Large Filing Separator Sheet

Case Number: 09-1066-EL-BGN

File Date: 12/21/09

Section: 6

Number of Pages: 200

Description of Document: Application

Prairie Creek

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S014CA	WATERBODY NAME: Prairie Creek
SITE NAME: Blue Creek	
DATE: 10/15/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: AF RH	ROVER FILE: / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO:

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	4 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 25 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	4 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY MEANDERING

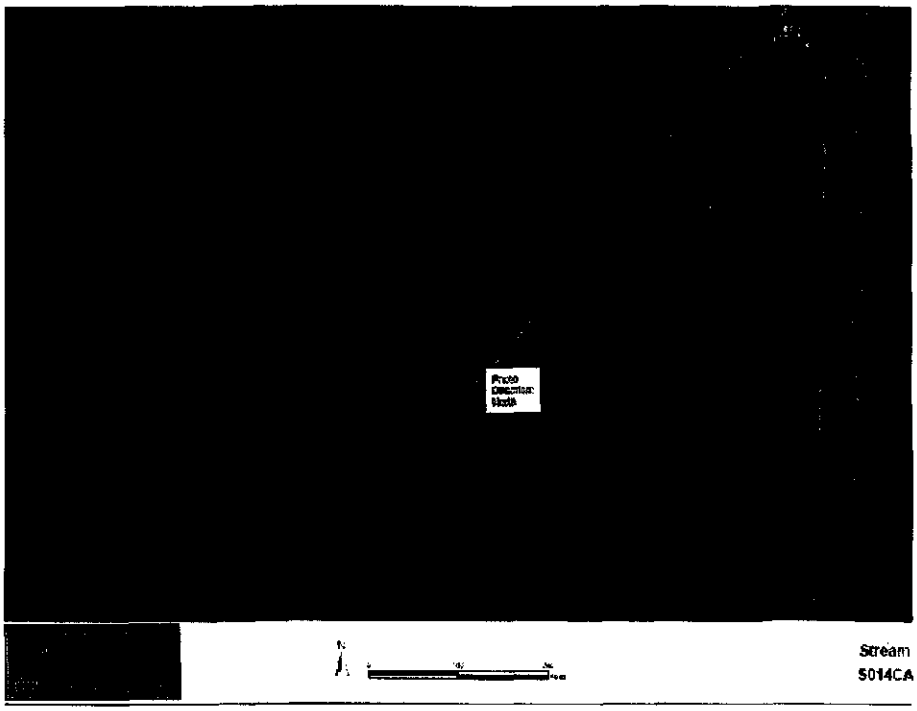
COMMENTS

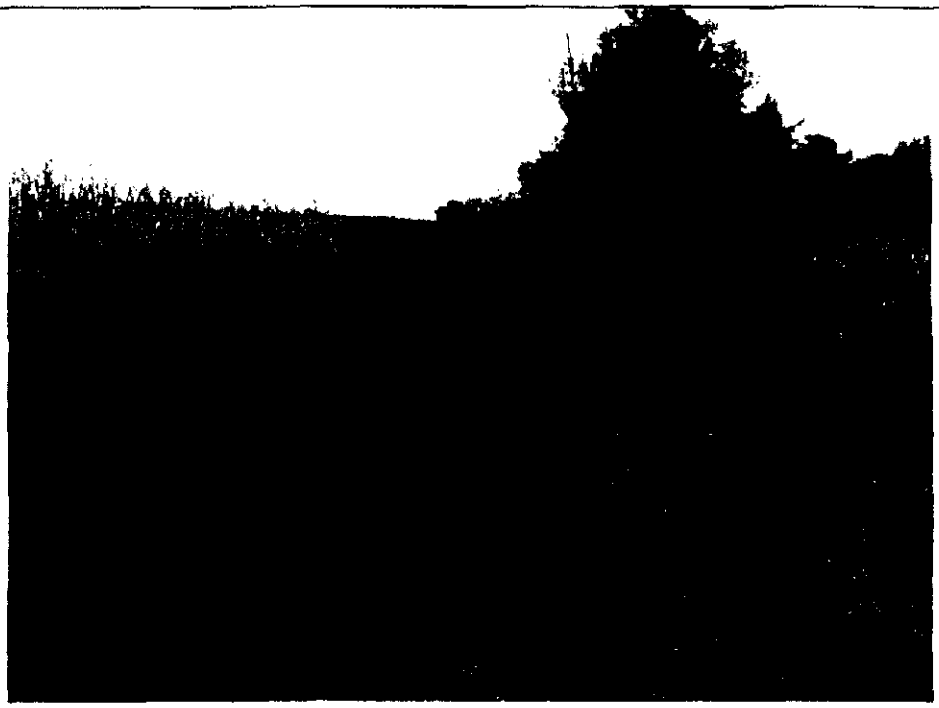
STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

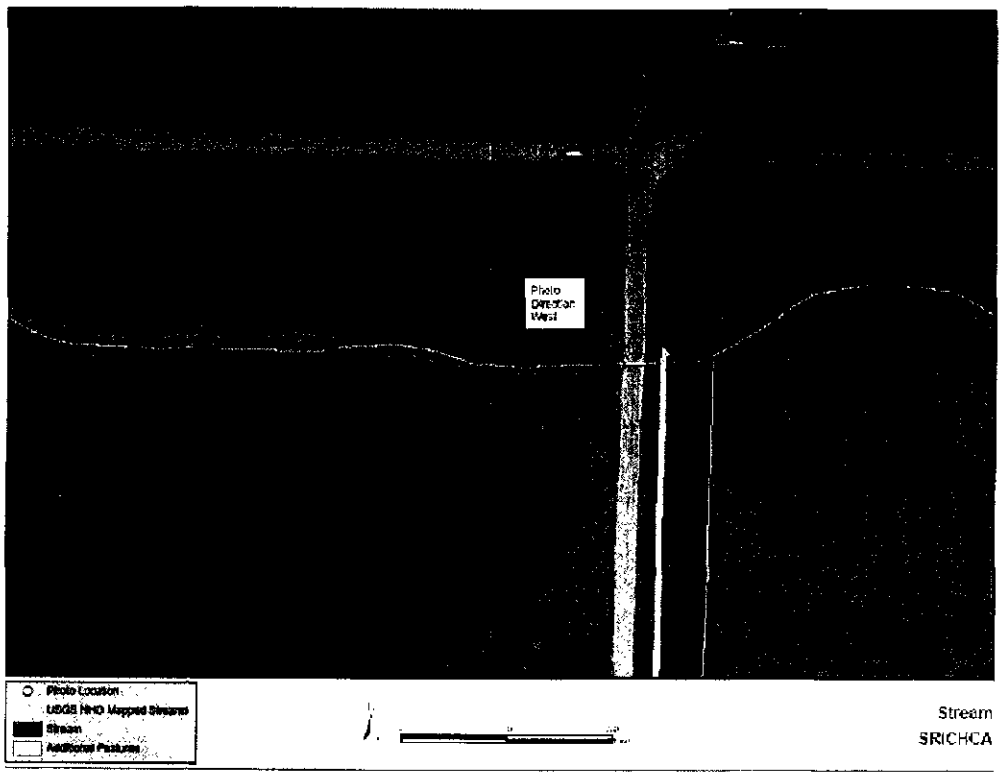
MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

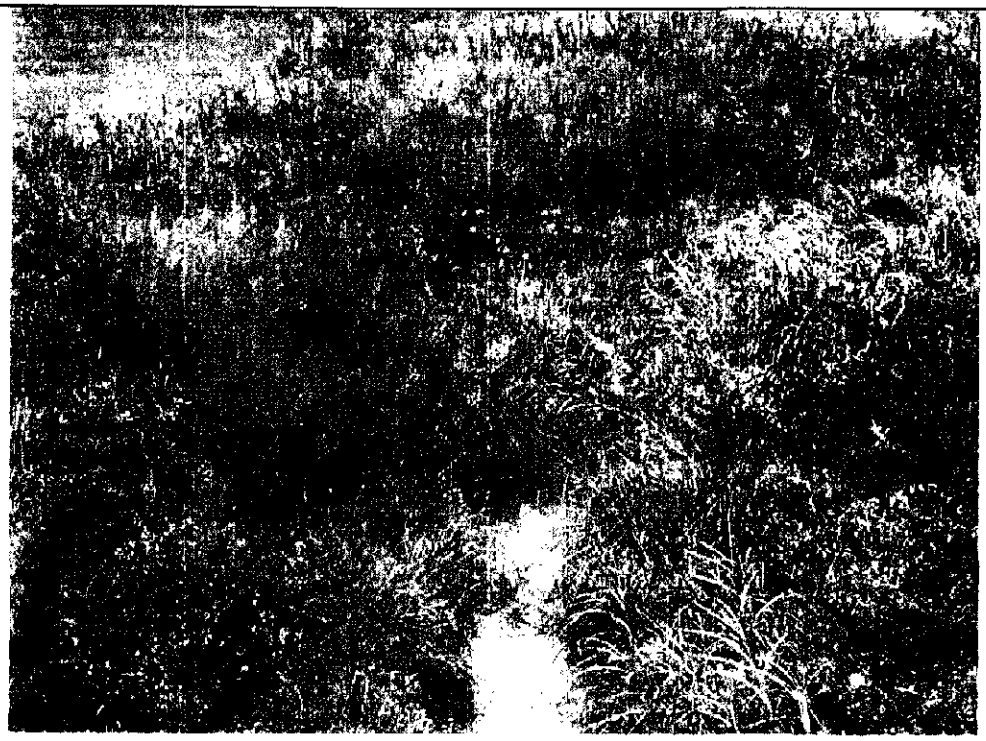
LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.





Stream S014CA





Stream SRICHCA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: SRICHCA	WATERBODY NAME: Prairie Creek
SITE NAME: Blue Creek	
DATE: 10/14/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: AF RH	ROVER FILE: / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO:

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	2 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	2 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY MEANDERING

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 48

Stream & Location: [illegible] Creek RM: 25.5 Date: 10/4/07

Scorers Full Name & Affiliation:

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal °) 40°.58'28" 84.38'55" ☐ 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
☐☐ BLDR/SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☒☐ COBBLE [8]	20	50	☐☐ MUCK [2]		
☐☒ GRAVEL [7]		20	☐☐ SILT [2]		
☐☐ SAND [6]			☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (Or 2 & average)

ORIGIN	QUALITY
☐ LIMESTONE [1]	☐ HEAVY [-2]
☒ TILLS [1]	☑ MODERATE [-1]
☐ WETLANDS [0]	☐ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [-2]
☐ RIP/RAP [0]	☒ MODERATE [-1]
☐ LACUSTURINE [0]	☐ NORMAL [0]
☐ SHALE [-1]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT / EMBEDDEDNESS

Substrate: 14 (Maximum 20)

Comments: [illegible] Moderate flow

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.

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

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

Comments

Cover Maximum 20: 9

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☒ LOW [2]	☑ FAIR [3]	☒ RECOVERING [3]	☒ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 9

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

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)
☐☒ NONE / LITTLE [3]	☐☐ WIDE > 50m [4]	☐☐ FOREST, SWAMP [3]
☐☐ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]
☐☐ HEAVY / SEVERE [1]	☐☑ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐☐ VERY NARROW < 5m [1]	☐☑ FENCED PASTURE [1]
	☑☐ NONE [0]	☒☒ OPEN PASTURE, ROWCROP [0]

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

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

Comments: (1)

Riparian Maximum 10: 4

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (Or 2 & average)
☑ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☒ FAST [1] ☐ INTERMITTENT [-2]
☒ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 6

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
☑ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☒ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☒ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments: Run is long pool at low flow via tributary

Riffle / Run Maximum 8: 6

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

DRAINAGE AREA (5 mi²)

%POOL: 10 %GLIDE: 80% %RUN: %RIFFLE: 10%

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]

STAGE
1st -sample pass- 2nd
- ☐ [illegible] ☐
- ☐ [illegible] ☐
- ☐ [illegible] ☐
- ☐ [illegible] ☐
- ☐ [illegible] ☐

DISTANCE
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ OTHER

CLARITY
1st -sample pass- 2nd
- ☐ [illegible] ☐
- ☐ [illegible] ☐
- ☐ [illegible] ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

______ [illegible]

CANOPY
- ☐ [illegible] - OPEN
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]

1st ______ cm
2nd ______ cm

C] RECREATION
AREA DEPTH
POOL: ☐ > [illegible] ☐ > [illegible]

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

B] AESTHETICS
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]

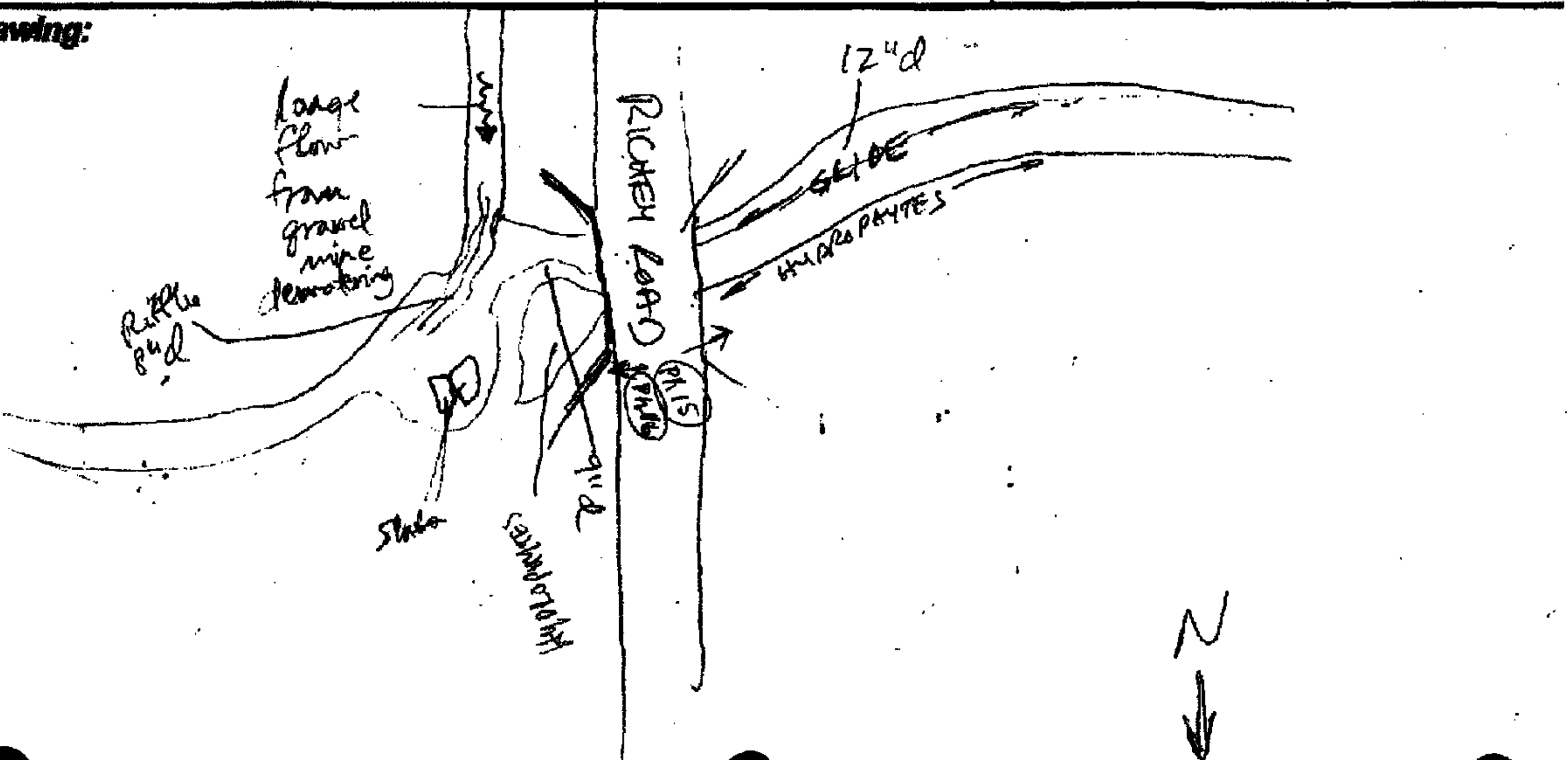
D] MAINTENANCE
PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

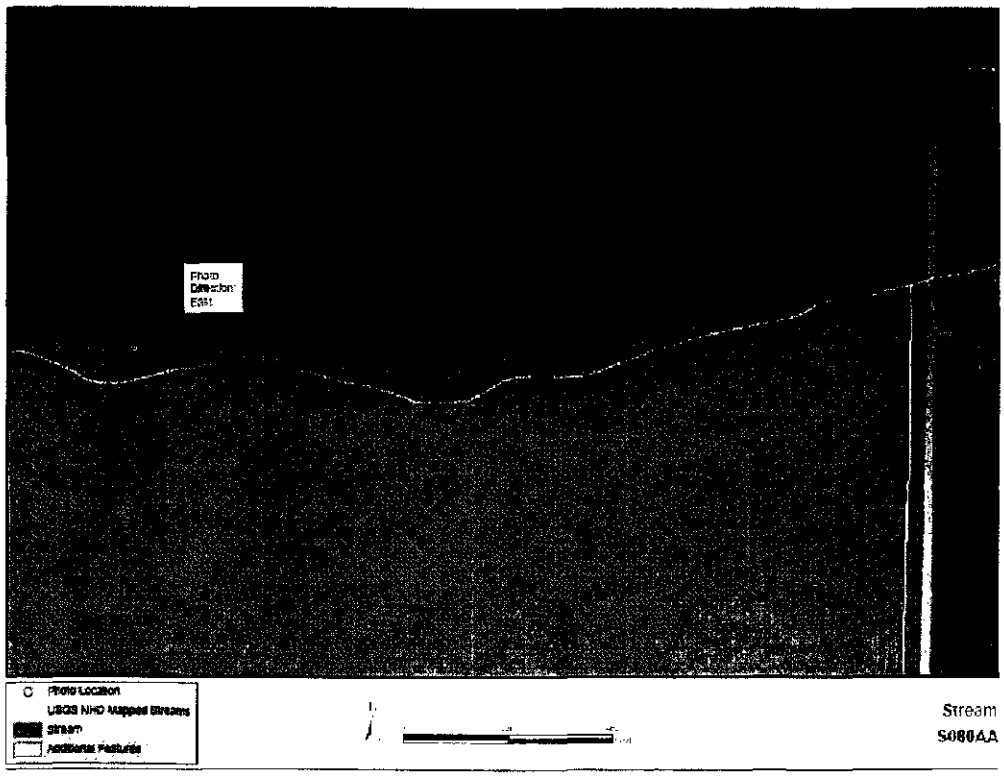
Circle some & COMMENT

E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O 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 x^2 width
entrench. ratio
Legacy Tree:

Stream Drawing:





Stream S080AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S080AA	WATERBODY NAME: Prairie Creek
SITE NAME: Blue Creek	

DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: S080cA	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	2 (in)		
AVG. STREAM WIDTH:	3 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Discolored	
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	12 ft wide to south	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 22

Stream & Location: SOBOA (PRAIRIE CREEK) **RM:** 14.4 **Date:** 9/11/06

Scorers Full Name & Affiliation: R HOOK / CHRMHILL

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal °) 40°.58'41" 84°.37'49" **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
☐☐ BLDR/SLABS [10]	___	___	☑☐ HARDPAN [4]	___	___
☐☐ BOULDER [9]	___	___	☐☐ DETRITUS [3]	___	___
☐☐ COBBLE [8]	___	___	☐☐ MUCK [2]	___	___
☐☐ GRAVEL [7]	___	___	☐☑ SILT [2]	___	___
☐☐ SAND [6]	___	___	☐☐ ARTIFICIAL [0]	___	___
☐☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (Or 2 & average)

ORIGIN		QUALITY	
☐ LIMESTONE [1]	SILT	☐ HEAVY [-2]	Substrate
☑ TILLS [1]		☑ MODERATE [-1]	5
☐ WETLANDS [0]		☐ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]	
☐ RIP/RAP [0]		☑ MODERATE [-1]	Maximum 20
☐ LACUSTURINE [0]		☐ NORMAL [0]	
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments No riffle/pool - mostly dry channel/intermittent

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]	___ POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]	☐ EXTENSIVE >75% [11]
___ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]	☐ MODERATE 25-75% [7]
___ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]	☐ SPARSE 5-<25% [3]
___ ROOTMATS [1]			☑ NEARLY ABSENT <5% [1]

Comments Little open water

Cover Maximum 20: 1

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☑ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☑ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 8

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: 3

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH (Check ONE (Or 2 & average))
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☒ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☑ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☑ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 1

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: —

6] GRADIENT 1.5 ft/mi)

DRAINAGE AREA 19.3 mi²)

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

%POOL: 100% %GLIDE: ___ %RUN: ___ %RIFFLE: ___

all open water - largely intermittent

Gradient Maximum 10: 4

EPA 4520 06/18/06

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☐ WADE
- ☐ LINE
- ☐ OTHER

STAGE (1st – sample pass – 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 2nd Site
- ☐ 3rd Site
- ☐ 4th Site
- ☐ 5th Site
- ☐ OTHER

_____ meters

CLARITY (1st – sample pass – 2nd)
- ☐ <20 cm ☐
- ☐ 20-40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTD ☐
- ☐ SECCHI DEPTH ☐

CANOPY
- ☐ >90% OPEN
- ☐ 60%-90%
- ☐ 30%-60%
- ☐ 10%-30%
- ☐ <10% CLOSED

1st _____ cm
2nd _____ cm

C] RECREATION AREA DEPTH
POOL: ☐ >100M² ☐ >3ft

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☐ BRIDGE or CULVERT/WATER
- ☐ GRAVEL TERRACE
- ☐ DEBRIS ACCUMULATION
- ☐ POOR ODOUR
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ HUMMOCKY GROUND
- ☐ SLUDGE DEPOSITS
- ☐ DISCHARGE/OUTFALLS

D] MAINTENANCE Circle some & COMMENT
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

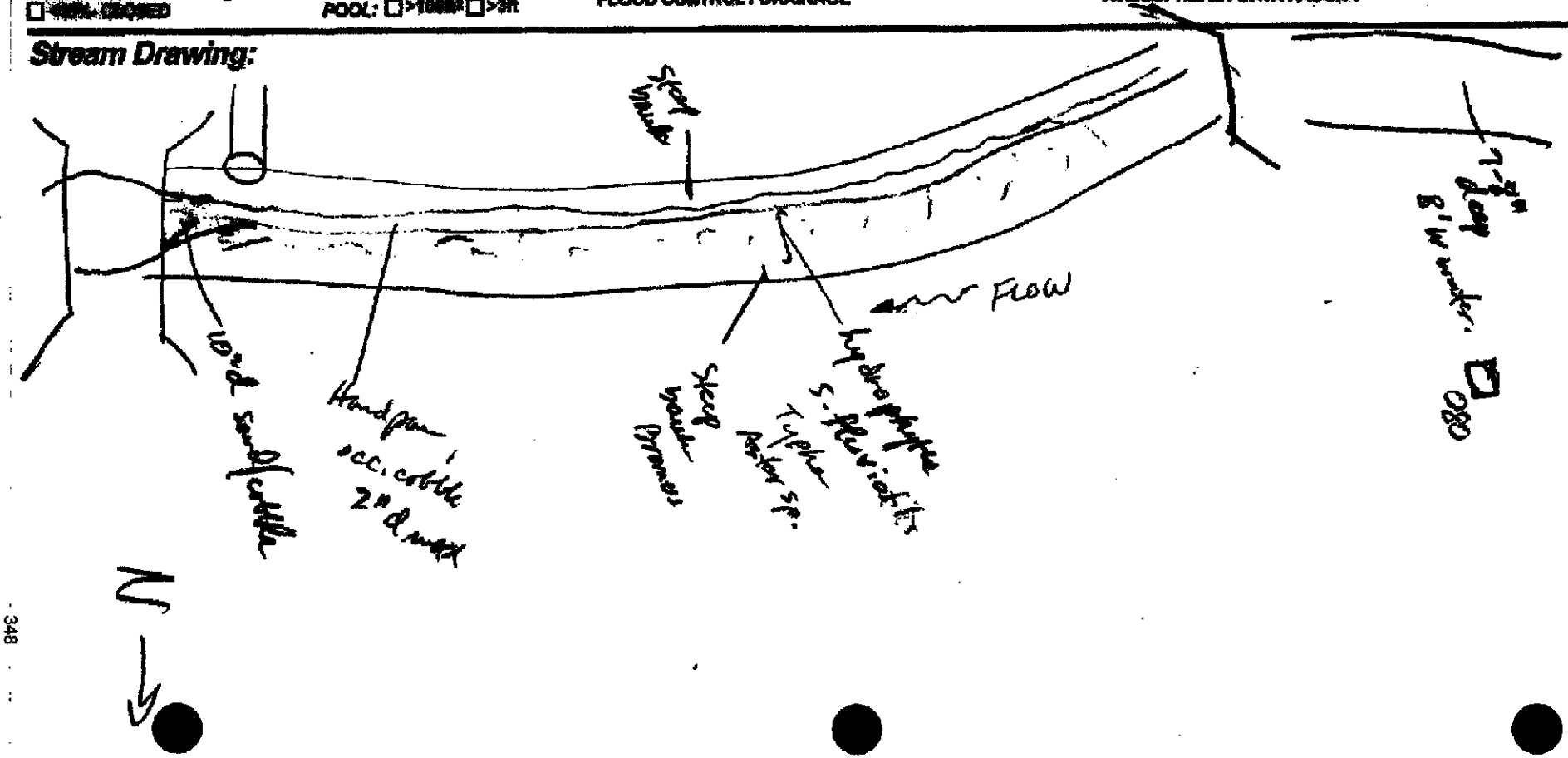
E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH $H_2\theta$ / TILE / $H_2\theta$ TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

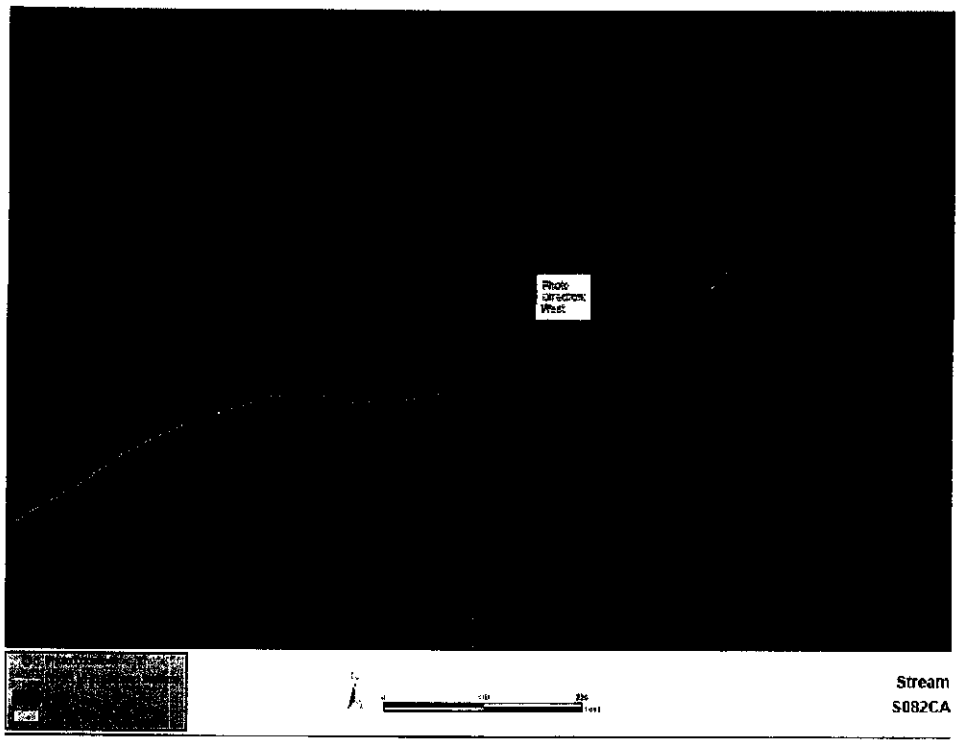
F] MEASUREMENTS
- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

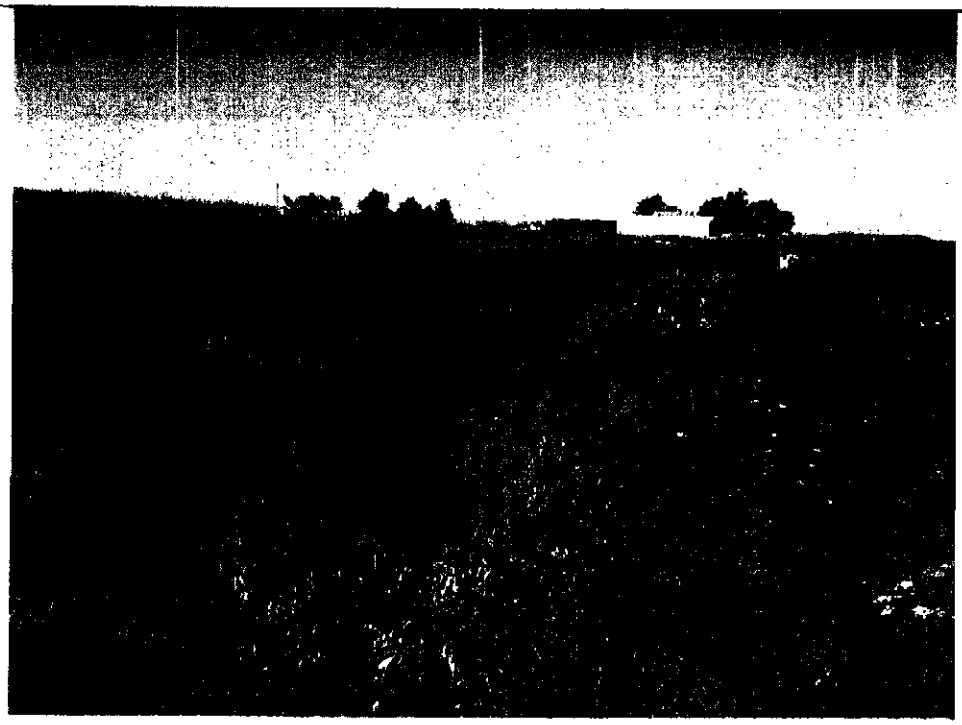
Legacy Tree:

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

Stream Drawing:







Stream S082CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S082CA**	WATERBODY NAME: **Prairie Creek**	
SITE NAME: Blue Creek		
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: S082CA	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	10 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

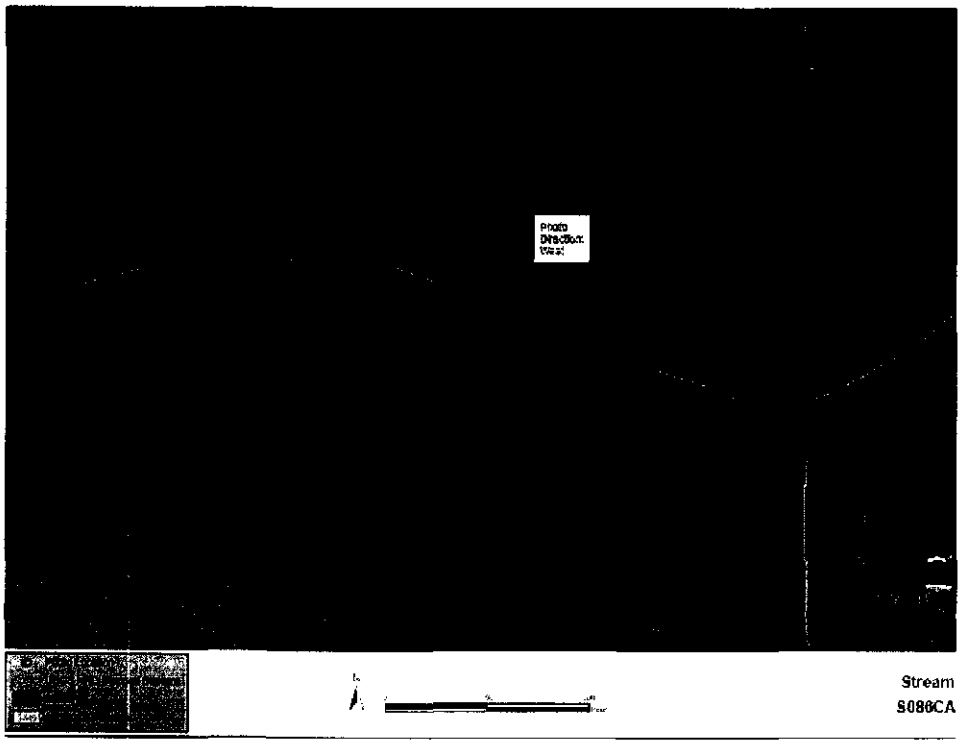
COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; Intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.



Stream S086CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S086CA	WATERBODY NAME: Prairie Creek	
SITE NAME: Blue Creek		
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: S086CA	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 10 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY MEANDERING

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 36

Stream & Location: S086CA (PRAIRIE CREEK) **RM:** 13.3 **Date:** 9/17/09

Scorers Full Name & Affiliation: R HOOK / CHEMUNG

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** 40° 58' 54" 184° 36' 42" (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
☐ ☐ BLDR/SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]		
☐ ☑ COBBLE [8]		10%	☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]			☐ ☐ SILT [2]		
☑ ☐ SAND [6]		90%	☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (Or 2 & average)

ORIGIN		QUALITY	
☐ LIMESTONE [1]	SILT	☐ HEAVY [-2]	Substrate
☑ TILLS [1]		☑ MODERATE [-1]	12
☐ WETLANDS [0]		☐ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]	EMBEDDEDNESS	☑ EXTENSIVE [-2]	Maximum 20
☐ RIP/RAP [0]		☐ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments Riffle only at ford

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.

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

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

Comments Vegetation largely removed around grass

Cover Maximum 20: 8

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☑ RECOVERING [3]	☑ LOW [1]
☑ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 6

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

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☑ ☑ NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]
☐ ☐ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☑ ☑ VERY NARROW < 5m [1]	☐ ☑ FENCED PASTURE [1]
	☑ ☑ NONE [0]	☑ ☑ OPEN PASTURE, ROWCROP [0]

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

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

Comments

Riparian Maximum 10: 3

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☑ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 3

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☑ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (2.5 ft/mi)
DRAINAGE AREA (13.1 mi²)

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

%POOL: ___ %GLIDE: 90%
%RUN: ___ %RIFFLE: 10%

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. CANE
- ☐ OTHER

STAGE

1st –sample pass– 2nd

- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE

- ☐ 0-50 m
- ☐ 50-100 m
- ☐ 100-150 m
- ☐ 150-200 m
- ☐ OTHER

_____ meters

CLARITY

1st –sample pass– 2nd

- ☐ <20 cm ☐
- ☐ 20-40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTB ☐
- ☐ SECCHI DEPTH ☐

CANOPY

- ☐ >80% - OPEN
- ☐ 60% - <80%
- ☐ 40% - <60%
- ☐ 20% - <40%
- ☐ <20% - CLOSED

1st _____ cm

2nd _____ cm

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

B] AESTHETICS

- ☐ [illegible]
- ☐ [illegible] CHANNELIZED
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ [illegible]
- ☐ SLUDGE DEPOSITS
- ☐ CSO / SSO / OUTFALLS

C] RECREATION

AREA DEPTH

POOL: ☐ >1000ft² ☐ >3ft

D] MAINTENANCE

Circle some & COMMENT

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

E] ISSUES

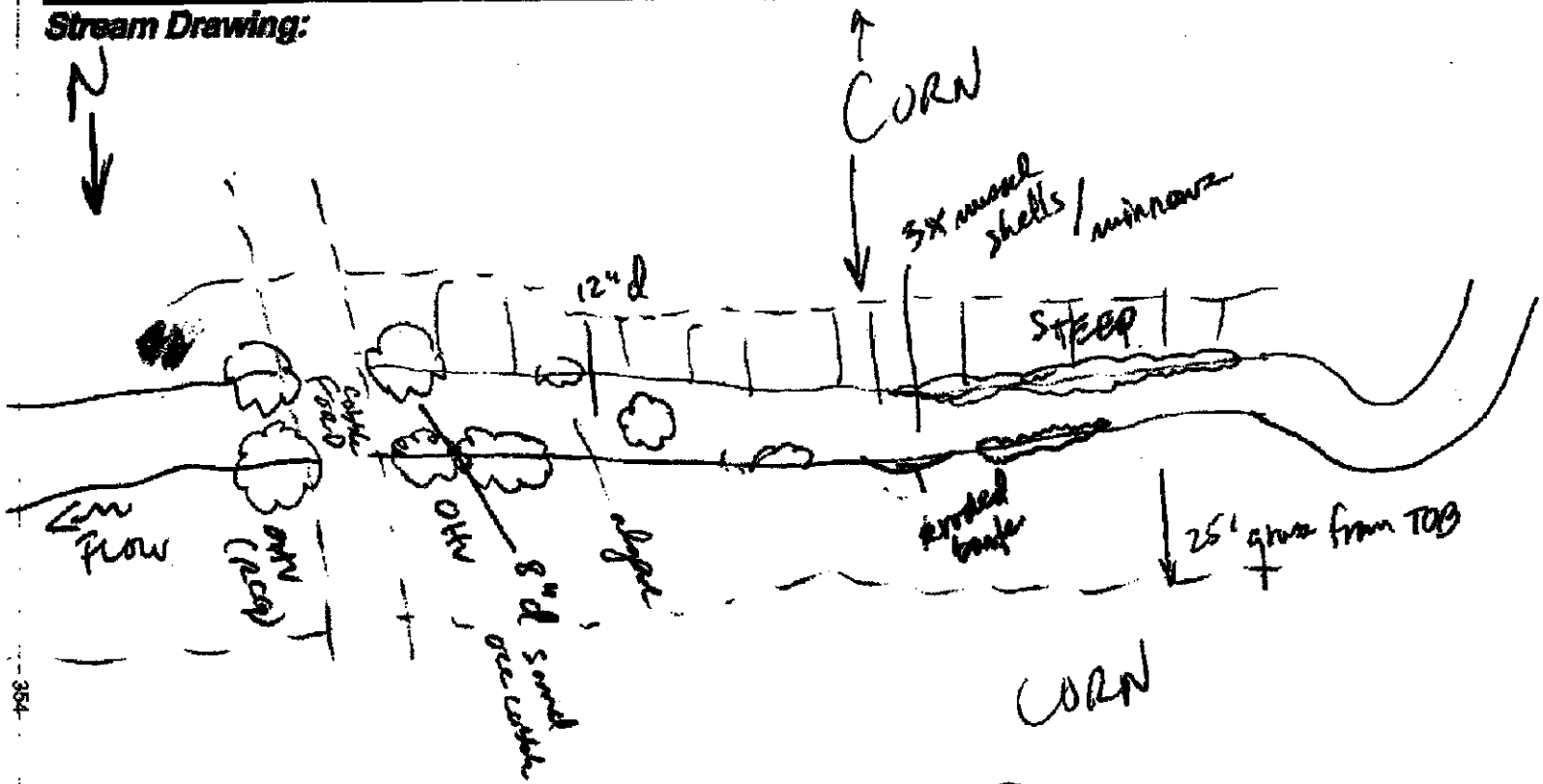
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

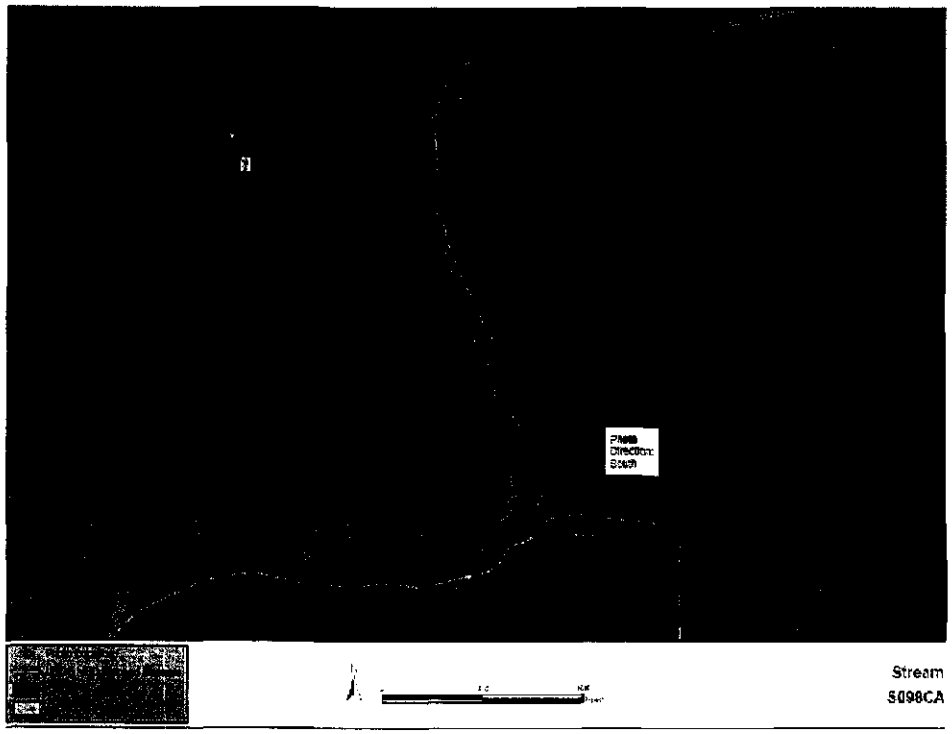
F] MEASUREMENTS

- X̄ width
- X̄ depth
- max. depth
- X̄ bankfull width
- bankfull X̄ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:





Stream S098CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S098CA**	WATERBODY NAME: **Prairie Creek**
SITE NAME: Blue Creek	
DATE: 9/17/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH091709A.cor / QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO:

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Stream		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	9 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 30 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:		
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Herbaceous	
WETLAND FRINGE (IF PRESENT):	Phalaris arundinacea	
CHANNEL CONDITION:		
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

channelized

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; l regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 42.5

Stream & Location: 598 CA (PRAIRIE CREEK) **RM:** 12.6 **Date:** 9/17/09

Scorers Full Name & Affiliation: RITOSK / CALHILL

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** 40° 59' 16" 84° 36' 13" (NAD 83 - decimal) **Office verified location** ☐

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

Check ONE (*Or 2 & average*) — 14.8 mi²

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR/SLABS [10]			☑☐ HARDPAN [4]	30%	
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☑ COBBLE [8]	20%		☐☐ MUCK [2]		
☐☐ GRAVEL [7]			☐☐ SILT [2]		
☐☐ SAND [6]	gravel		☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

ORIGIN	SILT	QUALITY	EMBEDDEDNESS
☐ LIMESTONE [1]		☐ HEAVY [-2]	
☑ TILLS [1]		☐ MODERATE [-1]	
☐ WETLANDS [0]		☑ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]		☐ EXTENSIVE [-2]	☑ EXTENSIVE [-2]
☐ RIP/RAP [0]		☑ MODERATE [-1]	☐ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]	☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]	☐ NONE [1]
☐ COAL FINES [-2]			

Substrate 12 (Maximum 20)

Comments

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

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

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

Cover 9 (Maximum 20)

Comments

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☑ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Channel 11 (Maximum 20)

Comments

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

River right looking downstream

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

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

Riparian 2.5 (Maximum 10)

Comments

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (*Or 2 & average*)
- ☑ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☑ SLOW [1]
- ☐ VERY FAST [1]
- ☐ INTERSTITIAL [-1]
- ☐ FAST [1]
- ☐ INTERMITTENT [-2]
- ☑ MODERATE [1]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

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

Pool / Current 4 (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]

Check ONE (*Or 2 & average*).

