline will not be crossing this stream at this location, but rather running parallel to it.

BJ AESTHETICS	DJ MAINTENANCE	EJ ISSUES	FJ MEASUREMENTS
<input type="checkbox"/> NUISANCE ALGAE <input type="checkbox"/> INVASIVE MACROPHYTES <input type="checkbox"/> EXCESS TURBIDITY <input type="checkbox"/> DISCOLORATION <input type="checkbox"/> FOAM / SCUM <input type="checkbox"/> OIL SHEEN <input type="checkbox"/> TRASH / LITTER <input type="checkbox"/> NUISANCE ODOR <input type="checkbox"/> SLUDGE DEPOSITS <input type="checkbox"/> CSO / SSO / OUTFALLS	PUBLIC / PRIVATE / BOTH / NA ACTIVE / HISTORIC / BOTH / NA YOUNG-SUCCESSION-OLD SPRAY / SNAG / REMOVED MODIFIED / DIPPED OUT / NA LEVEED / ONE SIDED RELOCATED / CUTOFFS MOVING-BEDLOAD-STABLE ARMORED / SLUMPS ISLANDS / SCOURED IMPOUNDED / DESICCATED FLOOD CONTROL / DRAINAGE	WWTP / CSO / NPDES / INDUSTRY HARDENED / URBAN / DIRT & GRIME CONTAMINATED / LANDFILL BMPs-CONSTRUCTION-SEDIMENT LOGGING / IRRIGATION / COOLING BANK / EROSION / SURFACE FALSE BANK / MANURE / LAGOON WASH H ₂ O / TILE / H ₂ O TABLE ACID / MINE / QUARRY / FLOW NATURAL / WETLAND / STAGNANT PARK / GOLF / LAWN / HOME ATMOSPHERE / DATA PAUCITY	x width x depth max. depth bankfull x width bankfull x depth W/D ratio bankfull max. depth floodprone x width entrench. ratio Legacy Tree:

Stream Drawing:



5-3d



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: **47**

Stream & Location: SOH-CRE-0070 - UT to Sugarwater RM: _____ Date: 04/16/08

DEO Franklin 20" Project Scorers Full Name & Affiliation: Joy Van Strick (GAI)

River Code: _____ STORET #: _____ Lat./ Long.: _____ (NAD 83 - decimal) Office verified location

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

BEST TYPES		POOL RIFFLE	OTHER TYPES		POOL RIFFLE	ORIGIN		QUALITY	
<input type="checkbox"/> BLDR /SLABS [10]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> LIMESTONE [1]	<input checked="" type="checkbox"/> HEAVY [-2]	<input checked="" type="checkbox"/> MODERATE [-1]	Substrate 1.5 Maximum 20
<input type="checkbox"/> BOULDER [9]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> DETRITUS [3]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> TILLS [1]	<input type="checkbox"/> NORMAL [0]	<input type="checkbox"/>	
<input type="checkbox"/> COBBLE [8]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> MUCK [2]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> WETLANDS [0]	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> GRAVEL [7]	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> SILT [2]	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> SAND [6]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> ARTIFICIAL [0]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/>	<input type="checkbox"/>	
<input type="checkbox"/> BEDROCK [5]	<input type="checkbox"/>	<input type="checkbox"/>	(Score natural substrates; ignore sludge from point-sources)			<input type="checkbox"/> RIP/RAP [0]	<input type="checkbox"/>	<input type="checkbox"/>	

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

Comments: over 90% of stream reach consists of silt

2] INSTREAM COVER Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

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

Comments: functional instream cover varies from sparse, to moderate downstream, need canopy grass near crossing

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

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

Comments: location provides habitat

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

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

Comments: eroding pipeline Row and Row maintenance

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	Recreation Potential Primary Contact Secondary Contact (circle one and comment on back)
Check ONE (ONLY)	Check ONE (Or 2 & average)	Check ALL that apply	
<input type="checkbox"/> > 1m [6]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> TORRENTIAL [-1]	Pool / Current Maximum 12 6.5
<input checked="" type="checkbox"/> 0.7-1m [4]	<input checked="" type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> VERY FAST [1]	
<input type="checkbox"/> 0.4-0.7m [2]	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> FAST [1]	
<input type="checkbox"/> 0.2-0.4m [1]		<input type="checkbox"/> MODERATE [1]	
<input type="checkbox"/> < 0.2m [0]		<input type="checkbox"/> INTERSTITIAL [-1]	

Comments: _____

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). NO RIFFLE [metric=0]

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

Comments: _____

6] GRADIENT (~3 ft/mi) VERY LOW - LOW [2-4] MODERATE [6-10] HIGH - VERY HIGH [10-6] %POOL: **45** %GLIDE: **0** %RUN: **45** %RIFFLE: **10** Gradient Maximum 10 **8**

AJ SAMPLED REACH

Check ALL that apply

- METHOD**
- BOAT
 - WADE
 - W/UP
 - L. LINE
 - OTHER
- STAGE**
- 1st - sample pass - 2nd
 - HIGH
 - UP
 - NORMAL
 - LOW
 - DRY
- DISTANCE**
- 0.5 Km
 - 0.2 Km
 - 0.15 Km
 - 0.12 Km
 - OTHER

- CLARITY**
- 1st - sample pass - 2nd
 - < 20 cm
 - 20-40 cm
 - 40-70 cm
 - > 70 cm / CTB
 - SECCHI DEPTH
- CANOPY**
- 1st _____ cm
 - 2nd _____ cm
 - > 85% - OPEN
 - 55% - 85%
 - 30% - 55%
 - 10% - 30%
 - < 10% - CLOSED

- CJ RECREATION**
- AREA DEPTH
 - POOL: > 100R2 > 3R

Comment RE: Reach consistency/Is reach typical of stream? Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.
 Photograph 75 76 (upstream), 77 (downstream), 79 (upstream) # 80 (downstream)
 Stream passes wetland. Adj. access road. Heavy to moderate cut through stream reach

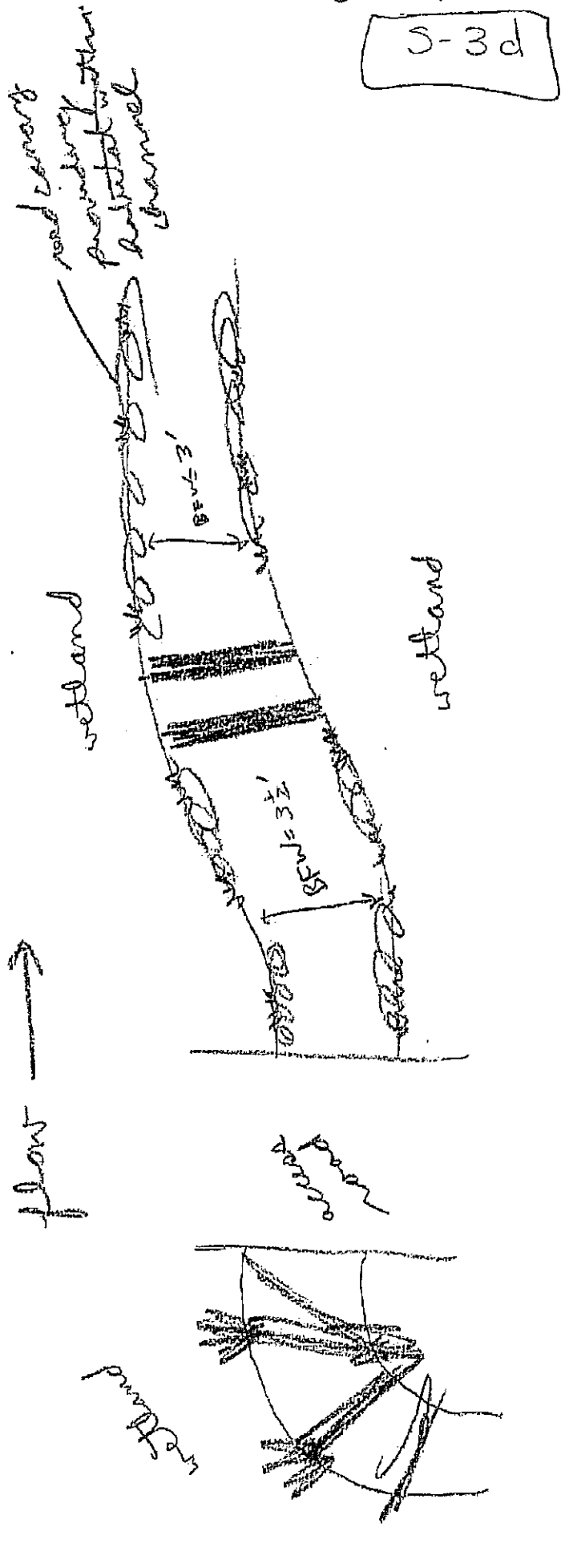
- BJ AESTHETICS**
- NUISANCE ALGAE
 - INVASIVE MACROPHYTES
 - EXCESS TURBIDITY
 - DISCOLORATION
 - FOAM / SCUM
 - OIL / SHEEN
 - TRASH / LITTER
 - NUISANCE ODOR
 - SLUDGE DEPOSITS
 - CSO / SSO / OUTFALLS

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

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

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

Stream Drawing:



Stream & Location: S-7-Tuscarawae River

RM: Date: 4/16/02

DEO Franklin 20" Project Scorers Full Name & Affiliation: Jonathan Shurt (GAI)

River Code: STORET #: Lat./Long.: 18 Office verified location

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

Check ONE (Or 2 & average)

Substrate assessment grid with categories: BEST TYPES, OTHER TYPES, ORIGIN, QUALITY. Includes checkboxes for BLDR/SLABS, BOULDER, COBBLE, GRAVEL, SAND, BEDROCK, etc.

NUMBER OF BEST TYPES: 4 or more [2] sludge from point-sources 3 or less [0]

Comments: Over 75% of stream reach consists of silt

2] INSTREAM COVER Indicate presence 0 to 3; 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts

AMOUNT Check ONE (Or 2 & average)

Instream cover assessment grid with categories: UNDERCUT BANKS, OVERHANGING VEGETATION, SHALLOWS, ROOTMATS, POOLS, ROOTWADS, BOULDERS, OXBOWS, BACKWATERS, AQUATIC MACROPHYTES, LOGS OR WOODY DEBRIS

Comments

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

Channel morphology assessment grid with categories: SINUOSITY, DEVELOPMENT, CHANNELIZATION, STABILITY

Comments

Low sinuosity along this reach, sinuosity appears to increase upstream

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

Bank erosion and riparian zone assessment grid with categories: EROSION, RIPARIAN WIDTH, FLOOD PLAIN QUALITY

Comments

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

Pool/Glide and Riffle/Run quality assessment grid with categories: MAXIMUM DEPTH, CHANNEL WIDTH, CURRENT VELOCITY

Comments

Recreation Potential Primary Contact Secondary Contact

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species; Check ONE (Or 2 & average)

Riffle/run quality assessment grid with categories: RIFFLE DEPTH, RUN DEPTH, RIFFLE / RUN SUBSTRATE, RIFFLE / RUN EMBEDDEDNESS

Comments

6] GRADIENT (~1/2' ft/ml) DRAINAGE AREA (~100 mi^2)

% POOL: 45% % GLIDE: 0% % RUN: 45% % RIFFLE: 10%

Gradient Maximum 10

S-4

36,400

AJ SAMPLED REACH

Check ALL that apply

METHOD

- BOAT
- WADE
- LINE
- OTHER

DISTANCE

- 0.5 Km
 - 0.2 Km
 - 0.15 Km
 - 0.12 Km
 - OTHER
- ~10 meters

CANOPY

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

CJ RECREATION

AREA DEPTH
POOL: >100ft >3ft

STAGE

- HIGH
- SUP
- NORMAL
- LOW
- DRY

CLARITY

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

Comment RE: Reach consistency/ is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.
 Photographs #84 (upstream) and #85 (downstream). RDB consists largely of wetland and woods while the LDB includes residential land use and sloped woods. Moderate to heavy silt load in stream reach.

BJ AESTHETICS

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

DJ MAINTENANCE

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

EJ ISSUES

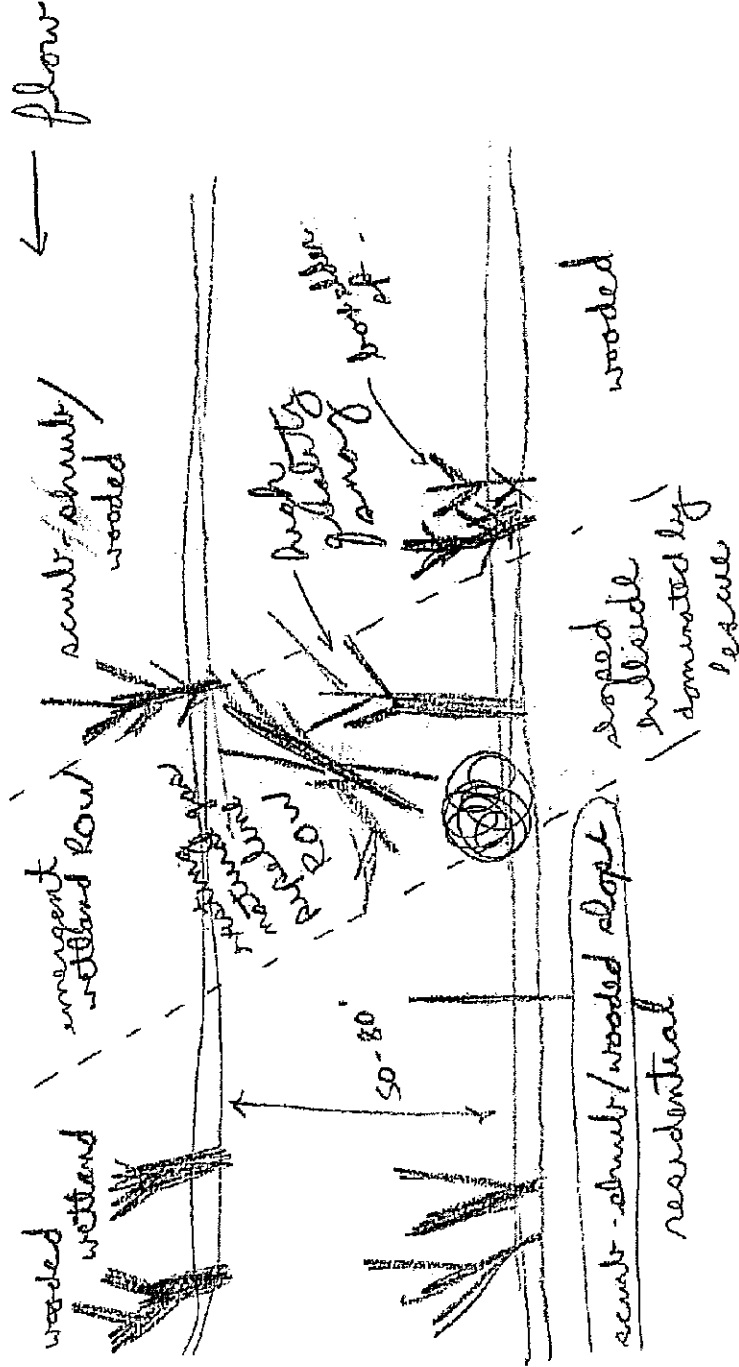
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT & GRIME
- CONTAMINATED / LANDFILL
- BMPs - CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H₂O / TILE / H₂O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT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

FJ MEASUREMENTS

- \bar{x} width
- \bar{x} depth
- max. depth
- \bar{x} bankfull width
- bankfull \bar{x} depth
- W/D ratio
- bankfull max. depth
- floodprone \bar{x} width
- entrench. ratio

Legacy Tree:

Stream Drawing:



S-4

SITE NAME/LOCATION DEO Franklin 20" Project
SOH-CRE-001 SITE NUMBER S-5 RIVER BASIN DRAINAGE AREA (mi²) 4.1
LENGTH OF STREAM REACH (ft) ~130' LAT. LONG. RIVER CODE RIVER MILE
DATE 4/16/08 SCORER JAV(GAT) COMMENTS substrate and riparian removal within ROW

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 [x] 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.