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

Riffle / Run — (Maximum 8)

Comments

6] GRADIENT (2.5 ft/mi)
DRAINAGE AREA (14.8 mi²)

- ☑ VERY LOW - LOW [2-4]
- ☐ MODERATE [8-10]
- ☐ HIGH - VERY HIGH [10-6]

%POOL: ____ %GLIDE: 100 %RUN: ____ %RIFFLE: ____

Gradient 4 (Maximum 10)

A] SAMPLED REACH
Check ALL that apply

METHOD
☐ BOAT
☐ WADE
☐ 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
______ meters

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

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

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

C] RECREATION AREA DEPTH
POOL: ☐>100ft² ☐>3ft

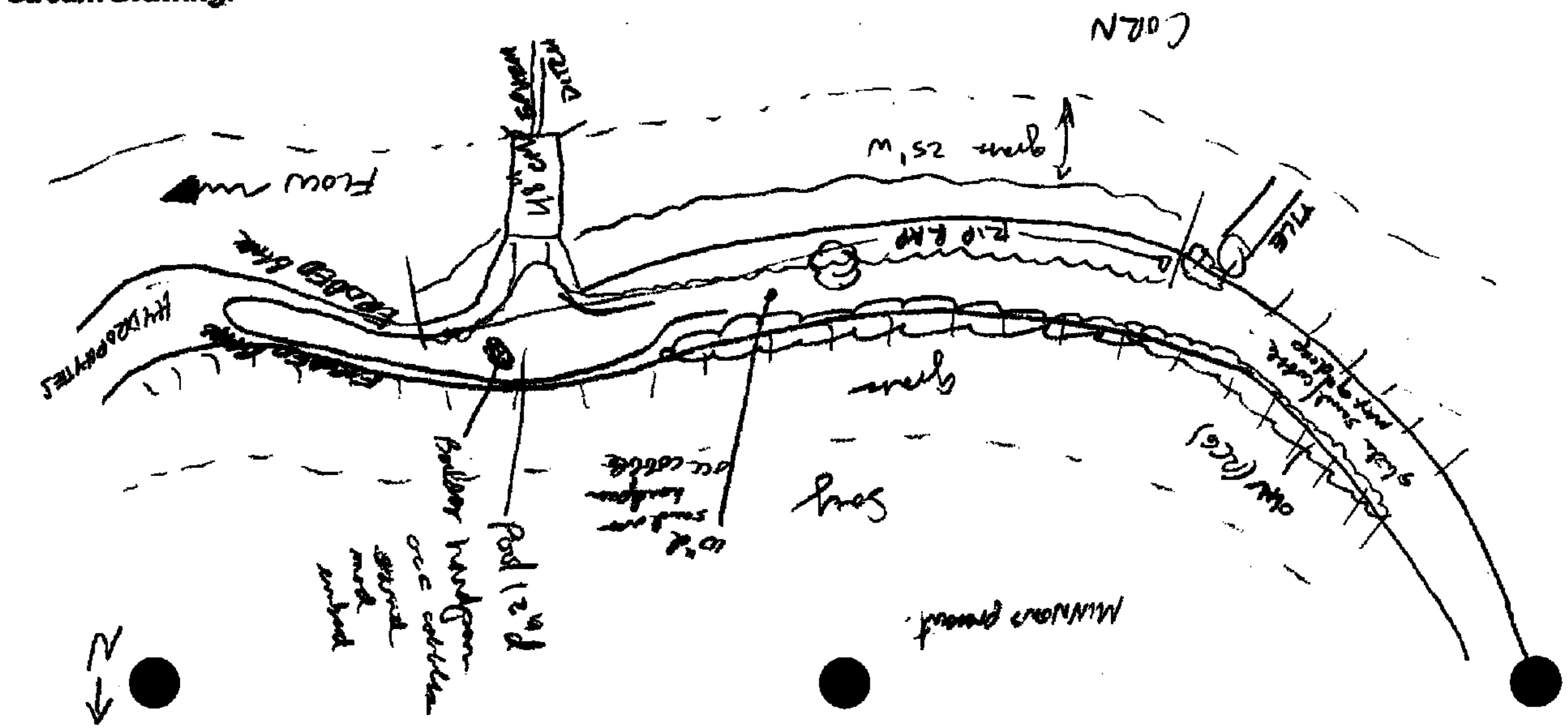
D] MAINTENANCE
PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

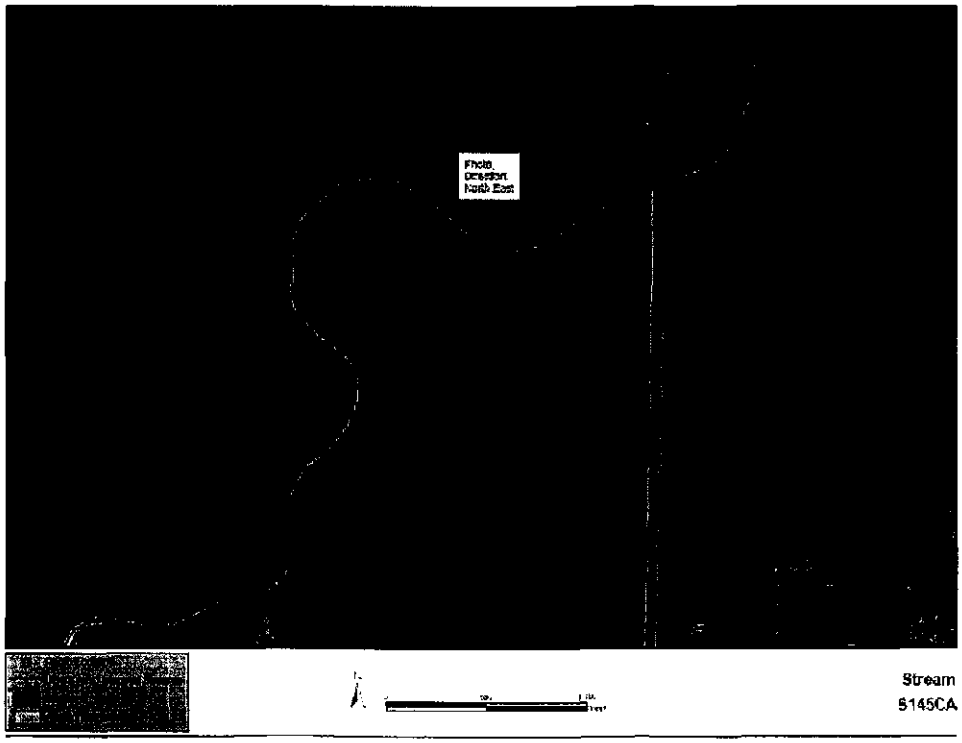
Circle some & COMMENT

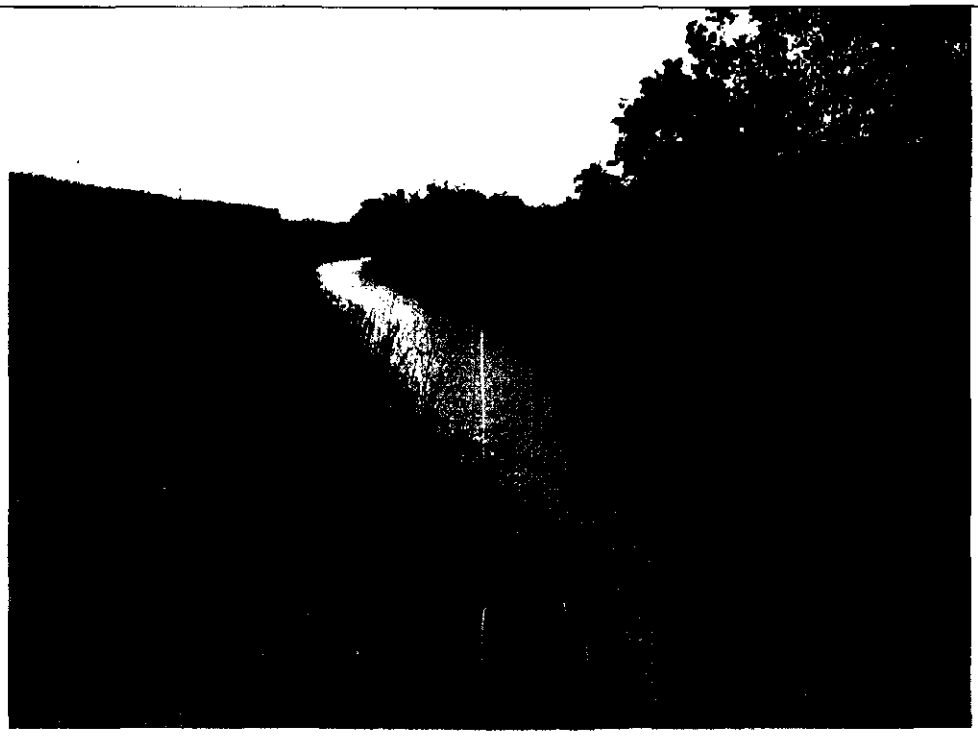
E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / 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 x^2 width
entrench. ratio
Legacy Tree:

Stream Drawing:







Stream S145CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S145CA-1**	WATERBODY NAME: **Prairie Creek**
SITE NAME: **Blue Creek**	

DATE: **9/17/2009**	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091709ADW.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Blue Creek	
	PHOTO NO: 094C31n & 094C32SW	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Fairly wide natural channel, likely some manipulation for drainage from ag fields directly adj		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	13 (ft)	TOP OF BANK: 15 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	3 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:	Fish/Spawn Areas	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Scrub Shrub	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Sloughing Banks	
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY MEANDERING

COMMENTS

collector line to turbine 094 crosses S145CA at this point; stream runs between ag fields

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S145CA-2	WATERBODY NAME: Prairie Creek	
SITE NAME: Blue Creek		
DATE: 9/17/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091709ADW.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Blue Creek	
	PHOTO NO: 095C27nE & 095C28SW	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Fairly wide natural channel, likely some manipulation for drainage from ag fields directly adj		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	15 (ft)	TOP OF BANK: 20 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	4 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:	Fish/Spawn Areas	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Scrub Shrub	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Highly Erodable	
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

collector line to turbine 095 crosses S145CA at this point; stream runs between ag fields

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening, rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S145CA-3**	WATERBODY NAME: **Prairie Creek**	
SITE NAME: Blue Creek		
DATE: 9/17/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091709ADW.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Blue Creek	
	PHOTO NO: 145C23n & 145C24S	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Fairly wide natural channel, likely some manipulation for drainage from ag fields directly adj		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	15 (ft)	TOP OF BANK: 20 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	4 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:	Fish/Spawn Areas	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Scrub Shrub	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Highly Erodable	
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

collector line to turbine 145 crosses S145CA; stream runs between ag fields

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; little regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 63.75

Stream & Location: [illegible] *RM:* ___ *Date:* [illegible]

Scorers Full Name & Affiliation: [illegible]

River Code: ___ - ___ - ___ *STORET #:* ___ *Lat./Long.:* (NAD 83 - decimal °) 40 .99736 84 .59231 *Office verified location* [illegible]

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
[illegible]			HARDPAN [1]		
			DETRITUS [-1]		
		30	MUCK [-2]		
			SILT [-2]	80	5
	20	5	ARTIFICIAL [0]		
[illegible]					

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

NUMBER OF BEST TYPES: [illegible] 1 or more [2] 3 or less [0]

ORIGIN: [illegible] [1]

SILT / EMBEDDEDNESS: [illegible] [0]

QUALITY: [illegible] [1]

Substrate Maximum 20: 11.5

Comments

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

UNDERCUT BANKS [1]	1	POOL >70cm [2]	OVERHANGING BRANCHES [1]
OVERHANGING VEGETATION [1]	1	ROOTWADS [1]	AQUATIC MACROPHYTES [1]
SHALLOWS (IN SLOW WATER) [1]	1	BOULDERS [1]	LOGS OR WOODY DEBRIS [1]
ROOT MATS [1]	1		

AMOUNT Check ONE (*Or 2 & average*)

[illegible] EXTENSIVE >75% [3] | [illegible] MODERATE 25-75% [2] | [illegible] SPARSE 5-25% [1] | [illegible] NEARLY ABSENT <5% [0]

Comments

Cover Maximum 20: 13

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
[illegible]	[illegible] EXCELLENT [7]	[illegible] NONE [6]	[illegible] HIGH [3]
[illegible] MODERATE [3]	[illegible] GOOD [5]	[illegible] RECOVERED [4]	[illegible] MODERATE [2]
[illegible] LOW [2]	[illegible] FAIR [3]	[illegible] RECOVERING [3]	[illegible] LOW [1]
[illegible] NONE [1]	[illegible] POOR [1]	[illegible] RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 14.5

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

River right looking downstream

EROSION L	EROSION R	RIPARIAN WIDTH L	RIPARIAN WIDTH R
[illegible] NONE/LITTLE [3]	[illegible] NONE/LITTLE [3]	[illegible] WIDE >10m [2]	[illegible] WIDE >10m [2]
[illegible] MODERATE [2]	[illegible] MODERATE [2]	[illegible] MODERATE 5-10m [1]	[illegible] MODERATE 5-10m [1]
[illegible] HEAVY/SEVERE [1]	[illegible] HEAVY/SEVERE [1]	[illegible] NARROW 1-5m [0]	[illegible] NARROW 1-5m [0]
		[illegible] VERY NARROW <1m [1]	[illegible] VERY NARROW <1m [1]
		[illegible] NONE [0]	[illegible] NONE [0]

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R
[illegible] FOREST, SWAMP [3]	[illegible] CONSERVATION TILLAGE [1]
[illegible] SHRUB OR OLD FIELD [2]	[illegible] URBAN OR INDUSTRIAL [0]
[illegible] RESIDENTIAL, PARK, NEW FIELD [1]	[illegible] MINING/CONSTRUCTION [0]
[illegible] FENCED PASTURE [1]	
[illegible] OPEN PASTURE, ROWCROP [0]	

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

Comments

Riparian Maximum 10: 4.75

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check **ONE** (*ONLY!*)

[illegible] >1m [6] | [illegible] 0.7-1m [4] | [illegible] 0.4-0.7m [2] | [illegible] 0.2-0.4m [1] | [illegible] <0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)

[illegible] POOL WIDTH > RIFFLE WIDTH [2] | [illegible] POOL WIDTH = RIFFLE WIDTH [1] | [illegible] POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply

[illegible] SWIFT [1] | [illegible] TORRENTIAL [-1] | [illegible] VERY FAST [1] | [illegible] INTERSTITIAL [-1] | [illegible] FAST [1] | [illegible] INTERMITTENT [-2] | [illegible] MODERATE [1] | [illegible] EDDIES [1]

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 10

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
[illegible] BEST AREAS >0.5m [2]	[illegible] MAXIMUM >50cm [2]	[illegible] STABLE (e.g. Cobble, Boulder) [2]	[illegible] NONE [2]
[illegible] BEST AREAS 0.25-0.5m [1]	[illegible] MAXIMUM 30-50cm [1]	[illegible] MOD. STABLE (e.g. Gravel, Coarse Sand) [1]	[illegible] LOW [1]
[illegible] BEST AREAS <0.25m [0]		[illegible] UNSTABLE (e.g. Fine Gravel, Sand) [0]	[illegible] MODERATE [0]
			[illegible] EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 4.5

6] GRADIENT (5.5 ft/mi) [illegible] VERY LOW [2] | [illegible] MODERATE [1] | [illegible] HIGH [0]

DRAINAGE AREA (17.05 mi²)

%POOL: 10 %GLIDE: 45 %RUN: 45 %RIFFLE: 5

Gradient Maximum 10: 6

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.16 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

STAGE

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

CLARITY

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

1st _____ cm

2nd _____ cm

CANOPY

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

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

B] AESTHETICS

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

C] RECREATION

POOL: AREA ☐ >100ft² DEPTH ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

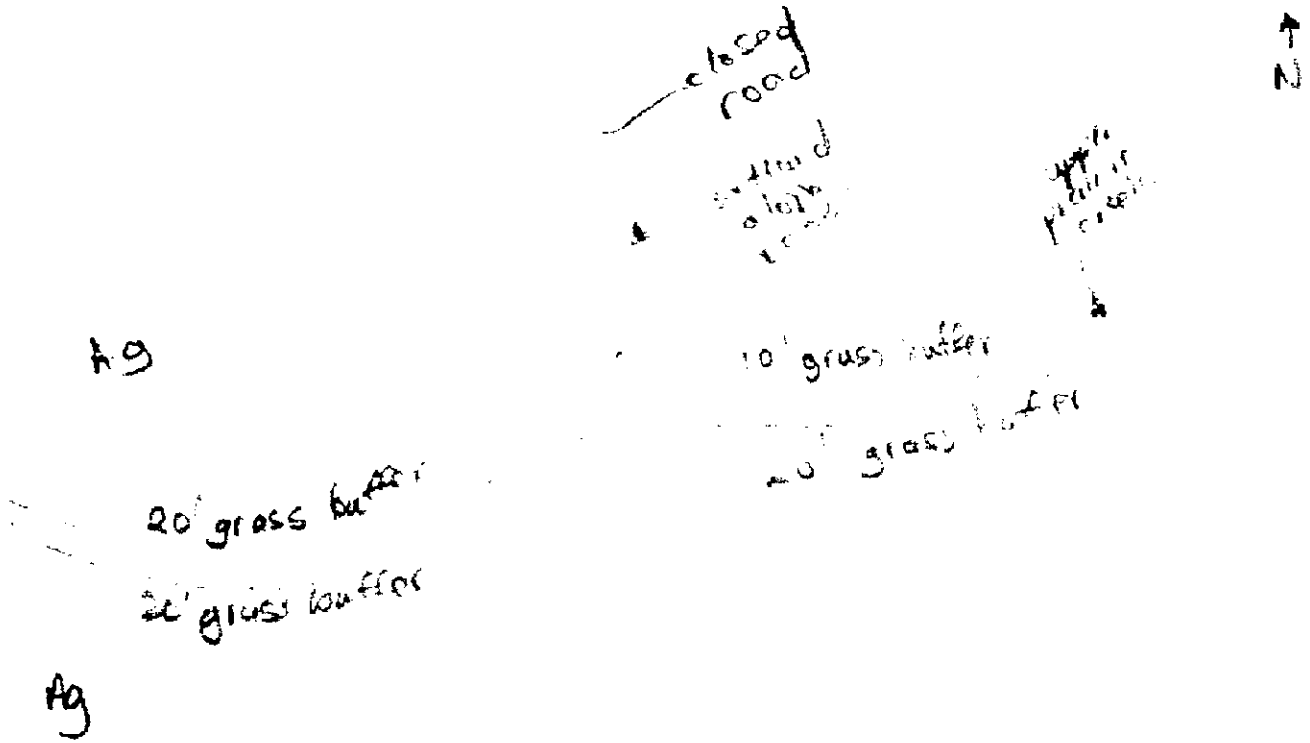
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

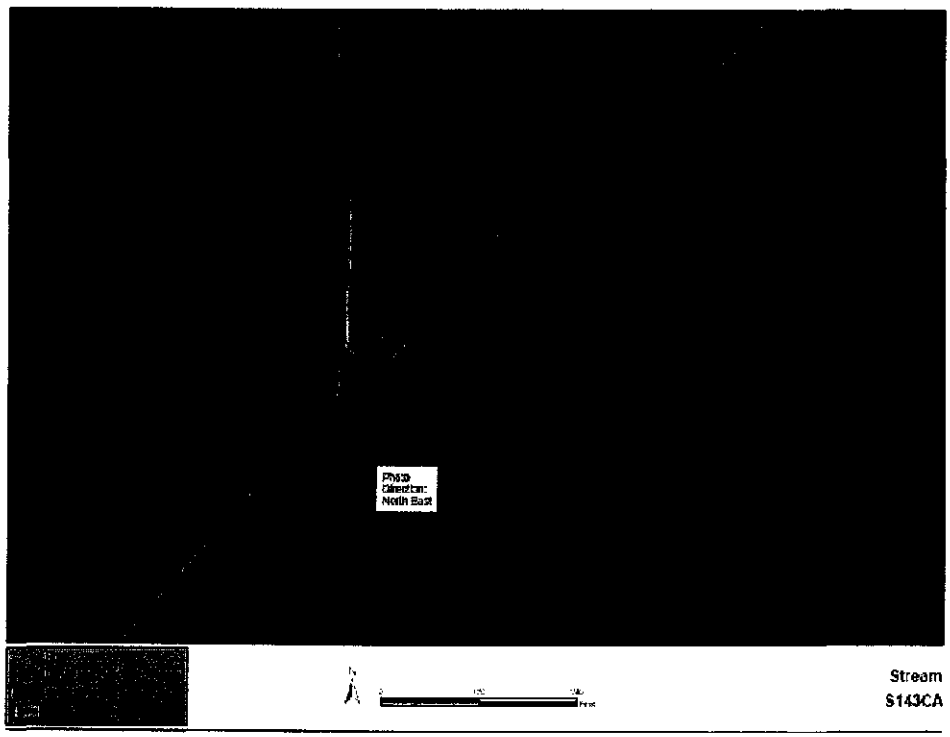
F] MEASUREMENTS

x̄ width	15'
x̄ depth	3.0'
max. depth	3.6'
x̄ bankfull width	
bankfull x̄ depth	
W/D ratio	
bankfull max. depth	
floodprone x^2 width	
entrench. ratio	

Legacy Tree:

Stream Drawing:





Stream S143CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S143CA**	WATERBODY NAME: **Prairie Creek**	
SITE NAME: Blue Creek		
DATE: 9/17/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091709ADW.cor	QUAD NAME: Latty
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Blue Creek	
	PHOTO NO: 143C10nE & 143C11SW	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Stream, fairly wide natural channel; likely some manipulation due to ag fields directly adj		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	20 (ft)	TOP OF BANK: 25 (ft)	ORDINARY HIGH WATER MARK WIDTH: 20 (ft)
AVG. BANK HEIGHT:	3 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Slighty Turbid	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:	Fish/Spawn Areas	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Highly Erodable	
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

collector line from turbine 146 to 143 crosses stream; stream runs between ag fields

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 51.5

Stream & Location: SIMCA **RM:** ___.__ **Date:** 09/17/09

Scorers Full Name & Affiliation: MATT NEDROW/MC CHRIS

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal °) 41.00782 / 84.58155 **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
☐ ☐ BDRK/SLABS [9]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]		
☒ ☐ COBBLE [8]		30	☐ ☐ MUCK [2]		
☒ ☐ GRAVEL [7]		10	☒ ☐ SILT [2]	10	
☒ ☐ SAND [6]	30	10	☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]					

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

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

Check ONE (Or 2 & average)

ORIGIN		QUALITY	
☒ NONE [6]	SILT	☐ HEAVY [-2]	Substra
☐ HIGH [-1]		☒ MODERATE [-1]	11
☐ EXTENSIVE [-1]		☐ NORMAL [0]	
☐ MODERATE [0]	EMBEDDEDNESS	☒ HIGH [1]	Maximu
☐ NORMAL [1]		☐ NONE [2]	20
☐ RECLAIMED [1]			
☐ CANALIZED [0]			

Comments

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

1 UNDERCUT BANKS [1]	1 POOL SIZE/DEPTH [2]	___ OXBOWS/BACKWATERS [1]	**AMOUNT**
2 OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
2 SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]	☐ EXTENSIVE >75% [7]
1 ROOTMATS [1]			☑ MODERATE 25-75% [5]
			☐ SPARSE 5-25% [3]
			☐ NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20: 13

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☒ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☒ GOOD [5]	☐ RECOVERED [4]	☒ MODERATE [2]
☒ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [0]	

Comments

Channel Maximum 20: 14

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: 5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH — Check ONE (Or 2 & average)
☒ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY — Check ALL that apply
☐ TORRENT [-1]
☒ SWIFT [1]
☐ VERY FAST [1]
☐ INTERSTITIAL [-1]
☐ FAST [1]
☐ EDDIES [1]
☒ MODERATE [0]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 10

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
☐ BEST AREAS >10cm [2]	☐ MAXIMUM >50cm [2]	☒ STABLE (e.g. cobble, boulder) [2]	☐ NONE [2]
☒ BEST AREAS 5-10cm [1]	☒ MAXIMUM 25-50cm [1]	☐ MOD. STABLE (e.g. gravel) [1]	☒ LOW [1]
☐ BEST AREAS <5cm [0]		☐ UNSTABLE (e.g. fine gravel, sand) [0]	☒ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 4.5

6] GRADIENT (2.8 ft/mi)
DRAINAGE AREA (17.50 mi²)

☒ VERY LOW-LOW [2.4]
☐ MOD. [3.6]
☐ HIGH [4.8]

%POOL: 10 %GLIDE: 45
%RUN: 40 %RIFFLE: 5

Gradient Maximum 10: 4

EPA 4520 06/16/06

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

_____ meters

STAGE

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

CLARITY

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

1st pass _____ cm

2nd _____ cm

CANOPY

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

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

B] AESTHETICS

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

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & COMMENT

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

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 H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

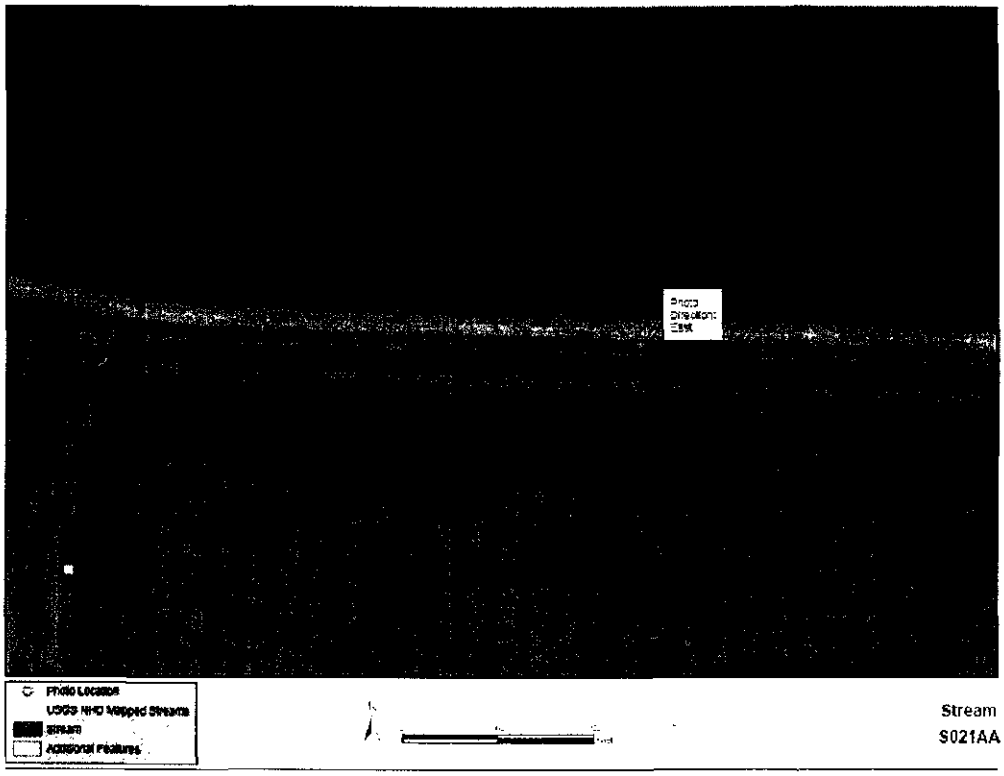
F] MEASUREMENTS

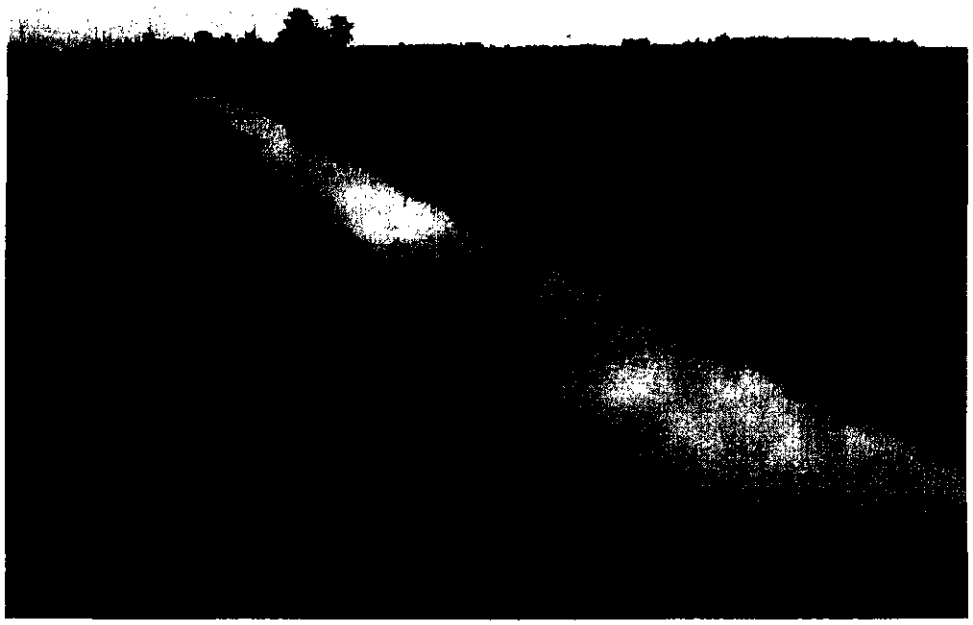
- x̄ width 20'
- x̄ depth 36"
- max. depth 48"
- x̄ bankfull width 25'
- bankfull x̄ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

Tributaries to Prairie Creek





Stream S021AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S021AA	WATERBODY NAME: Unnamed Tributary to Prairie Creek
SITE NAME: Blue Creek	
DATE: 9/21/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH090921.cor / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO: s021aa1

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	6 (in)		
AVG. STREAM WIDTH:	7 (ft)	TOP OF BANK: 30 (ft)	ORDINARY HIGH WATER MARK WIDTH: 10 (ft)
AVG. BANK HEIGHT:	7 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Scirpus ludwigia upstream	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; little regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types availeble; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3): 46

SITE NAME/LOCATION _____

SITE NUMBER SO21AA RIVER BASIN _____ DRAINAGE AREA (mi²) 0.2

LENGTH OF STREAM REACH (ft) _____ LAT. 40°32'45" LONG. 84°41'14" RIVER CODE _____ RIVER MILE 0

DATE 10/15/09 SCORER R Hook COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]		☑	SILT [3 pt]	100%
☐	BOULDER (>256 mm) [16 pts]		☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐	BEDROCK [16 pt]		☐	FINE DETRITUS [3 pts]	
☐	COBBLE (65-256 mm) [12 pts]		☐	CLAY or HARDPAN [0 pt]	
☐	GRAVEL (2-64 mm) [9 pts]		☐	MUCK [0 pts]	
☐	SAND (<2 mm) [6 pts]		☐	ARTIFICIAL [3 pts]	

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 TOTAL NUMBER OF SUBSTRATE TYPES: 1

HHEI Metric Points

Substrate Max = 40

7

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☑ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 12

Pool Depth Max = 30

19

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 (> 5' 7" - 4' 8") [20 pts]
- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (<=3' 3") [5 pts]

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 2.5

Bankfull Width Max=30

20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

☑ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

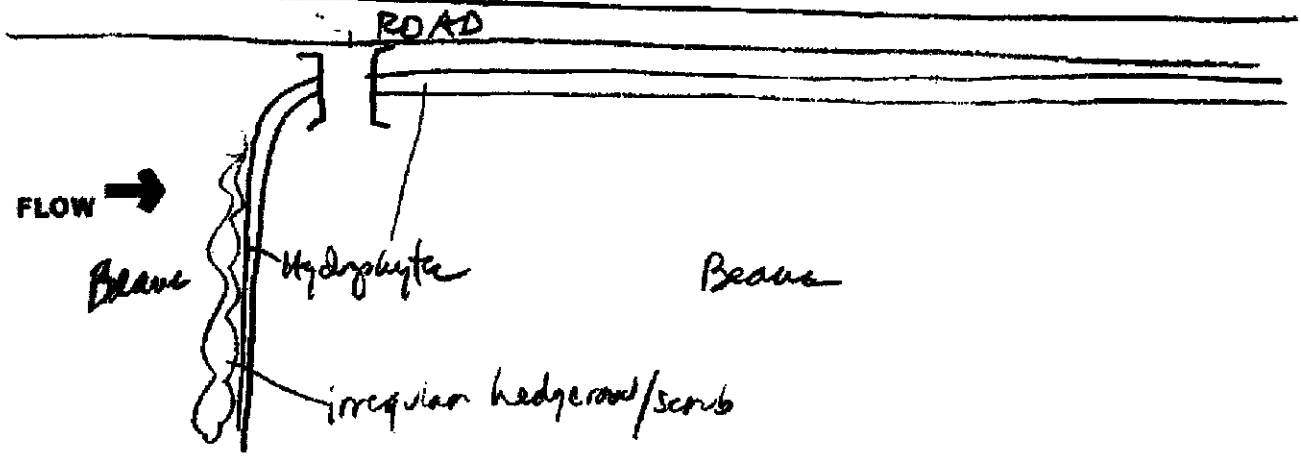
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

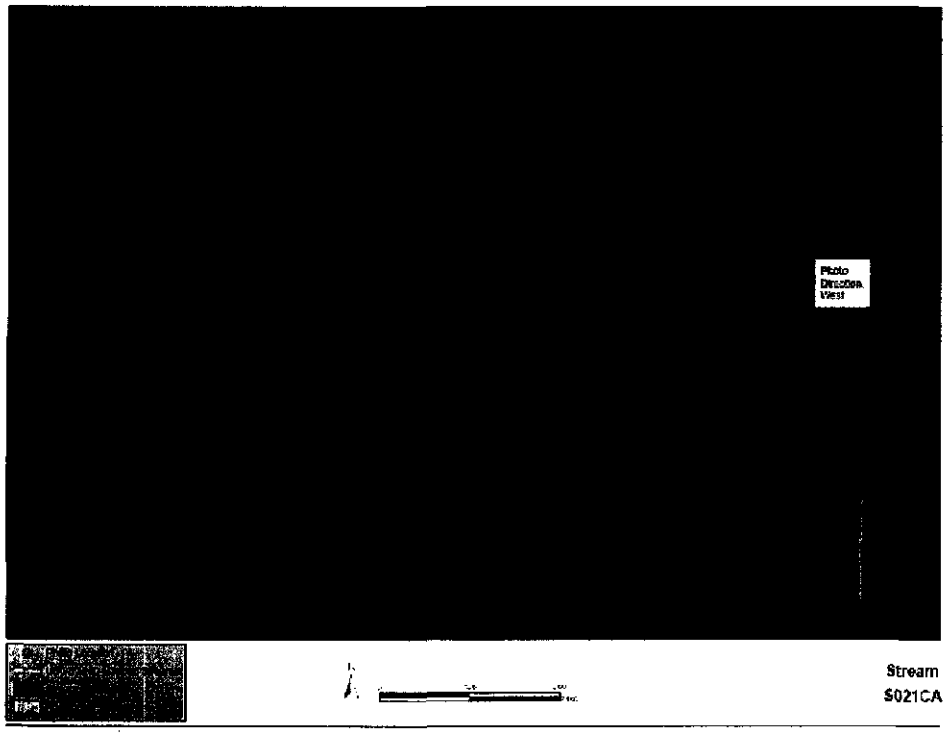
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

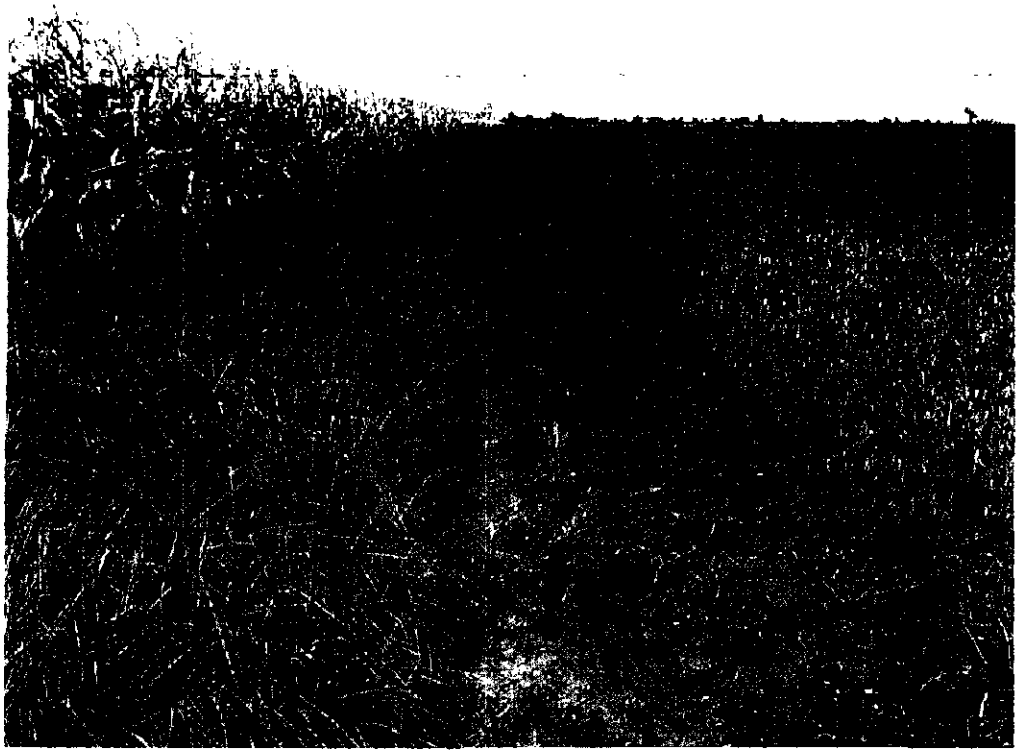
Comments Regarding Biology: _____

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

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







Stream S021CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S021CA**	WATERBODY NAME: **Unnamed Tributary to Prairie Cr**
SITE NAME: **Blue Creek**	
DATE: **10/15/2009**	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: AF RH	ROVER FILE: / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO:

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Ephemeral		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 1 (ft)	ORDINARY HIGH WATER MARK WIDTH: 0 (ft)
AVG. BANK HEIGHT:	1 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	None	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 22

SITE NAME/LOCATION _____

SITE NUMBER 502CA RIVER BASIN _____ DRAINAGE AREA (mi²) 0.1

LENGTH OF STREAM REACH (ft) _____ LAT. 40° 56' 32" LONG. 84° 40' 40" RIVER CODE _____ RIVER MILE _____

DATE 10/15/09 SCORER RWOOK COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]		☑	SILT [3 pt]	100
☐	BOULDER (>256 mm) [16 pts]		☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐	BEDROCK [16 pt]		☐	FINE DETRITUS [3 pts]	
☐	COBBLE (65-256 mm) [12 pts]		☐	CLAY or HARDPAN [0 pt]	
☐	GRAVEL (2-64 mm) [9 pts]		☐	MUCK [0 pts]	
☐	SAND (<2 mm) [6 pts]		☐	ARTIFICIAL [3 pts]	

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 TOTAL NUMBER OF SUBSTRATE TYPES: 1

HHEI Metric Points

Substrate Max = 40: 7 (A + B)

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): _____

Pool Depth Max = 30: 0

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

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

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 1

Bankfull Width Max=30: 15

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

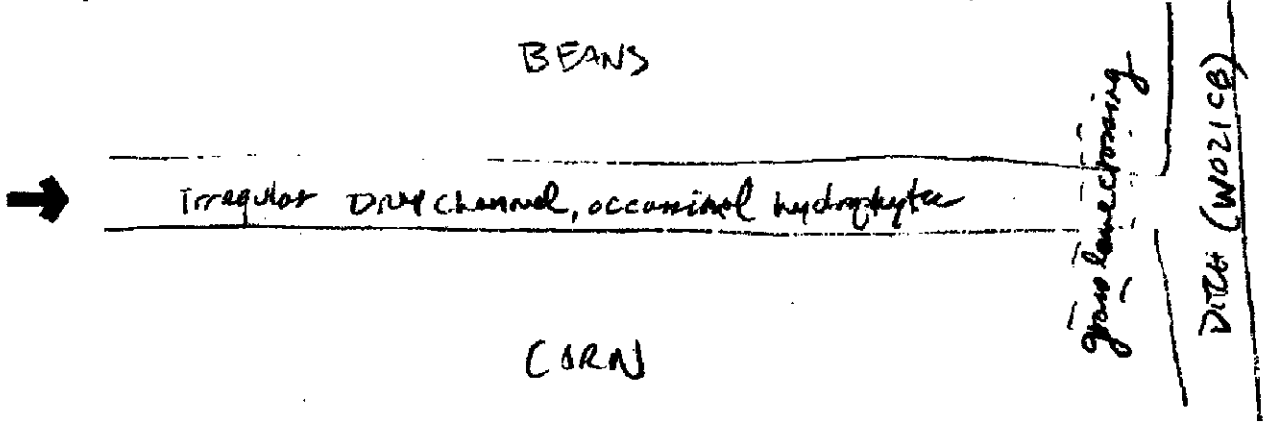
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

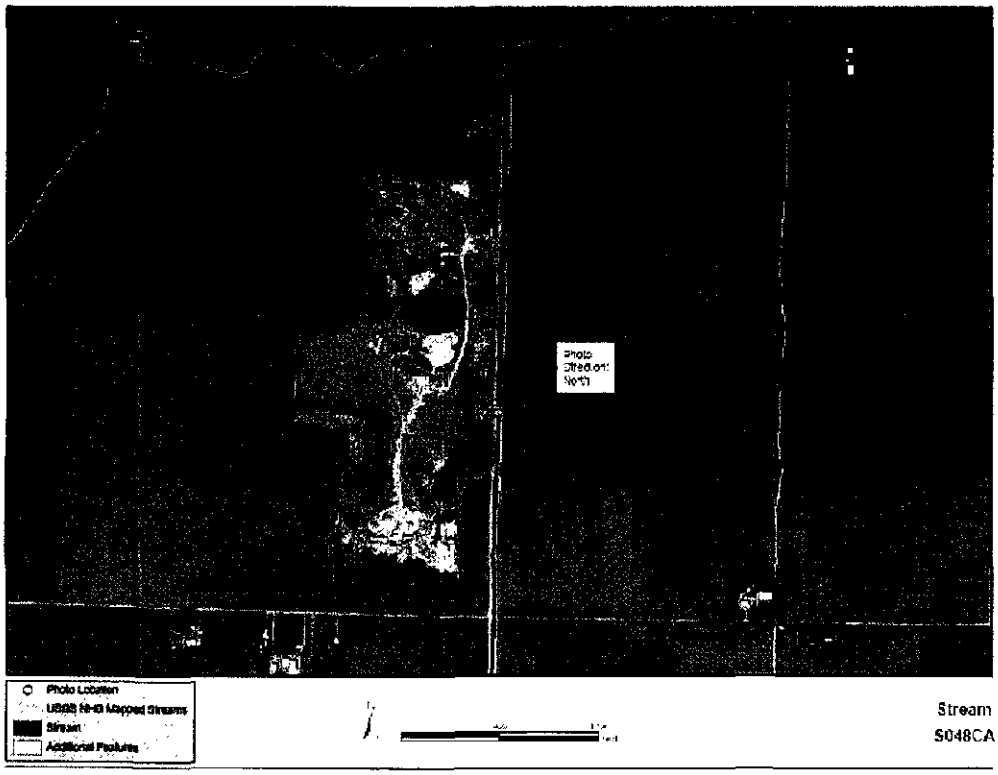
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

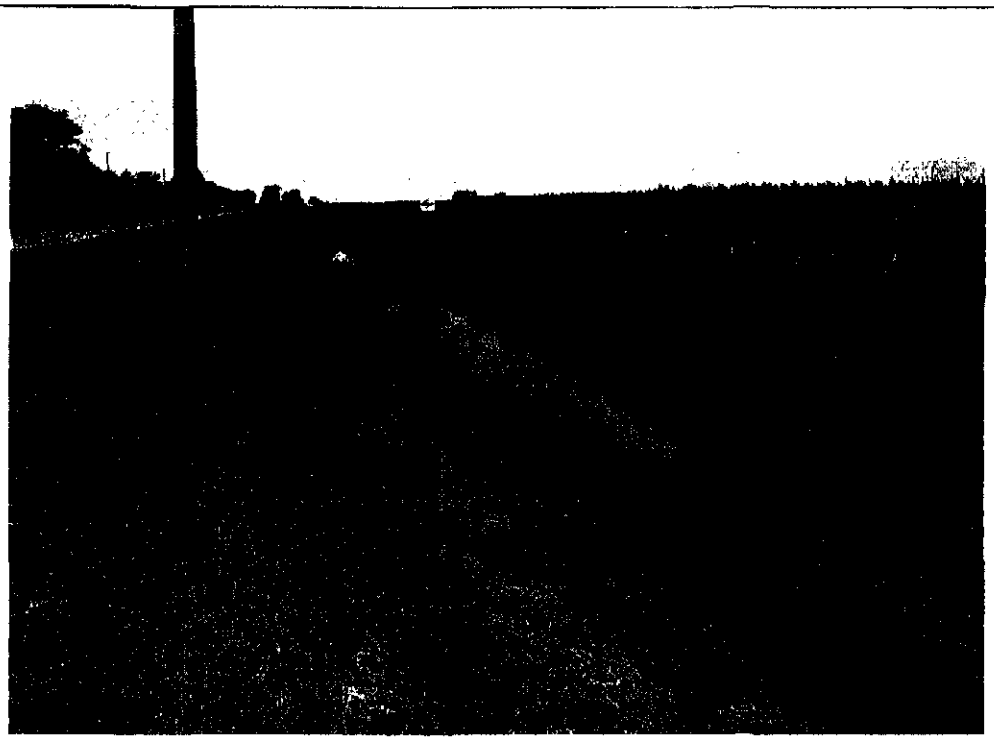
Comments Regarding Biology: _____

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

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







Stream S048CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S048CA	WATERBODY NAME: Unnamed Tributary to Prairie Creek
SITE NAME: Blue Creek	
DATE: 9/20/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH090920.cor / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO: s048aa1

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	18 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 25 (ft)	ORDINARY HIGH WATER MARK WIDTH: 10 (ft)
AVG. BANK HEIGHT:	6 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Herbaceous	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

high flow from gravel pit

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 59

SITE NAME/LOCATION _____

SITE NUMBER 5048A1 RIVER BASIN _____ DRAINAGE AREA (mi²) 0.5

LENGTH OF STREAM REACH (ft) _____ LAT. 40°57'58" LONG. 84°38'55" RIVER CODE _____ RIVER MILE _____

DATE 9/20/09 SCORER Rabosky COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☐☐	SILT [3 pt]	
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☑	COBBLE (65-256 mm) [12 pts]	15%	☑☐	CLAY or HARDPAN [0 pt]	85%
☐☐	GRAVEL (2-64 mm) [9 pts]		☐☐	MUCK [0 pts]	
☐☐	SAND (<2 mm) [6 pts]		☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 15% (A) (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 12 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40

14

A + B

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

- ☑ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Gravel pit flows - artificial? **MAXIMUM POOL DEPTH (centimeters):** 45

Pool Depth Max = 30

20

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 (> 5' 7" - 4' 8") [20 pts]
- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (<=3' 3") [5 pts]

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 4

Bankfull Width Max=30

25

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS gravel pit flow - artificial?

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

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

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

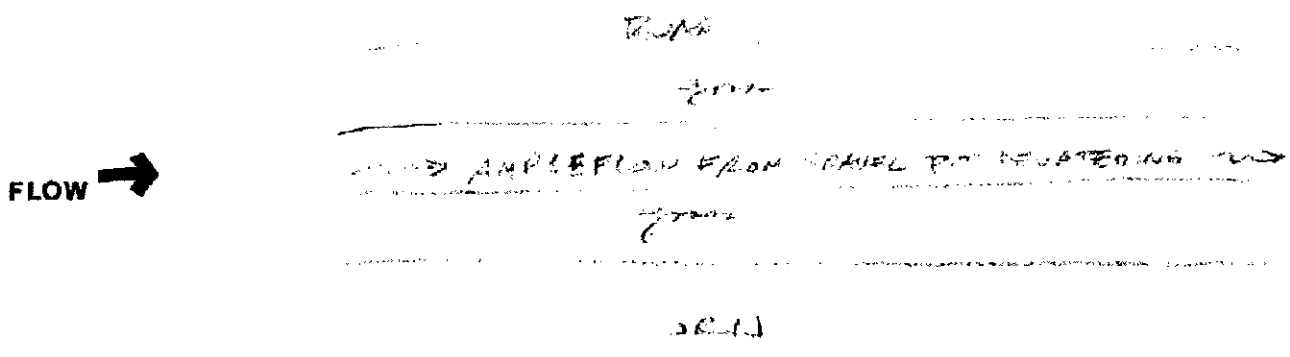
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

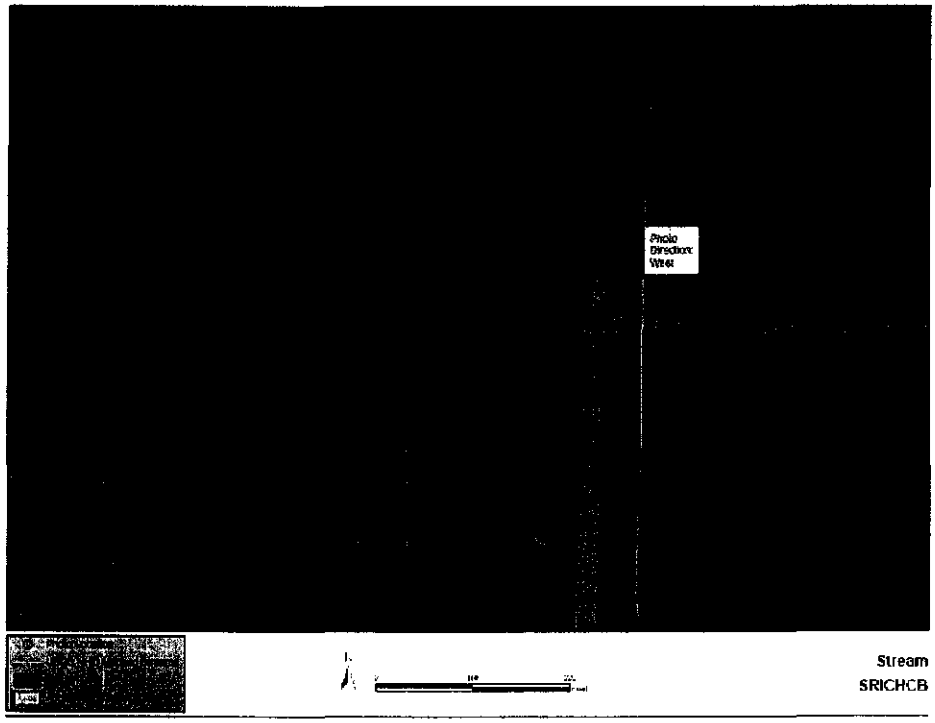
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

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

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





Stream SRICHCB

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: SRICHCB	WATERBODY NAME: Unnamed Tributary to Prairie Creek
SITE NAME: Blue Creek	

DATE: 10/14/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE:	QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO:	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Ephemeral		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 1 (ft)	ORDINARY HIGH WATER MARK WIDTH: 0 (ft)
AVG. BANK HEIGHT:	1 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

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

SITE NAME/LOCATION E Branch

SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) 3.4

LENGTH OF STREAM REACH (ft) _____ LAT. 40°51'11" LONG. 84°20'34" RIVER CODE _____ RIVER MILE 0

DATE 10/7/09 SCORER T. Hood COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]		☑	SILT [3 pt]	90
☐	BOULDER (>256 mm) [16 pts]		☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐	BEDROCK [16 pt]		☐	FINE DETRITUS [3 pts]	
☑	COBBLE (65-256 mm) [12 pts]	10	☐	CLAY or HARDPAN [0 pt]	
☐	GRAVEL (2-64 mm) [9 pts]		☐	MUCK [0 pts]	
☐	SAND (<2 mm) [6 pts]		☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10 (A) (B)

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):

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 0

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 2

HHEI Metric Points

Substrate Max = 40	17
A + B	
Pool Depth Max = 30	0
Bankfull Width Max=30	20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

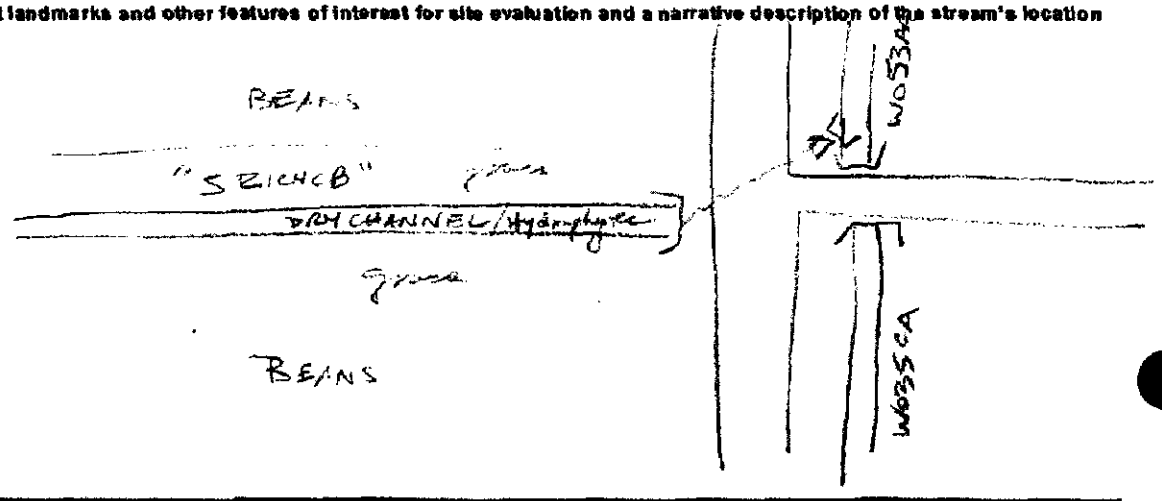
Fish Observed? (Y/N)_____ Voucher? (Y/N) Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

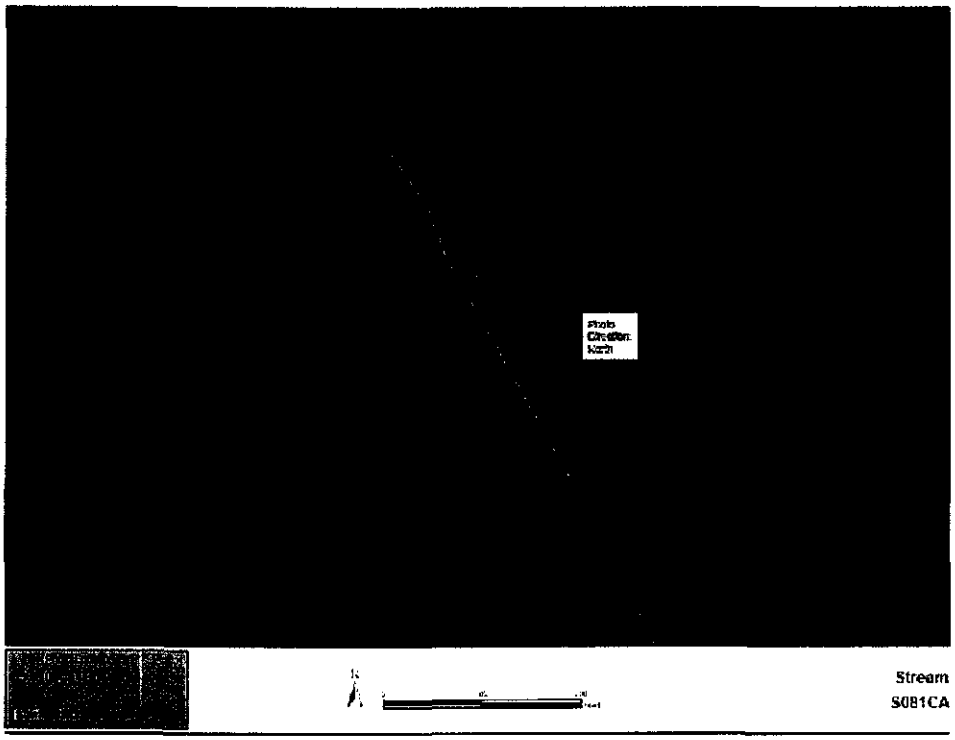
Frogs or Tadpoles Observed? (Y/N) Voucher? (Y/N) Aquatic Macroinvertebrates Observed? (Y/N) Voucher? (Y/N)_____

Comments Regarding Biology: _____

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

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





Stream S081CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S081CA	WATERBODY NAME: Unnamed Tributary to Prairie Cr[illegible]	
SITE NAME: Blue Creek		
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: S082CA	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Ephemeral		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	(ft)	TOP OF BANK: 30 (ft)	ORDINARY HIGH WATER MARK WIDTH: 10 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 15 (ft)	
	TYPE OF VEGETATION PRESENT: Scrub Shrub	
WETLAND FRINGE (IF PRESENT):	Ag in open reaches	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 41

SITE NAME/LOCATION SOBICA

SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) 0.9

LENGTH OF STREAM REACH (ft) _____ LAT. 40°59'51" LONG. 84°37'17" RIVER CODE _____ RIVER MILE _____

DATE 9/18/09 SCORER Hook COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]		☑	SILT [3 pt]	100
☐	BOULDER (>256 mm) [16 pts]		☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐	BEDROCK [16 pt]		☐	FINE DETRITUS [3 pts]	
☐	COBBLE (65-256 mm) [12 pts]		☐	CLAY or HARDPAN [0 pt]	
☐	GRAVEL (2-64 mm) [9 pts]		☐	MUCK [0 pts]	
☐	SAND (<2 mm) [6 pts]		☐	ARTIFICIAL [3 pts]	

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☑ NO WATER OR MOIST CHANNEL [0 pts]

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

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 2

HHEI Metric Points

	Max	Score
Substrate	40	7
A + B		
Pool Depth	30	0
Bankfull Width	30	20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

☑ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

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

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

Elevated Turbidity? (Y/N): N Canopy (% open): 95%

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

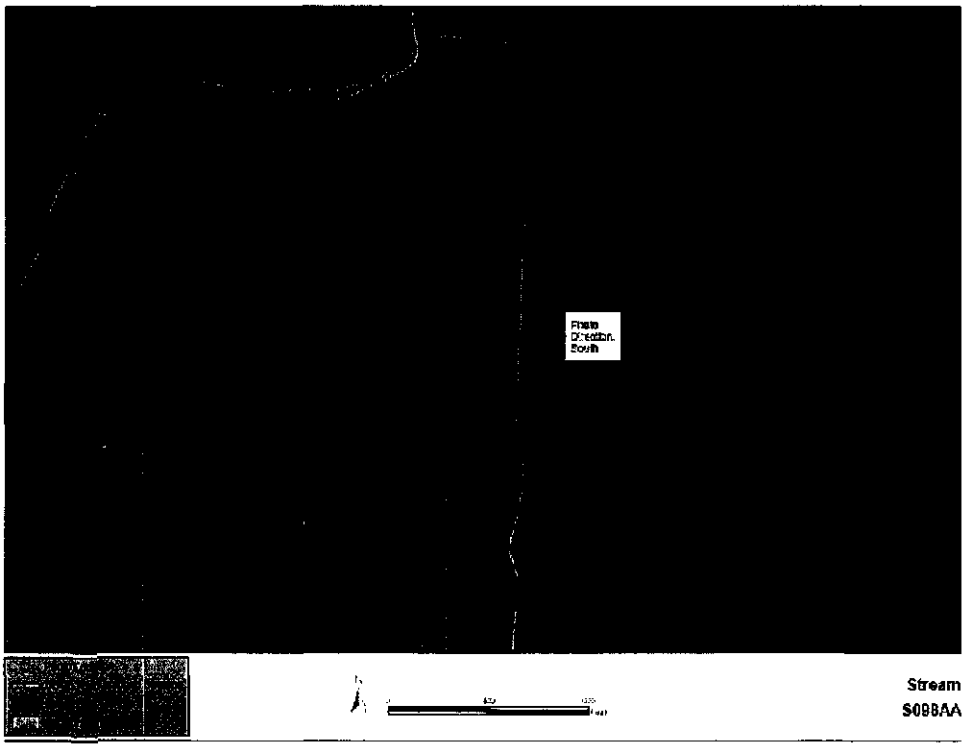
Fish Observed? (Y/N)____ Voucher? (Y/N)____ Salamanders Observed? (Y/N)____ Voucher? (Y/N)____
Frogs or Tadpoles Observed? (Y/N)____ Voucher? (Y/N)____ Aquatic Macroinvertebrates Observed? (Y/N)____ Voucher? (Y/N)____

Comments Regarding Biology: _____

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

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

FLOW →



Stream S098AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S098AA	WATERBODY NAME: Unnamed Tributary to Prairie Creek
SITE NAME: Blue Creek	
DATE: 9/17/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH091709A.cor / QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO:

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Ephemeral		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 15 (ft)	ORDINARY HIGH WATER MARK WIDTH: 6 (ft)
AVG. BANK HEIGHT:	5 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:		
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Scrub Shrub	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:		
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

linear ditch

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

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

SITE NAME/LOCATION _____

SITE NUMBER 5098 HA RIVER BASIN _____ DRAINAGE AREA (mi²) 1.0

LENGTH OF STREAM REACH (ft) _____ LAT. 40°59'10" LONG. 84°36'10" RIVER CODE _____ RIVER MILE _____

DATE 9/12/02 SCORER [illegible] COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]		☑	SILT [3 pt]	100
☐	BOULDER (>256 mm) [16 pts]		☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐	BEDROCK [16 pt]		☐	FINE DETRITUS [3 pts]	
☐	COBBLE (65-256 mm) [12 pts]		☐	CLAY or HARDPAN [0 pt]	
☐	GRAVEL (2-64 mm) [9 pts]		☐	MUCK [0 pts]	
☐	SAND (<2 mm) [6 pts]		☐	ARTIFICIAL [3 pts]	

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

HHEI Metric Points

Substrate Max = 40

7

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS [illegible] **MAXIMUM POOL DEPTH (centimeters):** [ ]

Pool Depth Max = 30

0

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 2

Bankfull Width Max=30

20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

☑ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: VAN WERT Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

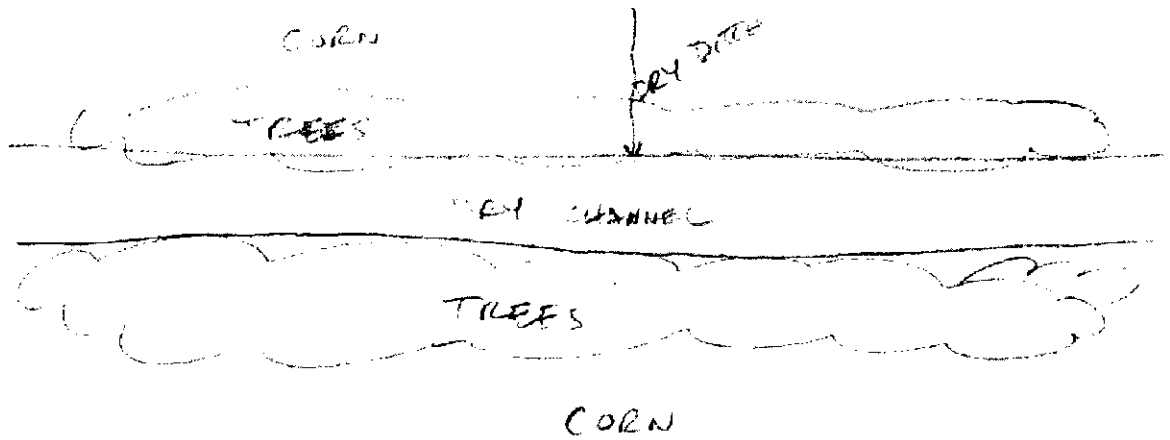
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

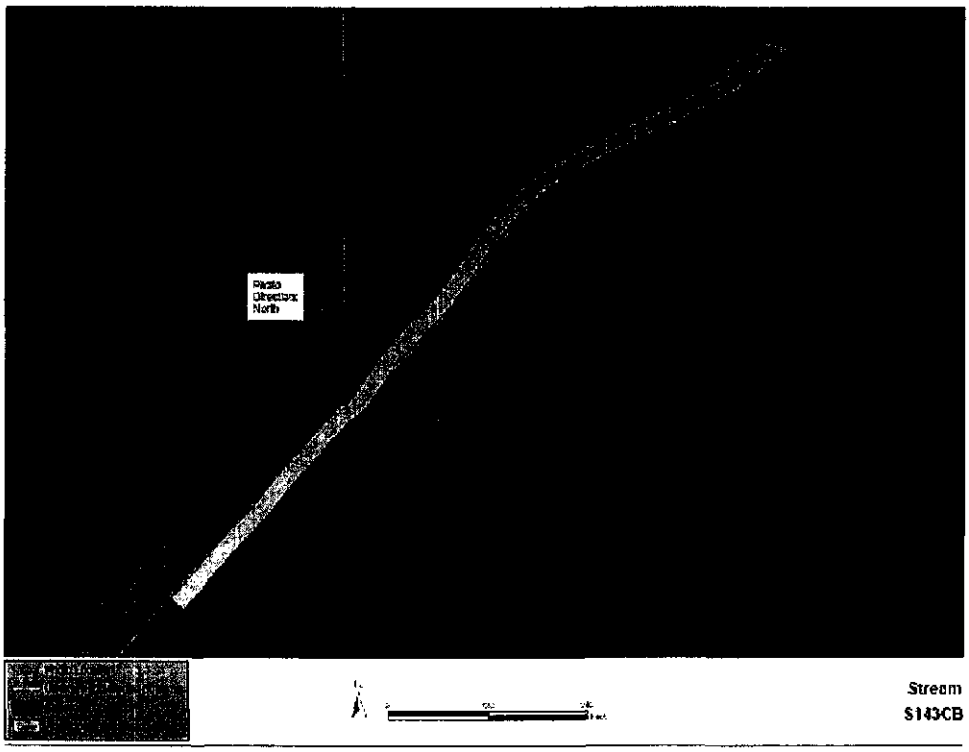
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

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

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





Stream S143CB

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S143CB	WATERBODY NAME: Unnamed Tributary to Prairie Cr[illegible]
SITE NAME: Blue Creek	
DATE: 9/17/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091709ADW.cor / QUAD NAME: Latty
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Blue Creek
	PHOTO NO: 143C12n & 143C13S

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Manipulated channel for drainage from ag fields directly adj to W & E		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 9 (ft)	ORDINARY HIGH WATER MARK WIDTH: 5 (ft)
AVG. BANK HEIGHT:	3 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Vegetation	
POTENTIAL HABITAT FOR:	None	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 10 (ft)	
	TYPE OF VEGETATION PRESENT: Forested	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Highly Erodable	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 30

Stream & Location: [illegible] B **RM:** ___.__ **Date:** 09/17/09

Scorers Full Name & Affiliation: MATT [illegible]

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** 41.00748 / 84.58236 (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
☐ BOULDER [9]			☐ HARDPAN [4]		
☐ COBBLE [8]			☐ DETRITUS [3]		
☐ GRAVEL [7]			☐ MUCK [2]		
☐ SAND [6]			☒ SILT [2]	100	100
☐ BEDROCK [5]			☐ ARTIFICIAL [0]		

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

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

Check ONE (Or 2 & average)

ORIGIN	QUALITY
☒ LIMESTONE [1]	☐ HEAVY [-2]
☐ DIKE [1]	☒ MODERATE [-1]
☐ WETLANDS [0]	☐ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [2]
☐ RIP/RAP [0]	☐ MODERATE [1]
☐ ACUSTURINE [0]	☒ NORMAL [0]
☐ SHALE [1]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT — EMBEDDEDNESS

Substrate 2 — Maximum 20

Comments
No riffles or pools

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.

___ UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	___ OXBOWS/BACKWATERS [1]
2 OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
___ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

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

Comments

Cover Maximum 20 10

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☒ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☒ FAIR [3]	☐ RECOVERING [3]	☒ LOW [1]
☒ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20 9

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

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☐ ☐ NONE/LITTLE [3]	☐ ☐ WIDE >50m [4]	☐ ☐ FOREST/SWAMP [3]
☒ ☒ MODERATE [2]	☒ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☒ NARROW 5-10m [2]	☒ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☐ ☒ OPEN PASTURE, ROWCROP [0]

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

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

Comments

Riparian Maximum 10 5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12 0

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
☐ BEST AREAS >10cm [2]	☐ MAXIMUM >50cm [2]	☐ STABLE (e.g. COBBLE, BOULDER) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM <50cm [1]	☐ MOD. STABLE (e.g. GRAVEL, COBBLE) [1]	☐ LOW [1]
☐ BEST AREAS <5cm [0]		☐ UNSTABLE (e.g. FINE GRAVEL, SAND) [0]	☐ MODERATE [0]
[metric=0]			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8 0

6] GRADIENT (3.8 ft/mi)
DRAINAGE AREA (1.49 mi²)

☒ VERY LOW-LOW [1]
☐ MODERATE [0]
☐ HIGH [-1]

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

Gradient Maximum 10 4

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ 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

_____ meters

CLARITY

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

CANOPY

1st pass _____ cm

2nd _____ cm

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

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

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

B] AESTHETICS

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

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

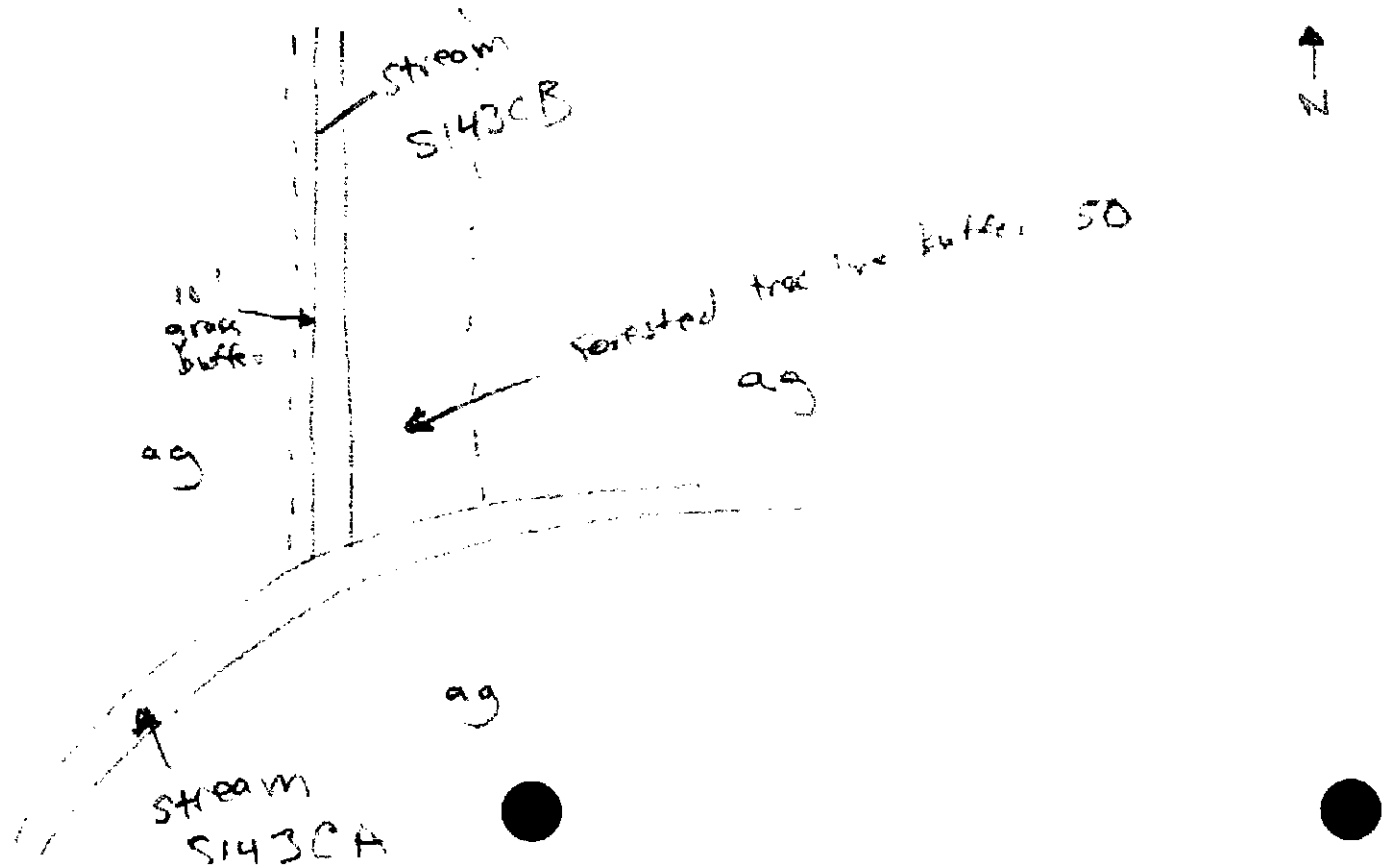
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

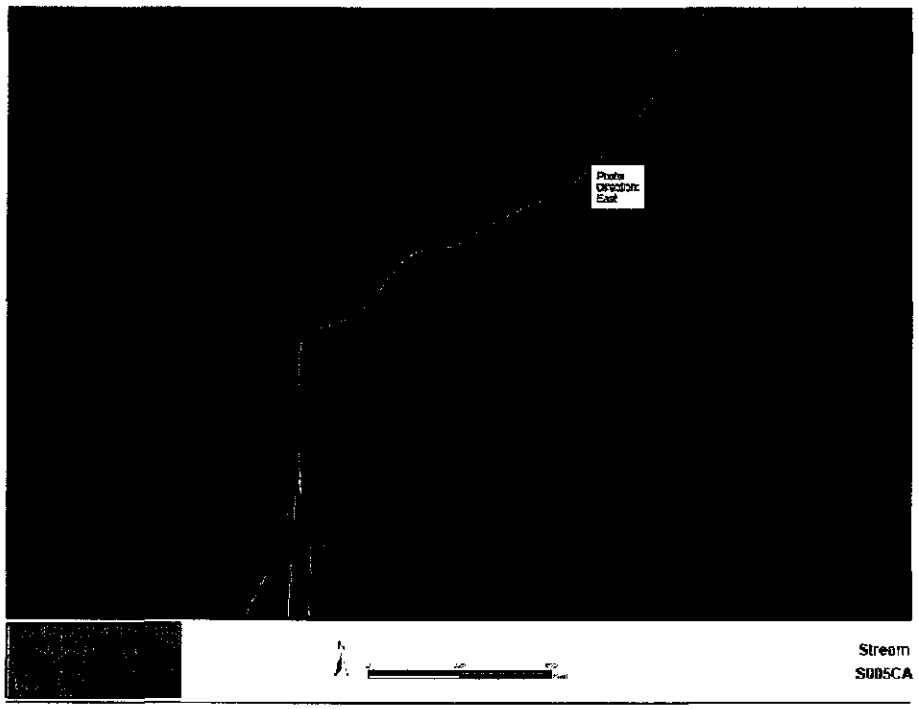
- x̄ width 5'
- x̄ depth dry
- max. depth dry
- x̄ bankfull width 8'
- bankfull x̄ depth 3'
- W/D ratio
- bankfull max. depth 3'
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



Upper Prairie Creek



Stream S005CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S005CA-1	WATERBODY NAME: Upper Prairie Creek
SITE NAME: Blue Creek	
DATE: 9/20/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH090920.cor / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO: a005aa5 a005aa6

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	8 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 45 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	15 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Herbaceous	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Sloughing Banks	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

upper prairie creek

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S005CA-2**	WATERBODY NAME: **Upper Prairie Creek**	
SITE NAME: **Blue Creek**		
DATE: 9/20/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090920.cor	QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: a005aa1 a005aa2	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	18 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	15 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Herbaceous	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	*Highly Erodable*	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

upper prairie creek

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; *no barriers to fish movement (seasonal water withdrawals prevent movement)*; many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 39.5

Stream & Location: S005 - A (UPPER PAINT CREEK) **RM:** 1.0 **Date:** 9/20/05

Scorers Full Name & Affiliation: ZHOOK / CEM 4120

River Code: ___-___-___ **STORET #:** ___ **Lat./Long.:** (NAD 83 - decimal) 40° 59' 11" 83° 40' 42" Office ver. location ☐

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

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR/SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]		
☐ ☑ COBBLE [8]	25%		☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]			☐ ☐ SILT [2]		
☑ ☐ SAND [6]	15%		☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

ORIGIN		QUALITY
☐ LIMESTONE [1]		☐ HEAVY [-2]
☑ TILLS [1]	SILT	☐ MODERATE [-1]
☐ WETLANDS [0]		☑ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]
☐ RIP/RAP [0]		☑ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Check ONE (Or 2 & average)

Substrate 14 Maximum 20

Comments

No riffle/pool

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.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]	
1 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]	
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]	
____ ROOTMATS [1]			

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

Comments

Cover Maximum 20: 4

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: [illegible]

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

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☑ ☐ NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]
☐ ☑ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☑ FENCED PASTURE [1]
	☑ ☑ NONE [0]	☑ ☑ OPEN PASTURE, ROWCROP [0]

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

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

2.5 < [illegible]

Comments

Riparian Maximum 10: 2.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (Or 2 & average)
☑ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 5

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: —

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

DRAINAGE AREA (6.7 mi²)

%POOL: 10% %GLIDE: 40% %RUN: ____ %RIFFLE: ____

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLE REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☐ WADE
- ☐ L. SIDE
- ☐ OTHER

STAGE

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

DISTANCE
- ☐ 1st Rm
- ☐ 2nd Rm
- ☐ 3rd Rm
- ☐ 4th Rm
- ☐ OTHER

_____ meters

CLARITY

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

CANOPY
- ☒ >95%-OPEN
- ☐ 85%-<95%
- ☐ 60%-<85%
- ☐ 15%-<60%
- ☐ <15%- CLOSED

1st _____ cm
2nd _____ cm

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☒ NUISANCE MACROPHYTES
- ☐ EXCESS FOAM/FLOTSAM
- ☐ ODOR/SEPTIC
- ☐ FECAL/TRASH
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODOR
- ☐ SLUDGE DEPOSITS
- ☐ CSO/SSO/OUTFALLS

C] RECREATION AREA DEPTH
POOL: ☐>100ft² ☐>3ft

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
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

Circle some & COMMENT

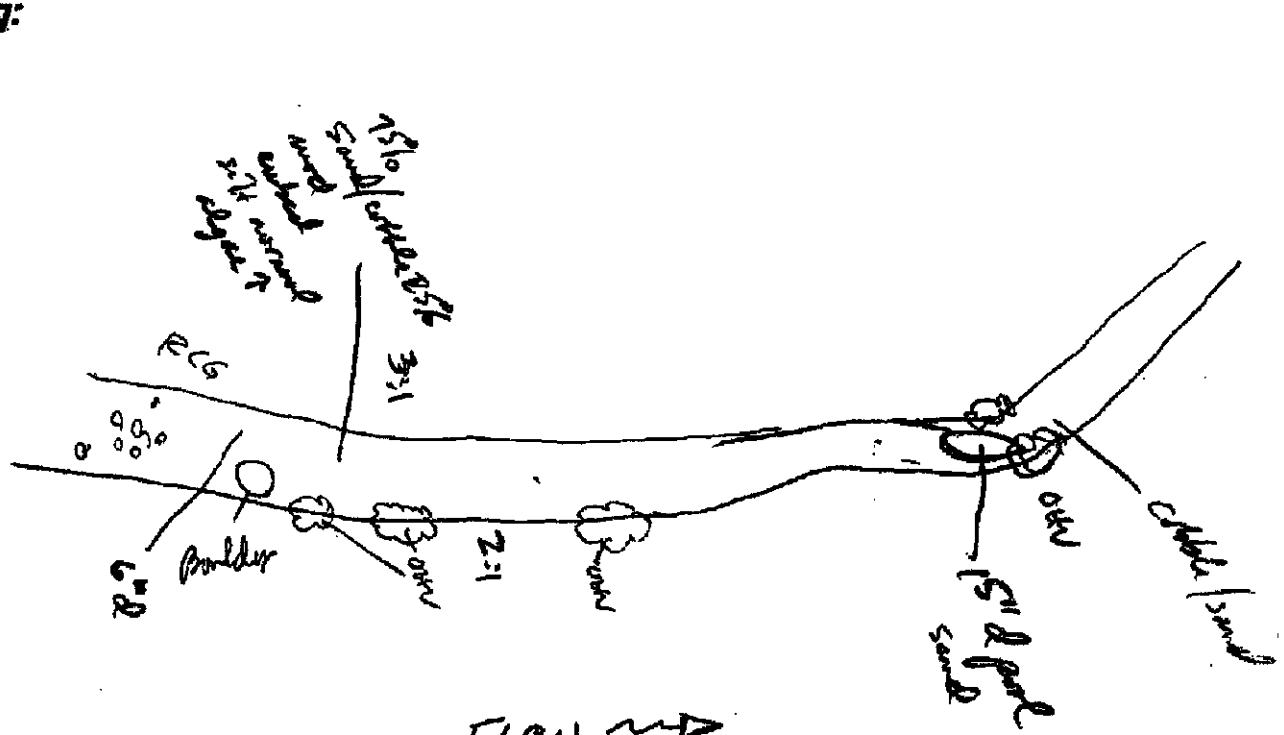
E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS
X-width
X depth
max. depth
X bankfull width
bankfull X depth
W/D ratio
bankfull max. depth
floodprone x^2 width
entrench. ratio
Legacy Tree:

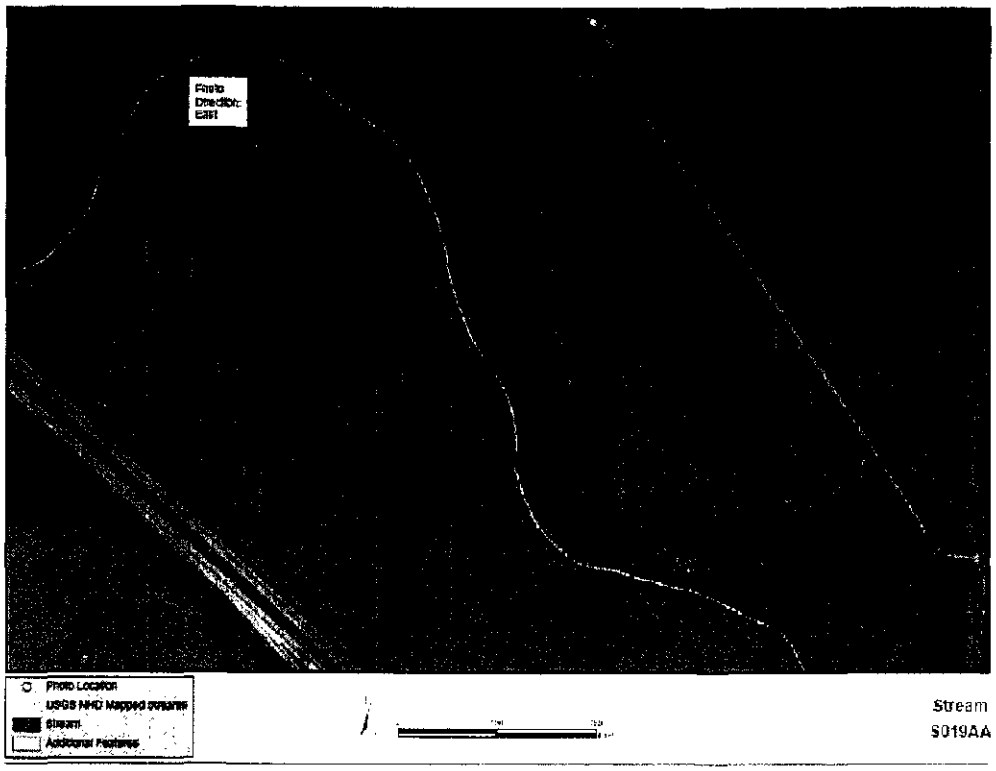
Comment RE: Reach consistency/ Is reach typical of steam?, Recre[illegible] Observed - Inferred, *Other*/ Sampling observations, Concerns, Access directions, e[illegible]

Reed Canary grass abundant

Stream Drawing:



Hagerman Creek



Stream S019AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S019AA	WATERBODY NAME: Hagerman Creek
SITE NAME: Blue Creek	
DATE: 9/21/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./ Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH090921.cor / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Tully
	PHOTO NO: a019aa

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Stream		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	10 (in)		
AVG. STREAM WIDTH:	9 (ft)	TOP OF BANK: 20 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Phalaris arundinacea, Saggitaria sp., Leersia oryzoides	
CHANNEL CONDITION:	Sloughing Banks	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 39

Stream & Location: 2019AA **RM:** ___ **Date:** 09/21/09

Scorers Full Name & Affiliation: MATTHEW [illegible] CHER

River Code: ___ - ___ - **STORET #:** ___ **Lat./Long.:** 40.93158 / 84.68875 (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
☐ BOULDER [10]			☐ HARDPAN [4]		
☐ COBBLE [8]			☐ DETRITUS [3]		
☒ GRAVEL [7]	5		☐ MUCK [2]		
☐ SAND [6]			☒ SILT [2]	60	
☐ BEDROCK [5]			☐ ARTIFICIAL [0]		

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

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

Check ONE (Or 2 & average)

ORIGIN: ☒ LIMESTONE [1] ☐ TILLS [0] ☐ WETLAND [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIPRAP [0] ☐ LACUSTRINE [0] ☐ SHALE [1] ☐ COAL FINES [-2]

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

SILT / EMBEDDEDNESS

Substrat: 4 Maximum 20

Comments No riffles

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.

___ UNDERCUT BANKS [1]	___ POOLS >70cm [2]	___ OXBOWS/BACKWATERS [1]
2 OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]
___ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

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

Comments

Cover Maximum 20: 10

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☒ HIGH [3]
☐ MODERATE [3]	☒ GOOD [5]	☒ RECOVERED [4]	☒ MODERATE [2]
☒ LOW [2]	☒ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 12.5

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

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☒ ☒ NONE / LITTLE [3]	☐ ☐ WIDE >50m [4]	☐ ☐ FOREST / SWAMP [3]
☐ ☐ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☒ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☒ VERY NARROW <5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☒ ☒ OPEN PASTURE, ROWCROP [0]

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

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

Comments

Riparian Maximum 10: 4.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)
☐ >1m [6] ☐ 0.7-1m [3] ☐ 0.4-0.7m [2] ☒ 0.2-0.4m [1] ☐ <0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2] ☒ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☒ SWIFT [1] ☐ VERY FAST [1] ☐ INTERSTITIAL [-1] ☐ FAST [1] ☐ INTERMITTENT [-2] ☒ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 4

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

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

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (4.2 ft/mi)
DRAINAGE AREA (2.29 mi²)
☒ VERY LOW-LOW [2.4] ☐ MODERATE [3.0] ☐ HIGH-VERY HIGH [3.6]

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

Gradient Maximum 10: 4

EPA 4520 06/16/06

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

_____ meters

STAGE

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

CLARITY

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

1st pass _____ cm

2nd _____ cm

CANOPY

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

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

B] AESTHETICS

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

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

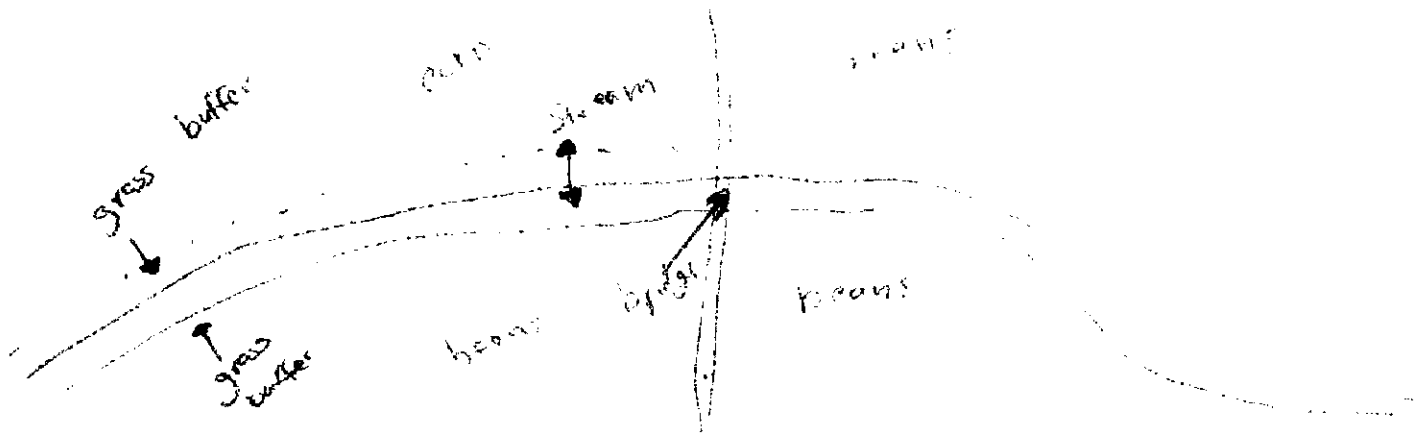
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

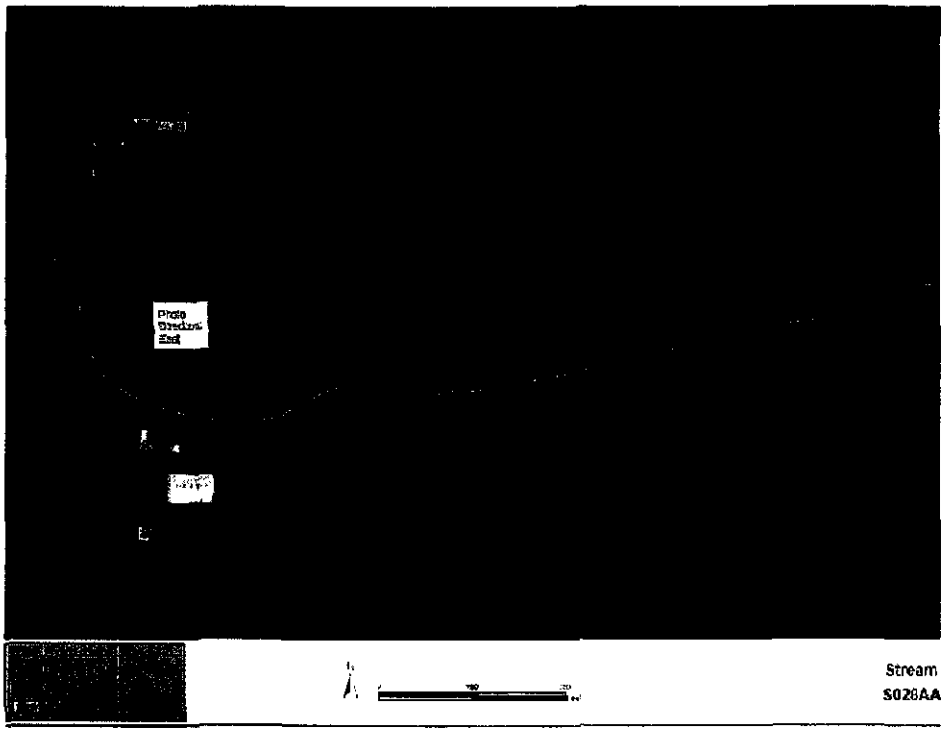
F] MEASUREMENTS

- x̄ width 20'
- x̄ depth 6'10"
- max. depth
- x̄ bankfull width 15.'
- bankfull x̄ depth 5'
- W/D ratio
- bankfull max. depth 4'
- floodprone x^2 width
- entrench. ratio
- *Legacy Tree:*

Stream Drawing:

N





Stream S028AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S028AA	WATERBODY NAME: Hagerman Creek
SITE NAME: Blue Creek	
DATE: 9/21/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH090921.cor / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO: W024aa2

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Stream		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 20 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Phalaris arundinacea	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 37.5

Stream & Location: 028 AA **RM:** ____ **Date:** 9/21/99

Scorers Full Name & Affiliation: MATTHEW JOSHUA

River Code: ___-___-___ **STORET #:** ____ **Lat./ Long.:** (NAD 83 - decimal °) 40 .92583 84 .67948 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
☐☐ BLDR/SLABS [10]			☒☐ HARDPAN [4]	100	
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☐ COBBLE [8]			☐☐ MUCK [2]		
☐☐ GRAVEL [7]			☐☐ SILT [2]		100
☐☐ SAND [6]			☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

ORIGIN	QUALITY
☒ LIMESTONE [1]	☒ HEAVY [2]
☐ TILL [0]	☐ MODERATE [1]
☐ WETLANDS [0]	☐ NORMAL [0]
☐ PARTING [0]	☐ FREE [1]
☐ SANDSTONE [0]	☒ EXTENSIVE [2]
☐ RIP/RAP [0]	☐ MODERATE [1]
☐ ALLUVIUM [0]	☐ NORMAL [0]
☐ SHALE [0]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT — EMBEDDEDNESS

Substrat: 3 Maximun 20

Comments

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

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS/BACKWATERS [1]	
2 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]	
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]	
1 ROOTMATS [1]			

AMOUNT Check ONE (Or 2 & average)

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

Comments

Cover Maximum 20: 10

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☒ HIGH [3]
☐ MODERATE [3]	☒ GOOD [5]	☒ RECOVERED [4]	☒ MODERATE [2]
☒ LOW [2]	☒ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 12.5

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: 4

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)

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

CHANNEL WIDTH Check ONE (Or 2 & average)

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

CURRENT VELOCITY Check ALL that apply

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

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 4

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

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

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (3.8 ft/mi) ☒ VERY LOW-LOW [2+1] ☐ MODERATE [0] ☐ HIGH-VERY HIGH [-1-0]

DRAINAGE AREA (2.90 mi²)

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

Gradient Maximum 10: 4

EPA 4520 06/16/06

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

_____ meters

STAGE

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

CLARITY

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

1st _____ cm pass 2nd _____ cm

CANOPY

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

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

B] AESTHETICS

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

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

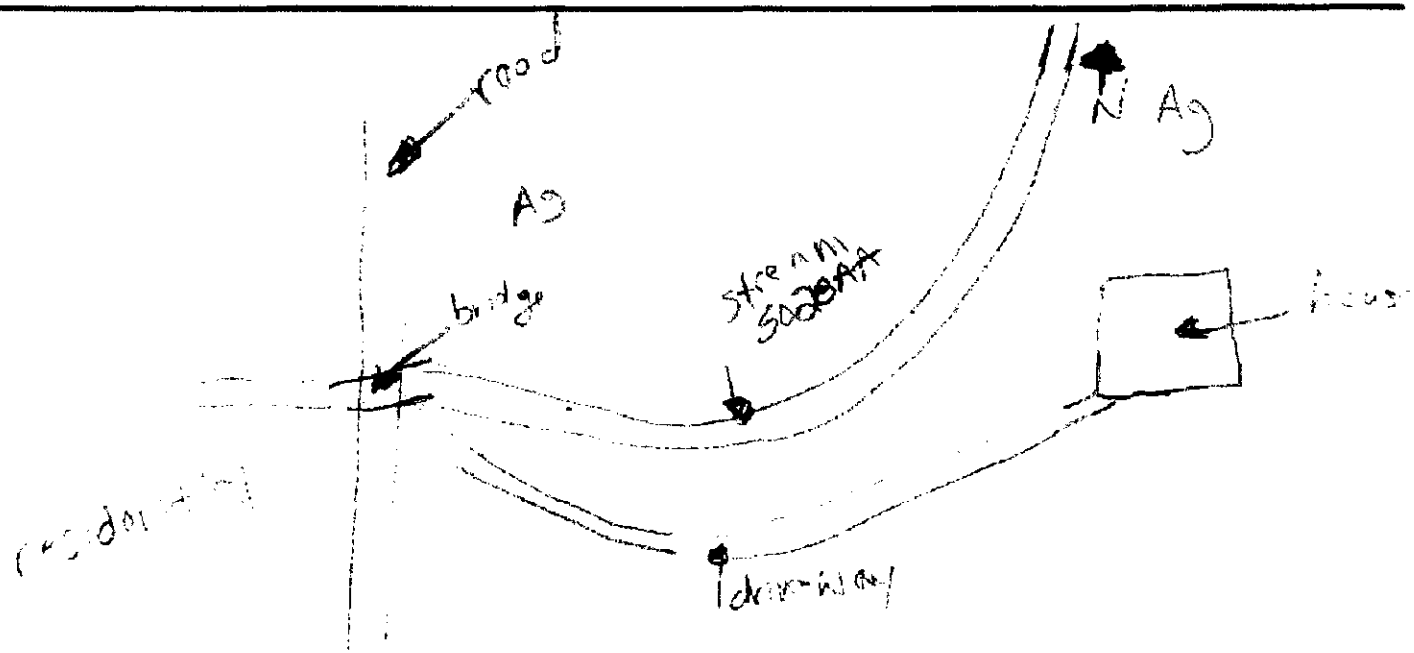
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

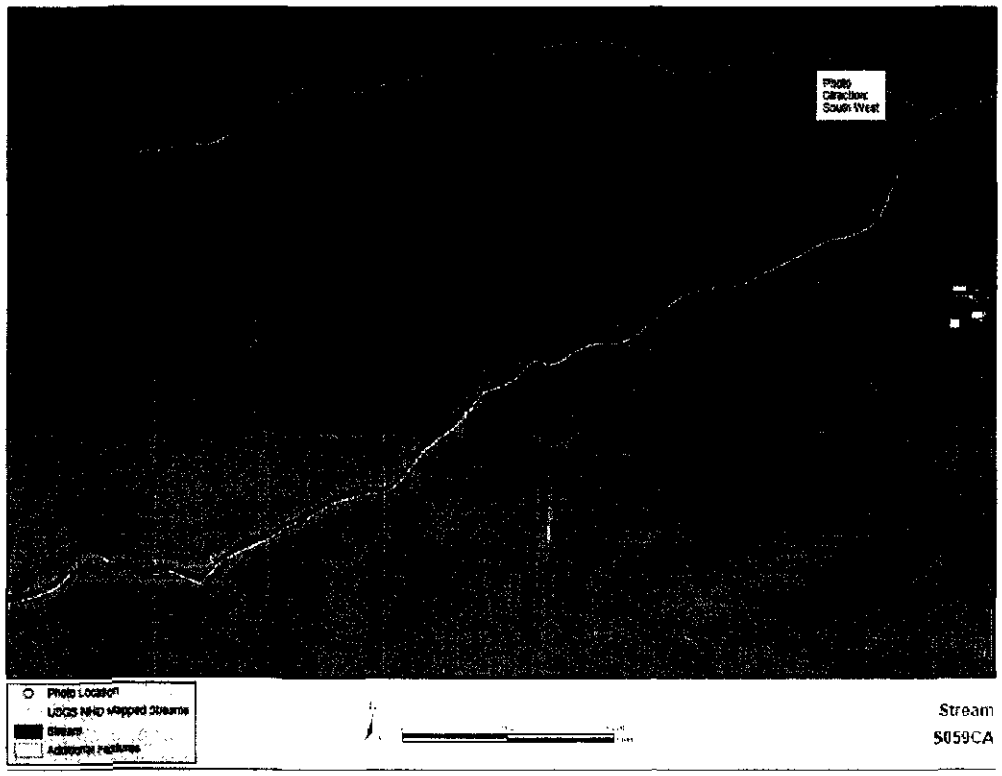
F] MEASUREMENTS

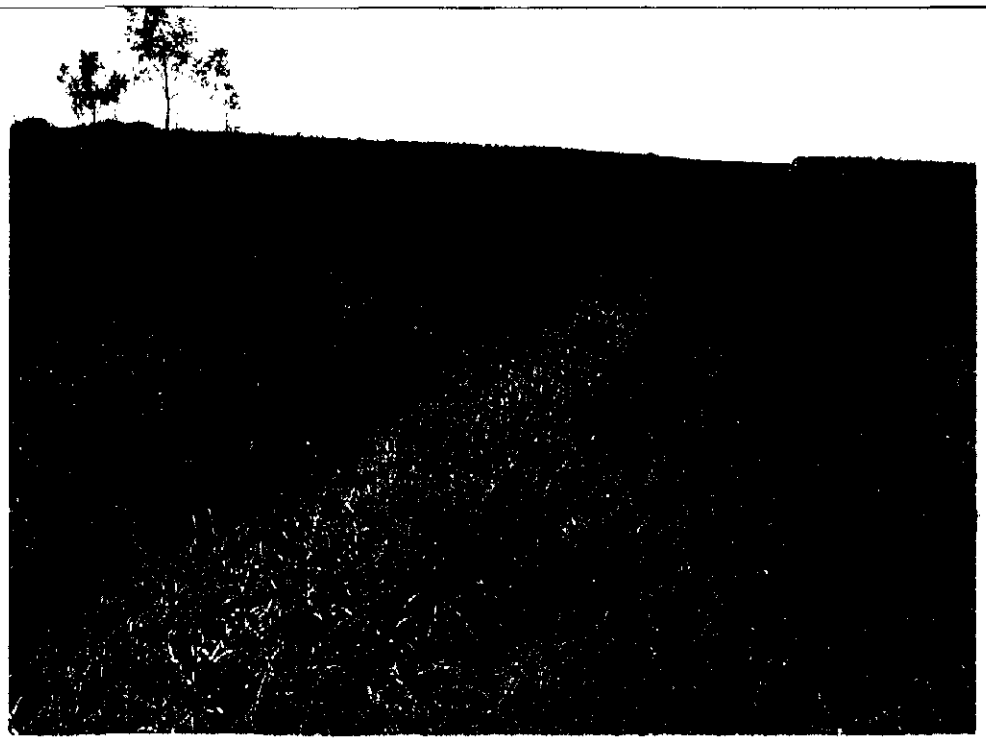
- x̄ width 4'
- x̄ depth 10"
- max. depth 1'
- x̄ bankfull width 10'
- bankfull x̄ depth 3'
- W/D ratio
- bankfull max. depth 4'
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:







Stream S059CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S059CA-1	WATERBODY NAME: Hagerman Creek
SITE NAME: Blue Creek	
DATE: 9/19/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: Hook	ROVER FILE: RAH090919B.cor / QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO: s59ca3

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	9 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Other	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Phalaris arundinacea	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S059CA-2**	WATERBODY NAME: **Hagerman Creek**	
SITE NAME: Blue Creek		
DATE: 9/19/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090919B.cor	QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s59ca	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Phalaris arundinacea	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 41

Stream & Location: Hoggerman Crk S of Troy **RM:** ____.1 **Date:** 9/19/29

Scorers Full Name & Affiliation: R Hook / CH2M HILL

River Code: ___-___-___ **STORET #:** **Lat./ Long.:** 40° 56' 00" 84° 38' 43" (NAD 83 - decimal) **Office ver. 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
☐☐ BLDR/SLABS [10]	____	____	☑☑ HARDPAN [4]	____	____	☐ LIMESTONE [1]	☐ HEAVY [-2]
☐☐ BOULDER [9]	____	____	☐☐ DETRITUS [3]	____	____	☐ TILLS [1]	☐ MODERATE [-1]
☐☐ COBBLE [8]	____	____	☐☐ MUCK [2]	____	____	☐ WETLANDS [0]	☑ NORMAL [0]
☐☐ GRAVEL [7]	____	____	☐☐ SILT [2]	____	____	☑ HARDPAN [0]	☐ FREE [1]
☐☐ SAND [6]	____	____	☐☐ ARTIFICIAL [0]	____	____	☐ SANDSTONE [0]	☐ EXTENSIVE [-2]
☐☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)			☐ RIP/RAP [0]	☐ MODERATE [-1]
						☐ LACUSTURINE [0]	☑ NORMAL [0]
						☐ SHALE [-1]	☐ NONE [1]
						☐ COAL FINES [-2]	

SILT / EMBEDDEDNESS

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

Comments

Substrate 8 / 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.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]	
3 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]	
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]	
____ ROOTMATS [1]			

AMOUNT Check ONE (Or 2 & average)

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

Comments

Cover Maximum 20: 12

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☑ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: [illegible]

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: 3

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)

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

CHANNEL WIDTH Check ONE (Or 2 & average)

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

CURRENT VELOCITY Check ALL that apply

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

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 3

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: —

6] GRADIENT (3.5 ft/mi) DRAINAGE AREA (5.5 mi²)

☐ VERY LOW - LOW [2-4] ☐ MODERATE [5-10] ☐ HIGH - VERY HIGH [10-6]

%POOL: ____ %GLIDE: 100% %RUN: ____ %RIFFLE: ____

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

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

DISTANCE
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ OTHER

_____ meters

CLARITY

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

CANOPY
- ☐ > 80% - OPEN
- ☐ 60% - <80%
- ☐ 40% - <60%
- ☐ 20% - <40%
- ☐ <20% - CLOSED

1st _____ cm
2nd _____ cm

C] RECREATION AREA DEPTH
POOL: ☐ >100M² ☐ >3ft

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]

D] MAINTENANCE
Circle some & COMMENT
- 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

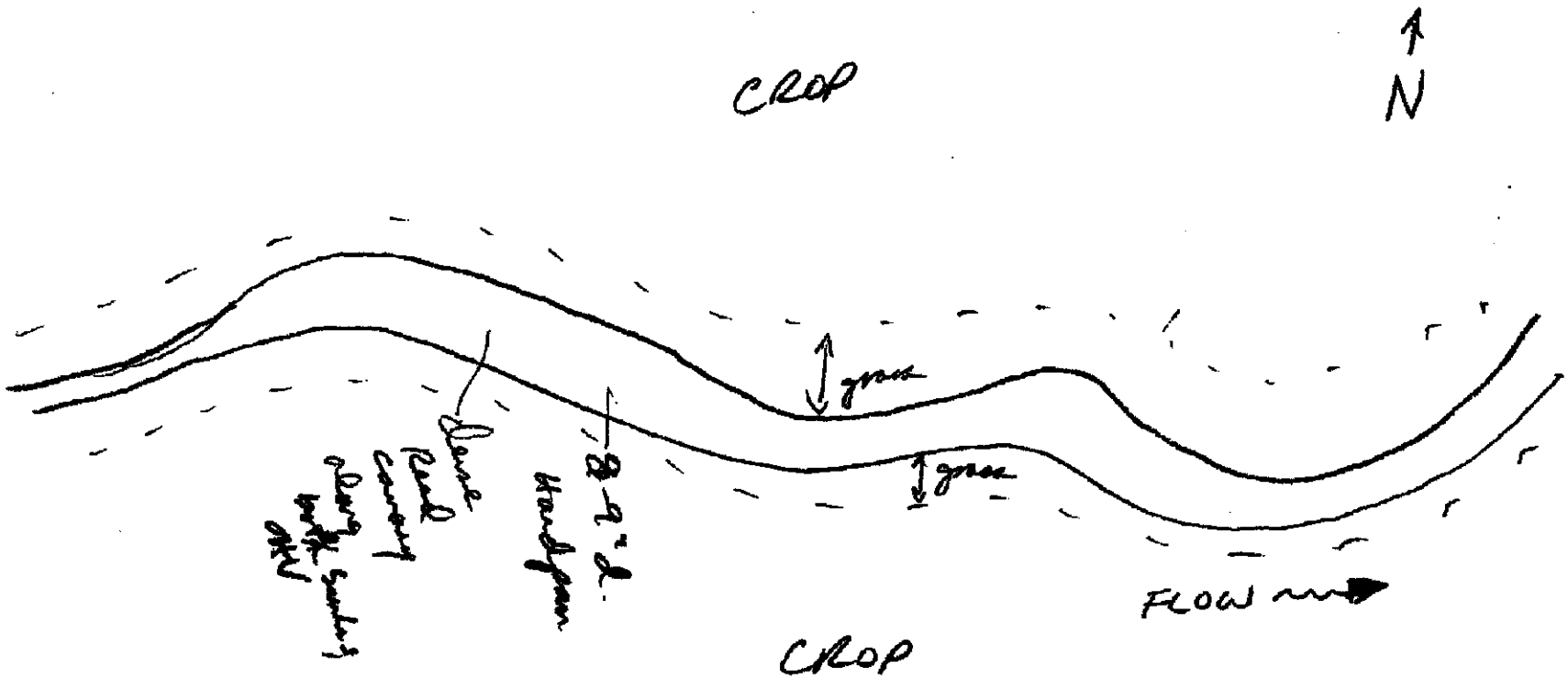
E] ISSUES
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H_20 / TILE / H_20 TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

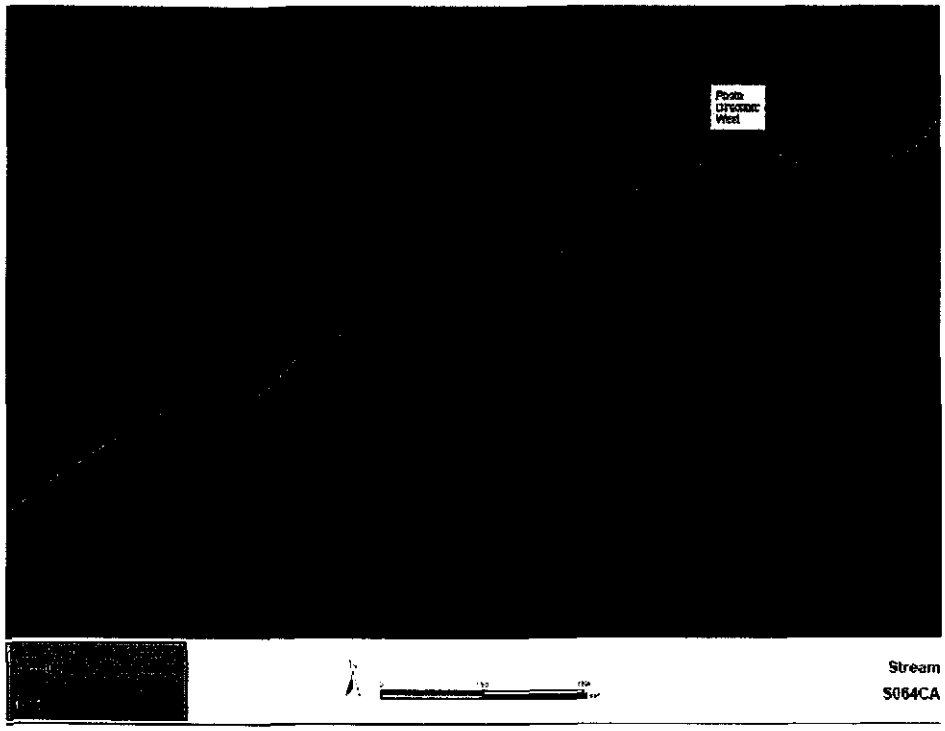
F] MEASUREMENTS
- $\bar{x}$ width
- $\bar{x}$ depth
- max. depth
- $\bar{x}$ bankfull width
- bankfull $\bar{x}$ depth
- W/D ratio
- bankfull max. depth
- floodprone² width
- entrench. ratio

Legacy Tree:

Comment RE: Reach consistency/ Is reach typical of stream?, Recre[illegible] Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, et[illegible]

Stream Drawing:





Stream S064CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S064CA	WATERBODY NAME: Hagerman Creek	
SITE NAME: Blue Creek		
DATE: 9/19/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090919B.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s64ca	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 35 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Phalaris arundinacea	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

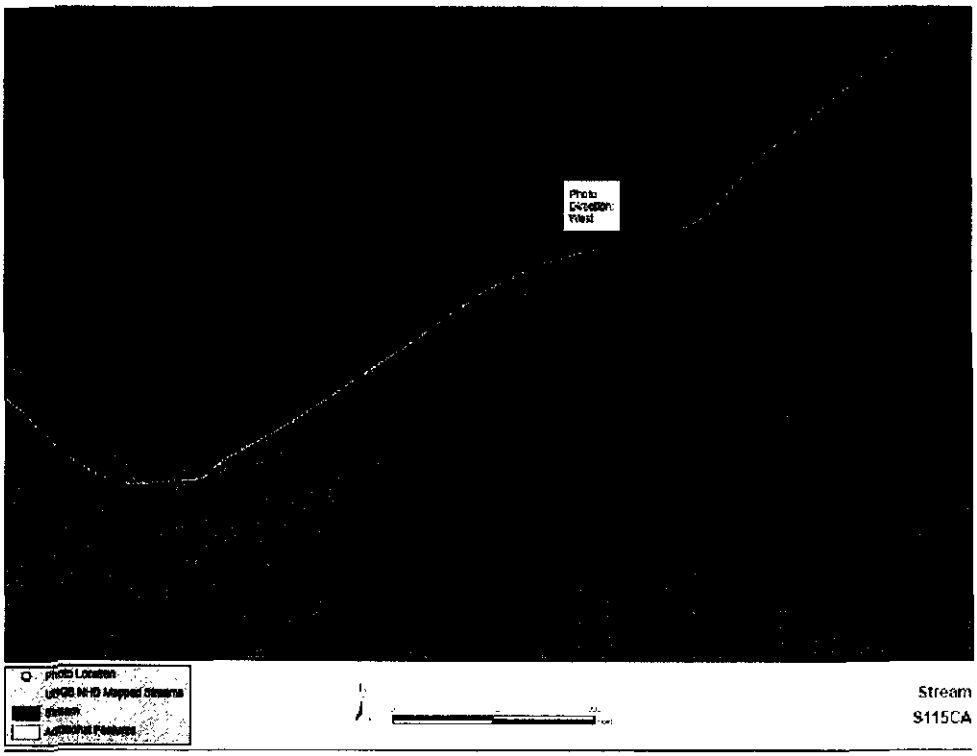
COMMENTS

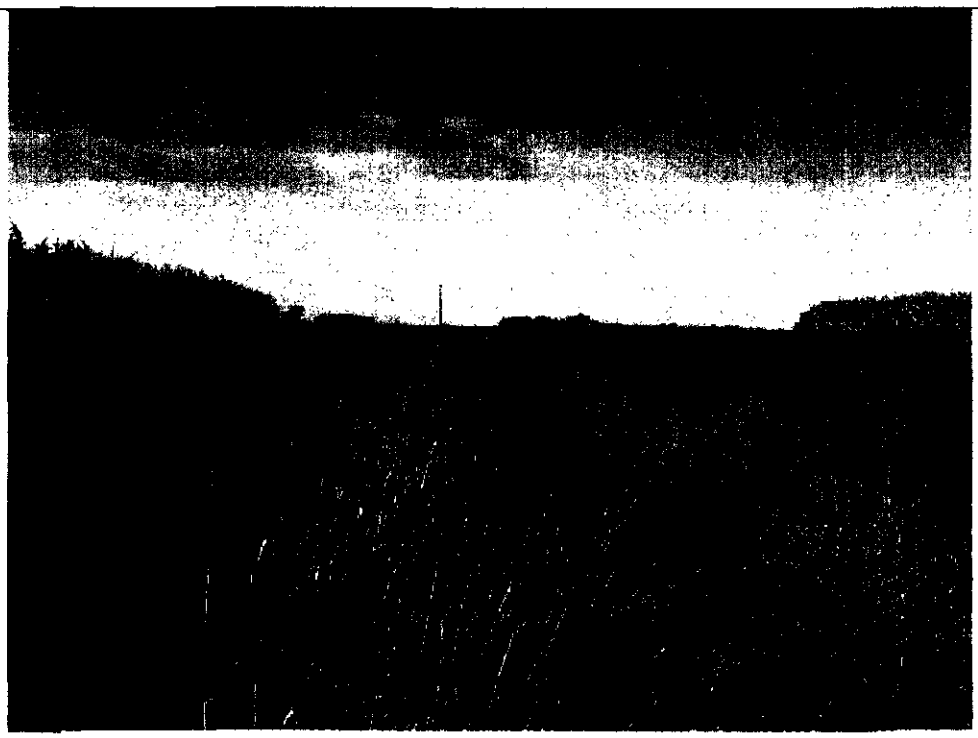
STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.