Table with columns: TYPE, PERCENT, TYPE, PERCENT. Rows include BLDR SLABS, BOULDER, BEDROCK, COBBLE, GRAVEL, SAND, SILT, LEAF PACK/WOODY DEBRIS, FINE DETRITUS, CLAY or HARDPAN, MUCK, ARTIFICIAL. Includes sub-totals (A) 6 and (B) 5.

HHEI Metric Points
Substrate Max = 40
11
A + B

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

Table for Maximum Pool Depth with options: >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]. Selected: >5 cm - 10 cm [15 pts].

Pool Depth Max = 30
15

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

Table for Bank Full Width with options: >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]. Selected: >1.0 m - 1.5 m (>3' 3" - 4' 8") [15 pts].

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☆

Table for Riparian Width and Floodplain Quality. Columns: L, R, (Per Bank) for Riparian Width; L, R, (Most Predominant per Bank) for Floodplain Quality. Options include Wide >10m, Moderate 5-10m, Narrow <5m, None, Mature Forest, Wetland, Immature Forest, Shrub or Old Field, Residential, Park, New Field, Fenced Pasture, Conservation Tillage, Urban or Industrial, Open Pasture, Row Crop, Mining or Construction.

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

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check ONLY one box):
[x] 0.5 [] 1.0 [] 2.0 [] 3.0
[] 1.5 [] 2.5 [] >3

STREAM GRADIENT ESTIMATE
[] Flat (0.5 ft/100 ft) [x] 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-5

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: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Summit Township City: Franklin

MISCELLANEOUS

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

Photograph Information: #98 (upstream), #99 (downstream)

Elevated Turbidity? (Y/N): Y Canopy (% open): ~50% → considers cleared Row and woodlot

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

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

Is the sampling reach representative of the stream (Y/N) N If not, please explain: culverting and riparian removal within existing Row

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

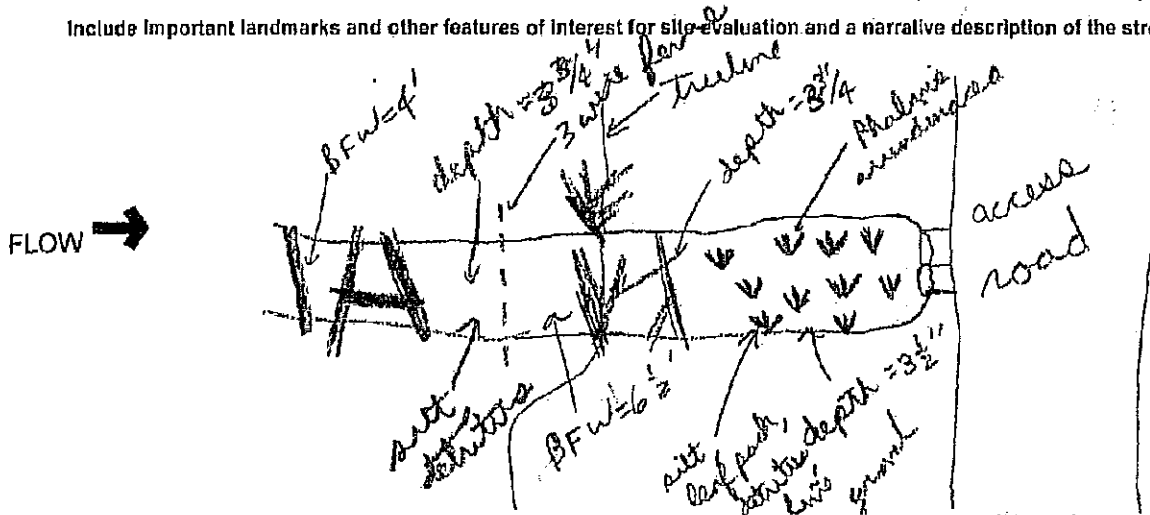
Fish Observed? (Y/N) N Voucher? (Y/N) _____ Salamanders Observed? (Y/N) N Voucher? (Y/N) _____

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

Comments Regarding Biology: observed chironomidae, caddis fly casing, water penny, various mollusca

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 DEO Franklin 20" Project
 SOH-LFS-002 SITE NUMBER S-6 RIVER BASIN _____ DRAINAGE AREA (mi²) 41
 LENGTH OF STREAM REACH (ft) ~200' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 4/17/08 SCORER JAV (GAI) COMMENTS culverting, channelization, and riparian removal

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]	<u>5%</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>35%</u>
<input type="checkbox"/> SAND (<2 mm) [6 pts]	_____	<input type="checkbox"/> ARTIFICIAL [3 pts]	_____

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0% (A) **3** (B) **3**

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

HHEI Metric Points
 Substrate Max = 40
6
 A + B

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

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

COMMENTS max. pool depth is during the crest of this drainage MAXIMUM POOL DEPTH (centimeters): **7 1/2**

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 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 vegetated borders of drainage were not considered in the BFW measurement, only the non-vegetated portion in which AVERAGE BANKFULL WIDTH (meters) **1.3**

Bankfull Width Max=30
5

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

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

COMMENTS adj. emergent wetland fringe is mature pasture.

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):

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: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township / City: Franklin

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: unknown Quantity: unknown
 Photograph Information: #24 (upstream), #25 (downstream)
 Elevated Turbidity? (Y/N): N Canopy (% open): 100%

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

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

Is the sampling reach representative of the stream (Y/N) N If not, please explain: stream appears to be natural or non-modified further upstream and dominates outside of study area
 Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

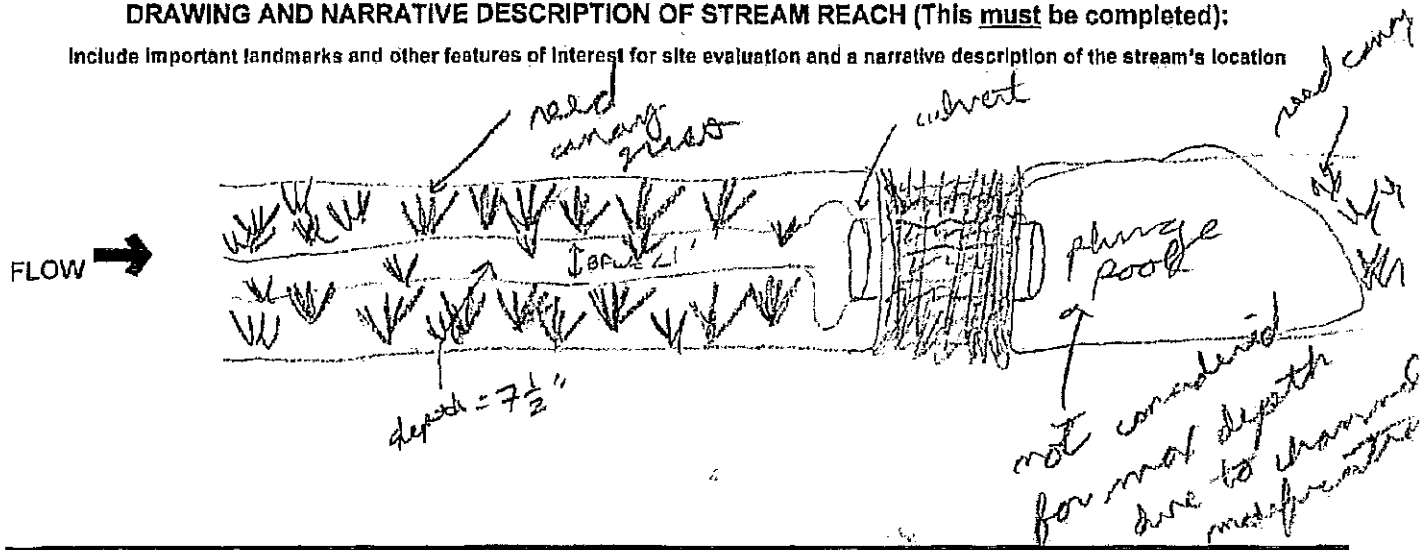
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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



36

SITE NAME/LOCATION DEO Franklin 20" Project SOH-CRE-009 SITE NUMBER S-7a RIVER BASIN DRAINAGE AREA (mi²) 41

LENGTH OF STREAM REACH (ft) ~250' LAT. LONG. RIVER CODE RIVER MILE

DATE 5/22/08 SCORER JAV (GAT) COMMENTS heavy siltation, also natural gas pipelines; exposed pipe in channel

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: * stream would likely score as a Modified Class I stream at base flow conditions.

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.

Table with columns: TYPE, PERCENT, TYPE, PERCENT. Rows include BLDR SLABS, BOULDER, BEDROCK, COBBLE, GRAVEL, SAND, SILT, LEAF PACK/WOODY DEBRIS, FINE DETRITUS, CLAY or HARDPAN, MUCK, ARTIFICIAL.

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

(A) 12

(B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40

1.6

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):

- > 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 not base flow conditions MAXIMUM POOL DEPTH (centimeters): 2 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]

Bankfull Width Max = 30

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): 4.3

This information must also be completed

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

Table with columns: RIPARIAN WIDTH, FLOODPLAIN QUALITY. Rows include Wide >10m, Moderate 5-10m, Narrow <5m, None, Mature Forest, Wetland, Immature Forest, Shrub or Old Field, Residential, Park, New Field, Fenced Pasture, Conservation Tillage, Urban or Industrial, Open Pasture, Row Crop, Mining or Construction.

COMMENTS

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

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

COMMENTS precipitation on 5/21/08; not base flow conditions

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)

S-7a

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: Canal Fraction NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
County: Summit Township: Franklin City: Franklin

MISCELLANEOUS

Base Flow Conditions? (Y/N): N Date of last precipitation: 5/21/08 Quantity: unknown
Photograph Information: # 9-10, etc.
Elevated Turbidity? (Y/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: _____

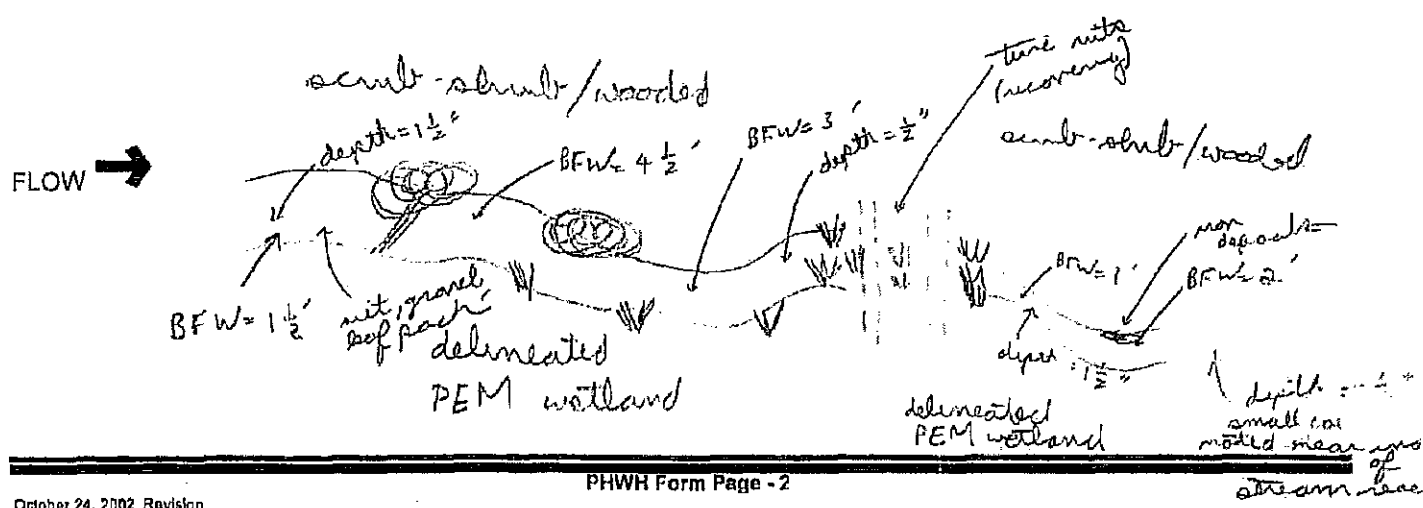
Additional comments/description of pollution impacts: _____

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



depth = 4"
small ear
mold near
of
stream base

S-7

UT to Mimsela Creek



Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 57.75

Stream & Location: SOH-CRE-010 ; S-11 (EIA) RM: _____ Date: 5/22/08
DEO FRANKLIN 20" PROJECT Scorers Full Name & Affiliation: Julie E. Nieset (GAL, Inc.)
 River Code: _____ STORET #: _____ Lat./Long.: _____ 18 _____ Office verified location

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

BEST TYPES		OTHER TYPES		ORIGIN		QUALITY	
<input type="checkbox"/> BLDG / SLABS [10]	<input type="checkbox"/> POOL RIFFLE	<input type="checkbox"/> HARDPAN [4]	<input type="checkbox"/> POOL RIFFLE	<input checked="" type="checkbox"/> LIMESTONE [1]	<input type="checkbox"/> SILT	<input type="checkbox"/> HEAVY [-2]	10 Substrate Maximum 20
<input type="checkbox"/> BOULDER [9]	<u>30</u> <u>30</u>	<input type="checkbox"/> DETRITUS [3]	<input type="checkbox"/> MUCK [2]	<input checked="" type="checkbox"/> TILLS [1]	<input type="checkbox"/> WETLANDS [0]	<input checked="" type="checkbox"/> MODERATE [-1]	
<input type="checkbox"/> COBBLE [8]	<u>30</u> <u>50</u>	<input checked="" type="checkbox"/> SILT [2]	<u>100</u> <u>20</u>	<input type="checkbox"/> HARDPAN [0]	<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> NORMAL [0]	
<input checked="" type="checkbox"/> GRAVEL [7]		<input type="checkbox"/> ARTIFICIAL [0]		<input type="checkbox"/> SANDSTONE [0]	<input type="checkbox"/> RI/RAP [0]	<input type="checkbox"/> FREE [1]	
<input type="checkbox"/> SAND [6]		(Score natural substrates; ignore sludge from point-sources)		<input type="checkbox"/> LACUSTURINE [0]	<input type="checkbox"/> SHALE [-1]	<input type="checkbox"/> EXTENSIVE [-2]	
<input type="checkbox"/> BEDROCK [5]				<input type="checkbox"/> COAL FINES [-2]	<input type="checkbox"/> NONE [1]	<input type="checkbox"/> MODERATE [-1]	

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

Comments: Silt, gravel dominant

2) **INSTREAM COVER** Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

<u>2</u> UNDERCUT BANKS [1]	<u>0</u> POOLS > 70cm [2]	<u>0</u> OXBOWS, BACKWATERS [1]	9 Cover Maximum 20
<u>1</u> OVERHANGING VEGETATION [1]	<u>0</u> ROOTWADS [1]	<u>0</u> AQUATIC MACROPHYTES [1]	
<u>1</u> SHALLOWS (IN SLOW WATER) [1]	<u>0</u> BOULDERS [1]	<u>1</u> LOGS OR WOODY DEBRIS [1]	
<input type="checkbox"/> ROOTMATS [1]			

Comments: _____

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

<input type="checkbox"/> HIGH [4]	<input type="checkbox"/> EXCELLENT [7]	<input checked="" type="checkbox"/> NONE [6]	<input type="checkbox"/> HIGH [3]	13.5 Channel Maximum 20
<input checked="" type="checkbox"/> MODERATE [3]	<input checked="" type="checkbox"/> GOOD [5]	<input checked="" type="checkbox"/> RECOVERED [4]	<input checked="" type="checkbox"/> MODERATE [2]	
<input type="checkbox"/> LOW [2]	<input checked="" type="checkbox"/> FAIR [3]	<input type="checkbox"/> RECOVERING [3]	<input checked="" type="checkbox"/> LOW [1]	
<input type="checkbox"/> NONE [1]	<input type="checkbox"/> POOR [1]	<input type="checkbox"/> RECENT OR NO RECOVERY [1]		