Stream S115CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S115CA	WATERBODY NAME: Hagerman Creek	
SITE NAME: Blue Creek		
DATE: 9/19/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090919B.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s115ca	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	6 (in)		
AVG. STREAM WIDTH:	7 (ft)	TOP OF BANK: 35 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Phalaris arundinace and Scirpus validus	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

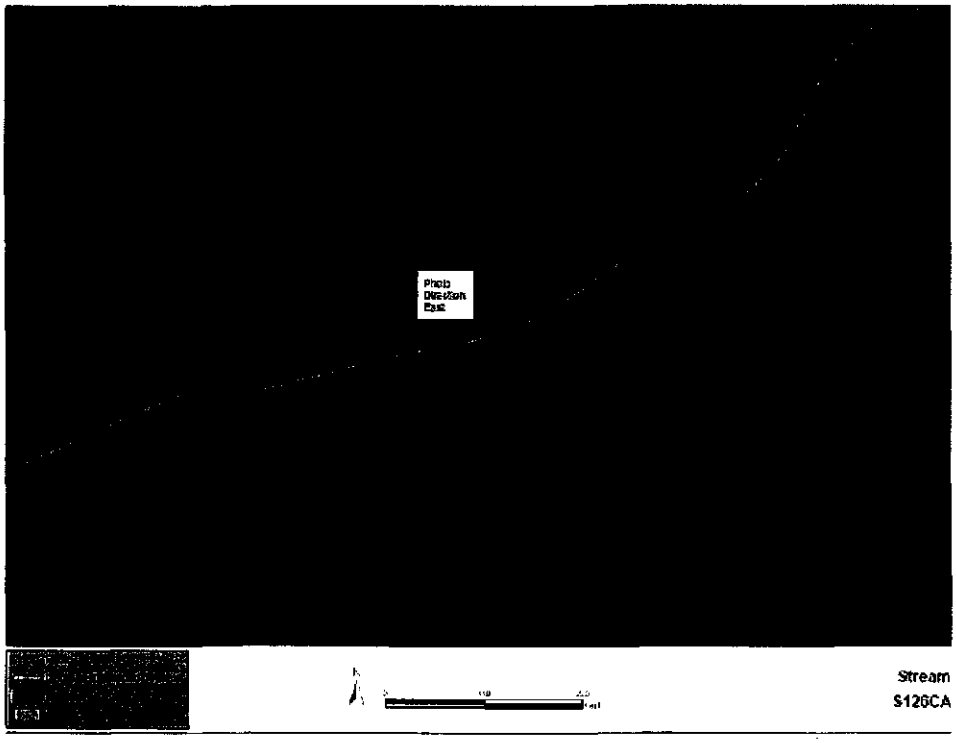
COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.



Stream S126CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S126CA**	WATERBODY NAME: **Hagerman Creek**
SITE NAME: **Blue Creek**	

DATE: **9/18/2009**	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm

INVESTIGATORS: RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s126ca	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	9 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 25 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 25 (ft)	
	TYPE OF VEGETATION PRESENT: Forested	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

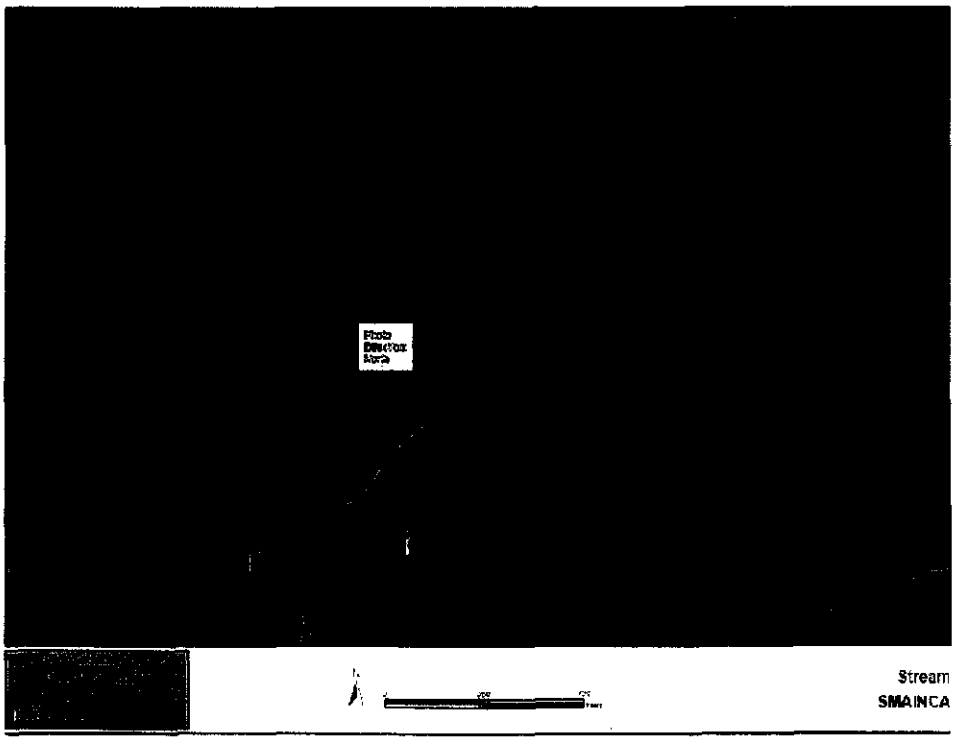
COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.



Stream SMAINCA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **SMAINCA-1**	WATERBODY NAME: **Hagerman Creek**	
SITE NAME: **Blue Creek**		
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: smainca2	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	10 (in)		
AVG. STREAM WIDTH:	10 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 20 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 75 (ft)	
	TYPE OF VEGETATION PRESENT: Forested	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: SMAINCA-2	WATERBODY NAME: Hagerman Creek
SITE NAME: Blue Creek	

DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm

INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: 133c2	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	6 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

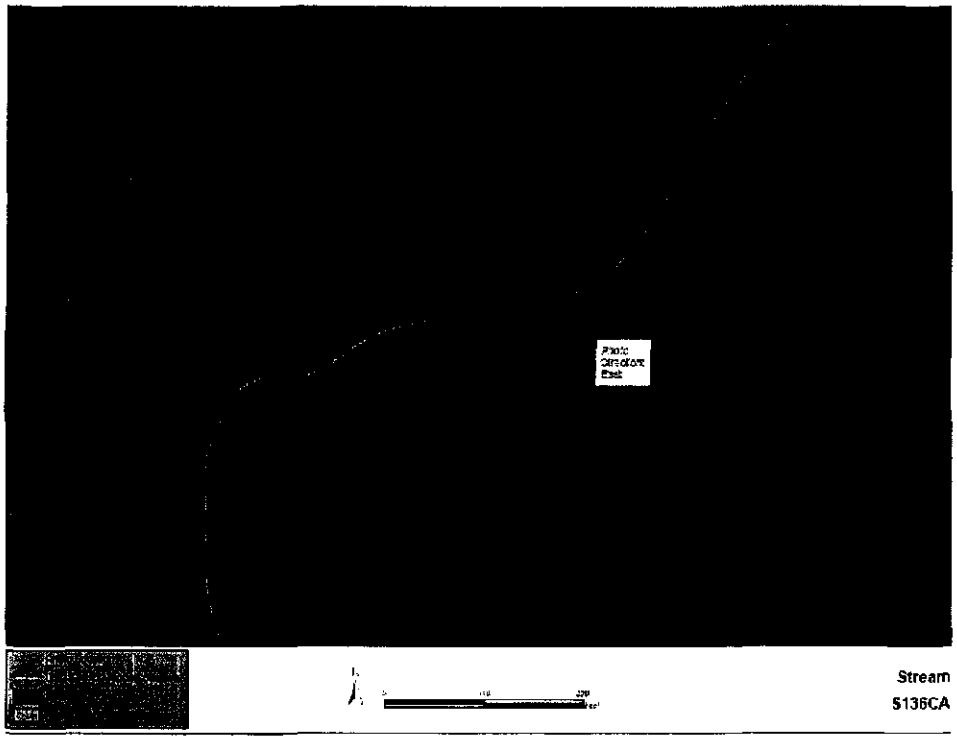
COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.



Stream S136CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S136CA	WATERBODY NAME: Hagerman Creek	
SITE NAME: Blue Creek		
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s136ca	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	10 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microInvertebrates present.

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Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 44.5

Stream & Location: 5136CA (HAGERMAN CREEK) **RM:** ___.1 **Date:** 9/18/09

Scorers Full Name & Affiliation: R Hook / CH2M HILL

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** (NAD 83 - decimal °) 40°.58'8" 84°.34'30" **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
☐ ☐ BLDR/SLABS [10]	____	____	☐ ☐ HARDPAN [4]	____	____
☐ ☐ BOULDER [9]	____	____	☐ ☐ DETRITUS [3]	____	____
☐ ☑ COBBLE [8]	25%	90%	☐ ☐ MUCK [2]	____	____
☐ ☑ GRAVEL [7]	____	____	☐ ☐ SILT [2]	____	____
☑ ☐ SAND [6]	75%	10%	☐ ☐ ARTIFICIAL [0]	____	____
☐ ☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (*Or 2 & average*)

ORIGIN		QUALITY
☐ LIMESTONE [1]		☐ HEAVY [-2]
☑ TILLS [1]	SILT	☑ MODERATE [-1]
☐ WETLANDS [0]		☐ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]		☐ EXTENSIVE [-2]
☐ RIP/RAP [0]	EMBEDDEDNESS	☑ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Substrate 13 *Maximum 20*

Comments

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

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

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

Comments

Cover *Maximum 20* 4

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☑ RECOVERING [3]	☑ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel *Maximum 20* 9

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

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☑ ☑ NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]
☐ ☐ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☑ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☑ ☐ NONE [0]	☑ ☑ OPEN PASTURE, ROWCROP [0]

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

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

Comments AVG = 0.5

Riparian *Maximum 10* 3.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☑ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current *Maximum 12* 5

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
☑ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☑ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☑ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run *Maximum 8* 6

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

DRAINAGE AREA (9.4 mi²)

%POOL: ____ %GLIDE: 90%
%RUN: ____ %RIFFLE: 10%

Gradient *Maximum 10* 4

EPA 4520 06/16/06

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☐ WADE
- ☐ L. EDDY
- ☐ OTHER

STAGE (1st - sample pass - 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 100 m
- ☐ 50 m
- ☐ 40 m
- ☐ 30 m
- ☐ OTHER

_____ meters

CLARITY (1st - sample pass - 2nd)
- ☐ <20 cm ☐
- ☐ 20-40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm / CTS ☐
- ☐ SECCHI DEPTH ☐

CANOPY
- 1st _____ cm
- 2nd _____ cm
- ☐ > 60% - OPEN
- ☐ 50% - 60%
- ☐ 40% - 50%
- ☐ 30% - 40%
- ☐ < 30% - CLOSED

B] AESTHETICS
- ☐ ABUNDANT ALGAE
- ☐ UNNATURAL COLOUR / FOAM
- ☐ EXCESS TURBIDITY
- ☐ SEWAGE / SEPTIC
- ☐ PULP / PAPER
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ HIGH BANK ERODING
- ☐ GARBAGE DUMPING
- ☐ CONCRETE CHANNEL / FALLS

C] RECREATION
POOL: ☐ >100M² ☐ >3ft
AREA DEPTH

D] MAINTENANCE
Circle some & COMMENT
- 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

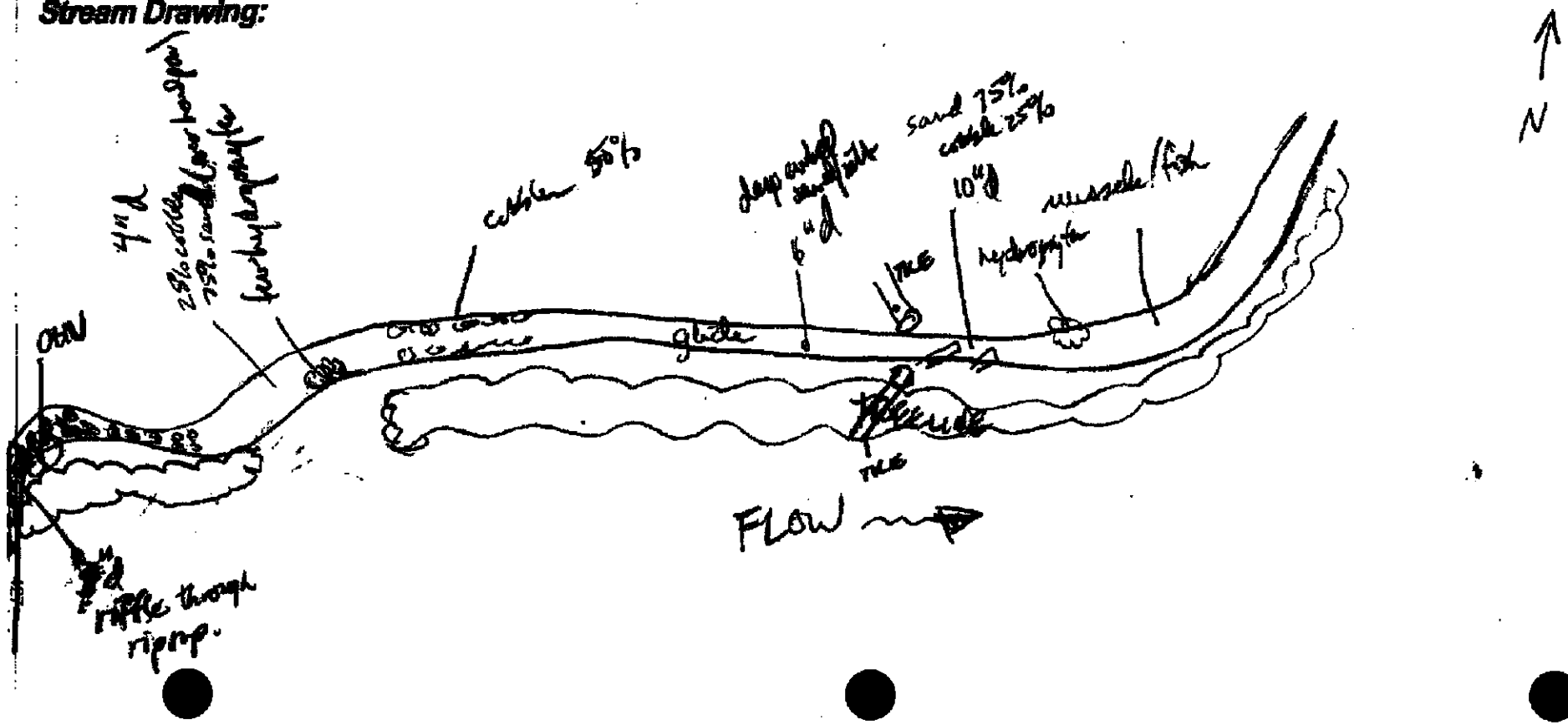
E] ISSUES
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIKE/GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H_2O / TILE / H_2O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

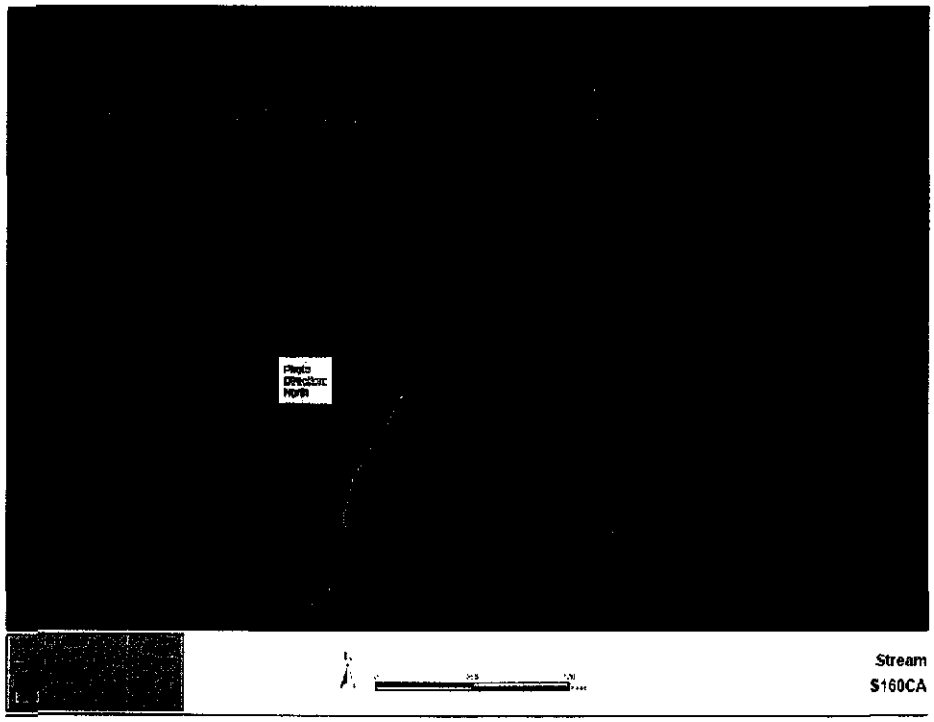
F] MEASUREMENTS
- Σ width
- Σ depth
- max. depth
- Σ bankfull width
- bankfull Σ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

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

Stream Drawing:





Stream S160CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S160CA**	WATERBODY NAME: **Hagerman Creek**	
SITE NAME: **Blue Creek**		
DATE: **9/16/2009**	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091609ADW.cor	QUAD NAME: Latty
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Latty	
	PHOTO NO: 160CA29S & 160CA30n	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Deep channel, banks may have been widened unnaturally (farmers)		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	12 (in)		
AVG. STREAM WIDTH:	12 (ft)	TOP OF BANK: 15 (ft)	ORDINARY HIGH WATER MARK WIDTH: 10 (ft)
AVG. BANK HEIGHT:	4 (ft)		
AVG. BANK SLOPE (RATIO):	Vertical (<= 1:1)		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:	Fish/Spawn Areas	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 10 (ft)	
	TYPE OF VEGETATION PRESENT: Forested	
WETLAND FRINGE (IF PRESENT):	S of existing road, W of stream, where stream crosses beneath	
CHANNEL CONDITION:	Highly Erodable	
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerent or no microinvertebrates present.

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 55

Stream & Location: _____ *RM:* ____ *Date:* 9/16/99

Scorers Full Name & Affiliation: _____

River Code: ___-___-___ *STORET #:* _____ *Lat./Long.:* (NAD 83 - decimal) 41 .00226 84.54584 *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
☐☐ BLDR/SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☒ COBBLE [8]	15	80	☐☐ MUCK [2]		
☐☒ GRAVEL [7]	15	10	☒☐ SILT [2]	20	5
☒☐ SAND [6]	50	5	☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (*Or 2 & average*)

ORIGIN	QUALITY
☒ LIMESTONE [1]	☐ HEAVY [-2]
☐ TILLAGE [0]	☐ MODERATE [-1]
☐ WETLANDS [0]	☒ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [2]
☐ RIP/RAP [0]	☐ MODERATE [1]
☐ LACUSTURINE [0]	☒ NORMAL [0]
☐ SHALE [1]	☐ NONE [1]
☐ COAL FINES [2]	

SILT — EMBEDDEDNESS

Substrate **12.5** *Maximum 20*

Comments

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

1 UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	___ OXBOWS/BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]
1 SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

AMOUNT Check ONE (*Or 2 & average*)
☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☒ SPARSE 5-25% [3]
☐ NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20 **9**

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☒ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☒ GOOD [5]	☐ RECOVERED [4]	☒ MODERATE [2]
☒ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [0]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20 **15**

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

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☐☐ NONE / LITTLE [3]	☐☐ WIDE >50m [4]	☐☐ FOREST/SWAMP [3]
☒☒ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]
☐☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☒☒ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]
	☐☐ NONE [0]	☒☒ OPEN PASTURE, ROWCROP [0]

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

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

Comments

Riparian Maximum 10 **3**

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☒ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1]
☐ VERY FAST [1]
☐ FAST [1]
☐ MODERATE [1]
☒ SLOW [1]
☐ INTERSTITIAL [-1]
☐ INTERMITTENT [-2]
☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12 **5**

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
☐ BEST AREAS >10cm [2]	☐ MAXIMUM > 50cm [2]	☒ STABLE (e.g., COBBLE/BOULDER) [2]	☐ NONE [2]
☒ BEST AREAS 5-10cm [1]	☒ MAXIMUM < 50cm [1]	☒ MOD. STABLE (e.g. LARGE GRAVEL) [1]	☒ LOW [1]
☐ BEST AREAS <5cm [metric=0]		☐ UNSTABLE (e.g., FINE GRAVEL/SAND) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8 **4.5**

6] GRADIENT (3.3 ft/mi)
DRAINAGE AREA (13.62 mi²)
☐ VERY LOW-LOW [2-4]
☒ MODERATE [6-10]
☐ HIGH [10+]

%POOL: 10 %GLIDE: 40
%RUN: 40 %RIFFLE: 10

Gradient Maximum 10 **6**

EPA 4520 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ 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

_____ meters

CLARITY

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

CANOPY

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

1st _____ cm
2nd _____ cm

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

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

B] AESTHETICS

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

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

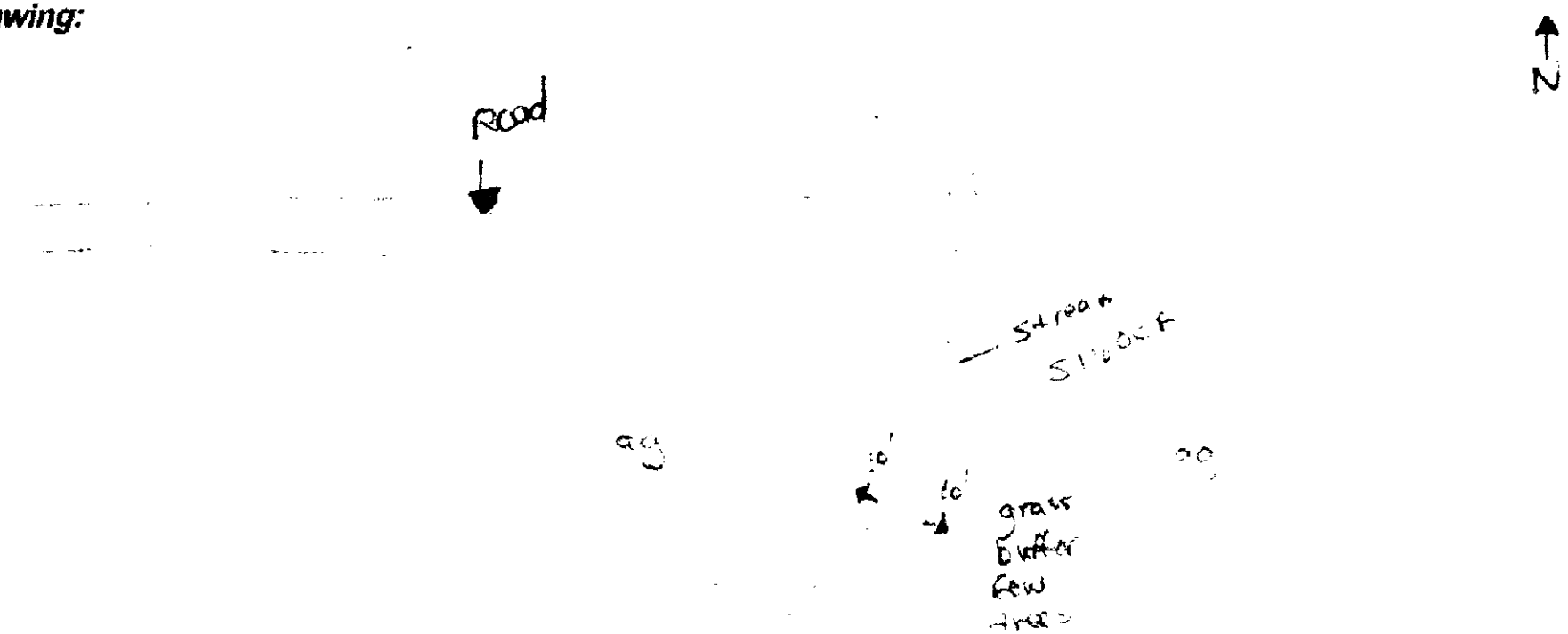
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

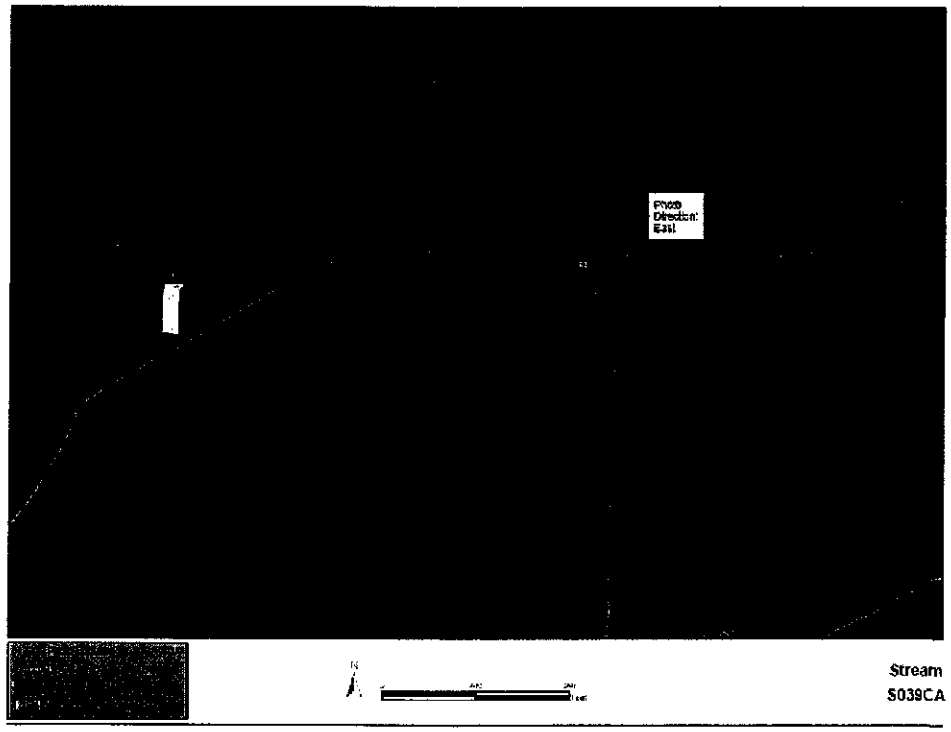
- x̄ width 10'
- x̄ depth 12"
- max. depth 15"
- x̄ bankfull width 15'
- bankfull x̄ depth 4'
- W/D ratio
- bankfull max. depth 4'
- floodprone x² width
- entrench. ratio

Legacy Tree:

Stream Drawing:



Tributaries to Hagerman Creek



Stream S039CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S039CA	WATERBODY NAME: Unnamed Tributary to Hagerman Creek
SITE NAME: Blue Creek	

DATE: 9/19/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090919B.cor	QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s59ca1	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 30 (ft)	ORDINARY HIGH WATER MARK WIDTH: 8 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Leersia oryzoides	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

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

SITE NAME/LOCATION _____

SITE NUMBER 509CA RIVER BASIN _____ DRAINAGE AREA (mi²) 0.50

LENGTH OF STREAM REACH (ft) _____ LAT. 40°36'21" LONG. 84°38'52" RIVER CODE _____ RIVER MILE _____

DATE 9/19/07 SCORER _____ COMMENTS _____

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

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

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

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

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

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

HHEI Metric Points

Substrate Max = 40

1

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

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

Pool Depth Max = 30

0

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 3

Bankfull Width Max=30

20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: Van Wert Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

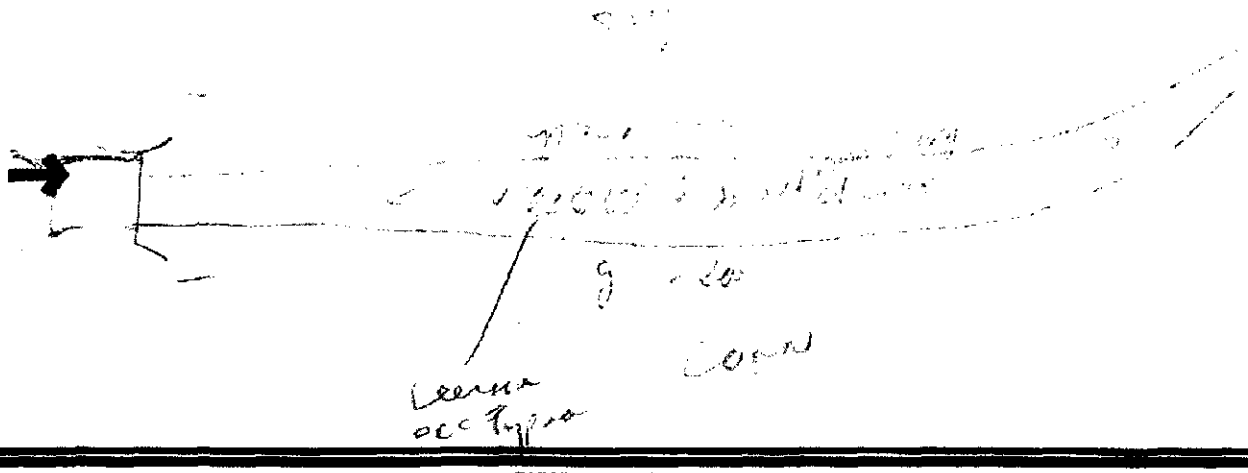
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

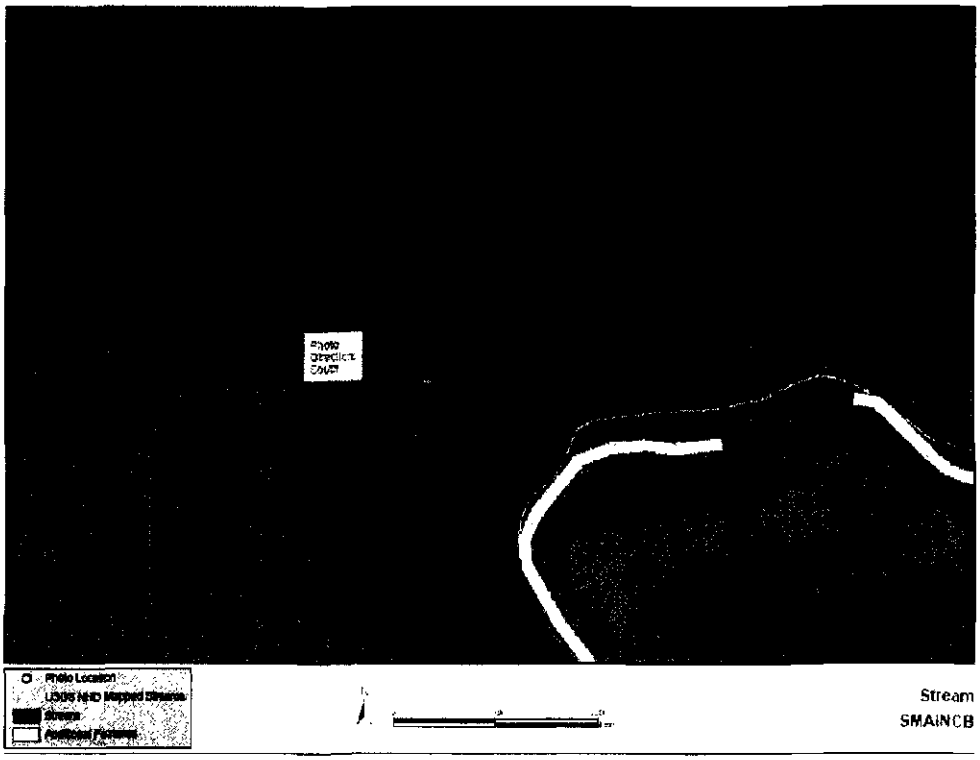
Frogs or Tadpoles Observed? (Y/N) Y Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

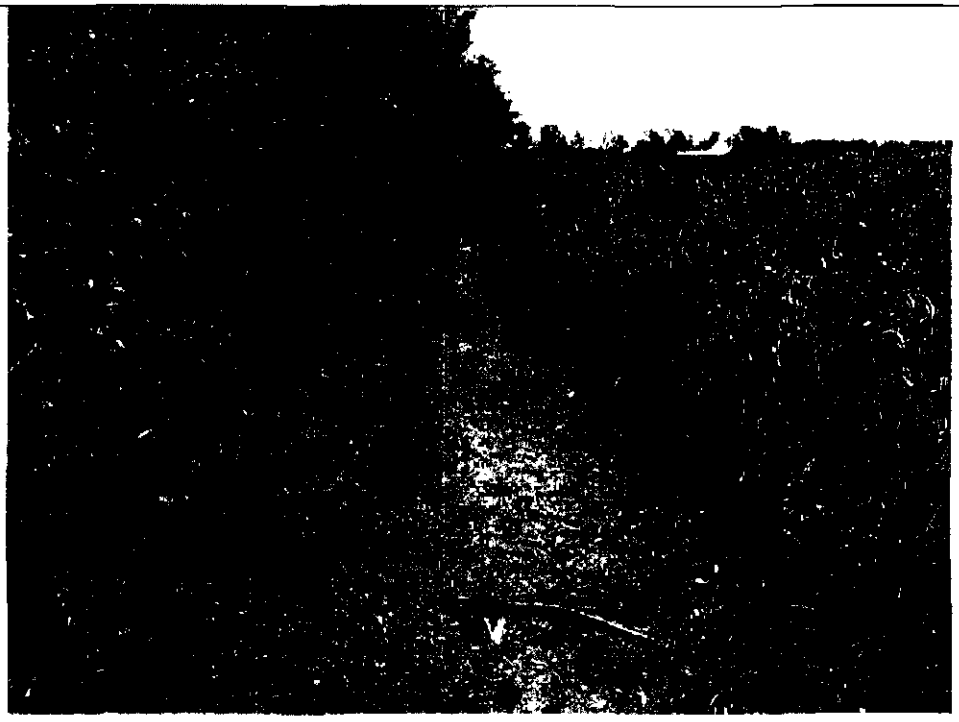
Comments Regarding Biology: _____

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

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







Stream SMAINCB

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **SMAINCB**	WATERBODY NAME: **Unnamed Tributary to Hagerman Creek**
SITE NAME: Blue Creek	
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor / QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO: smaincb1

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Ephemeral		
AVG. STREAM DEPTH:	(in)		
AVG. STREAM WIDTH:	(ft)	TOP OF BANK: 8 (ft)	ORDINARY HIGH WATER MARK WIDTH: 4 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 27

SITE NAME/LOCATION _____

SITE NUMBER SMAIN CB RIVER BASIN _____ DRAINAGE AREA (mi²) 0.