Comments: _____

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

<input type="checkbox"/> NONE / LITTLE [3]	<input checked="" type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> WIDE > 50m [4]	<input checked="" type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> FOREST, SWAMP [3] (PEM)	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	6.75 Riparian Maximum 10
<input checked="" type="checkbox"/> MODERATE [2]	<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NONE [0]	<input type="checkbox"/> WIDE > 50m [4]	<input checked="" type="checkbox"/> MODERATE 10-50m [3]	<input type="checkbox"/> NARROW 5-10m [2]	<input type="checkbox"/> VERY NARROW < 5m [1]	<input type="checkbox"/> NONE [0]	<input checked="" type="checkbox"/> FOREST, SWAMP [3] (PEM)	<input type="checkbox"/> SHRUB OR OLD FIELD [2]	<input type="checkbox"/> RESIDENTIAL, PARK, NEW FIELD [1]	<input type="checkbox"/> FENCED PASTURE [1]	<input type="checkbox"/> OPEN PASTURE, ROWCROP [0]	<input type="checkbox"/> CONSERVATION TILLAGE [1]	<input type="checkbox"/> URBAN OR INDUSTRIAL [0]	<input type="checkbox"/> MINING / CONSTRUCTION [0]	
<input type="checkbox"/> HEAVY / SEVERE [1]	<input type="checkbox"/> NONE [0]															

Comments: (2, 75)

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

<input type="checkbox"/> > 1m [6]	<input type="checkbox"/> 0.7-1m [4]	<input type="checkbox"/> 0.4-0.7m [2]	<input checked="" type="checkbox"/> 0.2-0.4m [1]	<input type="checkbox"/> < 0.2m [0]	<input checked="" type="checkbox"/> POOL WIDTH > RIFFLE WIDTH [2]	<input type="checkbox"/> POOL WIDTH = RIFFLE WIDTH [1]	<input type="checkbox"/> POOL WIDTH < RIFFLE WIDTH [0]	<input type="checkbox"/> TORRENTIAL [-1]	<input checked="" type="checkbox"/> SLOW [1]	<input type="checkbox"/> VERY FAST [1]	<input type="checkbox"/> INTERSTITIAL [-1]	<input checked="" type="checkbox"/> FAST [1]	<input type="checkbox"/> INTERMITTENT [-2]	<input checked="" type="checkbox"/> MODERATE [1]	<input type="checkbox"/> EDDIES [1]	6 Pool / Current Maximum 12

Comments: _____

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: NO RIFFLE [metric=0]

<input type="checkbox"/> BEST AREAS > 10cm [2]	<input checked="" type="checkbox"/> BEST AREAS 5-10cm [1]	<input type="checkbox"/> BEST AREAS < 5cm [metric=0]	<input type="checkbox"/> MAXIMUM > 50cm [2]	<input checked="" type="checkbox"/> MAXIMUM < 50cm [1]	<input type="checkbox"/> UNSTABLE (e.g., Fine Gravel, Sand) [0]	<input type="checkbox"/> NONE [2]	<input type="checkbox"/> LOW [1]	<input checked="" type="checkbox"/> MODERATE [0]	<input type="checkbox"/> EXTENSIVE [-1]	2.5 Riffle / Run Maximum 8

Comments: _____

6) **GRADIENT** (20.8 ft/mi) VERY LOW - LOW [2-4] MODERATE [6-10] HIGH - VERY HIGH [10-6]

DRAINAGE AREA (1.5 mi²) VERY LOW - LOW [2-4] MODERATE [6-10] HIGH - VERY HIGH [10-6]

%POOL: 25 %GLIDE: 5 %RUN: 35 %RIFFLE: 35

Gradient Maximum 10 10

1.1
5280
48
10.1
48 = 20.8
~ 1 1/2 mi²

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

Phytometrics # 16 (Upstream) and # 17 Downstream
 Precipitation on 5/21/08

Exposed pipelines cuts across stream

Heavy siltation in pools

Along an established R=0-W

AJ SAMPLED REACH
 Check ALL that apply

- METHOD**
- BOAT
 - WADE
 - L. LINE
 - OTHER
- DISTANCE**
- 0.5 Km
 - 0.2 Km
 - 0.15 Km
 - 0.12 Km
 - OTHER

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

- CANOPY**
- > 85% - OPEN
 - 55% - 85%
 - 30% - 55%
 - 10% - 30%
 - < 10% - CLOSED

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

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

Circle some & COMMENT

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

- FJ MEASUREMENTS**
- \bar{x} width 12 ft
 - \bar{x} depth 0.25 ft
 - max. depth 0.5 ft
 - \bar{x} bankfull width 18 ft
 - bankfull \bar{x} depth 0.5 ft
 - W/D ratio
 - bankfull max. depth 2.5 ft
 - floodprone \bar{x} width
 - entranch. ratio
 - Legacy Tree:

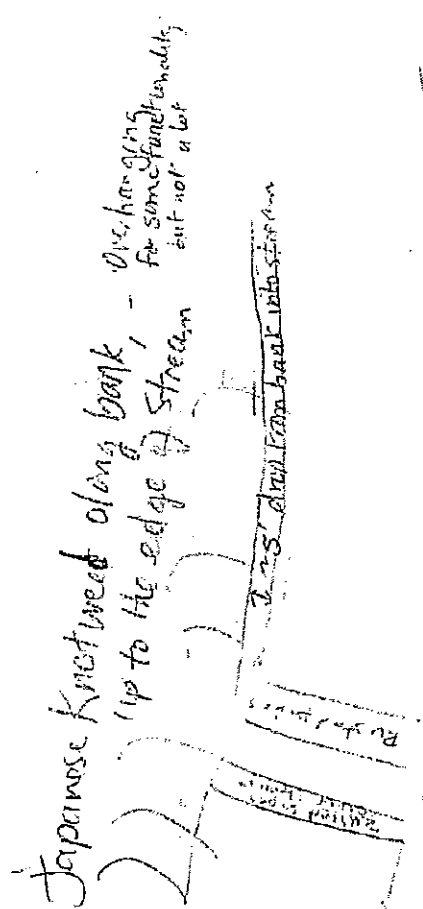
- CJ RECREATION**
- AREA DEPTH
- POOL: > 100 ft > 3 ft

Japanese Knotweed along bank - up to the edge of stream
 Rusted Open Trenched Pipeline Exposed

Stream Drawing:

UP STREAM

DOWN STREAM



Trondrop's along banks of stream

Dominated by Phalaris, up to the edge of the bank - non-invasive

Des dip from bank into stream

Banks slick with silty clay

S-7

5-8

SITE NAME/LOCATION DEO Franklin 20" Project
 SOH-CRE-008 SITE NUMBER 5-8 RIVER BASIN _____ DRAINAGE AREA (mi²) 41
 LENGTH OF STREAM REACH (ft) ~200' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 5/22/08 SCORER JAV (GAI) COMMENTS existing pipeline ROW

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]	<u>3%</u>	<input type="checkbox"/> LEAF PACK/WOODY DEBRIS [3 pts]	<u>5%</u>
<input type="checkbox"/> BEDROCK [16 pt]		<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 pt]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>50%</u>	<input type="checkbox"/> MUCK [0 pts]	
<input type="checkbox"/> SAND (<2 mm) [6 pts]		<input type="checkbox"/> ARTIFICIAL [3 pts]	<u>2%</u>

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ~13%

(A) **12**

(B) **6**

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 type="checkbox"/> NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS isolated pool of 1 1/2"

MAXIMUM POOL DEPTH (centimeters):

1 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)

3'

Bankfull Width Max = 30

5

This information must also be completed

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

RIPARIAN WIDTH

FLOODPLAIN QUALITY

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

COMMENTS

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

<input 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 isolated pool of 1 1/2' due to stream disturbance

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 checked="" 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):

S-8

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: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township: Franklin City: Franklin

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/21/08 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: _____

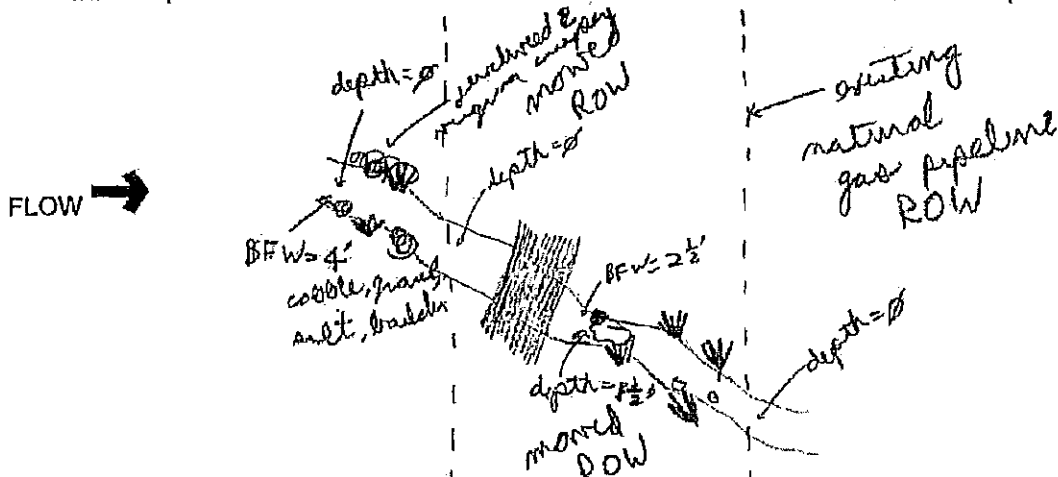
Additional comments/description of pollution impacts: _____

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



S-9
 SITE NAME/LOCATION DEO Franklin 20" Project
 S-12 SITE NUMBER S-9 RIVER BASIN _____ DRAINAGE AREA (mi²) 41
 LENGTH OF STREAM REACH (ft) ~200' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 5/22/08 SCORER JAV(GAI) COMMENTS existing natural gas pipeline ROW

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]	<u>15%</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 type="checkbox"/> BEDROCK [16 pt]		<input type="checkbox"/> FINE DETRITUS [3 pts]	
<input checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>20%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>55%</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 ~25%

(A) 21

(B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate 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]

Pool Depth Max = 30

25

COMMENTS _____

MAXIMUM POOL DEPTH (centimeters):

5 1/2

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]	

Bankfull Width Max=30

15

COMMENTS BFW varies substantially along stream reach from ~1' to ~7'

AVERAGE BANKFULL WIDTH (meters)

1 1/2

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS max pool depth recorded at 5 1/2"

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):

S-9

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: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township: Franklin City: Franklin

MISCELLANEOUS

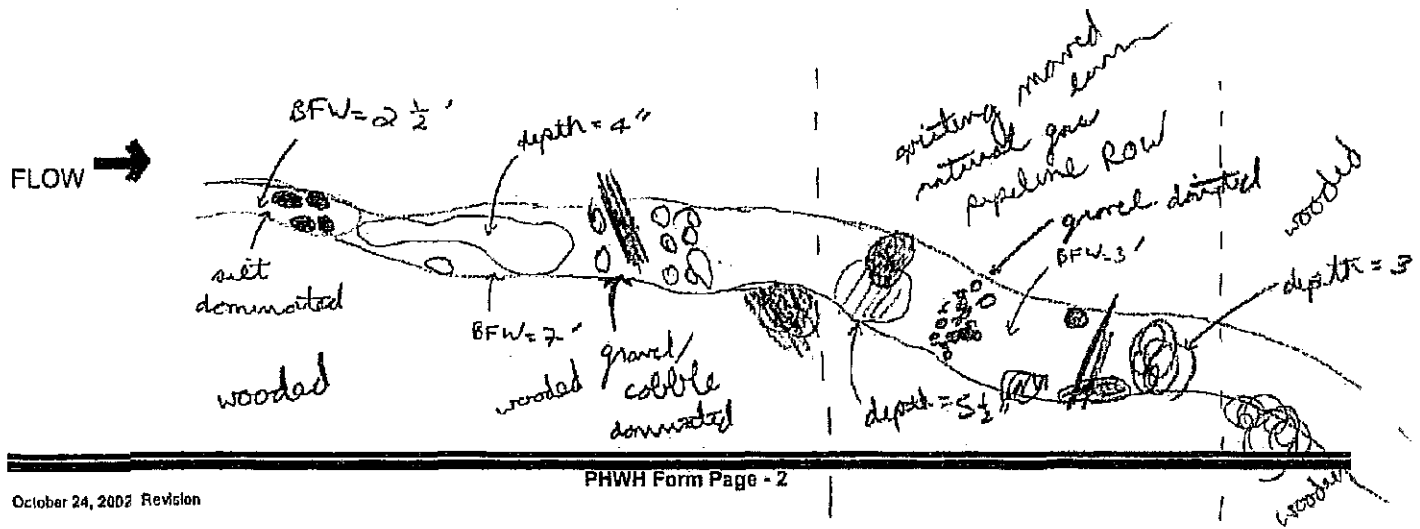
Base Flow Conditions? (Y/N): N Date of last precipitation: 5/21/08 Quantity: unknown
 Photograph Information: yes
 Elevated Turbidity? (Y/N): _____ Canopy (% open): _____
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id, and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N) N If not, please explain: existing pipeline Row
 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



23

S-10a

SITE NAME/LOCATION DEO Franklin 20" Project
SDH-CRE-006 SITE NUMBER S-10a RIVER BASIN DRAINAGE AREA (mi²) 41
LENGTH OF STREAM REACH (ft) ~250' LAT. LONG. RIVER CODE RIVER MILE

DATE 5/22/08 SCORER JAV (GAI) COMMENTS adjacent to existing pipeline ROW, post pipeline rehab

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 [X] 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.

Table with columns: TYPE, PERCENT, TYPE, PERCENT. Includes categories like BLDR SLABS, BOULDER, BEDROCK, COBBLE, GRAVEL, SAND, SILT, LEAF PACK/WOODY DEBRIS, FINE DETRITUS, CLAY or HARDPAN, MUCK, ARTIFICIAL.

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ~12%

(A) 6

reference debris in channel

(B) 7

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):

- > 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

5

COMMENTS MAXIMUM POOL DEPTH (centimeters): 4"

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

5

COMMENTS AVERAGE BANKFULL WIDTH (meters): 3.3'

This information must also be completed

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

Table with columns: RIPARIAN WIDTH, FLOODPLAIN QUALITY. Includes categories like Wide >10m, Moderate 5-10m, Narrow <5m, None, Mature Forest, Wetland, Imature Forest, Shrub or Old Field, Residential, Park, New Field, Fenced Pasture, Conservation Tillage, Urban or Industrial, Open Pasture, Row Crop, Mining or Construction.

COMMENTS

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

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

COMMENTS moist channel, isolated pools

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) [X] Moderate to Severe [] Severe (10 ft/100 ft)

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

S-10a

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 Quadrange Name: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township: Franklin City: Franklin

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/20/08 Quantity: unknown

Photograph Information: yes

Elevated Turbidity? (Y/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 (umhos/cm) _____

Is the sampling reach representative of the stream (Y/N) N If not, please explain: SOH-CRE-0066-5000

Modified Class II stream

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

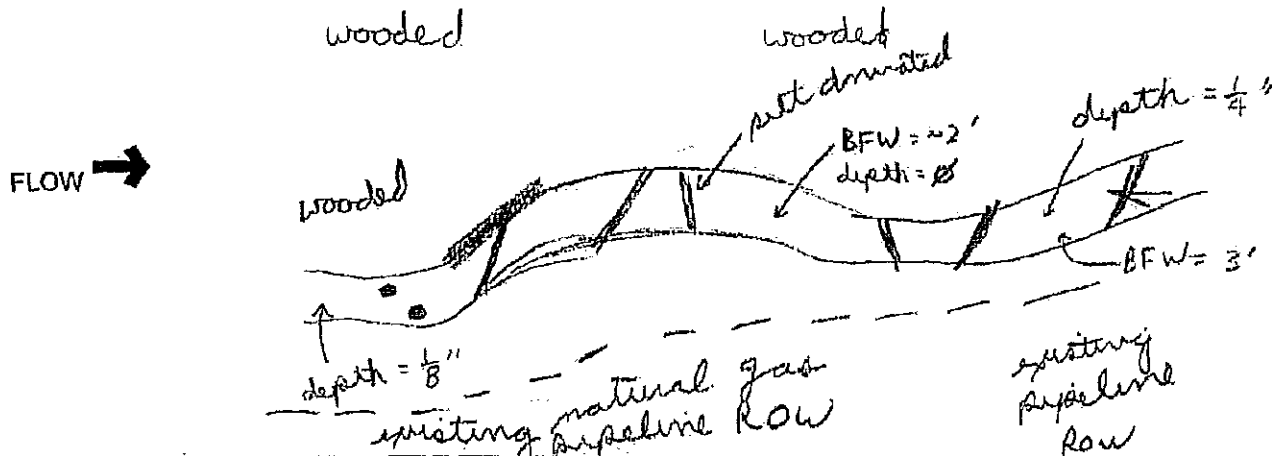
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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) : 22

S-106

SITE NAME/LOCATION DEO Franklin 20' Project
SOH-CRE-006 B SITE NUMBER S-106 RIVER BASIN _____ DRAINAGE AREA (mi²) 1

LENGTH OF STREAM REACH (ft) ~120' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 5/23/08 SCORER JAV (GAI) COMMENTS filling and relocation of channel along upper portion of stream reach with minimum flow

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>50%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>2%</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]	<u>5%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	
<input checked="" type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>33%</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 ~7% (A) 12 (B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: _____ TOTAL NUMBER OF SUBSTRATE TYPES: _____

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

<input type="checkbox"/> > 30 centimeters [20 pts]	<input type="checkbox"/> > 5 cm - 10 cm [15 pts]
<input type="checkbox"/> > 22.5 - 30 cm [30 pts]	<input 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 saturated channel 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 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) ~ 3'

HHEI Metric Points

Substrate Max = 40
17
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	L	R	L	R
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wide >10m		Mature Forest, Wetland		Conservation Tillage	
<input type="checkbox"/>	<input checked="" 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 checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Narrow <5m		Residential, Park, New Field		Open Pasture, Row Crop	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
None		Fenced Pasture <u>by existing ROW</u>		Mining or Construction	

COMMENTS _____

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

<input type="checkbox"/> Stream Flowing	<input checked="" type="checkbox"/> <u>Moist Channel</u> 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):

S-10b

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: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township/City: Franklin

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/22/08 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) N If not, please explain: _____

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

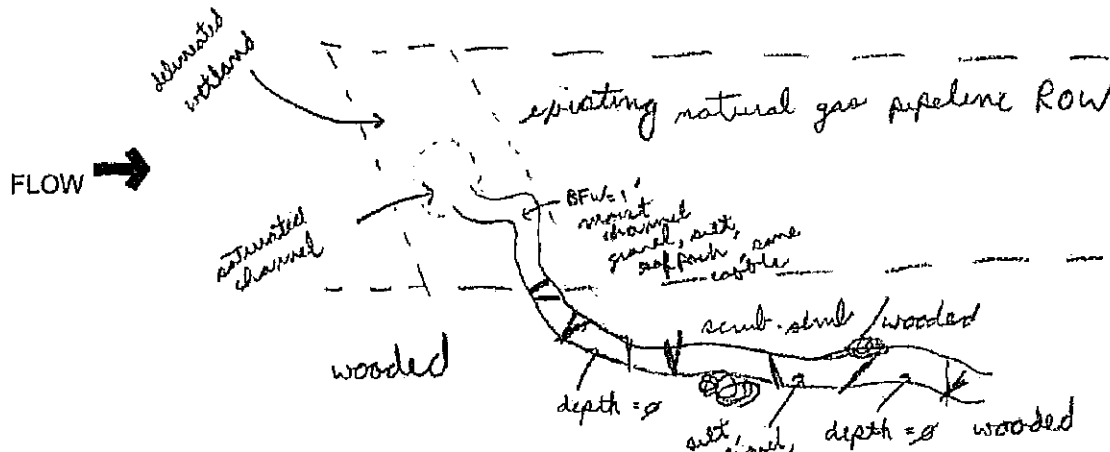
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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

Comments Regarding Biology: _____

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

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



59

SITE NAME/LOCATION DEO Franklin 20" Project
SOH-CRE-006C SITE NUMBER S-10C RIVER BASIN DRAINAGE AREA (mi²) 1.1
LENGTH OF STREAM REACH (ft) ~100' LAT. LONG. RIVER CODE RIVER MILE

DATE 5/23/08 SCORER JAV(GAI) COMMENTS only recovering from past impacts as a consequence of adit base pipeline ROW, severe gradient
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.

Table with columns: TYPE, PERCENT, TYPE, PERCENT. Includes categories like BLDR SLABS, BOULDER, BEDROCK, COBBLE, GRAVEL, SAND, SILT, LEAF PACK/WOODY DEBRIS, FINE DETRITUS, CLAY or HARDPAN, MUCK, ARTIFICIAL.

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock ~70% (A) 28 (B) 6
SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points
Substrate Max = 40
34
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
5

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]

Bankfull Width Max=30
20

COMMENTS AVERAGE BANKFULL WIDTH (meters) ~5 1/2

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

Table for Riparian Width and Floodplain Quality. Includes categories like Wide >10m, Moderate 5-10m, Narrow <5m, None, Mature Forest, Wetland, Immature Forest, Shrub or Old Field, Residential, Park, New Field, Fenced Pasture, Conservation Tillage, Urban or Industrial, Open Pasture, Row Crop, Mining or Construction.

FLOW REGIME (At Time of Evaluation) (Check ONLY one box):
Stream Flowing Moist Channel, isolated pools, no flow (Intermittent)
Subsurface flow with isolated pools (Intersitial) 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):

S-100

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: Conal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township: Franklin City: Franklin

MISCELLANEOUS

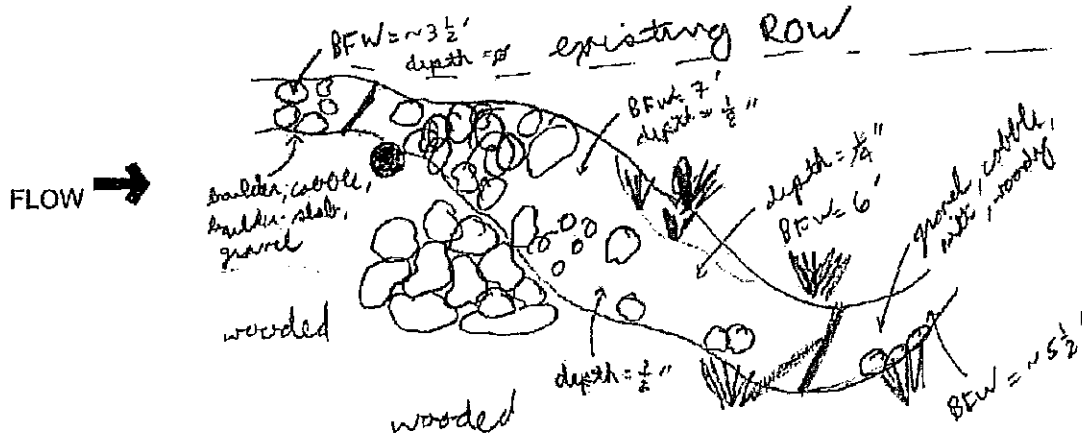
Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/22/08 Quantity: unknown
 Photograph Information: yes
 Elevated Turbidity? (Y/N): N Canopy (% open): _____
 Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N): N If not, please explain: upstream portion of stream reach is a modified class I headwater stream
 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



S-10d

Modified Class II



Primary Headwater Habitat Evaluation Form

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

41

SITE NAME/LOCATION DEO Franklin 20" Project
 SOU-JEN-003 SITE NUMBER S-10d RIVER BASIN _____ DRAINAGE AREA (mi²) 21
 LENGTH OF STREAM REACH (ft) ~120' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____

DATE 5/23/08 SCORER JAV (GAT) COMMENTS stream is slowly recovering from past impacts associated with the pipeline flow

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHW 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>3%</u>	<input checked="" type="checkbox"/> SILT [3 pt]	<u>30%</u>
<input type="checkbox"/> BOULDER (>256 mm) [16 pts]	<u>12%</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 checked="" type="checkbox"/> COBBLE (65-256 mm) [12 pts]	<u>30%</u>	<input type="checkbox"/> CLAY or HARDPAN [0 pt]	_____
<input type="checkbox"/> GRAVEL (2-64 mm) [9 pts]	<u>15%</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 ~45% (A) 15 (B) 6

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

HHEI Metric Points
Substrate Max = 40
21
A + B

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

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

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 3 1/2"

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 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): 3' 3"

Bankfull Width
Max=30
5

This information must also be completed

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

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

S-10d

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: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township/ City: Franklin

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/22/08 Quantity: unknown
 Photograph Information: yes
 Elevated Turbidity? (Y/N): _____ Canopy (% open): _____
 Were samples collected for water chemistry? (Y/N): _____ (Note lab sample no. or id. and attach results) Lab Number: _____
 Field Measures: Temp (°C) _____ Dissolved Oxygen (mg/l) _____ pH (S.U.) _____ Conductivity (µmhos/cm) _____
 Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

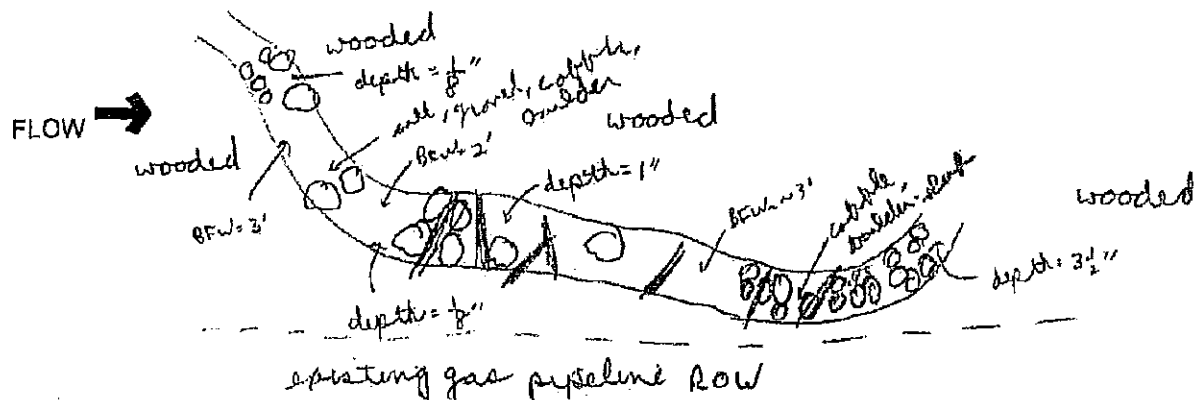
Additional comments/description of pollution impacts: _____

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



77

S-10

SITE NAME/LOCATION DEO Franklin 20" Project
 S-13 SITE NUMBER S-10 RIVER BASIN _____ DRAINAGE AREA (mi²) 21
 LENGTH OF STREAM REACH (ft) ~180' LAT. _____ LONG. _____ RIVER CODE _____ RIVER MILE _____
 DATE 5/23/08 SCORER JAV (GAT) COMMENTS maintained gas pipeline ROW within stream reach, drainage pipe noted upstream

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>2%</u>	<input type="checkbox"/> SILT [3 pt]	<u>10%</u>
<input type="checkbox"/> Boulder (>256 mm) [16 pts]	<u>8%</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]	<u>15%</u>	<input type="checkbox"/> Clay or Hardpan [0 pt]	_____
<input checked="" type="checkbox"/> Gravel (2-64 mm) [9 pts]	<u>25%</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 ~25 (A) **15** (B) **2**

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

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

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

COMMENTS see site sketch for pool location MAXIMUM POOL DEPTH (centimeters): **11"**

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

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

COMMENTS wide BFW noted along stream reach AVERAGE BANKFULL WIDTH (meters) **~10 1/2**

HHEI Metric Points

Substrate Max = 40

22

A + B

Pool Depth Max = 30

30

Bankfull Width Max=30

25

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

<input type="checkbox"/> None	<input type="checkbox"/> 1.0	<input type="checkbox"/> 2.0	<input type="checkbox"/> 3.0
<input checked="" 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-10

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: Canal Fulton NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____
 County: Summit Township City: Franklin

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 5/22/08 Quantity: unknown

Photograph Information: yes

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) N If not, please explain: modified channel due to pipeline crossings

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

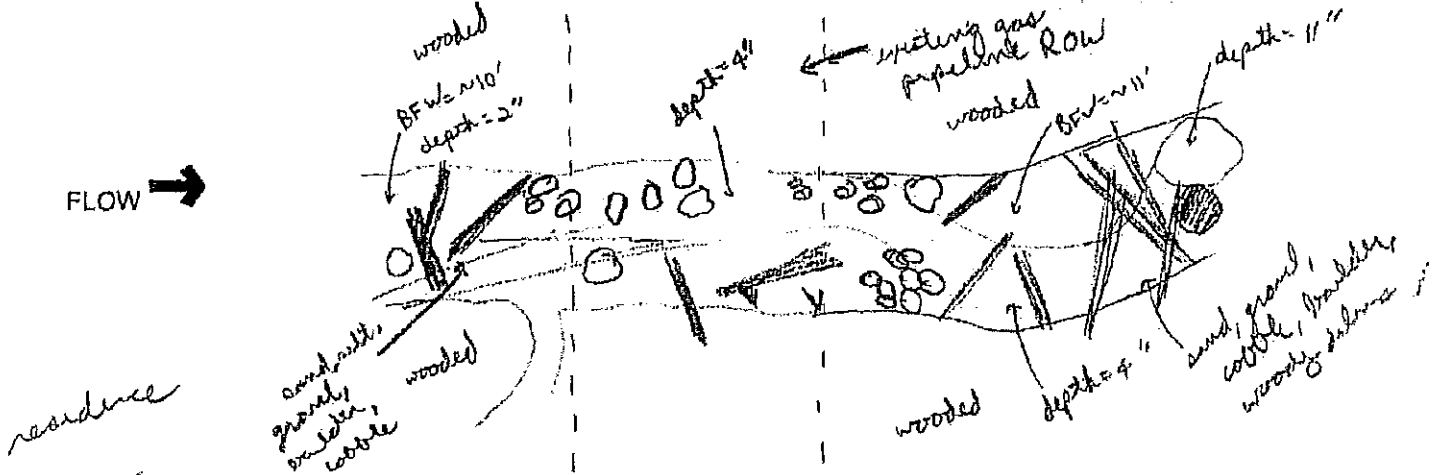
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

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 07-1E

SUPPLEMENTAL PROJECT PHOTOGRAPHS FROM GAI FIELD SURVEYS

SUPPLEMENTAL PROJECT PHOTOGRAPHS FROM GAI FIELD SURVEYS



Photograph 1: Stream S-2a looking northeast.



Photograph 2: Stream S-2b looking southeast.



Photograph 3: Stream S-2c looking northeast.



Photograph 4: Wetland 7c looking northeast.



Photograph 4: Wetland 7d looking west.



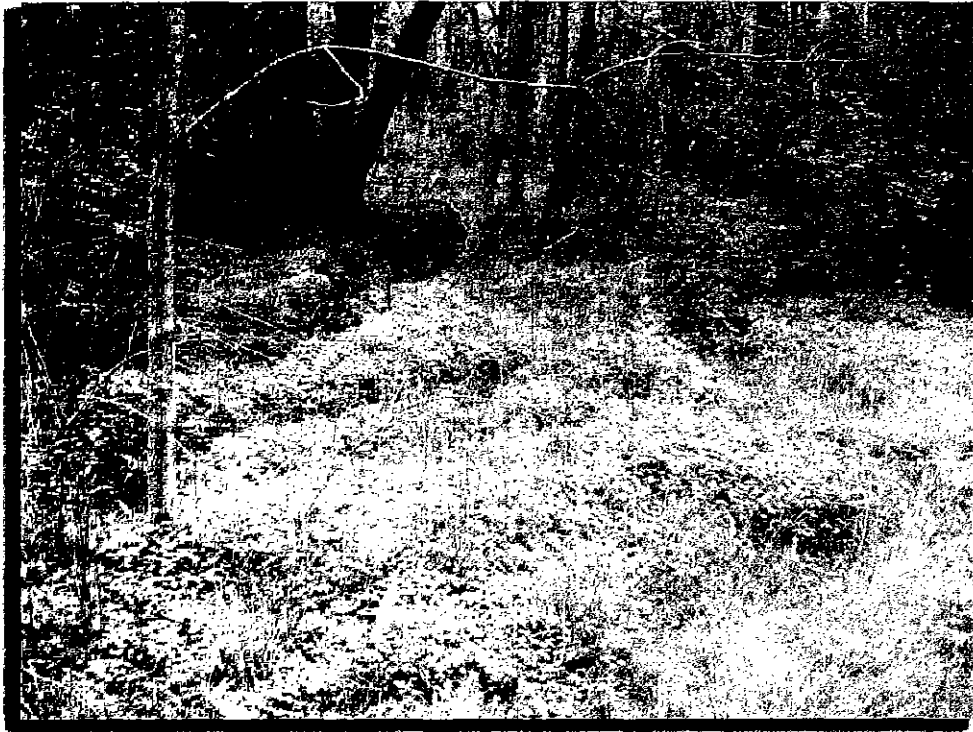
Photograph 5: Wetland 9c looking north.