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

DATE 9/18/09 SCORER R. Hook COMMENTS _____

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

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

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

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

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 TOTAL NUMBER OF SUBSTRATE TYPES: 1

HHEI Metric Points

Substrate Max = 40: 7

A + B

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

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): _____

Pool Depth Max = 30: 0

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

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

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 1.5

Bankfull Width Max=30: 20

This information must also be completed

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

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☑	☑	Wide >10m @ old RR →	☑	☑	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☑	Open Pasture, Row Crop UPPER REACH
☑	☑	None UPPER REACH	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

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

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

COMMENTS _____

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

☑ None
☐ 0.5
☐ 1.0
☐ 1.5
☐ 2.0
☐ 2.5
☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

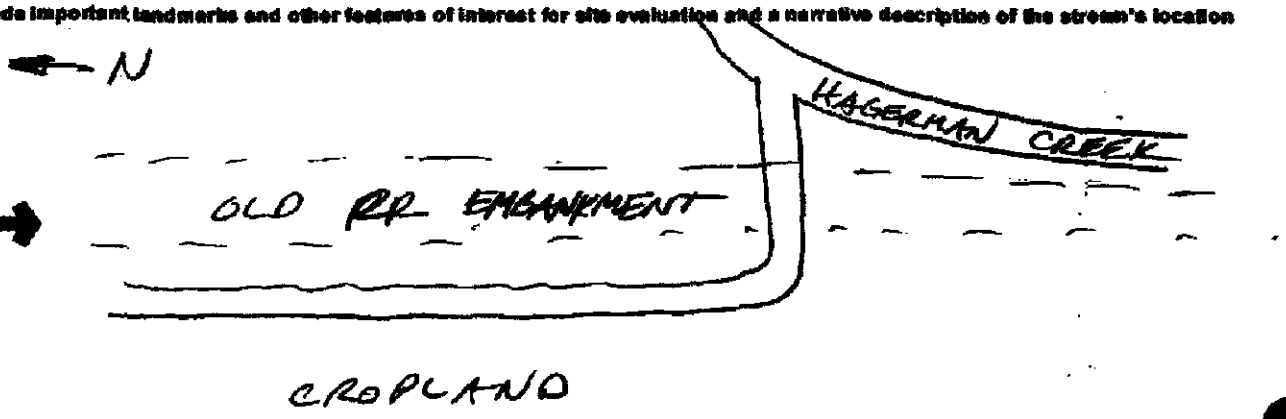
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

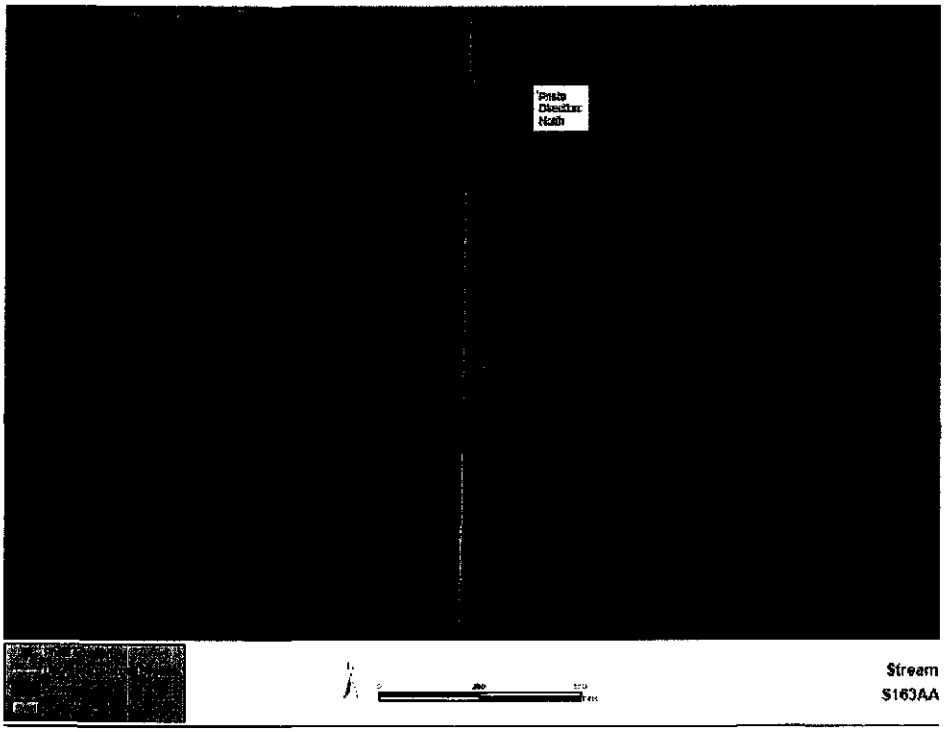
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

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

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





Stream S163AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S163AA	WATERBODY NAME: Unnamed Tributary to Hagerman Crk (to the N)
SITE NAME: Blue Creek	

DATE: 9/16/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091609ADW.cor	QUAD NAME: Latty
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Latty	
	PHOTO NO: 163C13n & 163C14S	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag drainage, rip-rap along small portion of the E bank; manmade, cubbles and veg in bed		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 20 (ft)	ORDINARY HIGH WATER MARK WIDTH: 8 (ft)
AVG. BANK HEIGHT:	6 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Vegetation	
POTENTIAL HABITAT FOR:	None	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: Other (Specify)	
WETLAND FRINGE (IF PRESENT):	none	
CHANNEL CONDITION:	Other	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 41

SITE NAME/LOCATION _____

SITE NUMBER S163AA RIVER BASIN _____ DRAINAGE AREA (mi²) 0.19

LENGTH OF STREAM REACH (ft) _____ LAT. 41.00680 LONG. -84.53430 RIVER CODE _____ RIVER MILE _____

DATE 09/16/09 SCORER Nechvatal COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]	0%	☑	SILT [3 pt]	70%
☐	BOULDER (>256 mm) [16 pts]	0%	☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐	BEDROCK [16 pt]	0%	☐	FINE DETRITUS [3 pts]	0%
☑	COBBLE (65-256 mm) [12 pts]	30%	☐	CLAY or HARDPAN [0 pt]	0%
☐	GRAVEL (2-64 mm) [9 pts]	0%	☐	MUCK [0 pts]	0%
☐	SAND (<2 mm) [6 pts]	0%	☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 30.00% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 15 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

HHEI Metric Points

Substrate Max = 40

16

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☑ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 2

Pool Depth Max = 30

5

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 2.00

Bankfull Width Max=30

20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

QHEI PERFORMED? - [✓] Yes [ ] No QHEI Score 28.0 (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

[ ] WWH Name: _____ Distance from Evaluated Stream _____

[ ] CWH Name: _____ Distance from Evaluated Stream _____

[ ] EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: Paulding Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: 0.00

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

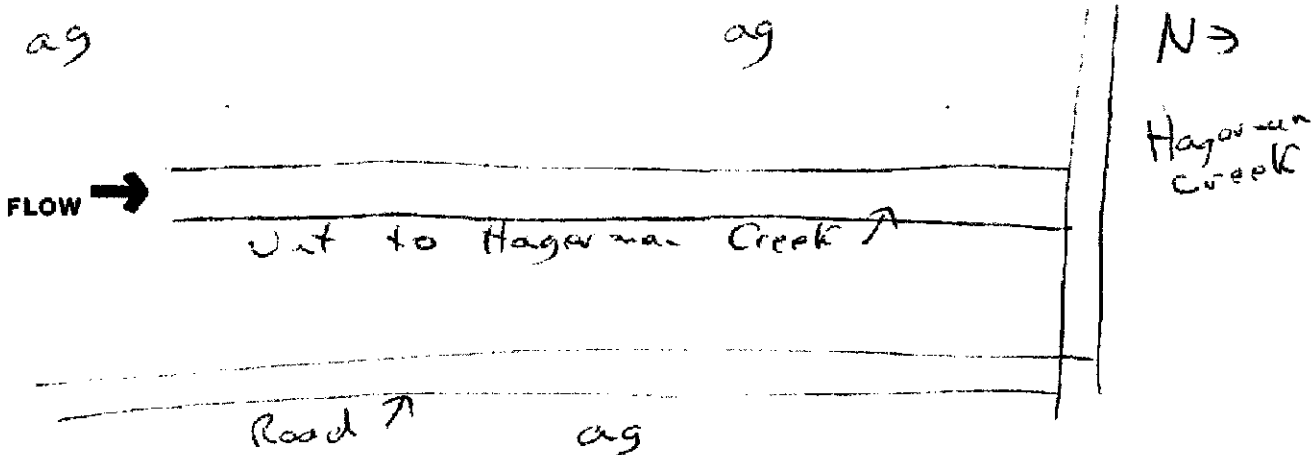
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

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

Comments Regarding Biology: _____

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

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



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 26

Stream & Location: _____ RM: ___.__ Date: __/__/__

Scorers Full Name & Affiliation: _____

River Code: __-__-__ STORET #: _____ Lat./Long.: (MAD 83 - decimal °) ___.____ / 8 ___.____ 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
☐☐ BLDR/SLABS [10]	____	____	☐☐ HARDPAN [4]	____	____
☐☐ BOULDER [9]	____	____	☐☐ DETRITUS [3]	____	____
☐☐ COBBLE [8]	____	____	☐☐ MUCK [2]	____	____
☐☐ GRAVEL [7]	____	____	☐☒ SILT [2]	100	100
☐☐ SAND [6]	____	____	☐☐ ARTIFICIAL [0]	____	____
☐☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (*Or 2 & average*)

ORIGIN		QUALITY	
☒ LIMESTONE [1]	SILT	☐ HEAVY [-2]	
☐ TILLS [1]		☐ MODERATE [-1]	Substrate
☐ WETLANDS [0]		☐ NORMAL [0]	7
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]	Maximum 20
☐ RIP/RAP [0]		☐ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments 100 pools

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.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]	
____ OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]	
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]	
____ ROOTMATS [1]			

AMOUNT Check ONE (*Or 2 & average*)

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

Comments

Cover Maximum 20: 5

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☒ MODERATE [2]
☒ LOW [2]	☐ FAIR [3]	☒ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☒ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 5

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: 2

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 0

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (5 ft/mi) ☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (0.19 mi²)

%POOL: 0 %GLIDE: 30 %RUN: 40 %RIFFLE: 30

Gradient Maximum 10: 4

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

_____ meters

STAGE

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

CLARITY

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

CANOPY

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

1st_____ cm

2nd_____ cm

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

_____

_____

_____

_____

B] AESTHETICS

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

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

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

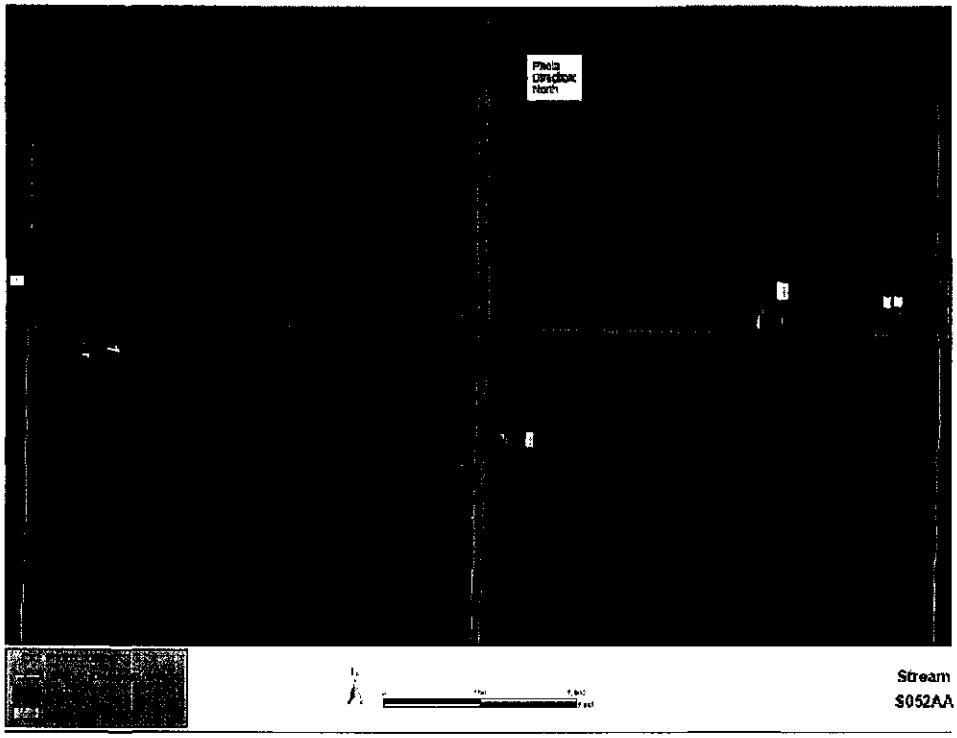
E] ISSUES

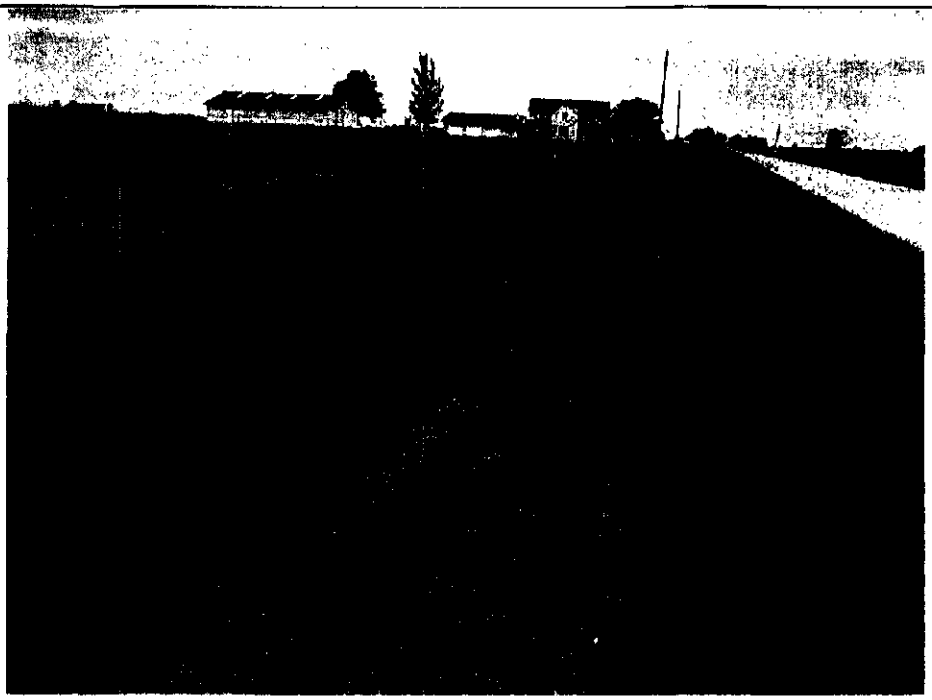
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / 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 x^2 width
entrench. ratio
Legacy Tree:

Stream Drawing:





Stream S052AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S052AA**	WATERBODY NAME: **Unnamed Tributary to Hagerman Creek**	
SITE NAME: **Blue Creek**		
DATE: 9/20/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090920.cor	QUAD NAME: Convoy
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s052aa1	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 20 (ft)	ORDINARY HIGH WATER MARK WIDTH: 5 (ft)
AVG. BANK HEIGHT:	6 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 5 (ft)	
	TYPE OF VEGETATION PRESENT: Herbaceous	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 22

SITE NAME/LOCATION _____

SITE NUMBER 505AA RIVER BASIN _____ DRAINAGE AREA (mi²) 0.6

LENGTH OF STREAM REACH (ft) _____ LAT. 40°57'50" LONG. 84°37'48" RIVER CODE _____ RIVER MILE _____

DATE 09/20/04 SCORER [illegible] COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☐☐	SILT [3 pt]	
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☐	COBBLE (65-256 mm) [12 pts]	5%	☑☑	CLAY or HARDPAN [0 pt]	95%
☐☐	GRAVEL (2-64 mm) [9 pts]		☐☐	MUCK [0 pts]	
☐☐	SAND (<2 mm) [6 pts]		☐☐	ARTIFICIAL [3 pts]	

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 0 **TOTAL NUMBER OF SUBSTRATE TYPES:** 2

HHEI Metric Points

Substrate Max = 40

2

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** —

Pool Depth Max = 30

0

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 2

Bankfull Width Max=30

2

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

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

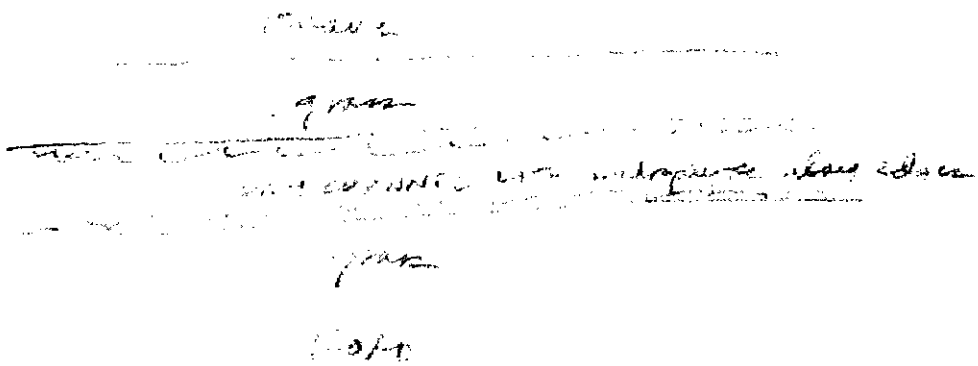
Frogs or Tadpoles Observed? (Y/N) _____ Voucher? (Y/N) _____ Aquatic Macroinvertebrates Observed? (Y/N) _____ Voucher? (Y/N) _____

Comments Regarding Biology: _____

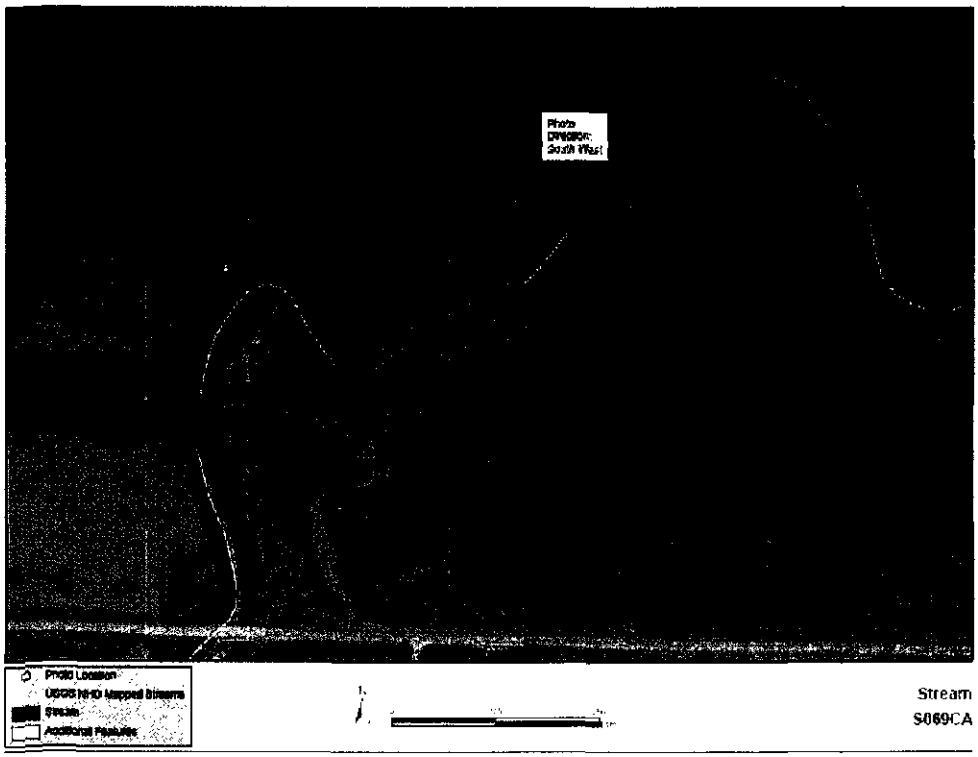
DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

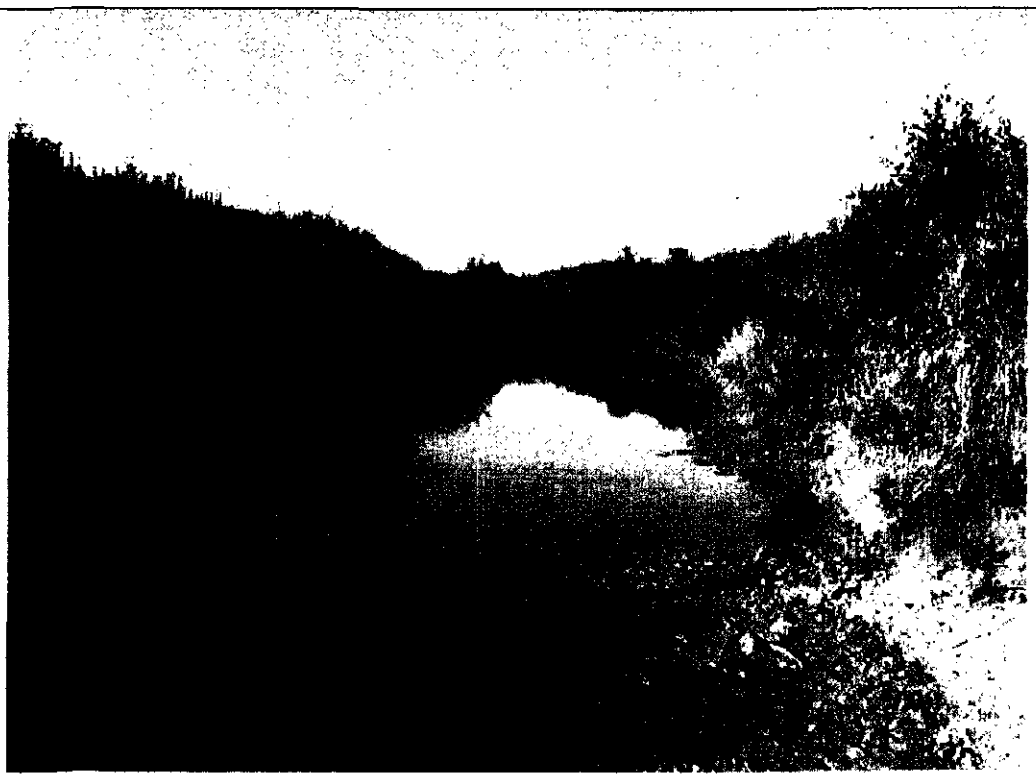
Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location

FLOW ➡



Blue Creek





Stream S069CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S069CA	WATERBODY NAME: Blue Creek	
SITE NAME: Blue Creek		
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M.Nechvatal	ROVER FILE: R091809ADW.cor	QUAD NAME: Payne
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Blue Creek	
	PHOTO NO: 069C5nE & 069C6SW	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Wide, deep natural channel, likely manipulated/cut out due to adj ag fields		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	6 (in)		
AVG. STREAM WIDTH:	15 (ft)	TOP OF BANK: 20 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	2 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Fish/Spawn Areas	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 100 (ft)	
	TYPE OF VEGETATION PRESENT: Herbaceous	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Sloughing Banks	
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY MEANDERING

COMMENTS

collector line from 070 to 069T crosses stream diagonally at this point, 069T to NW

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 57.25

Stream & Location: 3069 CA **RM:** ___ **Date:** 09/18/06

Scorers Full Name & Affiliation: [illegible]

River Code: ___-___-___ **STORET #:** ___ **Lat./Long.:** 41.00528 / 84.65797 (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
☐ ☐ BEDR/SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]		
☐ ☐ COBBLE [8]			☐ ☐ MUCK [2]		
☐ ☒ GRAVEL [7]	5	66	☒ ☐ SILT [2]	60	15
☒ ☒ SAND [6]	35	30	☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (Or 2 & average)

ORIGIN		QUALITY
☒ LIMESTONE [1]	SILT	☐ HEAVY [-2]
☐ TILLS [0]		☐ MODERATE [-1]
☐ WETLANDS [0]		☒ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]
☐ RIP/RAP [0]		☒ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Substrat 10.5 Maximun 20

Comments

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

1 UNDERCUT BANKS [1]	___ POOLS >70cm [2]	___ OXBOWS/BACKWATERS [1]
___ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
1 SHALLOWS (IN SLOW WATER) [1]	1 BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
1 ROOTMATS [1]		

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

Comments

Cover Maximum 20: 13

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☒ NONE [6]	☐ HIGH [3]
☒ MODERATE [3]	☒ GOOD [5]	☐ RECOVERED [4]	☒ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☒ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 15.5

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

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)
☐ ☐ NONE / LITTLE [3]	☒ ☒ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]
☒ ☒ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☒ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☒ ☐ OPEN PASTURE, ROWCROP [0]

LAND USE (L R)
☒ ☒ CONSERVATION TILLAGE [1]
☐ ☐ URBAN OR INDUSTRIAL [0]
☐ ☐ MINING / CONSTRUCTION [0]

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

Comments

Riparian Maximum 10: 6.25

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (Or 2 & average)
☒ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☒ SLOW [1] ☐ VERY FAST [1] ☐ INTERSTITIAL [-1] ☐ FAST [1] ☐ INTERMITTENT [-2] ☒ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 8

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
☐ BEST AREAS >10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Fine Gravel) [1]	☐ LOW [1]
☒ BEST AREAS <5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (1.7 ft/mi) ☒ VERY LOW-LOW [2.4]
DRAINAGE AREA (42.54 mi²) ☐ MODERATE [6] ☐ HIGH-VERY HIGH [10]

%POOL: 15 %GLIDE: 35 %RUN: 35 %RIFFLE: 15

Gradient Maximum 10: 4

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

_____ meters

STAGE

1st <sample pass>		2nd
☐	HIGH	☐
☐	UP	☐
☐	NORMAL	☐
☐	LOW	☐
☐	DRY	☐

CLARITY

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

CANOPY

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

1st pass _____ cm

2nd _____ cm

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

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

B] AESTHETICS

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

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

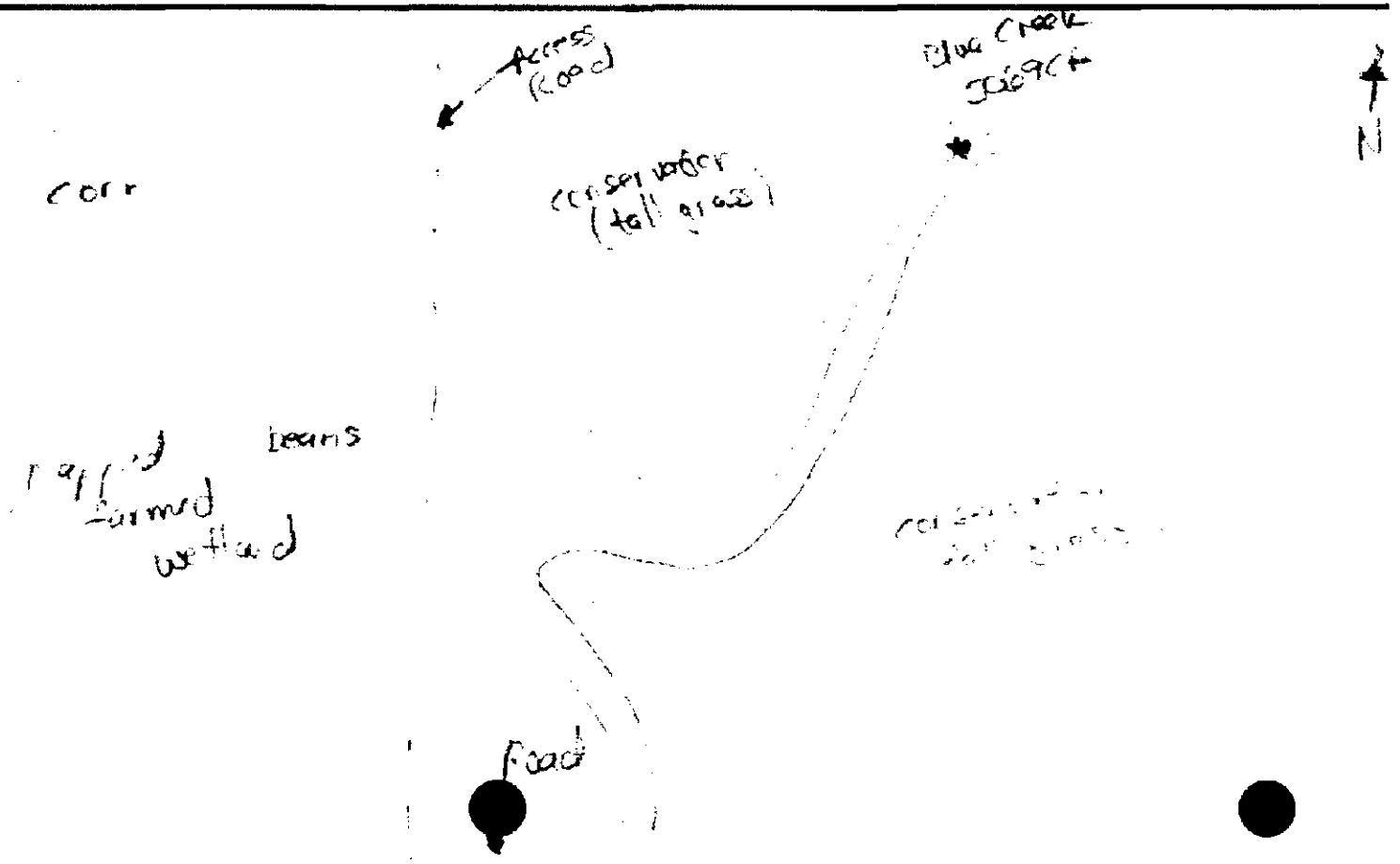
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

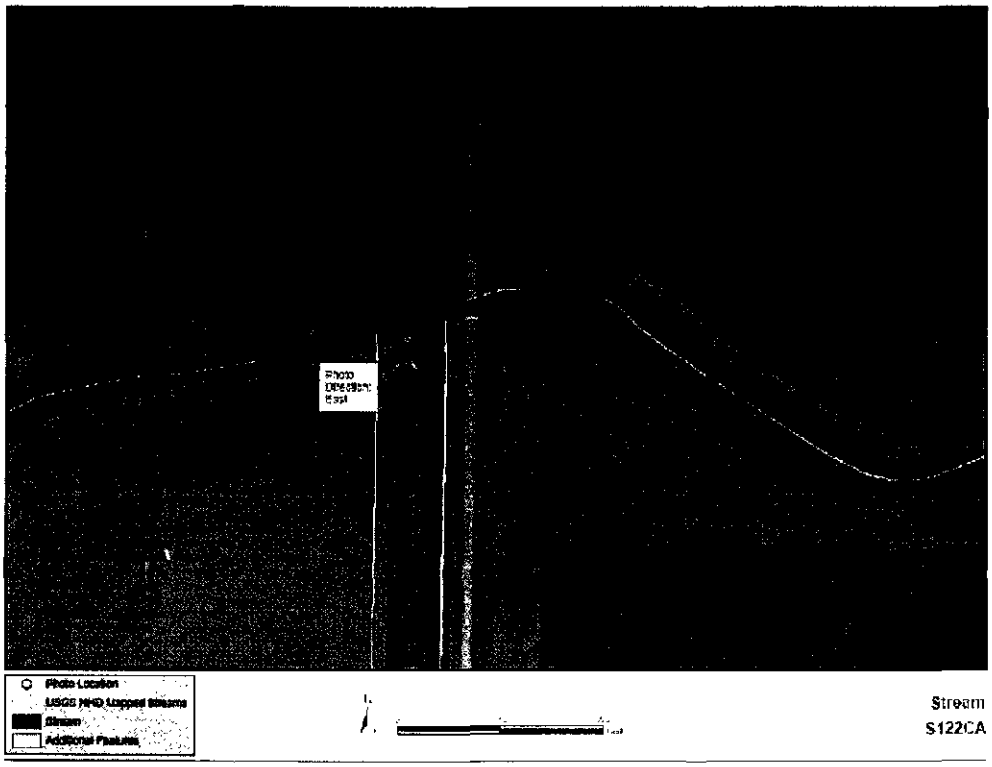
- x̄ width 15'
- x̄ depth 18"
- max. depth 36"
- x̄ bankfull width 20'
- bankfull x̄ depth 36"
- W/D ratio
- bankfull max. depth 48"
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:



Pottawatomie Creek.



Stream S122CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S122CA	WATERBODY NAME: Pottawatomie Creek
SITE NAME: Blue Creek	

DATE: 10/14/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm

INVESTIGATORS: AF RH	ROVER FILE:	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO:	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	2 (in)		
AVG. STREAM WIDTH:	4 (ft)	TOP OF BANK: 25 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	3 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY MEANDERING

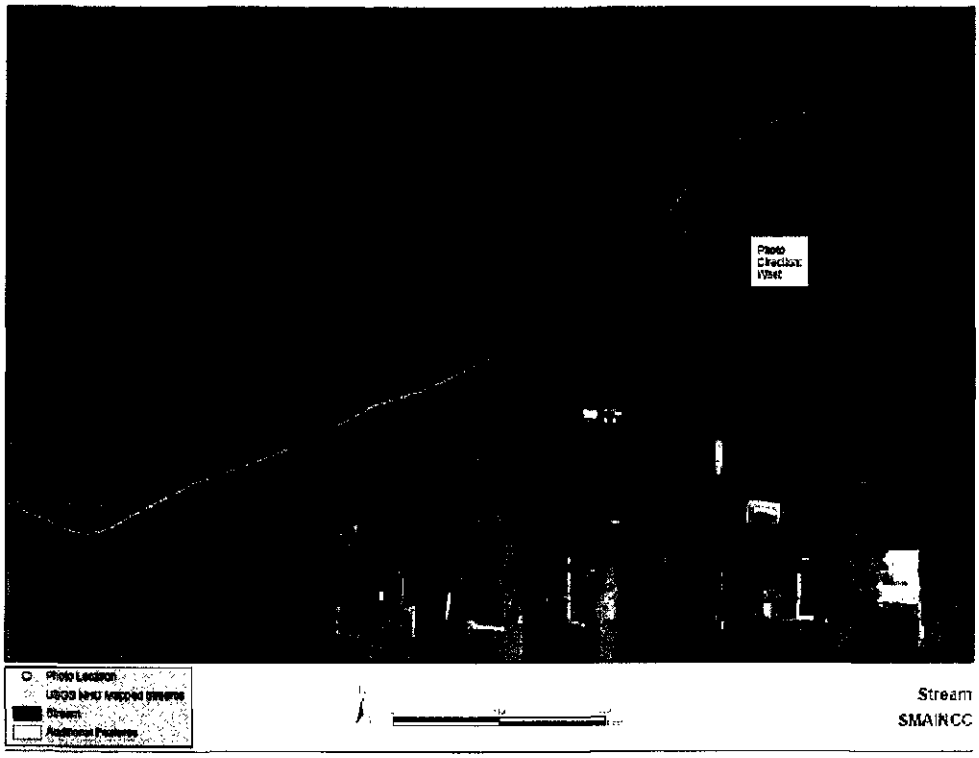
COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.