Photograph 6: Wetland 9d looking south.



Photograph 7: Wetland 10a looking west.



Photograph 8: Wetland 10b looking northeast.



Photograph 9: Wetland 10c looking north.



Photograph 10: Wetland 10d looking south.



Photograph 11: Wetland 11a looking north.

APPENDIX 07-2A
INDIANA BAT HABITAT SURVEY REPORT



July 25, 2008

Corporate Headquarters
1500 North Mantua Street
P.O. Box 5193
Kent, OH 44240-5193
330-673-5685
Toll Free 1-800-828-8312
FAX: 330-673-0860

Mishelle L. Beercheck
Environmental Specialist
GAI Consultants, Inc.
385 East Waterfront Drive
Homestead, Pennsylvania 15120

RE: *Indiana Bat Consulting Services*— Proposed Franklin 20-Inch Storage Pipeline Project, Wayne and Summit Counties, Ohio

Dear Ms. Beercheck:

This letter and the enclosed photographs, map, and data table describe the potential habitat for the Indiana bat (*Myotis sodalis*) identified within the 8.8-mile proposed pipeline site located in Wayne and Summit Counties, Ohio.

David Riddell performed the site inspection on July 16, 21, and 22, 2008. Jessica Hickey and Ken Christensen provided technical oversight. Thirteen potential Indiana bat maternity roost trees were mapped. In addition, other habitat features, such as potential habitat trees, vegetation habitat quality, and potential flight corridors, were described.

STUDY AREA

The site is located within the Doylestown and Canal Fulton Quadrangles of the USGS Topographical 7.5-minute series maps starting west at Latitude: 40.9407°, Longitude: 81.6798° and concluding east at Latitude: 40.9292°, Longitude: 81.5327°. This site contains successional woods, upland old fields, agricultural fields, marsh and wet meadow, lawn and developed area, and disturbed roadside vegetation. The enclosed map depicts property boundaries and vegetation communities.

INDIANA BAT HABITAT SURVEY

Potential Indiana Bat Maternity Roost Trees

Potential Indiana bat maternity roost trees tend to be large-diameter, standing live, dead, and partially dead trees with direct exposure to sunlight. Generally, trees greater than 23 centimeters at breast height are surveyed. Typical characteristics of potential maternity roost trees include exfoliating bark, deadwood, crevices, and cavities.

Thirteen potential Indiana bat maternity roost trees were identified scattered throughout the site (Photographs 1–13). Each potential maternity roost tree was mapped using GPS technology. Table 1 provides a summary of data for each potential maternity roost tree. Refer to the attached maps for locations of these trees.

Potential Indiana Bat Habitat Trees

Potential Indiana bat habitat trees and potential maternity roost trees can possess similar characteristics; however, potential habitat trees are utilized primarily by solitary male bats. Therefore, sunlight exposure and large amounts of exfoliating bark, crevices, or cavities are not as crucial to provide a suitable habitat tree.

There are potential habitat trees (Photograph 14) for the Indiana bat within the project site. The habitat trees located on-site were mostly dead trees and snags receiving minimal sunlight. Several potential habitat trees (Photograph 15) exist adjacent to the site and consist of mostly dead or declining trees with dead wood and crevices.

Flight Corridors and Foraging Areas

The proposed pipeline runs parallel with an existing pipeline which provides a suitable flight corridor (Photograph 16). The adjacent forested parcels consist of successional woods with dense understory providing minimal flight and foraging corridors.

The proposed pipeline intersects the Tuscarawas River (Photograph 17) which provides foraging opportunities. The canopy on-site and directly adjacent is open, thus does not provide a quality enclosed flight corridor. Two additional streams are intersected by the proposed pipeline. These streams are narrow and have dense overhanging vegetation, providing minimal foraging and flight opportunities (Photograph 18).

Vegetation Communities

The site contains successional woods, upland old fields, agricultural fields, marsh and wet meadow, lawn and developed area, and disturbed roadside vegetation. The successional woods (Photograph 19) contain mostly *Acer rubrum* (red maple), *Prunus serotina* (black cherry), *Liriodendron tulipifera* (tulip tree), and *Quercus rubra* (red oak). The successional woods within the proposed pipeline and on adjacent properties are dominated by young tree growth with moderate to dense understory vegetation (Photograph 20). Upland old fields, agricultural fields, lawn and developed area provide little to no habitat for the Indiana bat. A marsh and wet meadow was located east of Cleveland Massillon Road (Photograph 21). Disturbed roadside vegetation communities consist of saplings and thick shrub cover.

Surrounding Areas

The proposed pipeline is surrounded by all of the same vegetation communities that encompass the site. Successional woods, lawn and developed area, and agricultural fields are the dominant vegetation communities adjacent to the site. The majority of the forested communities that were identified within the 2.5-mile radius consist of young growth trees with minimal potential Indiana bat habitat. An aerial photograph showing the site and surrounding areas is included with this letter.

Mishelle L. Beercheck
GAI Consultants, Inc.
July 25, 2008
Page 3 of 3.

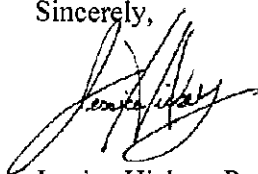
AVOIDANCE AND MINIMIZATION MEASURES

Davey Resource Group does not believe that a mist-net survey of the entire line is necessary to gauge the impact of this project on potential Indiana bat habitat due to the limited amount of quality habitat and flight corridors present. Much of the pipeline will be located in presently cleared areas, along roadsides, and through agricultural fields, and the remaining line will travel through successional woods and dense shrubby vegetation. Thus, fragmentation of high-quality habitat will not occur.

Some of the identified potential Indiana bat maternity roost trees identified fall on the boundary of the right-of-way and these may be avoided during construction. These trees will be clearly marked prior to construction and future maintenance activities to avoid accidental removal. If it becomes necessary to remove the remaining trees, an emergence survey will be conducted prior to removal during the summer survey dates of May 15 through August 15. If bats are not seen utilizing these trees, USFWS will be contacted and these trees will be removed within 24 hours of the conclusion of the survey. Additional tree clearing along this project area will occur in most areas between September 30 and April 1. However, it may be necessary to clear some forested areas during the summer dates due to scheduling. If this occurs, USFWS will be contacted and a study plan will be prepared and sent to USFWS for review and approval. It is the opinion of Davey Resource Group that this project will not likely adversely affect the Indiana bat.

If you have any questions or need additional information regarding the proposed project, please contact me at 800-828-8312, ext. 27 or via e-mail at jhickey@davey.com.

Sincerely,



Jessica Hickey, Project Manager/Biologist
Natural Resource Consulting

Enclosures

cf: Sheri L. Franz, Consulting Engineer, Dominion Gas Environmental Services

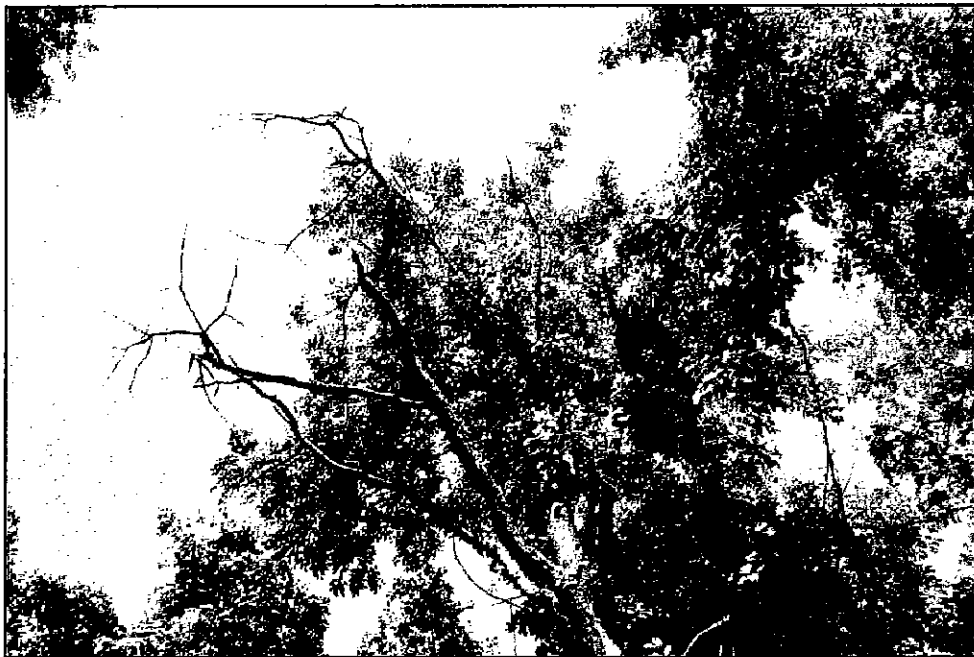
Table 1. Summary of Maternity Roost Tree Data

Tree Number	Tree Species	DBH (Inches)	Condition	Available Sun	Canopy Cover (%)	Roost Tree Characteristics
1	dead tree (unknown)	18	dead	Fair sun	40	dead wood, crevices, cavities
2	<i>Prunus serotina</i>	16	poor	Fair sun	40	dead wood, cavities, crevices
3	<i>Robinia pseudoacacia</i>	13	critical	Good sun	20	dead wood, crevices
4	<i>Prunus serotina</i>	44	critical	Good sun	20	cavities, deadwood
5 (group of 3)	<i>Liriodendron tulipifera</i>	24 (average)	critical	Good sun	30	dead wood, crevices
6	<i>Salix</i> sp.	16	critical	Full sun	<10	dead wood, exfoliating bark, crevices
7	dead tree (unknown)	22	dead	Full sun	< 10	dead wood, cavities, crevices
8	dead tree (unknown)	24	dead	Good sun	20	dead wood, exfoliating bark, crevices
9	dead tree (unknown)	18	dead	Good sun	20	dead wood, cavities
10	<i>Fraxinus pennsylvanica</i>	38	dead	Good sun	30	dead wood, crevices
11 (group of 3)	<i>Fraxinus pennsylvanica</i>	12 (average)	poor	Fair sun	40	dead wood, crevices
12	<i>Quercus rubra</i>	26	critical	Good Sun	30	dead wood, crevices, exfoliating bark
13	<i>Quercus palustris</i>	28	critical	Good sun	30	dead wood, cavities, crevices

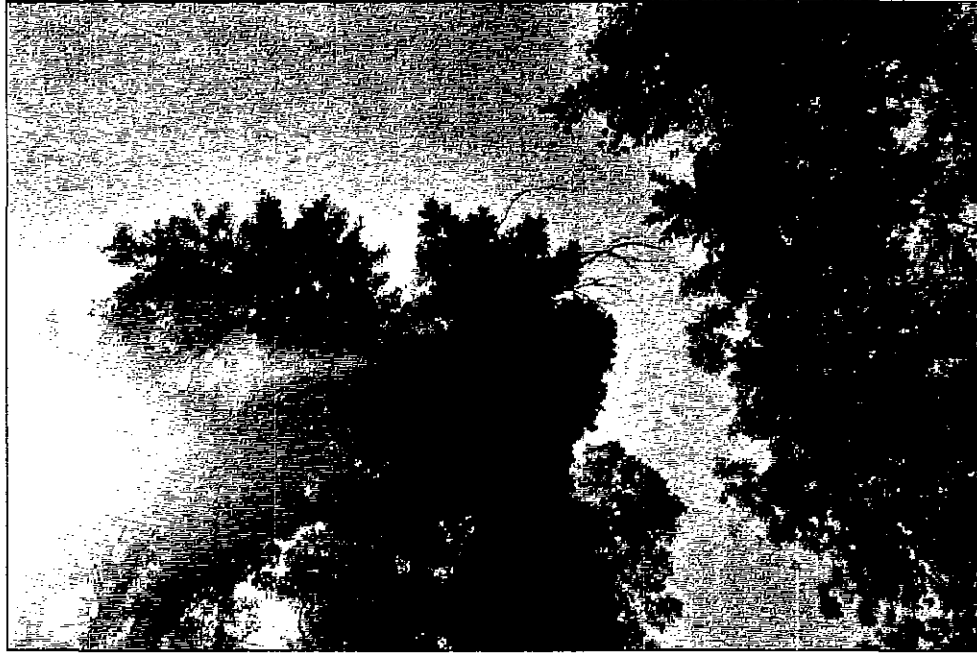
Photographs



Photograph 1 (7-16-08). Tree 1 is a dead tree which exhibits dead wood, crevices, and cavities.



Photograph 2 (7-16-08). Tree 2 is a *Prunus serotina* (black cherry), in poor condition, and exhibiting dead wood, cavities, and crevices.



Photograph 3 (7-16-08). Tree 3 is a *Robinia pseudoacacia* (black locust) receiving good sun and exhibiting dead wood and crevices.



Photograph 4 (7-21-08). Tree 4 is a *Prunus serotina* (black cherry) exhibiting cavities and dead wood.



Photograph 5 (7-21-08). Tree 5 is a group of three *Liriodendron tulipifera* (tulip tree) with dead wood and crevices.



Photograph 6 (7-21-08). Tree 6 is a *Salix* sp. (willow sp.) with crevices, dead wood, and exfoliating bark.



Photograph 7 (7-21-08). Tree 7 is a dead tree with crevices, dead wood, and cavities.



Photograph 8 (7-21-08). Tree 8 is a dead tree with crevices, dead wood, and exfoliating bark.



Photograph 9 (7-21-08). Tree 9 is a dead tree with crevices and dead wood and receiving good sunlight.



Photograph 10 (7-21-08). Tree 10 is a *Fraxinus pennsylvanica* (green ash) exhibiting dead wood and crevices.



Photograph 11 (7-21-08). Tree 11 is a group of three dead *Fraxinus pennsylvanica* (green ash) exhibiting dead wood and crevices.



Photograph 12 (7-21-08). Tree 12 is a *Quercus rubra* (red oak) receiving good sunlight and exhibiting dead wood, crevices, and exfoliating bark.



Photograph 13 (7-22-08). Tree 13 is a *Quercus palustris* (pin oak) with dead wood, cavities, and crevices.



Photograph 14 (7-16-08). Potential habitat trees were identified within the project area. This dead snag does not receive adequate sunlight to support a maternity colony.



Photograph 15 (7-21-08). Potential habitat and maternity trees were identified on adjacent properties. These dead trees were identified north of the proposed pipeline in an upland old field.



Photograph 16 (7-22-08). Limited areas within the existing gas line have adequate canopy cover and create a suitable flight corridor.



Photograph 17 (7-21-08). The proposed pipeline intersects the Tuscarawas River. This portion of the river is surrounded by dense understory, lawn, and successional woods dominated by saplings. Canopy cover over the river is sparse.



Photograph 18 (7-22-08). This small stream is densely covered by overhanging vegetation, preventing a good flight pathway.



Photograph 19 (7-22-08). The adjacent forested communities consisted of successional woods. *Acer rubrum* (red maple) and *Prunus serotina* (black cherry) were the dominant species.



Photograph 20 (7-21-08). The understory is dense and vines cover most of the trees within the successional woods.



Photograph 21 (7-22-08). A marsh and wet meadow was identified east of Cleveland-Massillon Road.

APPENDIX 07-2B

INDIANA BAT EMERGENCE SURVEY REPORT



August 19, 2008

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Mishelle L. Beercheck
Environmental Specialist
GAI Consultants, Inc.
385 East Waterfront Drive
Homestead, Pennsylvania 15120

RE: *Indiana Bat Emergence Survey*—Proposed Franklin 20-Inch Storage Pipeline
Project, Wayne and Summit Counties, Ohio

Dear Ms. Beercheck:

Davey Resource Group completed an emergence survey on August 13 and 14, 2008 on trees identified along the proposed Franklin 20-inch pipeline project in Wayne and Summit Counties, Ohio. Thirteen potential maternity roost trees were identified in total along this corridor during a recent habitat study that Davey Resource Group conducted. Of these thirteen trees, only 8 trees (1,2,3,4,5,9,11, and 12) were determined to be impacted by this project. After discussion of the results with Angela Boyer of U. S. Fish and Wildlife Service, it was determined that an emergence survey of trees to be impacted would be sufficient to determine if removal of those trees would result in an adverse impact to bat populations in the area.

Davey Resource Group biologists sat at their designated trees and watched for bat emergence for at least 1.5 hours. This time-span included at least .5 hour prior to sunset and 1 to 1.5 hours after sunset. During this time, bat activity in the area was noted. Weather conditions on Wednesday were clear to partly cloudy and 67°F. Weather conditions on Thursday were mostly cloudy and 63°F. A recent large storm had passed through the project area on Thursday, but no rain or heavy wind affected the study.

Bats were seen foraging with the open fields and existing gas line around 8:35 pm on Wednesday night by numerous biologists. On Thursday night, bats were seen flying around 8:14 pm. After two days of study, no bats were seen emerging from or interested in the marked maternity roost trees. After contacting USFWS to alert them of the study results, the marked trees were removed on Friday by The Davey Tree Expert Company which was within 24 hours of the study.

Upon review of this information, please let me know if you have any questions.
Thank you.

Sincerely,

Jessica Hickey, Project Manager/Biologist
Natural Resource Consulting

APPENDIX 07-2C

EASTERN MASSASAUGA AND EASTERN HELLBENDER HABITAT SURVEY REPORT



GREGORY LIPPS, LLC

4110 County Road 342 Delta, Ohio 43015 Phone: 419 376,3443 Fax: 419 335,1092 GregLipps@aol.com

Mishelle L. Beercheck
Environmental Specialist
GAI Consultants, Inc.
385 East Waterfront Drive
Homestead, PA 15120

28 July 2008

Re: Surveys of potential habitat for the Eastern Massasauga and Eastern Hellbender along proposed Dominion East Ohio Gas, Franklin 20-inch Storage Pipeline Corridor.

Dear Ms. Beercheck:

This letter is in response to your request for a proposal to conduct habitat assessments for the Eastern Massasauga and the Eastern Hellbender along a proposed pipeline corridor in Ohio. The surveys have been requested by the US Fish and Wildlife Service and Ohio Department of Natural Resources, respectively, as indicated in letters forwarded in your e-mails of 11 June 2008. The project is located within Wayne and Summit counties in Ohio, and consists of a construction corridor extending 30 ft. in either direction from the proposed pipeline centerline.

Methods for Eastern Massasauga habitat assessment

The Eastern Massasauga (*Sistrurus catenatus catenatus*) is a small, stout-bodied rattlesnake that rarely exceeds 3 feet in length. The subspecies ranges from southern Canada, east to New York and Pennsylvania and west to Iowa and Missouri. In Ohio, Massasaugas have been documented throughout the glaciated portion of the state, although populations are disjunct and uncommon.

Massasaugas are tied to open wetland habitats, such as bogs, fens, marshes, wet prairies, and pond margins. Here they hibernate in underground burrows, such as those made by crayfish, and make use of the open canopy to thermoregulate in the spring and summer. Individuals may, however, widely disperse into adjacent upland and forested habitats during the summer months.

The Massasauga has experienced significant declines throughout its range, including in Ohio. The subspecies is listed as endangered by the Ohio Division of Wildlife, and the U.S. Fish and Wildlife Service has named it as a candidate

species for listing under the U.S. Endangered Species Act. Major causes of decline include habitat destruction, degradation, fragmentation, and succession; intentional killing, and over-collecting¹.

Areas that could potentially harbor Eastern Massasaugas along the proposed pipeline corridor were first determined on a landscape scale using aerial photographs, topographic maps, and GIS layers of land use/land cover. The species is unlikely to be found in areas consisting entirely of intensive agriculture, urbanized land, or closed-canopy forests, and these areas were eliminated from further investigation. Landscape scale analysis focused on locating fallow fields, grasslands, and areas of shrub/scrub and adjacent wetlands that could potentially have suitable Massasauga habitat.

Visits to areas identified by the landscape analysis assessed the potential for Eastern Massasauga habitat by examination of the vegetation, hydrology, and structure of areas as they relate to the requirements of the species and their similarities to known occupied sites in the state. Areas supporting Massasaugas typically consist of grassy fields with a mosaic of small, early successional woody species, such as hawthorn (*Crataegus sp.*), dogwood (*Cornus sp.*), multiflora rose (*Rosa multiflora*) or raspberry (*Rubus sp.*). Common herbaceous species associated with Massasaugas may include the sensitive fern (*Onoclea sensibilis*), goldenrod (*Solidago sp.*), partridge pea (*Cassia fasciculata*), cinquefoil (*Potentilla sp.*), strawberry (*Fragaria sp.*), and *Sphagnum*. At each site visited, the dominant vegetation was noted, as well as the presence/absence of suitable wetland areas for overwintering.

In addition to the assessment of the physical habitat, a review of the literature and documented and anecdotal accounts of Massasauga occurrence near the proposed corridor was also conducted.

Methods for Eastern Hellbender habitat assessment

The Eastern Hellbender (*Cryptobranchus alleganiensis*) is one of the world's largest amphibian species, reaching a total length of up to 24 inches. This completely aquatic salamander inhabits well-oxygenated flowing waters where large rocks are available for shelter and nesting. In Ohio, Hellbenders are found only within the Ohio River drainage.

Hellbenders appear to be declining throughout their range, due in part to stream modifications (e.g., dams), collecting, excess siltation, introduced game fish, and pollution. In Ohio, documented occurrences of the species number only 200, and the species is listed as endangered by the Ohio Division of Wildlife. The U.S. Fish and Wildlife Service recently sponsored a review of the status of the Hellbender to determine if "candidate species" listing is warranted².

Areas that could potentially harbor Eastern Hellbenders along the proposed pipeline corridor were first determined on a landscape scale using aerial photographs, topographic maps, and GIS data layers. The species only inhabits perennial lotic water bodies, and only these areas were selected for further review. Visits to these selected areas were made to determine if

appropriate habitat characteristics are present to make the site potentially suitable for supporting Hellbenders. At each site visited, turbidity, siltation, water velocity, and the availability of shelter rocks were qualitatively assessed.

In addition to the assessment of the physical habitat, a review of the literature and documented and anecdotal accounts of Hellbender occurrence near the proposed corridor were conducted.

Results of the Eastern Massasauga habitat assessment

The Eastern Massasauga has been documented to occur in Franklin Township, Wayne County³, and the species is occasionally reported from the Killbuck Marsh Wildlife Area, also located in the southwestern portion of Wayne county. No occurrences of the Eastern Massasauga are known from Chippewa Township in northeastern Wayne County or from Summit County.

One site along the proposed pipeline corridor was visited on 8 July 2008 (Fig. 1). This grassy area is a current pipeline corridor located between Hametown Road (CR 169) and Silver Creek (Rouge Hollow) in Chippewa Township, Wayne County. Reed Canary Grass (*Phalaris* sp.) is the dominant vegetation in this area. It is bordered on the west by an active agricultural field, on the east by a forested hillside, and on the north and south by residences. No areas of wetland vegetation were noted outside of the creek. This area does not appear to provide suitable habitat for the Eastern Massasauga.

Results of the Eastern Hellbender habitat assessment

The Eastern Hellbender has been documented to occur in the Tuscarawas River drainage south of the proposed pipeline corridor⁴. The area where the corridor crosses the Tuscarawas River was visited on 8 July 2008 (Fig. 2). The river at this location (Franklin Township, Summit County) is sluggish and silt-laden, with mud banks and no rocks visible. This site does not provide suitable habitat for the Eastern Hellbender.

I appreciate the opportunity to provide my services to GAI Consultants, Inc. Should you have any questions, or if I can be of any further assistance, please contact me by e-mail (GregLipps@aol.com) or by phone (419-376-3441). Thank you.

Sincerely,

VIA E-MAIL

Gregory Lipps, LLC

-
- ¹ Szymanski, J. 1998. Status assessment for the eastern massasauga (*Sistrurus c. catenatus*). U.S. Fish and Wildlife Service, Endangered Species Division, Fort Snelling, Minnesota, USA.
- ² Mayasich, J., D. Grandmaison, and C. Phillips. 2003. Eastern hellbender status assessment report. Technical report to the U.S. Fish and Wildlife Service, available at: www.fws.gov/midwest/Endangered/amphibians/eahe-sa.pdf
- ³ Conant, R. 1938. The Reptiles of Ohio. *American Midland Naturalist* 20(1):1-200.
- ⁴ Seibert, H. C.. 1989. Hellbender. *In: Salamanders of Ohio*. Eds: R. A. Pflingsten and F. L. Downs. Ohio Biological Survey Bulletin New Series Vol. 7 No. 2.

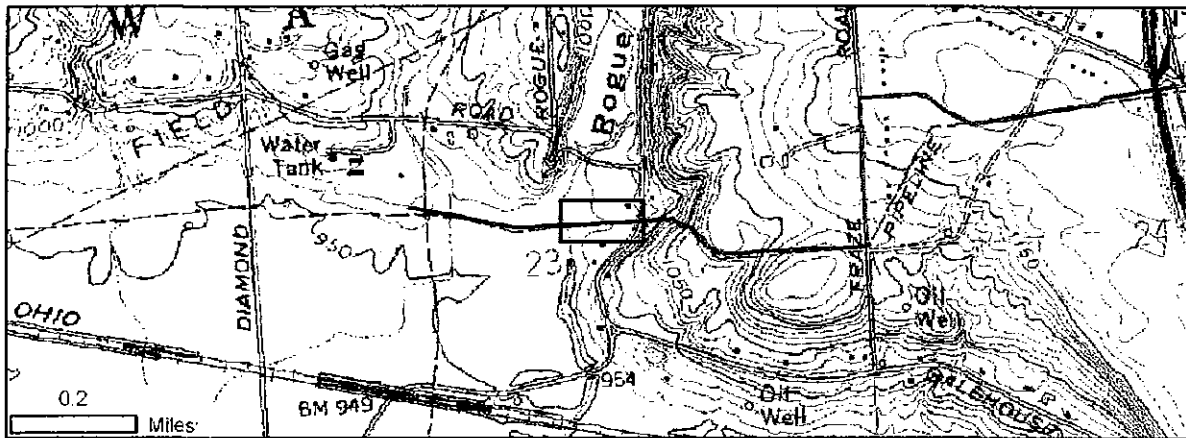


Figure 1. USGS 7.5' topographic map (top), OSIP aerial image (center), and photograph (bottom) of site located between Hametown Road and Silver Creek.

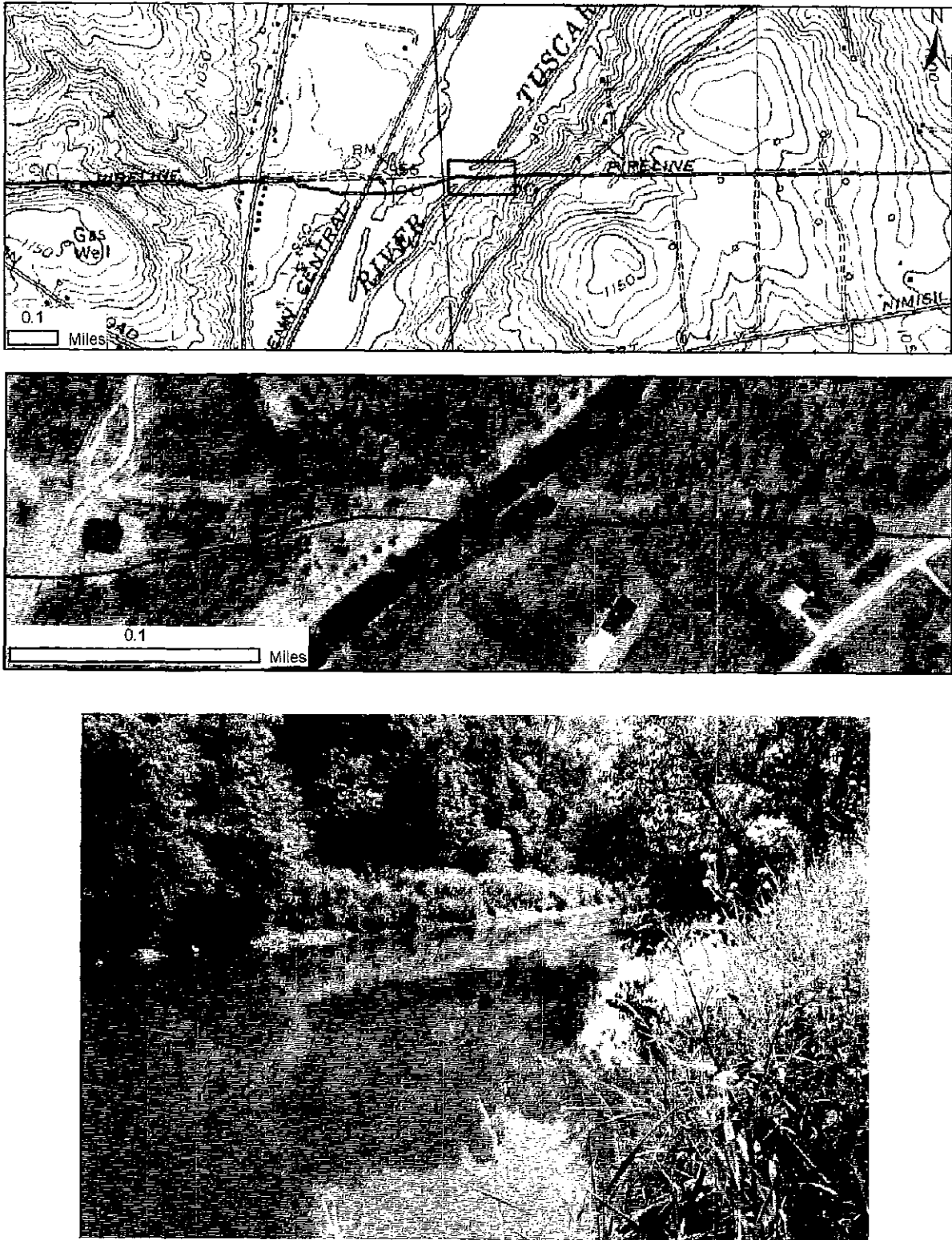


Figure 2. USGS 7.5' topographic map (top), OSIP aerial image (center), and photograph (bottom) of the Tuscarawas River at the proposed pipeline corridor crossing.

APPENDIX 07-2D

**HABITAT ASSESSMENT AND SPECIES SURVEY REPORT FOR THE NORTHERN
MONKSHOOD AND THE EASTERN PRAIRIE FRINGED-ORCHID**

**Habitat Assessment and Species Survey for the
Northern Monkshood (*Aconitum noveboracense*) and the
Eastern Prairie Fringed-Orchid (*Platanthera leucophaea*)**

**Dominion East Ohio Gas
Franklin 20-Inch Storage Pipeline Project
Wayne and Summit Counties, Ohio**

Project C070939.00/C080420.00
August 2008

Submitted By: Dominion East Ohio Gas
7015 Freedom Avenue, N.W.
North Canton, Ohio 44720

Prepared By: GAI Consultants, Inc.
Pittsburgh Office
385 East Waterfront Drive
Homestead, Pennsylvania 15120-5005



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Habitat Assessment and Species Survey for the Northern Monkshood (*Aconitum noveboracense*) and the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
Dominion East Ohio Gas, Franklin 20-Inch Pipeline Project, Wayne and Summit Counties, Ohio

LIST OF FIGURES

<u>Number</u>	<u>Title</u>
1	Topographic Map of Habitat Assessment and Survey Area
2	Aerial Photography Map of Habitat Assessment and Survey Area
3	Aerial Photography Map of <i>P. Leucophaea</i> Presence/Absence Survey Area

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<u>Number</u>	<u>Title</u>
1	Forested habitat along existing ROW at Site A facing south.
2	Forested habitat along existing ROW at Site B facing southeast.
3	Forested habitat at Site B facing east.
4	Forested habitat at Site E facing east.
5	Rock habitat at Site A facing south. Photograph location is outside of Project area.
6	Rock habitat at Site A facing south. Photograph location is outside of Project area.
7	Rock habitat at Site A facing west. Photograph location is outside of Project area.
8	Rock habitat at Site A facing east. Photograph location is outside of Project area.
9	Meadow habitat surveyed for eastern prairie fringed-orchid. Site X facing west.
10	Meadow habitat at Site X surveyed for eastern prairie fringed-orchid.
11	Meadow habitat surveyed for eastern prairie fringed-orchid. Site X facing west.
12	Meadow habitat surveyed for eastern prairie fringed-orchid. Site X facing west.
13	Herbaceous roadside habitat surveyed for eastern prairie fringed-orchid. Site Y facing northwest.
14	Herbaceous roadside habitat surveyed for eastern prairie fringed-orchid. Site Z facing southeast.