Stream SMAINCC

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **SMAINCC**	WATERBODY NAME: **Pottawatomie Creek**
SITE NAME: Blue Creek	

DATE: 9/19/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm

INVESTIGATORS: Hook	ROVER FILE: RAH090919.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: smaincc1	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	8 (in)		
AVG. STREAM WIDTH:	8 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 15 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Other	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:		
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

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Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 29.5

Stream & Location: SMANCO (POTTAWATOMIE CREEK) **RM:** 2.9 **Date:** 9/19/02

Scorers Full Name & Affiliation:

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** 40°.56'52"/84°.34'55" (NAD 83 - decimal) Office verified location ☐

2.7 mi²

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

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☑ ☑ HARDPAN [4]	100	
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]		
☐ ☐ COBBLE [8]			☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]			☐ ☐ SILT [2]		
☐ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (Or 2 & average)

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

SILT / EMBEDDEDNESS

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

Substrate: 8 (Maximum 20)

Comments

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

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

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

Comments

Cover Maximum 20: 5

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☑ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☐ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 9

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

River right looking downstream

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

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

Comments AVG 0.5

Riparian Maximum 10: 3.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH (Check ONE (Or 2 & average))
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☑ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☑ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☑ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 0

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: —

6] GRADIENT (2.5 ft/mi)
DRAINAGE AREA (2.7 mi²)

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

%POOL: %GLIDE: 100
%RUN: %RIFFLE:

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☐ WADE
- ☐ L. ARM
- ☐ OTHER

STAGE (1st sample pass / 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 0-0.5 mi
- ☐ 0.5-1 mi
- ☐ 1-2.5 mi
- ☐ 2.5-5 mi
- ☐ OTHER

_____ meters

CLARITY (1st — sample pass — 2nd)
- ☐ <30 cm ☐
- ☐ 30-60 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm / CLR ☐
- ☐ SECCHI DEPTH ☐

CANOPY
- ☐ >25% - OPEN
- ☐ 25% - <50%
- ☐ 50% - <75%
- ☐ 75% - <90%
- ☐ >90% - CLOSED

1st _____ cm
2nd _____ cm

B] AESTHETICS
- ☐ MARGINAL ALGAE
- ☐ BENTHIC MACROPHYTES
- ☐ RIPARIAN VEGETATION
- ☐ GRASSY VEGETATION
- ☐ FOAM / SCUM
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ HUMAN ACCESS
- ☐ SURFACE IMPACTS
- ☐ CHANNELIZATION/RIPRAP

C] RECREATION AREA DEPTH
POOL: ☐ >100ft² ☐ >3ft

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
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

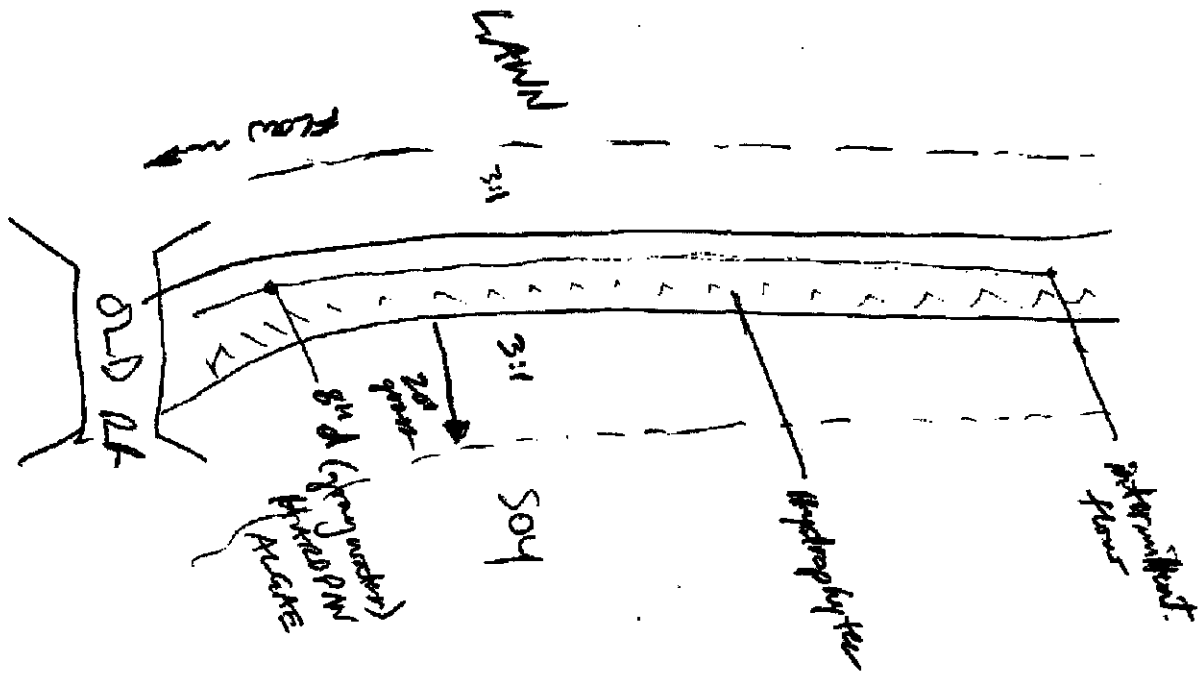
Circle some & COMMENT

E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_2O / TILE / H_2O TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS
X width
X depth
max depth
X bankfull width
bankfull X depth
W/D ratio
bankfull max. depth
floodprone x^2 width
entrench. ratio
Legacy Tree:

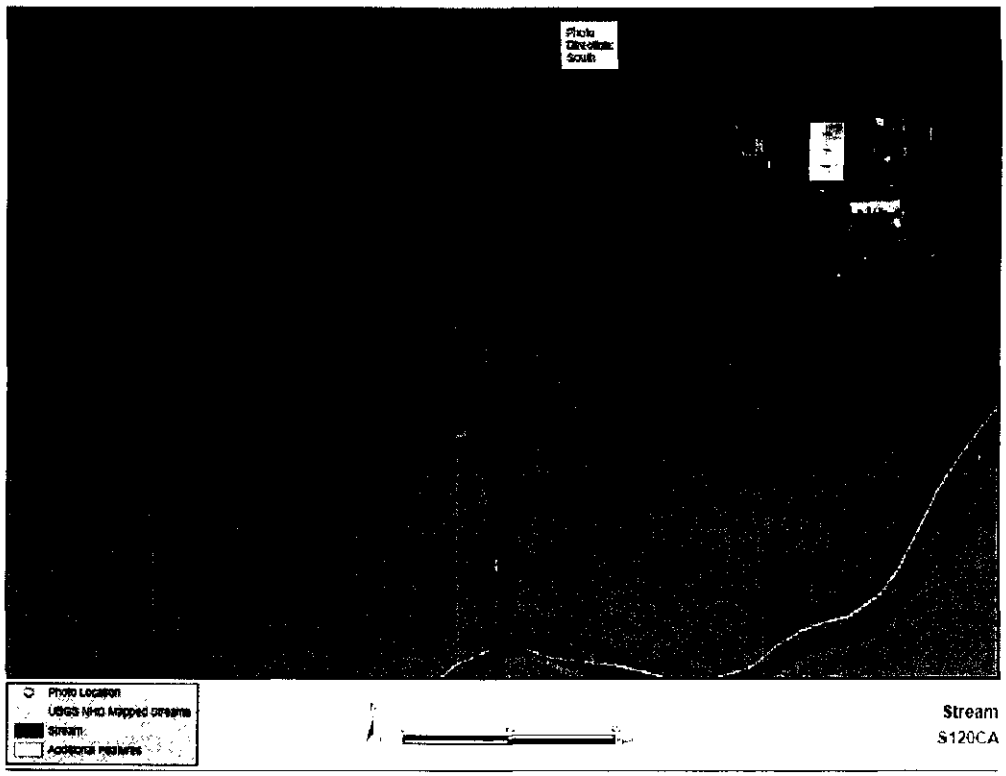
Comment RE: Reach consistancy/ Is reach typical of stream?, Recreation/ Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, etc.

Stream Drawing:



N

Tributaries to Pottawatomie Creek



Stream S120CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S120CA	WATERBODY NAME: Unnamed Tributary to Pottawatomie Creek	
SITE NAME: Blue Creek		
DATE: 10/14/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE:	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO:	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	2 (in)		
AVG. STREAM WIDTH:	1 (ft)	TOP OF BANK: 10 (ft)	ORDINARY HIGH WATER MARK WIDTH: 6 (ft)
AVG. BANK HEIGHT:	4 (ft)		
AVG. BANK SLOPE (RATIO):	3:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

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OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 46

SITE NAME/LOCATION S120CA

SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) <1 mi2

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

DATE 09/19/09 SCORER M Nechvatal COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☐■	SILT [3 pt]	80
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☐	COBBLE (65-256 mm) [12 pts]		☐☐	CLAY or HARDPAN [0 pt]	
☐☐	GRAVEL (2-64 mm) [9 pts]		☐☐	MUCK [0 pts]	
■☐	SAND (<2 mm) [6 pts]	20	☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0 (A) 9

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES:

(B) 2

TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40: 11

A + B

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

- ☐ > 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]

10

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters):

Pool Depth Max = 30: 15

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

- ☐ > 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]

2

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters)

Bankfull Width Max=30: 20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

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

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: Van Wert Township / City: Union

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts:_____

BIOTIC EVALUATION

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

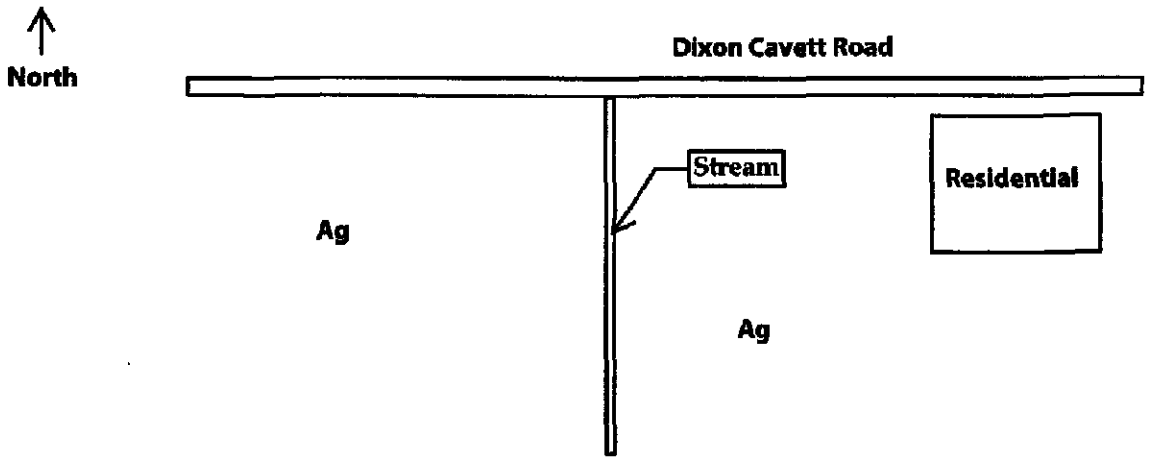
Fish Observed? (Y/N)_____ Voucher? (Y/N)_____ Salamanders Observed? (Y/N)_____ Voucher? (Y/N)_____

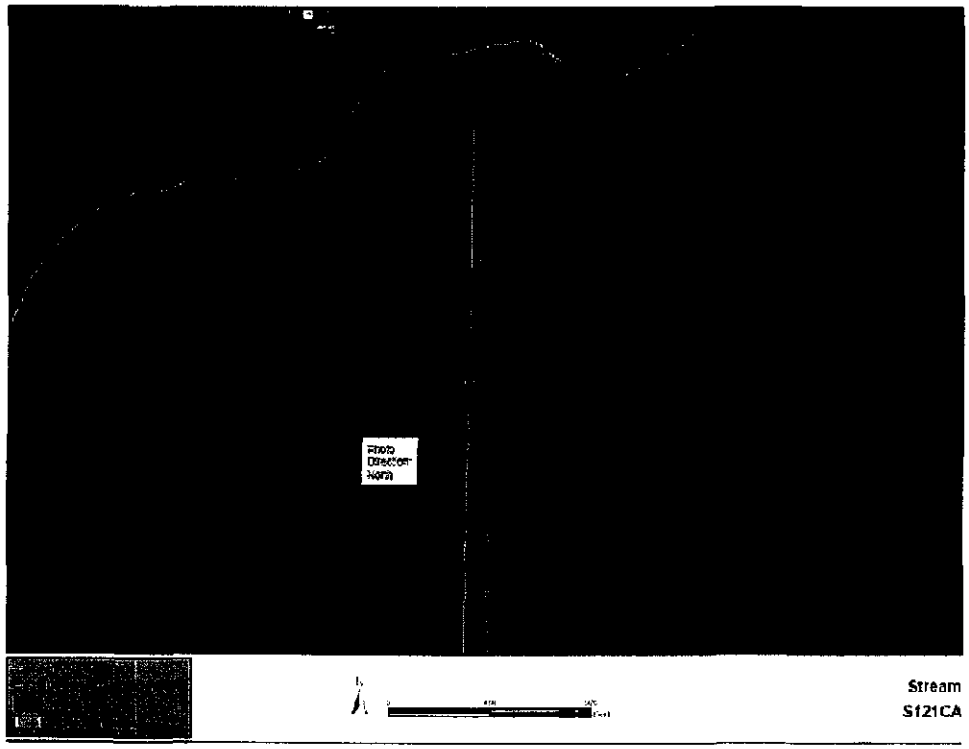
Frogs or Tadpoles Observed? (Y/N)_____ Voucher? (Y/N)_____ Aquatic Macroinvertebrates Observed? (Y/N)_____ Voucher? (Y/N)_____

Comments Regarding Biology:_____

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

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





Stream S121CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S121CA	WATERBODY NAME: Unnamed Tributary to Pottawatomie Creek
SITE NAME: Blue Creek	

DATE: 9/19/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090919B.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: s121aa1 a121aa2	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag drainage		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 30 (ft)	ORDINARY HIGH WATER MARK WIDTH: 5 (ft)
AVG. BANK HEIGHT:	6 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):	Typha latifolia 30%	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riperian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considereble water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 27

SITE NAME/LOCATION _____

SITE NUMBER S121AA RIVER BASIN _____ DRAINAGE AREA (mi²) 0.2

LENGTH OF STREAM REACH (ft) _____ LAT. 40° 56' 37" LONG. 84° 35' 33" RIVER CODE _____ RIVER MILE _____

DATE 9/19/09 SCORER R Hook COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐	BLDR SLABS [16 pts]		☑	SILT [3 pt]	100
☐	BOULDER (>256 mm) [16 pts]		☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐	BEDROCK [16 pt]		☐	FINE DETRITUS [3 pts]	
☐	COBBLE (65-256 mm) [12 pts]		☐	CLAY or HARDPAN [0 pt]	
☐	GRAVEL (2-64 mm) [9 pts]		☐	MUCK [0 pts]	
☐	SAND (<2 mm) [6 pts]		☐	ARTIFICIAL [3 pts]	

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

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 TOTAL NUMBER OF SUBSTRATE TYPES: 1

HHEI Metric Points

Substrate Max = 40

7

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☒ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ MAXIMUM POOL DEPTH (centimeters): 0

Pool Depth Max = 30

0

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

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

COMMENTS _____ AVERAGE BANKFULL WIDTH (meters): 2

Bankfull Width Max=30

20

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

☑ None	☐ 1.0	☐ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

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

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

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

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: _____ Township / City: _____

MISCELLANEOUS

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

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

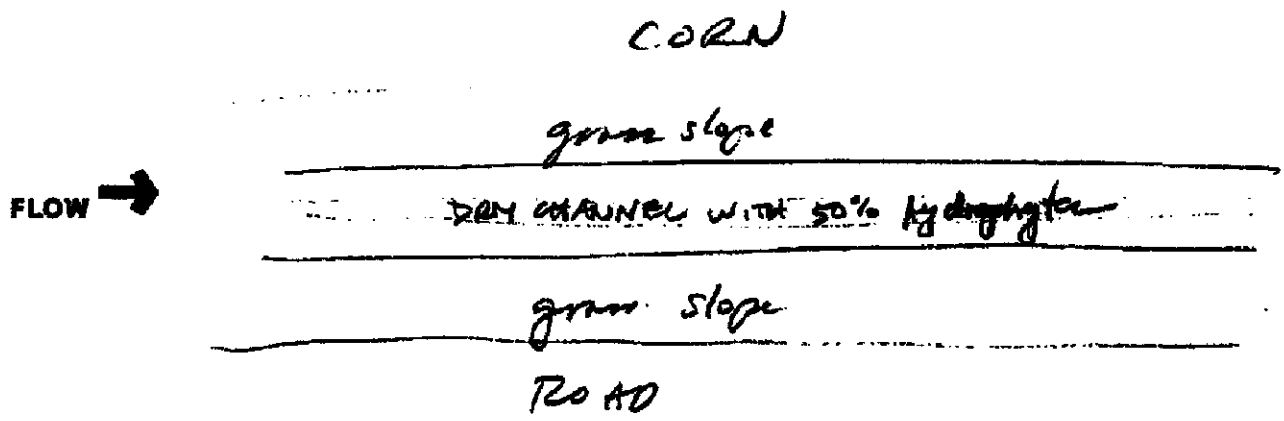
Fish Observed? (Y/N) _____ Voucher? (Y/N) _____ Salamanders Observed? (Y/N) _____ Voucher? (Y/N) _____

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

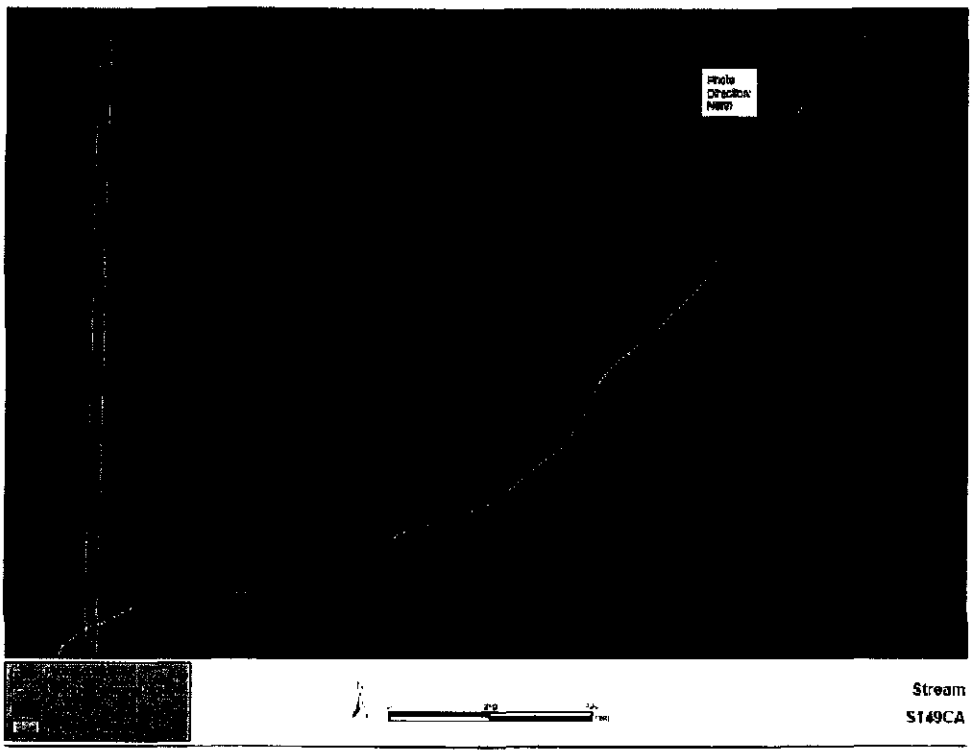
Comments Regarding Biology: _____

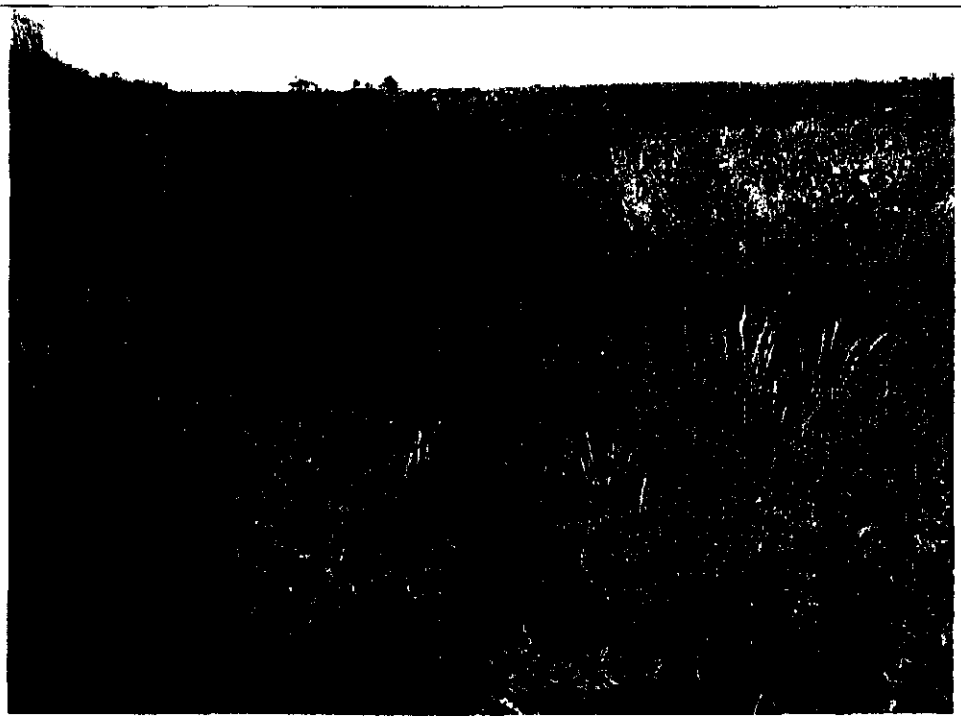
DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

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



Dry Creek





Stream S149CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: SMAINCA-1	WATERBODY NAME: Hagerman Creek
SITE NAME: Blue Creek	
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor; QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union
	PHOTO NO: smainca2

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	10 (in)		
AVG. STREAM WIDTH:	10 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 20 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 75 (ft)	
	TYPE OF VEGETATION PRESENT: Forested	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; l regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: SMAINCA-2	WATERBODY NAME: Hagerman Creek	
SITE NAME: Blue Creek		
DATE: 9/18/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091809A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: 133c2	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	6 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 12 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Clear	
PRIMARY SUBSTRATE:	Sands	
POTENTIAL HABITAT FOR:	*Aq/Wild Diversity*	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S149CA-1	WATERBODY NAME: Dry Creek
SITE NAME: Blue Creek	
DATE: 9/16/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: AF RH	ROVER FILE: / QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Latty
	PHOTO NO:

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	2 (in)		
AVG. STREAM WIDTH:	2 (ft)	TOP OF BANK: 10 (ft)	ORDINARY HIGH WATER MARK WIDTH: 6 (ft)
AVG. BANK HEIGHT:	2 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY MEANDERING

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

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LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S149CA-2	WATERBODY NAME: Dry Creek	
SITE NAME: Blue Creek		
DATE: 9/16/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE:	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Latty	
	PHOTO NO:	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Modified ag ditch		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	6 (in)		
AVG. STREAM WIDTH:	4 (ft)	TOP OF BANK: 10 (ft)	ORDINARY HIGH WATER MARK WIDTH: 8 (ft)
AVG. BANK HEIGHT:	5 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY MEANDERING

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

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OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 31

Stream & Location: S149CA (DRY CREEK) **RM:** 2.3 **Date:** 9/16/08

Scorers Full Name & Affiliation: R. Hook / CH2M Hill

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal °) 40°.59'.45" 84°.34'.1" Office verify location ☐

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

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR/SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☐☐ COBBLE [8]			☐☐ MUCK [2]		
☐☐ GRAVEL [7]			☑☑ SILT [2]	100	
☐☐ SAND [6]			☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (Or 2 & average)

ORIGIN		QUALITY	
☐ LIMESTONE [1]	SILT	☑ HEAVY [-2]	Substrate
☑ TILLS [1]		☐ MODERATE [-1]	
☐ WETLANDS [0]		☐ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]	EMBEDDEDNESS	☑ EXTENSIVE [-2]	1
☐ RIP/RAP [0]		☐ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	Maximum 20
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments dredged channel / deep, trapezoidal

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.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

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

Comments

Cover Maximum 20: 12

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☑ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☑ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☑ POOR [1]	☑ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 7

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: 3

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (Or 2 & average)
☑ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1] ☐ VERY FAST [1] ☐ INTERSTITIAL [-1] ☐ FAST [1] ☐ INTERMITTENT [-2] ☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 4

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

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

Comments

Riffle / Run Maximum 8: 0

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

DRAINAGE AREA (1.5 mi²)

%POOL: %GLIDE: 100 %RUN: %RIFFLE:

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLE REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☐ WADE
- ☐ L. BIKE
- ☐ OTHER

STAGE (1st sample pass / 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 3x6.1m
- ☐ 3x2.1m
- ☐ 4x10.0m
- ☐ 1x33.1m
- ☐ OTHER

_____ meters

CLARITY (1st – sample pass – 2nd)
- ☐ < 20 cm ☐
- ☐ 20-40 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm/ CTD ☐
- ☐ SECCHI DEPTH ☐

CANOPY
- ☐ >85% OPEN
- ☐ 65%-<85%
- ☐ 45%-<65%
- ☐ 15%-<45%
- ☐ <15% CLOSED

1st _____ cm
2nd _____ cm

C] RECREATION AREA DEPTH
POOL: ☐>100ft² ☐>3ft

Comment RE: Reach consistency/ Is reach typical of stream?, Recre[illegible] Observed - Inferred, Other/ Sampling observations, Concerns, Access directions, e[illegible]

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☐ RIVERINE MACROINVERTEBRATES
- ☐ RIVERINE VERTEBRATE
- ☐ RIPARIAN/WETLAND
- ☐ POOR / TURBID
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ NUISANCE ODORS
- ☐ SEWAGE ODORS
- ☐ CHEMICAL ODORS/FILLS

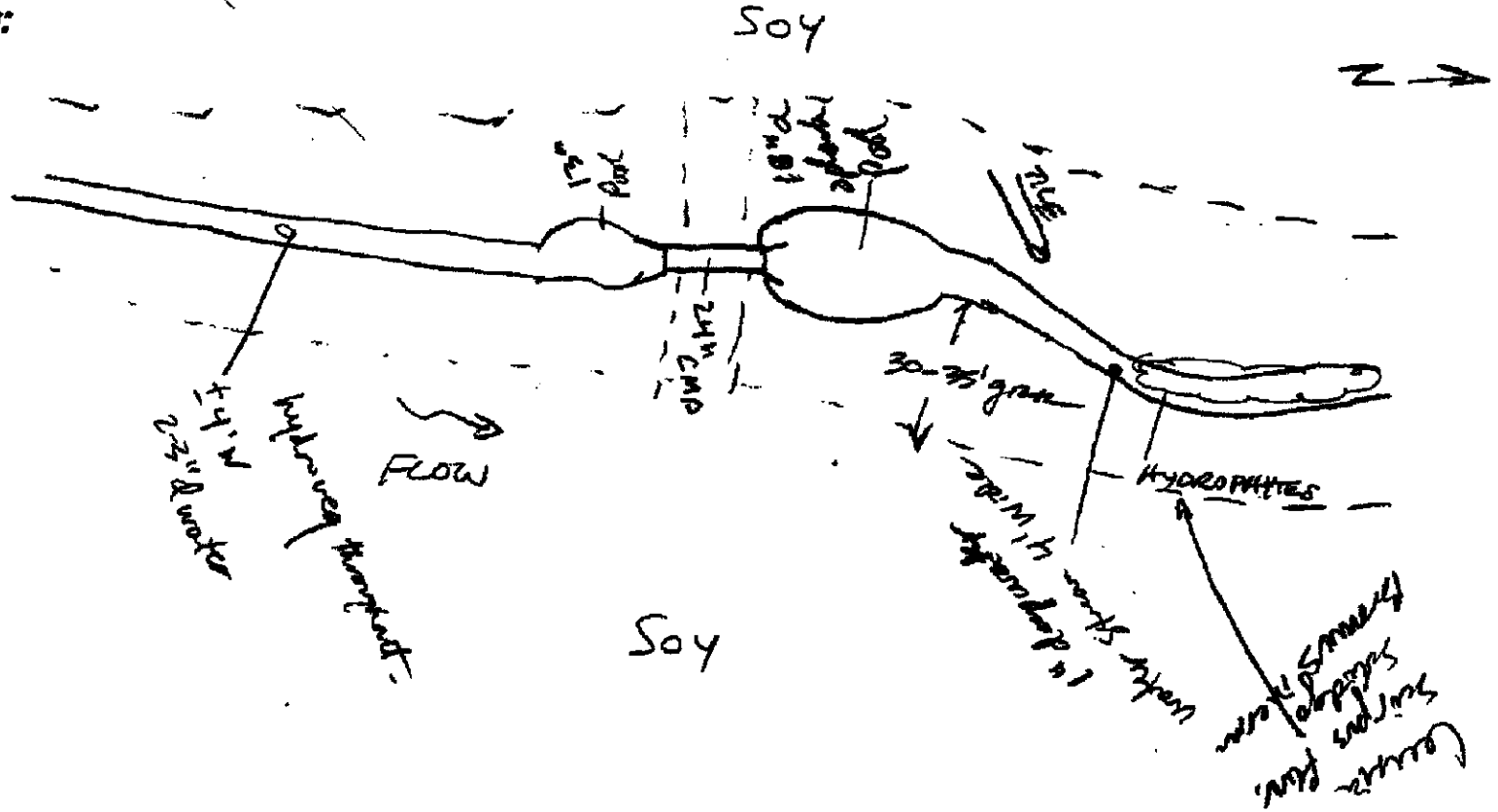
D] MAINTENANCE (Circle some & COMMENT)
PUBLIC / PRIVATE / BOTH / NA
ACTIVE / HISTORIC / BOTH / NA
YOUNG-SUCCESSION-OLD
SPRAY / SNAG / REMOVED
MODIFIED / DIPPED OUT / NA
LEVEED / ONE SIDED
RELOCATED / CUTOFFS
MOVING-BEDLOAD-STABLE
ARMOURED / SLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

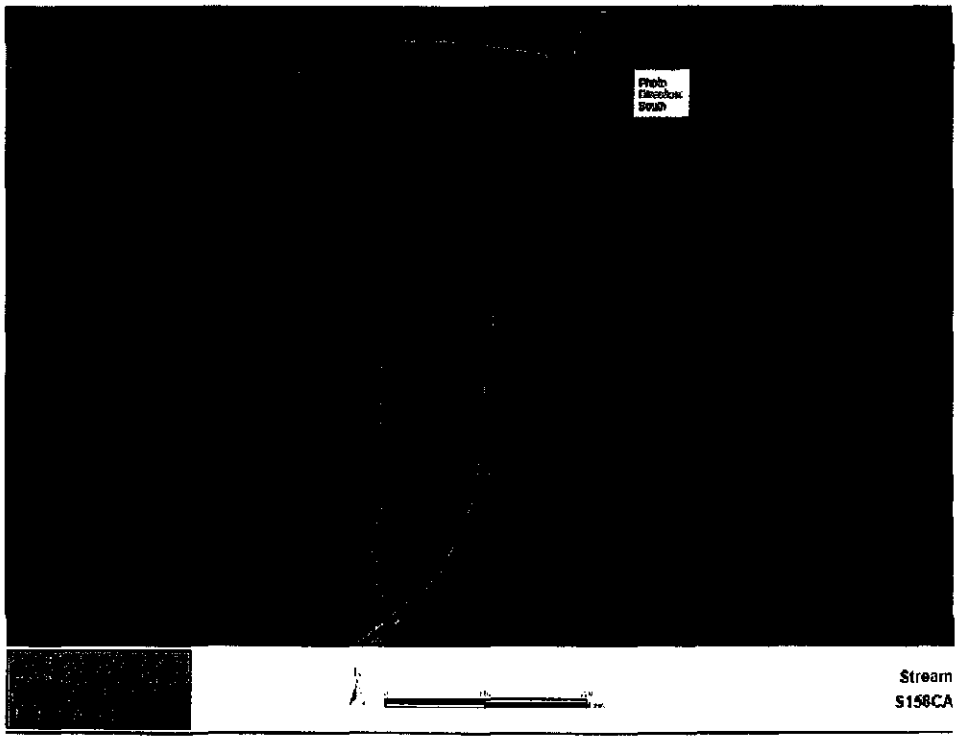
E] ISSUES
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
EMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS
- Xwidth
- Xdepth
- max. depth
- X bankfull width
- bankfull X depth
- W/D ratio
- bankfull max. depth
- flood prone x² width
- entrench. ratio

Legacy Tree:

Stream Drawing:





Stream S158CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S158CA**	WATERBODY NAME: **Main channel of Dry Creek**	
SITE NAME: Blue Creek		
DATE: 9/16/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091609ADW.cor	QUAD NAME: Latty
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Latty	
	PHOTO NO: 158CA35S	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Ag Drainage, channel, deep, well cut, with ag fields adj on all sides		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	5 (in)		
AVG. STREAM WIDTH:	6 (ft)	TOP OF BANK: 10 (ft)	ORDINARY HIGH WATER MARK WIDTH: 4 (ft)
AVG. BANK HEIGHT:	4 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Vegetation	
POTENTIAL HABITAT FOR:	Fish/Spawn Areas	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:		
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack of regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Ohio EPA — Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 30.5

Stream & Location: _____ *RM:* ____ *Date:* 07/16/__

Scorers Full Name & Affiliation: Matthew [illegible]

River Code: ___-___-___ *STORET #:* _____ *Lat./ Long.:* 41 .01060 /84 .55304 (NAD 83 - decimal°) *Office Location:* [illegible]

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

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BOULDER [9]			☐ ☐ WARRENTON [2]		
☐ ☐ COBBLE [8]			☐ ☐ SILT [2]		
☐ ☐ GRAVEL [7]			☒ ☐ MUCK [2]	5	
☐ ☐ SAND [6]			☒ ☒ HARDPAN [2]	45	100
☐ ☐ BEDROCK [5]			☐ ☐ ASPHALT [0]		

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

NUMBER OF BEST TYPES: ☐ 1 or more [2] ☒ 0 or less [0]

Check ONE (*Or 2 & average*)

ORIGIN		QUALITY	
☒	MAN-INDUCED [-1]	☒	HEAVY [-2]
☐	[illegible] [6]	☒	MODERATE [-1]
☐	[illegible] [6]	☐	FREE [1]
☐	[illegible] [6]	☒	NORMAL [2]
☐	[illegible] [6]	☐	[illegible] [2]
☐	[illegible] [6]	☐	[illegible] [2]
☐	[illegible] [6]		
☐	[illegible] [6]		
☐	[illegible] [6]		
☐	[illegible] [6]		
☐	[illegible] [6]		

SILT — EMBEDDEDNESS

Substrate Maximum 20: 25

Comments

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

2	UNDERCUT BANKS [1]	___ BOULDERS [2]	___ OVERHANGING VEGETATION [1]
___	EXTENSIVE SUBMERGED VEGETATION [1]	___ ROOTWADS [1]	___ ARTIFICIAL (CONCRETE) [1]
___	SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]
___	ROOT MATS [1]		

AMOUNT Check ONE (*Or 2 & average*)

☐ EXTENSIVE >75% [3] ☒ MODERATE 25-75% [2] ☐ SPARSE 5-25% [1] ☐ NEARLY ABSENT <5% [0]

Comments

Cover Maximum 20: 12

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☒ RECOVERED [4]	☒ MODERATE [2]
☒ LOW [2]	☒ FAIR [3]	☒ RECOVERING [3]	☐ LOW [1]
☒ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 15

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: [illegible]

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)

☐ [illegible] [6] ☐ [illegible] [4] ☐ [illegible] [2] ☐ [illegible] [1] ☒ [illegible] [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)

☐ [illegible] [2] ☐ [illegible] [1] ☐ [illegible] [0]

CURRENT VELOCITY Check ALL that apply

☐ [illegible] ☐ [illegible] ☐ [illegible] ☐ [illegible] ☐ [illegible] ☐ [illegible] ☐ [illegible] ☐ [illegible]

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 10

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

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (4.2 ft/mi) ☒ [illegible]

DRAINAGE AREA (3.39 mi²) ☐ [illegible] ☐ [illegible]

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

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLE REACH

Check all that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.16 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

STAGE

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

CLARITY

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

CANOPY

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

1st pass _____ cm

2nd _____ cm

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

B] AESTHETICS

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

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

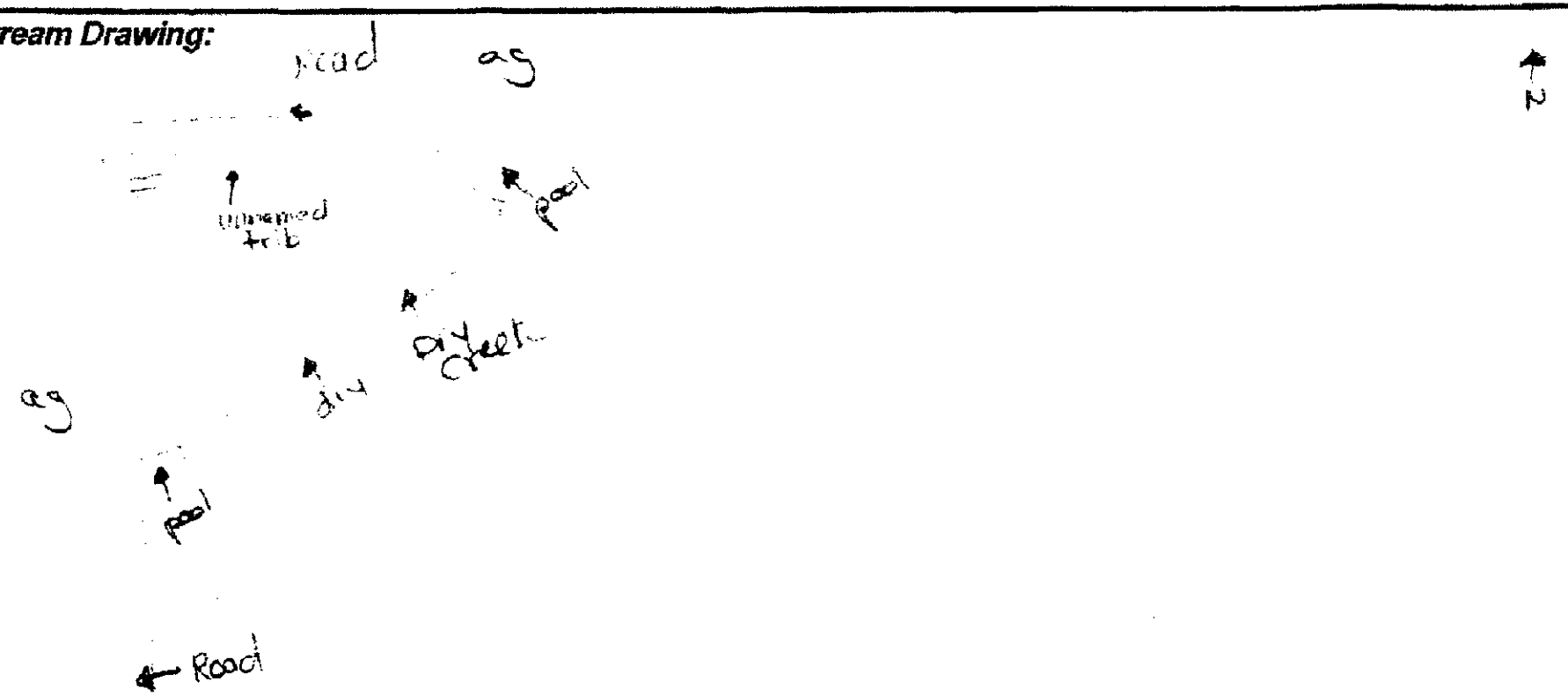
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

F] MEASUREMENTS

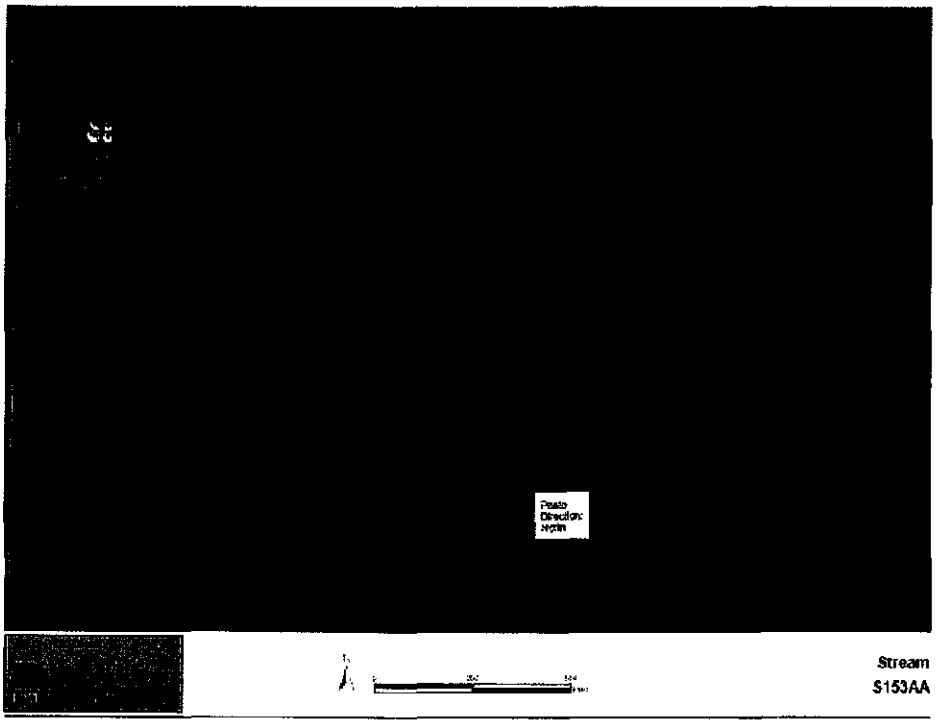
- $\bar{x}$ *width* 3'
- $\bar{x}$ depth .4
- max. depth .4
- $\bar{x}$ bankfull width 5'
- bankfull $\bar{x}$ depth .2'
- W/D ratio
- bankfull max. depth .3
- floodprone x^2 width
- entrench. ratio

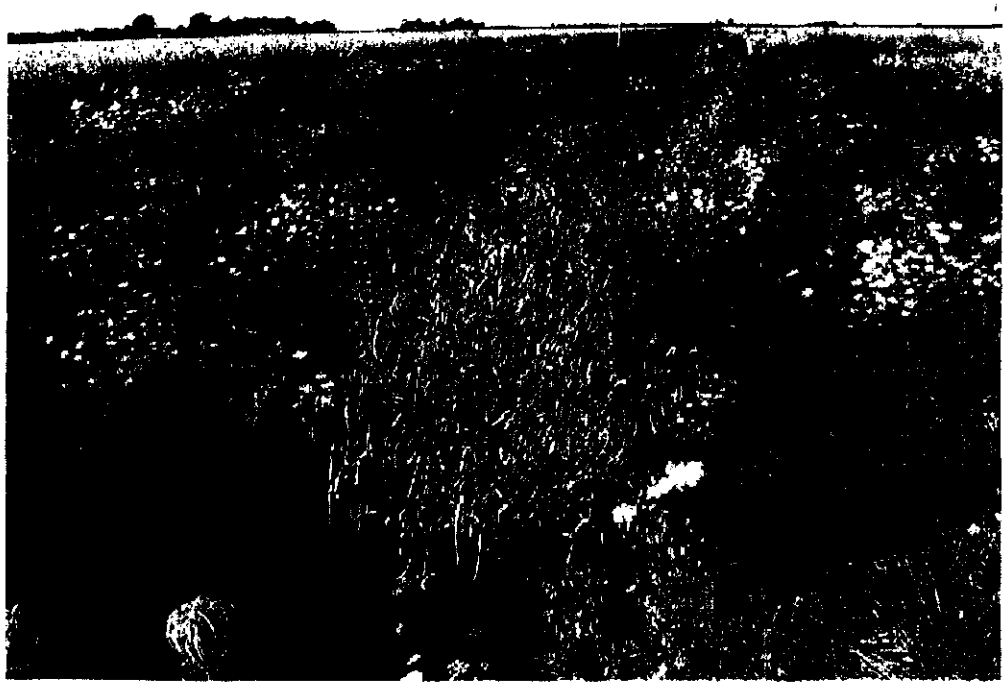
Legacy Tree:

Stream Drawing:



Tributaries to Dry Creek.