Habitat Assessment and Species Survey for the Northern Monkshood (*Aconitum noveboracense*) and the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
Dominion East Ohio Gas, Franklin 20-Inch Pipeline Project, Wayne and Summit Counties, Ohio

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1.0 INTRODUCTION

Dominion East Ohio Gas (Dominion) proposes to install approximately 8.7 miles of 20-inch natural gas pipeline in Chippewa and Franklin Townships of Wayne and Summit Counties, Ohio (OH), respectfully. The proposed work (Project) will follow an existing, maintained pipeline right-of-way (ROW) for most of the Project length and disturbance associated with construction will be limited to 30 feet on either side of the centerline of the pipeline (Figures 1 and 2). The Project will be accessed using existing maintained access roads and the existing ROW.

In compliance with Federal Energy Regulatory Commission regulations, Dominion contacted the appropriate state and federal resource agencies concerning the potential presence of endangered and threatened species in the vicinity of the proposed Project (Endangered Species Act of 1973). Through this coordination process, the United States Fish and Wildlife Service (USFWS) identified that the Project lies within the range of five federally-listed threatened species or species of concern (letter dated May 6, 2008, Appendix A). This report considers two federally-listed threatened plant species. The USFWS indicated that Project elements within Summit County, OH overlap with the range of the northern monkshood (*Aconitum noveboracense*), while Project elements within Wayne County, OH overlap with the range of the eastern prairie fringed-orchid (*Platanthera leucophaea*).

The USFWS requested that Dominion conduct a habitat assessment to determine whether potential habitat for the northern monkshood and the eastern prairie fringed-orchid occurs within the Project area (letter dated May 6, 2008, Appendix A). If potentially suitable habitat for either species was found within the Project area, the USFWS requested that presence/absence surveys be conducted in coordination with the USFWS OH Field Office. Dominion retained GAI Consultants, Inc. (GAI) to conduct a habitat assessment and any necessary presence/absence surveys of the Project elements occurring within the range of both species. This report summarizes the results of those assessments and surveys.

2.0 NORTHERN MONKSHOOD HABITAT AND LIFE HISTORY

2.1 DESCRIPTION AND LIFE HISTORY

The northern monkshood (*Aconitum noveboracense*) is an understory perennial herb with blue hood-like flowers (Gleason and Cronquist, 1991). A member of the buttercup family (*Ranunculaceae*), the species has broad basal leaves with toothed lobes. Multiple flowers are arranged on a terminal raceme on stems that may reach up to 1.5 meters in height. Flowers are approximately 2.5 cm in length with the uppermost sepals distinctly helmet-shaped and the uppermost pair of petals clawed. Flowering occurs between June and September depending upon the geographic location of the population. Bumble bees (*Bombus* spp.) are considered the primary pollinators of the species (Brink, 1982).

Establishment of the species typically occurs by seed, however seed germination is poor and thought to be highly dependent upon cool microclimate conditions (discussed further in Section 2.2). In turn, gene flow between populations is extremely low due to the isolated nature of known populations (Cole and Kuchenreither, 2001; and Dixon and May, 1990). The probability of population expansion is considered highly unlikely throughout the range of the species (Read and Hale, 1983; and Windus and Cochrane, 2000). Propagation of the species has been relatively unsuccessful and transplant survivorship is extremely low (Read and Hale, 1983).

Population decline has predominately been attributed to a litany of common factors including loss of habitat, forest clearing, increased herbivore pressure, invasive species, hydrological shifts, soils and water contamination and scientific collecting (Read and Hale, 1983). Given the already highly specific habitat requirements of the species, it is likely that the negative effect of any additional stressor to population viability will be compounded.

2.2 HABITAT

The range of the northern monkshood spans throughout the southern great lakes region, however, documented populations are few. The greater range of the species runs from Iowa and Wisconsin eastward through OH and into New York (Read and Hale, 1983). Within OH, only Hocking, Portage, and Summit Counties contain known populations (Andreas, 1983). The Hocking Hills Region of Hocking County is considered as the last remaining region within OH thought to potentially contain suitable habitat for the species (Windus and Cochrane, 2000). The species requires cool rocky locations. Typically the species is found growing in or near cracks in cliffs, rock outcrops, talus slopes and rock faces along wooded streams and low-light ravines. The species requires cool soil and air temperatures in order to maintain a low temperature high humidity microclimate. Therefore, the area must be highly protected from direct sun, be temperature regulated by cold air or water, and have constantly cool soil conditions (6 to 18° C).

3.0 EASTERN PRAIRIE FRINGED-ORCHID HABITAT AND LIFE HISTORY

3.1 DESCRIPTION AND LIFE HISTORY

The eastern prairie fringed-orchid (*Platanthera leucophaea*) is a long-lived (up to 30 years) perennial herb in the orchid (*Orchidaceae*) family (Gleason and Cronquist, 1991). This large and showy orchid species was historically found throughout the southern great lakes region extending east to west from Maine to Iowa, and found as far south as Oklahoma (USFWS, 1999). The species is characterized by a large single upright ramet capable of reaching approximately 100 cm in height. The inflorescence is typically 8 to 20 cm in length and forms a terminal raceme containing up to 40 creamy white flowers (Rhoads and Block, 2000). Leaves are alternate, elliptical to lance-shaped and sheath the stem, becoming progressively larger toward the base and reaching up to 20 cm in length. Flowers are characterized by a deeply three-lobed and fringed lip with small lance-shaped bracts (Rhoads and Block, 2000).

Flowers typically bloom in late June and early July. The species is pollinated by moths of the Sphingidae Family. Large sphinx moths are thought to be the primary pollinators, however, a handful of hawk moth species have also been documented as potential pollinators (Sheviak and Bowles, 1986). Flowering is sporadic and individual plants often producing only a single basal leaf over the course of a growing season. Dormancy is not uncommon and is thought to be initiated by the onset of drought conditions and terminated by wildfires; however, little definitive data exists to support or refute these assertions (Bowles, 1983). Establishment typically occurs by seed, as vegetative reproduction is rare.

Disturbance and mycorrhizal associations are considered key elements necessary for successful colonization of new habitat patches (Hadley and Pegg, 1989; and Stoutamire, 1974).

Population decline has predominately occurred due to habitat conversion of one form or another. Historically, the conversion of prairie and meadow for intensive agricultural purposes is thought to have initiated widespread population decline (USFWS, 1989). More recently, the conversion of habitat due to development, wetland drainage, reforestation, and invasive species has continued to contribute to population decline (USFWS, 1999).

3.2 HABITAT

The eastern prairie fringed-orchid typically occurs in various mesic prairie, sedge meadow, shrub/prairie complex, roadside ditch, marsh, peat bog, and wet graminoid-dominated shrub and forest understory habitats (USFWS, 1999, and Sarena Selbo, USFWS, personal communication). The likelihood of the species occurring within these habitats varies primarily according to soil substrate conditions (Case, 1987). Overall, the species is highly dependent upon early- to mid-successional plant communities with moist, open, high-light conditions. These conditions may be maintained by natural disturbance regimes, significant groundwater flow maintaining grass-sedge patches, or grazing (USFWS, 1999).

The species prefers plant communities of small stature, presumably to promote the location of the inflorescence by potential pollinators (USFWS, 1999). Although habitat disturbance and fire, as previously mentioned, may play an important role in maintaining the long-term viability of these populations, additional disturbance such as herbivore damage or repeated mowing is thought to result in limited ramet production, dormancy, and mortality (Case, 1987).

Within OH, known populations are found in lake plain prairies, wet roadside ditches, sedge meadows, shrub/prairie complexes, and wet graminoid-dominated shrub and forest understories (USFWS, 1999; and Sarena Selbo, USFWS, personal communication). In Wayne County, known eastern prairie fringed-orchid populations occur near the Project area (USFWS, 1999; and Sarena Selbo, USFWS, personal communication). Within the Project area it is presumed that (1) wet prairies, (2) sedge meadows, (3) wet roadside ditches, (4) shrub/prairie complexes, and (5) wet graminoid-dominated shrub and forest understories are considered suitable local habitat based upon the geographic location, substrate type, and habitat characteristics of known populations within the vicinity.

4.0 SURVEY METHODOLOGY

The identification of potential habitat for the northern monkshood and the eastern prairie fringed-orchid and was conducted in June 2008. Initial identification of potential habitat was made based on review of aerial photography (Ohio Geographically Referenced Information Program, 2006) and United States Geologic Survey (USGS) quadrangles (USGS, 1978a and 1978b). Based on this review, specific areas of concern were then further evaluated based upon environmental data collection and photographs of each site obtained during previous environmental investigations conducted throughout 2007 and 2008. Additional field views of (1) areas identified as potential habitat based upon previously collected data and (2) areas with insufficient data to rule out the occurrence of either species were conducted on June 23 and 24, 2008.

4.1 NORTHERN MONKSHOOD HABITAT CRITERIA

Potential northern monkshood habitat within Summit County, OH was initially identified based upon the following criteria:

- Steep sloping forested areas were identified on aerial photography and topographic maps. Field data, including photographs, collected during previous environmental investigations were utilized to determine if rock outcrops, cliffs or talus slopes were present within the Project area. Open, cleared and gently sloping areas were not considered as potential habitat.

4.2 EASTERN PRAIRIE FRINGED-ORCHID HABITAT CRITERIA

Potential eastern prairie fringed-orchid habitat within Wayne County, OH was initially identified based upon the following criteria:

- Mesic Prairie/Sedge-Dominated Meadows/Shrub-prairie Complexes: Low, open areas not currently in row crop production were identified on aerial photography, topographic maps, and field photographs. These criteria were utilized to locate suitable mesic-prairie/sedge-dominated meadow/shrub-prairie habitat locations. Non-forested habitat within or downslope from documented (Ohio Department of Natural Resources, 2008; and USFWS, 2008) or delineated wetland habitat was also identified based upon the assumption that these areas are likely to be mesic- or wet-prairie communities as a result of the upslope wetland hydrology. Densely forested areas were removed from consideration. In addition, cleared non-woody plant communities dominated by herbaceous forb species (e.g. *Solidago* and *Aster* spp.) were also removed from consideration because the eastern prairie fringed-orchid is not found in habitats dominated by these tall, competitive species.
- Wet Roadside Ditches: Roadside ditches and all Project road crossings were identified from field visits and field photographs for further inspection to determine if roadside ditches present within the Project area constituted suitable habitat.

- **Graminoid-dominated Forest Understories:** Forested areas with a patchy or broken canopy cover were identified on aerial photography maps, topographic maps, and field photographs. Forested areas with patchy or broken canopies are the most likely to have a graminoid-dominated understory. Forested areas with a dense or contiguous canopy cover were removed from consideration because graminoid-dominated understories do not establish or survive long in these light-depauperate environments.

4.3 GROUND-TRUTHING AND PRESENCE/ABSENCE SURVEYS

Based upon these criteria, each qualifying area was then further evaluated to determine if potential habitat was present within the Project area. Initial ground-truthing efforts were conducted as part of an overall environmental survey of the Project area, beginning in 2007. Where supplementary information was needed, additional site visits were used to confirm the presence of habitat for both species. If confirmed, the habitat location was mapped for future survey. Habitat assessments and species surveys were conducted by Mr. Henry B. Schumacher and Mr. Anthony J. Baumert of GAI, who were approved for habitat assessments and species surveys by the USFWS (Appendix A, phone log dated June 4, 2008).

All graminoid-dominated habitat identified in Wayne County was examined for the presence/absence of the eastern prairie fringed-orchid on July 9, 2008 by Mr. Schumacher and Mr. Baumert of GAI (Appendix B). All sites identified in the habitat assessment with potentially suitable habitat for the eastern prairie fringed-orchid were thoroughly searched for the presence/absence of the species (see Section 5.2). Surveyors systematically walked the proposed ROW, searching all of the area identified as potentially suitable habitat for the presence of eastern prairie fringed-orchids in flower.

5.0 RESULTS

This section discusses those areas that have been preliminarily identified as potential habitat for both the northern monkshood and the eastern prairie fringed-orchid based on review of aerial photography, mapping, and on-ground field views. Where necessary, this section also discusses presence/absence species surveys in the Project area.

5.1 SUMMIT COUNTY - NORTHERN MONKSHOOD

5.1.1 Habitat Assessment

The majority of the habitat traversed by the Project area in Summit County consists of open herbaceous fields and roadsides, croplands, residential lawns, and small woodlots across a gently sloping landscape (Figures 1 and 2). Five areas were identified from previous environmental field assessments and reviews of aerial photography and topographic maps to be sloping, wooded areas (Figures 1 and 2). These five areas were assessed by the surveyors to determine the suitability of the habitat for the northern monkshood (Figures 1 and 2, Sites A through E). No other Project areas within Summit County contained suitable habitat for the northern monkshood because all other Project areas were (1) open, herbaceous habitats, (2) flat or gently sloping areas, or (3) residential or agricultural areas (Figures 1 and 2). The overstory of the five sites identified was dominated by American beech (*Fagus grandifolia*), red oak (*Quercus rubra*), bitternut hickory (*Carya cordiformis*), sugar maple (*Acer saccharum*), and tulip poplar (*Liriodendron tulipifera*), while the mid-story/sapling layer was dominated by these same species in addition to ironwood (*Carpinus caroliniana*) and witch hazel (*Hamamelis virginiana*). The understory of these five sites was primarily comprised of poison ivy (*Toxicodendron radicans*), garlic mustard (*Alliaria petiolata*), Virginia creeper (*Parthenocissus quinquefolia*), spotted St. Johnswort (*Hypericum punctatum*), and dames rocket (*Hesperis matronalis*) in the higher light areas. The understory in the more shaded areas contained spicebush (*Lindera benzoin*), *Trillium* spp., hairy Solomon's seal (*Polygonatum pubescens*), hay-scented fern (*Dennstedtia punctilobula*), and may-apple (*Podophyllum peltatum*). Four of the five sites had a gently sloping topography (Figure 1, Sites B through E) with little deep shade and no large rock outcrops or talus slope (Photographs 2 through 4). These sites had relatively high light availability in the understory as a result of the prior removal of trees and woody vegetation along the existing ROW. Due to the gently sloping nature, high light availability, and lack of rocks or talus slopes, Sites B through E do not represent suitable habitat for the northern monkshood. At Site A there were no deeply shaded rock outcrops or steep talus slopes within the Project area, and the existing ROW was dominated by the herbaceous woodland species listed above (Photograph 1). However, to the south of the Project area, approximately 45 to 70 feet outside the existing ROW, there are large boulders along the forested hillside that may represent suitable habitat for the northern monkshood (Photographs 5 through 8). These boulders lay approximately 100 to 150 feet from the treeline to the south and there are no springs, seeps, or streams in the immediate vicinity. This area will not be affected by the Project. Based on this habitat assessment, potentially suitable habitat is not present within the Project area in Summit County, OH. Potentially

suitable habitat may be present in the vicinity of the Project area at Site A. However, this habitat is outside of the Project area, therefore, presence/absence surveys for the northern monkshood are not recommended.

5.1.2 Species Survey

No species presence/absence surveys were conducted for the northern monkshood as potentially suitable habitat does not occur within the Project area.

5.2 WAYNE COUNTY - EASTERN PRAIRIE FRINGED-ORCHID

5.2.1 Habitat Assessment

In Wayne County, the open, herbaceous habitat in the Project area is primarily comprised of herbaceous grass/sedge meadow and residential, maintained lawns. The residential lawns do not provide suitable habitat and were excluded from further review. The meadow habitat (Photographs 9 through 14) was common throughout the majority of the existing ROW in Wayne County, had a maximum vegetation height ranging from 2.5 to 4.5 feet tall, and was dominated by graminoid species with frequent occurrences of forbs. The vegetation of the meadow consisted of an overstory dominated by orchard grass (*Dactylis glomerata*), Timothy grass (*Phleum pratense*), and reed canary grass (*Phalaris arundinacea*), with a subdominant overstory component of Canada goldenrod (*Solidago canadensis*), lance-leaved goldenrod (*Euthamia graminifolia*), rough-stemmed goldenrod (*Solidago rugosa*), common yarrow (*Achillea millefolium*), spotted joe-pye weed (*Eupatorium maculatum*), and multiflora rose (*Rosa multiflora*). The understory of the meadow habitat was comprised of poison ivy (*Toxicodendron radicans*), tall buttercup (*Ranunculus acris*), soft rush (*Juncus effusus*), red clover (*Trifolium pratense*), oxeye daisy (*Chrysanthemum leucanthemum*), field hawkweed (*Hieracium pratense*), white ash (*Fraxinus americanus*) seedlings, English plantain (*Plantago lanceolata*), green bulrush (*Scirpus atrovirens*), fringed sedge (*Carya crineda*), shallow sedge (*C. lurida*), and fox sedge (*C. vulpinoida*). Graminoid-dominated meadows represent suitable habitat for the eastern prairie fringed-orchid (USFWS, 1999; and Sarena Selbo, USFWS, personal communication). The herbaceous grass/sedge meadow habitats surveyed represent potentially suitable habitat for the eastern prairie fringed-orchid (Photographs 9 through 14).

Specifically, there are three sections of the Project area within Wayne County that were determined to warrant presence/absence surveys (Sites X, Y, and Z, Figures 1 and 2). These three sections cover approximately 1 mile of the ROW, with approximately 7.5 acres total survey area within the 60-foot wide ROW (Figure 3).

5.2.2 Species Survey

A systematic walk-through survey of the entire survey area was conducted at Sites X, Y, and Z, totaling 7.5 acres (Figure 3). No individuals of the eastern prairie fringed-orchid were found in the Project area (Appendix C).

6.0 CONCLUSIONS

The results of this habitat assessment identified no potentially suitable habitat for the northern monkshood within the Project area in Summit County, OH. Potentially suitable habitat for the northern monkshood may exist in the vicinity of the Project area at Site A (Photographs 3 and 4, Figures 1 and 2), however, as the location of this habitat falls outside of the Project area, additional surveys for this species are not recommended.

Potentially suitable habitat for the eastern prairie fringed-orchid does exist within the Project area. Graminoid-dominated meadow habitat exists along the Project ROW at three sites in Wayne County (Figure 3, Photographs 9 through 14). As requested by the USFWS, presence/absence surveys were conducted for the eastern prairie fringed-orchid at these three sites on July 9, 2008, covering approximately 7.5 acres. No eastern prairie fringed-orchids were found during an intensive walk-through survey of Sites X, Y, and Z.

Based on the results of these habitat assessments and species surveys, no impacts to the northern monkshood or eastern prairie fringed-orchid are anticipated as a result of the Project. The scope of this survey is limited to the areas affected by the Project as described herein. USFWS review and concurrence is requested on the results and conclusions of this habitat assessment and presence/absence survey by the USFWS.

Should you have any questions or require additional information, please feel free to contact us at 412-476-2000.

Respectfully submitted,
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AJB:HSB:SEG/hmm
0842000t001-hass-hbs/dominion d5

7.0 REFERENCES

- Andreas, B. K. 1983. Status report on *Aconitum noveboracense* in Ohio, report to the Ohio Department of Natural Resources, Columbus, Ohio.
- Bowles, M. L. 1983. The tallgrass prairie orchids *Platanthera leucophaea* (Nutt.) Lindl. and *Cypripedium candidum* Muhl. Ex Willd.: Some aspects of their status, biology, and ecology, and implications toward management. *Natural Areas Journal* 3(4) 14-37.
- Brink, D. 1982. Tuberous *Aconitum* (Ranunculaceae) of the continental United States: morphological variation, taxonomy and disjunction. *Bull. Torr. Bot. Club* 109:13-23.
- Case, F. W. 1987. *Orchids of the western Great Lakes region, revised edition*. Cranbrook Institute of Science Bulletin 48, Bloomfield Hills, Michigan.
- Cole, C. T. and M. A. Kuchenreuther. 2001. Molecular markers reveal little genetic differentiation among *Aconitum noveboracense* and *A. columbianum* (Ranunculaceae) populations. *American Journal of botany* 88(2):337-347.
- Dixon, P. M. and B. May. 1990. Genetic diversity and population structure of a rare plant northern monkshood (*Aconitum noveboracense*). *New York State Museum Bulletin* 471:167-175.
- Gleason, H. A. and A. Cronquist. 1991. *Manual of Vascular Plants of the Northeastern United States and Adjacent Canada. Second Edition*. New York Botanical Garden, Bronx, New York.
- Hadley, G. and G. F. Pegg. 1989. *Host-Fungus relationships in orchid mycorrhizal systems*. In: *Modern Methods in Orchid Conservation: The Role of Physiology, Ecology and Management*. H. W. Pritchard, Editor. Cambridge University Press, Cambridge, England. p 5-71.
- Ohio Department of Natural Resources. 2008. *Ohio Wetland Inventory*. <https://dnr.state.oh.us/dnap/wetland/mapping/tabid/1002/Default.aspx>. Accessed April 2008.
- Ohio Geographically Referenced Information Program. 2006a. Stark, Summit, and Wayne Counties.
- Read, R. H. and J. B. Hale. 1983. Recovery Plan for the Northern Monkshood (*Aconitum noveboracense*). Report for the U.S. Fish and Wildlife Service.
- Rhoads, A. F. and T. A. Block. 2000. *The Plants of Pennsylvania: An Illustrated Manual*. University of Pennsylvania Press, Philadelphia

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Dominion East Ohio Gas, Franklin 20-Inch Pipeline Project, Wayne and Summit Counties, Ohio

Sheviak, C. J. and M. L. Bowles. 1986. *The prairie fringed orchids: a pollinator-isolated species pair*. *Rhodora* 88:267-290.

Stoutamire, W. P. 1974. *Terrestrial orchid seedlings*. In: *The orchids: Scientific studies*. C.C. Withner, Editor. John Wiley and Sons, New York, New York. pp. 101-128

United States Fish and Wildlife Service. 1989. *Endangered and threatened wildlife and plants: Determination of threatened status for eastern and western prairie fringed orchids: Final rule*. *Federal Register* 54 (187): 39857-39862.

United States Fish and Wildlife Service. 1999. Eastern prairie fringed orchid *Platanthera leucophaea* (Nutt.) Lindl. Recovery Plan. Report to the U.S. Fish and Wildlife Service.

United States Fish and Wildlife Service. 2008. *National Wetlands Inventory*. <http://www.fws.gov/nwi/>. Accessed April 2008.

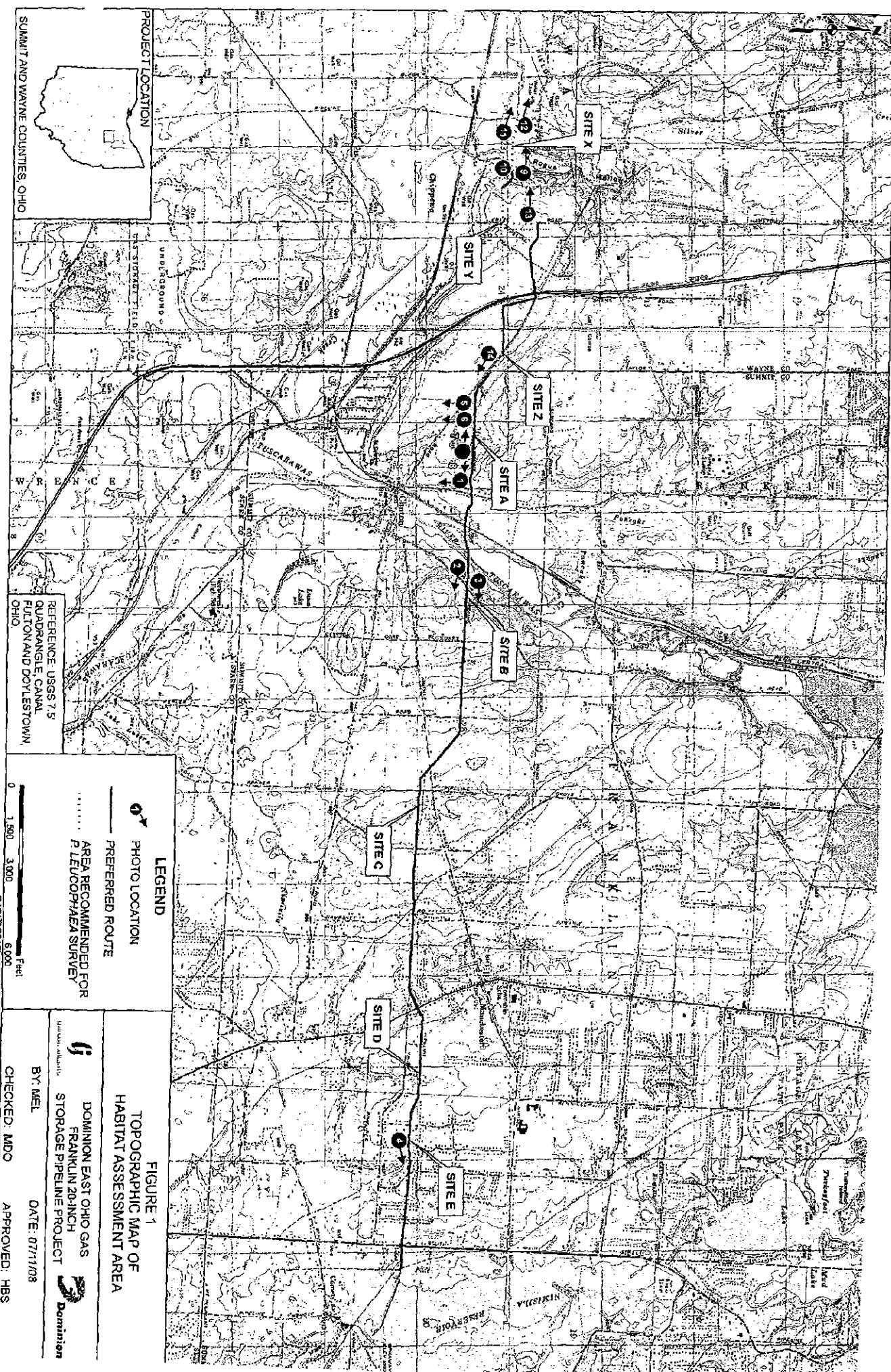
United States Geological Survey. 1978a. 7.5-Minute Quadrangle, Canal Fulton, Ohio.

United States Geological Survey. 1978b. 7.5-Minute Quadrangle, Doylestown, Ohio.

Windus, J. L. and K. E. Cochrane. 2000. Monitoring, research and restoration activities for Ohio populations of northern monkshood (*Aconitum noveboracense*): 1997-1999, a final report for the U.S. Fish and Wildlife Service, Reynoldsburg, Ohio.

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Dominion East Ohio Gas, Franklin 20-Inch Pipeline Project, Wayne and Summit Counties, Ohio

FIGURES



SUMMIT AND WAYNE COUNTIES, OHIO

PROJECT LOCATION

REFERENCE USGS 7.5 QUADRANGLE, CANAL FULTON AND DOYLESTOWN, OHIO

LEGEND

- PHOTO LOCATION
- PREFERRED ROUTE
- AREA RECOMMENDED FOR PLEISTOCENE SURVEY

FIGURE 1
TOPOGRAPHIC MAP OF HABITAT ASSESSMENT AREA

DOMINION EAST OHIO GAS FRANKLIN 20-INCH STORAGE PIPELINE PROJECT

BY: MEL DATE: 07/11/08

CHECKED: MDO APPROVED: HBS

DOMINION

P:\PI\T2307\CO\03539 00\GIS\topo\fig1\PHOTO_LOCATION_SITES_TOPO_BSIZE_071008.mxd



PROJECT LOCATION

SUMMIT AND WAYNE COUNTIES, OHIO

REFERENCE: OHIO
GEOGRAPHICALLY
REFERENCED
INFORMATION PROGRAM
STARK, SUMMIT AND WAYNE
COUNTIES, OHIO, 2005.

LEGEND

- PHOTO LOCATION
- PREFERRED ROUTE
- AREA RECOMMENDED FOR
P. leucophaea SURVEY
- COUNTY BOUNDARY

0 1,500 3,000 6,000 Feet

FIGURE 2
AERIAL PHOTOGRAPHY MAP OF
HABITAT ASSESSMENT AREA

DOMINION EAST OHIO GAS
FRANKLIN 20-INCH
STORAGE PIPELINE PROJECT

BY: MEL DATE: 07/11/08

CHECKED: MDO APPROVED: HBS



PROJECT LOCATION

SUMMIT AND WAYNE COUNTIES, OHIO

REFERENCE:
OHIO GEOGRAPHICALLY
REFERENCED
INFORMATION PROGRAM,
SUMMIT AND WAYNE
COUNTIES, OHIO, 2006.

LEGEND

- PHOTO LOCATION
- WETLAND
- PREFERRED ROUTE
- AREA RECOMMENDED FOR P. LEUCOPHAEA SURVEY
- FORESTED AREA
- RESIDENTIAL LAWN
- CORNFIELD
- COUNTY BOUNDARY

0 375 750 1,500 Feet

FIGURE 3

AERIAL PHOTOGRAPHY MAP OF P. LEUCOPHAEA PRESENCE/ABSENCE SURVEY AREA

DOMINION EAST OHIO GAS
FRANKLIN 20-INCH
STORAGE PIPELINE PROJECT

BY: MEL DATE: 07/11/2008

CHECKED: MDO APPROVED: HBS

Habitat Assessment and Species Survey for the Northern Monkshood (*Aconitum
noveboracense*) and the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
Dominion East Ohio Gas, Franklin 20-Inch Pipeline Project, Wayne and Summit Counties, Ohio

PHOTOGRAPHS

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Photograph 1. Forested habitat along existing ROW at Site A facing south.



Photograph 2. Forested habitat along existing ROW at Site B facing southeast.

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Photograph 3. Forested habitat at Site B facing east.



Photograph 4. Forested habitat at Site E facing east.

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Photograph 5. Rock habitat at Site A facing south. Photograph location is outside of Project area.



Photograph 6. Rock habitat at Site A facing south. Photograph location is outside of Project area.

Habitat Assessment and Species Survey for the Northern Monkshood (*Aconitum noveboracense*) and the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
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Photograph 7. Rock habitat at Site A facing west. Photograph location is outside of Project area.



Photograph 8. Rock habitat at Site A facing east. Photograph location is outside of Project area.

Habitat Assessment and Species Survey for the Northern Monkshood (*Aconitum noveboracense*) and the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
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Photograph 9. Meadow habitat surveyed for eastern prairie fringed-orchid. Site X facing west.



Photograph 10. Meadow habitat at Site X surveyed for eastern prairie fringed-orchid.

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Photograph 11. Meadow habitat surveyed for eastern prairie fringed-orchid. Site X facing west.



Photograph 12. Meadow habitat surveyed for eastern prairie fringed-orchid. Site X facing west.

Habitat Assessment and Species Survey for the Northern Monkshood (*Aconitum noveboracense*) and the Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
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Photograph 13. Herbaceous roadside habitat surveyed for eastern prairie fringed-orchid. Site Y facing northwest.



Photograph 14. Herbaceous roadside habitat surveyed for eastern prairie fringed-orchid. Site Z facing southeast.