Stream S153AA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S153AA	WATERBODY NAME: Unnamed Tributary to Dry Creek	
SITE NAME: Blue Creek		
DATE: 9/16/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091609ADW.cor	QUAD NAME: Latty
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Latty	
	PHOTO NO: 153AA42n	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Drainage ditch for adj ag fields (soybeans), very linear		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 10 (ft)	ORDINARY HIGH WATER MARK WIDTH: 4 (ft)
AVG. BANK HEIGHT:	5 (ft)		
AVG. BANK SLOPE (RATIO):	Vertical (<= 1:1)		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Vegetation	
POTENTIAL HABITAT FOR:	None	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:		
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; little regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

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

SITE NAME/LOCATION _____

SITE NUMBER S153AA RIVER BASIN _____ DRAINAGE AREA (mi²) 0.09

LENGTH OF STREAM REACH (ft) _____ LAT. 40.00990 LONG. -84.56780 RIVER CODE _____ RIVER MILE _____

DATE 09/16/09 SCORER Nechvatal COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]	0%	☑☑	SILT [3 pt]	100%
☐☐	BOULDER (>256 mm) [16 pts]	0%	☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐☐	BEDROCK [16 pt]	0%	☐☐	FINE DETRITUS [3 pts]	0%
☐☐	COBBLE (65-256 mm) [12 pts]	0%	☐☐	CLAY or HARDPAN [0 pt]	0%
☐☐	GRAVEL (2-64 mm) [9 pts]	0%	☐☐	MUCK [0 pts]	0%
☐☐	SAND (<2 mm) [6 pts]	0%	☐☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

HHEI Metric Points

Substrate Max = 40

7

A + B

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

- ☐ > 30 centimeters [20 pts]
- ☐ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☑ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS _____ **MAXIMUM POOL DEPTH (centimeters):** 8

Pool Depth Max = 30

15

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 1.20

Bankfull Width Max=30

15

This information must also be completed

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

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

COMMENTS

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

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

COMMENTS

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

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

STREAM GRADIENT ESTIMATE

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

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

QHEI PERFORMED? [✓] Yes [ ] No QHEI Score 24.5 (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

[ ] WWH Name: _____ Distance from Evaluated Stream _____

[ ] CWH Name: _____ Distance from Evaluated Stream _____

[ ] EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: Paulding Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: 0.00

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

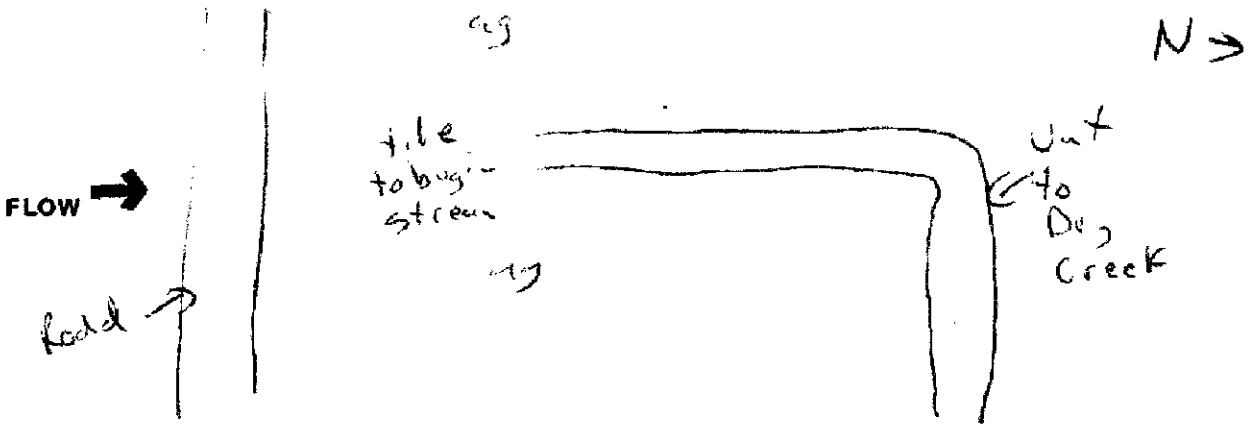
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

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

Comments Regarding Biology: _____

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

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



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 245

Stream & Location: _____ RM: ____ Date: __/__/__

Scorers Full Name & Affiliation: _____

River Code: __-__-__ STORET #: _____ Lat./Long.: (NAD 83 - decimal °) ____ . ____ / 8 ____ . ____ 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
☐☐ BLDR/SLABS [10]	____	____	☐☐ HARDPAN [4]	____	____
☐☐ BOULDER [9]	____	____	☐☐ DETRITUS [3]	____	____
☐☐ COBBLE [8]	____	____	☐☐ MUCK [2]	____	____
☐☐ GRAVEL [7]	____	____	☑☑ SILT [2]	100	100
☐☐ SAND [6]	____	____	☐☐ ARTIFICIAL [0]	____	____
☐☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

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

ORIGIN	QUALITY
☐ LIMESTONE [1]	☐ HEAVY [-2]
☐ TILLS [1]	☐ MODERATE [-1]
☐ WETLANDS [0]	☐ NORMAL [0]
☐ HARDPAN [0]	☐ FREE [1]
☐ SANDSTONE [0]	☐ EXTENSIVE [-2]
☐ RIPRAP [0]	☐ MODERATE [-1]
☐ LACUSTURINE [0]	☑ NORMAL [0]
☐ SHALE [-1]	☐ NONE [1]
☐ COAL FINES [-2]	

SILT / EMBEDDEDNESS

Comments

Substrate: 2 (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.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS/BACKWATERS [1]
____ OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

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

Comments

Cover Maximum 20: 11

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 7

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

River right looking downstream

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

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

Comments

Riparian Maximum 10: 5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH (Check ONE (ONLY))
- ☐ > 1m [5]
- ☐ 0.7 < 1m [4]
- ☐ 0.4 < 0.7m [2]
- ☐ 0.2 < 0.4m [1]
- ☑ < 0.2m [0]

CHANNEL WIDTH (Check ONE (Or 2 & average))
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)
- ☐ TORRENTIAL [1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☐ SLOW [1]
- ☐ INTERSTITIAL [1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: 0

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble/Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (3.3 ft/mi)
DRAINAGE AREA (.09 mi²)

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

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

Gradient Maximum 10: 4

EPA 4520 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ 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

_____ meters

CLARITY

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

CANOPY

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

1st _____ cm

2nd _____ cm

C] RECREATION

POOL: AREA ☐ >100ft² DEPTH ☐ >3ft

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

B] AESTHETICS

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

D] MAINTENANCE

Circle some & *COMMENT*

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

E] ISSUES

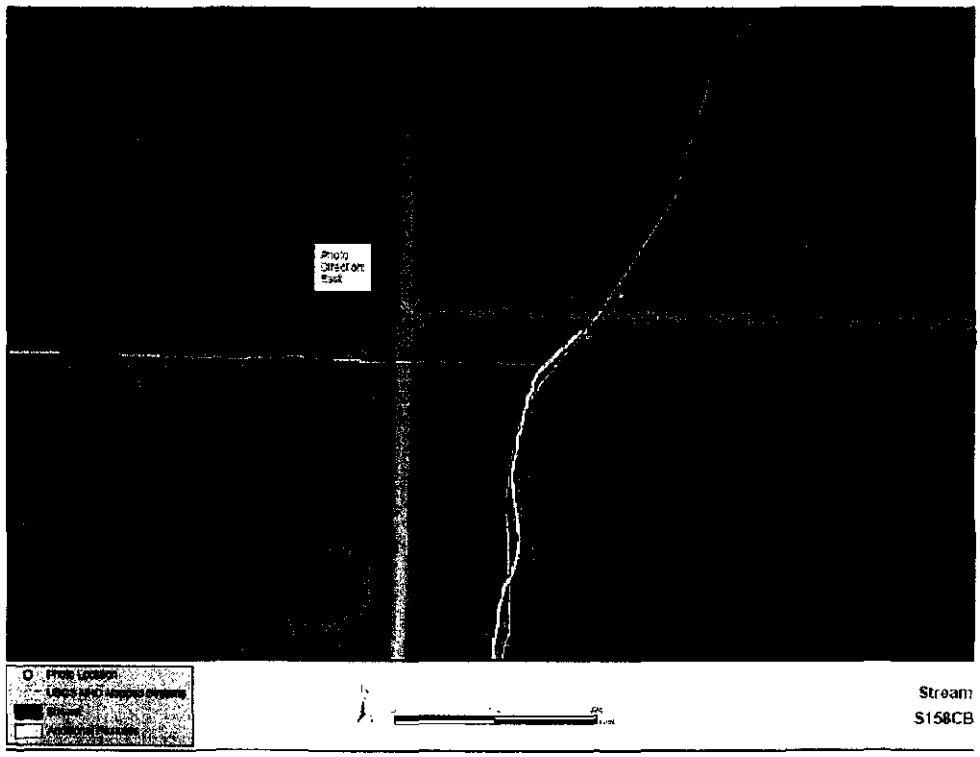
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

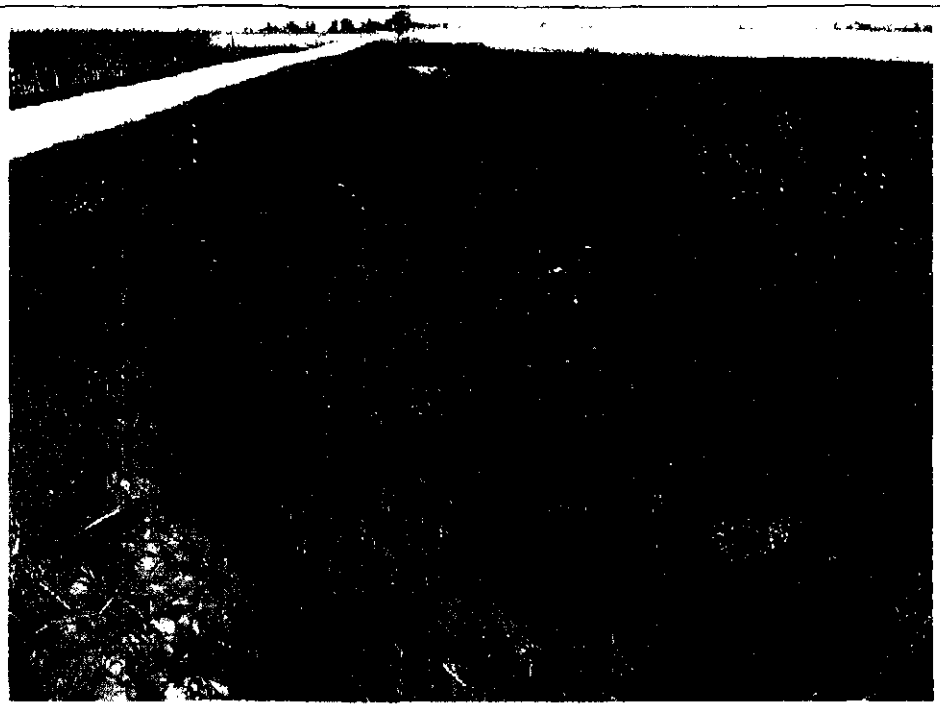
F] MEASUREMENTS

- x̄ width
- x̄ depth
- max. depth
- x̄ bankfull width
- bankfull x̄ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:





Stream S158CB

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S158CB**	WATERBODY NAME: **Unnamed Tributary to Dry Creek**
SITE NAME: **Blue Creek**	

DATE: 9/16/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: D.West, M. Nechvatal	ROVER FILE: R091609ADW.cor	QUAD NAME: Latty
STATE/COUNTY: Ohio/Paulding	TOWNSHIP.: Latty	
	PHOTO NO: 158CB34E	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Drainage ditch for adj ag fields		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Intermittent		
AVG. STREAM DEPTH:	0 (in)		
AVG. STREAM WIDTH:	0 (ft)	TOP OF BANK: 7 (ft)	ORDINARY HIGH WATER MARK WIDTH: 4 (ft)
AVG. BANK HEIGHT:	3 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:		
PRIMARY SUBSTRATE:	Vegetation	
POTENTIAL HABITAT FOR:	None	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT: None	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:		
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; little regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 22

SITE NAME/LOCATION _____

SITE NUMBER S158CB RIVER BASIN _____ DRAINAGE AREA (mi²) 0.57

LENGTH OF STREAM REACH (ft) _____ LAT. 41.01170 LONG. -84.55320 RIVER CODE _____ RIVER MILE _____

DATE 09/16/09 SCORER Nechvatal COMMENTS _____

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

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

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

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]	0%	☑☑	SILT [3 pt]	100%
☐☐	BOULDER (>256 mm) [16 pts]	0%	☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	0%
☐☐	BEDROCK [16 pt]	0%	☐☐	FINE DETRITUS [3 pts]	0%
☐☐	COBBLE (65-256 mm) [12 pts]	0%	☐☐	CLAY or HARDPAN [0 pt]	0%
☐☐	GRAVEL (2-64 mm) [9 pts]	0%	☐☐	MUCK [0 pts]	0%
☐☐	SAND (<2 mm) [6 pts]	0%	☐☐	ARTIFICIAL [3 pts]	0%

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0.00% (A) 100% (B)

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: 6 **TOTAL NUMBER OF SUBSTRATE TYPES:** 1

HHEI Metric Points

Substrate Max = 40

7

A + B

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

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☑ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS Dry **MAXIMUM POOL DEPTH (centimeters):** 0

Pool Depth Max = 30

0

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

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

COMMENTS _____ **AVERAGE BANKFULL WIDTH (meters):** 1.20

Bankfull Width Max=30

15

This information must also be completed

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

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

COMMENTS _____

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

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

COMMENTS _____

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

☑ None
☐ 0.5
☐ 1.0
☐ 1.5
☐ 2.0
☐ 2.5
☐ 3.0
☐ >3

STREAM GRADIENT ESTIMATE

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

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

QHEI PERFORMED? - [✓] Yes [ ] No QHEI Score 27.0 (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

[ ] WWH Name: _____ Distance from Evaluated Stream _____

[ ] CWH Name: _____ Distance from Evaluated Stream _____

[ ] EWH Name: _____ Distance from Evaluated Stream _____

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

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

County: Paulding Township / City: _____

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: _____ Quantity: 0.00

Photograph Information: _____

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

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

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

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

Additional comments/description of pollution impacts: _____

BIOTIC EVALUATION

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

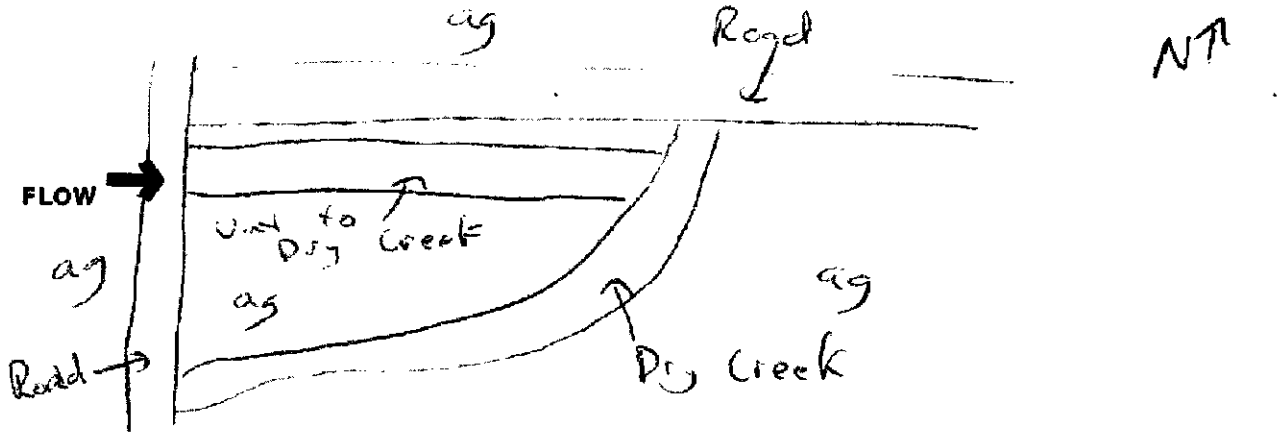
Fish Observed? (Y/N) N Voucher? (Y/N) N Salamanders Observed? (Y/N) N Voucher? (Y/N) N

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

Comments Regarding Biology: _____

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

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



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 27

Stream & Location: _____ *RM:* ____ *Date:* __/__/__

Scorers Full Name & Affiliation: _____

River Code: __-__-__ *STORET #:* _____ *Lat./Long.:* (NAD 83 - decimal °) _____ . _____ / 8 . _____ *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
☐ ☐ BLDR/SLABS [10]	____	____	☐ ☐ HARDPAN [4]	____	____
☐ ☐ BOULDER [9]	____	____	☐ ☐ DETRITUS [3]	____	____
☐ ☐ COBBLE [8]	____	____	☐ ☐ MUCK [2]	____	____
☐ ☐ GRAVEL [7]	____	____	☒ ☐ SILT [2]	100	____
☐ ☐ SAND [6]	____	____	☐ ☐ ARTIFICIAL [0]	____	____
☐ ☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

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

ORIGIN		QUALITY
☐ LIMESTONE [1]	SILT	☐ HEAVY [-2]
☐ TILLS [1]		☐ MODERATE [-1]
☐ WETLANDS [0]		☐ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]
☐ RIP/RAP [0]		☐ MODERATE [-1]
☐ LACUSTURINE [0]		☐ NORMAL [0]
☐ SHALE [-1]		☐ NONE [1]
☐ COAL FINES [-2]		

Comments

Substrate 1 *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.

____ UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS/BACKWATERS [1]
____ OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
____ SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	____ LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

AMOUNT Check ONE (*Or 2 & average*)
☒ EXTENSIVE >75% [11] ☐ MODERATE 25-75% [7] ☐ SPARSE 5-25% [3] ☐ NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20 11

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☒ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☒ NONE [1]	☒ POOR [1]	☒ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20 7

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

River right looking downstream

EROSION L	EROSION R	RIPARIAN WIDTH L	RIPARIAN WIDTH R
☒	☒ NONE / LITTLE [3]	☐	☐ WIDE > 50m [4]
☐	☐ MODERATE [2]	☐	☐ MODERATE 10-50m [3]
☐	☐ HEAVY / SEVERE [1]	☐	☐ NARROW 5-10m [2]
☐	☐	☒	☒ VERY NARROW < 5m [1]
☐	☐	☐	☐ NONE [0]

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

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

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

Comments

Riparian Maximum 10 7

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
☐ > 1m [5] ☐ 0.7-1m [4] ☐ 0.4-0.7m [2] ☐ 0.2-0.4m [1] ☒ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☐ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1] ☐ INTERSTITIAL [-1] ☐ INTERMITTENT [-2] ☐ VERY FAST [1] ☐ FAST [1] ☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12 6

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
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8 0

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

DRAINAGE AREA (0.57 mi²)

%POOL: ____ %GLIDE: ____ %RUN: ____ %RIFFLE: ____

Gradient Maximum 10 4

EPA 4520 06/16/06

A] SAMPLED REACH

Check ALL that apply

METHOD

- ☐ BOAT
- ☐ WADE
- ☐ L. LINE
- ☐ OTHER

STAGE

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

DISTANCE

- ☐ 0.6 Km
- ☐ 0.2 Km
- ☐ 0.15 Km
- ☐ 0.12 Km
- ☐ OTHER

_____ meters

CLARITY

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

1st _____ cm

pass

2nd _____ cm

CANOPY

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

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

B] AESTHETICS

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

C] RECREATION

AREA DEPTH

POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE

Circle some & *COMMENT*

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 / BLUMPS
ISLANDS / SCOURED
IMPOUNDED / DESICCATED
FLOOD CONTROL / DRAINAGE

E] ISSUES

WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN / HOME
ATMOSPHERE / DATA PAUCITY

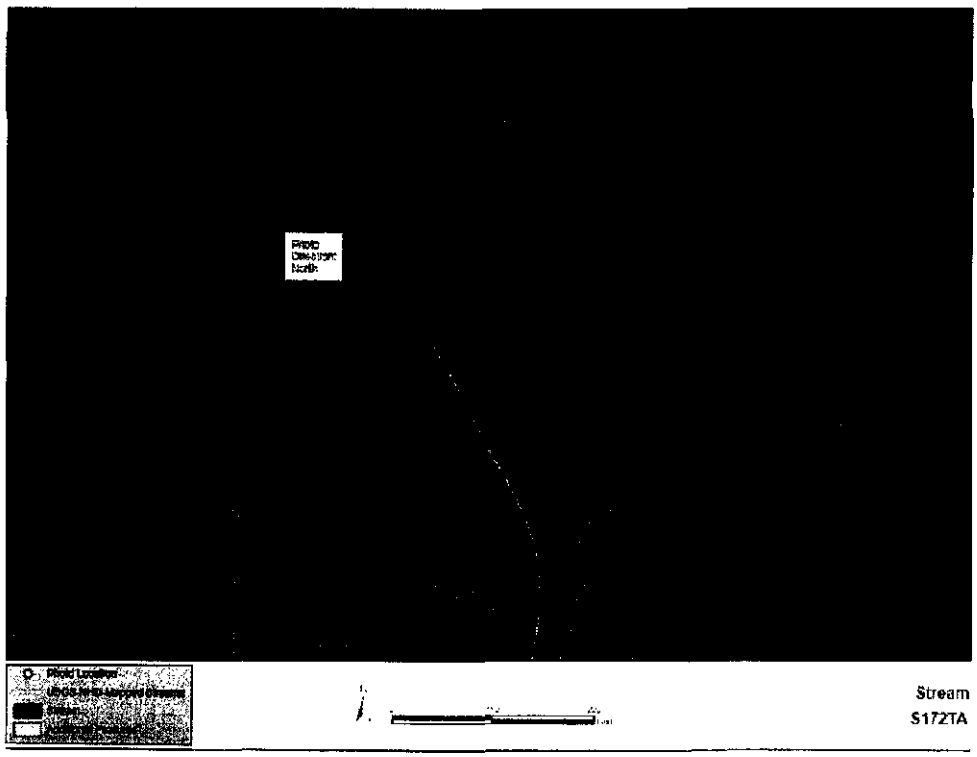
F] MEASUREMENTS

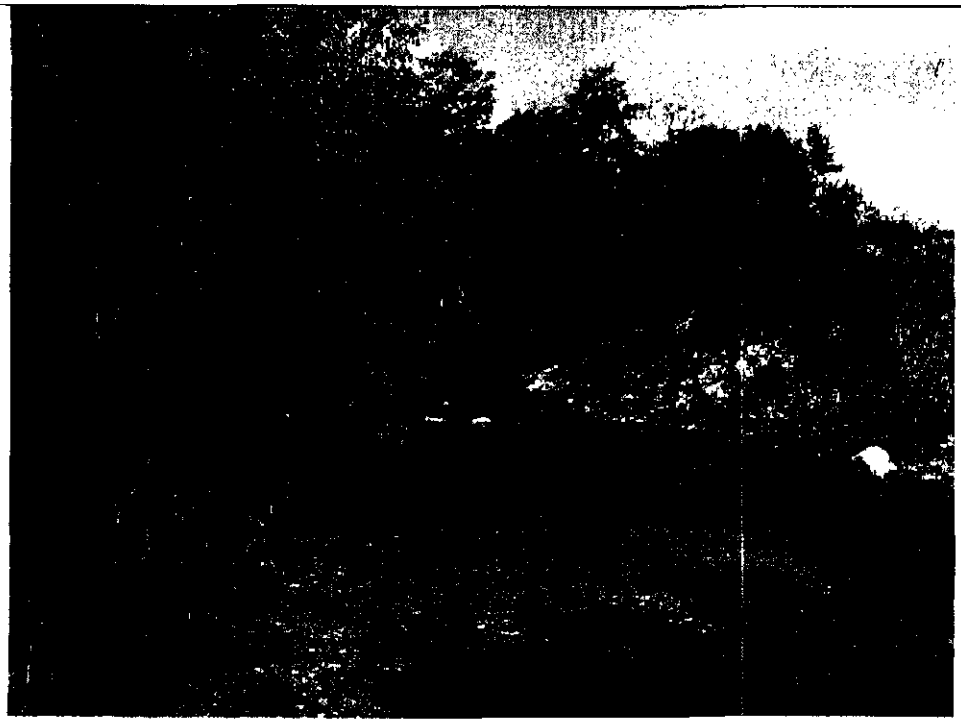
- x̄ width
- x̄ depth
- max. depth
- x̄ bankfull width
- bankfull x̄ depth
- W/D ratio
- bankfull max. depth
- floodprone x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:

Maddox Creek





Stream S172TA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: S172TA	WATERBODY NAME:	
SITE NAME: Blue Creek		
DATE: 9/16/2009	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: AF RH	ROVER FILE: RAH091609A.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Hoaglin	
	PHOTO NO: S172A	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Stream		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	9 (in)		
AVG. STREAM WIDTH:	20 (ft)	TOP OF BANK: 35 (ft)	ORDINARY HIGH WATER MARK WIDTH: 35 (ft)
AVG. BANK HEIGHT:	10 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Slighty Turbid	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 35 (ft)	
	TYPE OF VEGETATION PRESENT: Forested	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Natural	CHANNEL GEOMETRY MEANDERING

COMMENTS

More notes on QHEI sheet

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; [illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 44.5

Stream & Location: SITZTA (MADDOX CREEK) **RM:** 5.0 **Date:** 9/16/09

Scorers Full Name & Affiliation: RHOOL / CH2M HILL

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal) 40°.57'18" 84°.31'34" **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
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☑☐ COBBLE [8]	50%	75%	☐☐ MUCK [2]		
☐☐ GRAVEL [7]			☐☐ SILT [2]	25%	
☑☐ SAND [6]	25%	25%	☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (*Or 2 & average*)

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]

SILT

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

EMBEDDEDNESS

Substrate Maximum 20: **13**

Comments

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

- ___ 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]

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

Comments

Cover Maximum 20: **5**

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]

>1.5

Comments

Channel Maximum 20: **9.5**

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

River right looking downstream

EROSION

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

RIPARIAN WIDTH

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

FLOOD PLAIN QUALITY

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

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

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

Comments

Riparian Maximum 10: **5**

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☑ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☑ MODERATE [1]
- ☑ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

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

Comments

Pool / Current Maximum 12: **4**

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

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

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

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

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

Comments

Riffle / Run Maximum 8: **0**

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

DRAINAGE AREA (28 mi²)

%POOL: ___ %GLIDE: 100

%RUN: ___ %RIFFLE: ___

Gradient Maximum 10: **4**

EPA 4520 06/16/06

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ BOAT
- ☐ WADE
- ☐ L. CANE
- ☐ OTHER

STAGE (1st - sample pass - 2nd)
- ☐ HIGH ☐
- ☐ UP ☐
- ☐ NORMAL ☐
- ☐ LOW ☐
- ☐ DRY ☐

DISTANCE
- ☐ 0-40m
- ☐ 41-75m
- ☐ 76-150m
- ☐ 151-300m
- ☐ OTHER

_____ meters

CLARITY (1st - sample pass - 2nd)
- ☐ <40 cm ☐
- ☐ 41-75 cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm / CTD ☐
- ☐ SECCHI DEPTH ☐

CANOPY
- ☐ >50% OPEN
- ☐ 50% - 25%
- ☐ 25% - 10%
- ☐ 10% - 0%
- ☐ <10% SHADED

1st _____ cm
2nd _____ cm

C] 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.

_____

_____

_____

_____

_____

B] AESTHETICS
- ☐ NUISANCE ALGAE
- ☐ [illegible]
- ☐ EXCESS TURBIDITY
- ☐ [illegible]
- ☐ FOAM / SHEEN
- ☐ OIL SHEEN
- ☐ TRASH / LITTER
- ☐ [illegible]
- ☐ SLUDGE DEPOSITS
- ☐ [illegible]

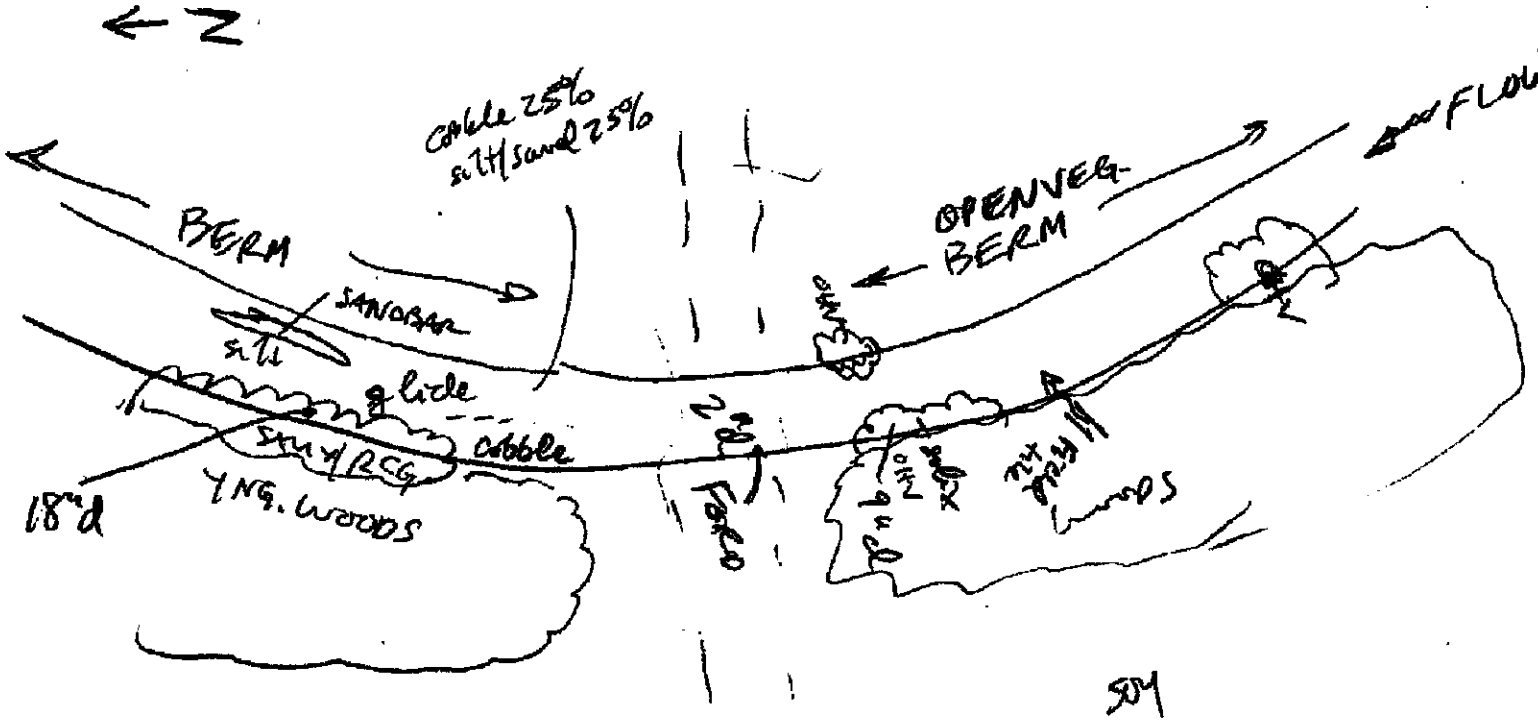
D] MAINTENANCE
Circle some & COMMENT
- PUBLIC / PRIVATE / BOTH / NA
- ACTIVE / HISTORIC / BOTH / NA
- YOUNG-SUCCESSION-OLD
- SPRAY / SNAG / REMOVED
- MODIFIED / DIPPED OUT / NA
- LEVEED / ONE SIDED
- RELOCATED / CUTOFFS
- MOVING-BEDLOAD-STABLE
- ARMOURED / SLUMPS
- ISLANDS / SCOURED
- IMPOUNDED / DESICCATED
- FLOOD CONTROL / DRAINAGE

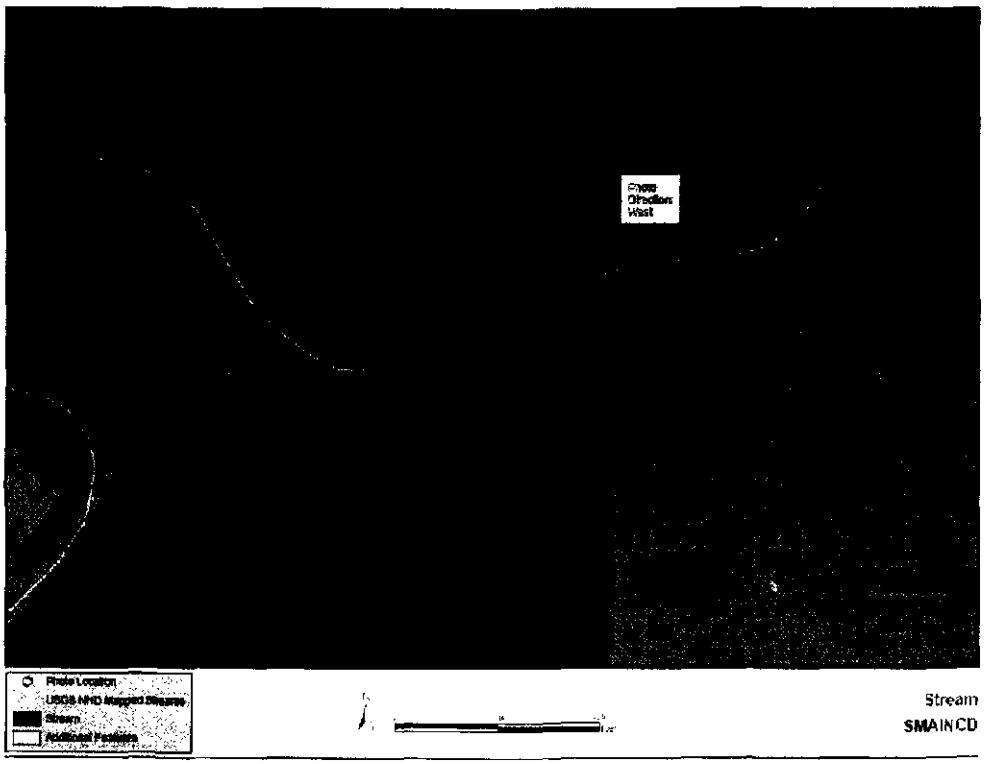
E] ISSUES
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H_2O / TILE / H_2O TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / 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 x^2 width
- entrench. ratio

Legacy Tree:

Stream Drawing:





Stream SMAINCD

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **SMAINCD**	WATERBODY NAME: **Hoaglin Creek**	
SITE NAME: **Blue Creek**		
DATE: **9/21/2009**	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm	
INVESTIGATORS: Hook	ROVER FILE: RAH090921.cor	QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Union	
	PHOTO NO: smaincc1 2	

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Routed under old rr		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	24 (in)		
AVG. STREAM WIDTH:	20 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 25 (ft)
AVG. BANK HEIGHT:	9 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Cobbles	
POTENTIAL HABITAT FOR:		
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 0 (ft)	
	TYPE OF VEGETATION PRESENT:	
WETLAND FRINGE (IF PRESENT):		
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY RELATIVELY STRAIGHT

COMMENTS

STREAM QUALITY: Medium

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; lack regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 42.5

Stream & Location: SMMCD (HOAGLIN CREEK) **RM:** 17.0 **Date:** 9/21/09

Scorers Full Name & Affiliation: R HOOK / CH2M HILL

River Code: _ _ _ - _ _ _ - _ _ **STORET #:** _ _ _ _ _ _ **Lat./ Long.:** (NAD 83 - decimal °) 40° 56' 13" 84° 34' 55" **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
☐☐ BLDR /SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]			☐☐ DETRITUS [3]		
☑☐ COBBLE [8]	50%		☐☐ MUCK [2]		
☐☐ GRAVEL [7]			☐☐ SILT [2]		
☐☑ SAND [6]	50%		☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

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

Check ONE (*Or 2 & average*)

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]

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

Substrate 14 *Maximum 20*

Comments
No riffle/pool

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.

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

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

Comments

Cover *Maximum 20* 4

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

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

DEVELOPMENT
☐ EXCELLENT [7]
☐ GOOD [5]
☑ FAIR [3]
☐ POOR [1]

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

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

Comments

Channel *Maximum 20* 10

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

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

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

FLOOD PLAIN QUALITY	L	R
FOREST, SWAMP [3]	☑	☐
SHRUB OR OLD FIELD [2]	☐	☐
RESIDENTIAL, PARK, NEW FIELD [1]	☐	☐
FENCED PASTURE [1]	☐	☐
OPEN PASTURE, ROWCROP [0]	☑	☐
CONSERVATION TILLAGE [1]	☐	☐
URBAN OR INDUSTRIAL [0]	☐	☐
MINING / CONSTRUCTION [0]	☐	☐

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

Comments
AVERAGE = 2 AVER = 1.5

Riparian *Maximum 10* 6.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☑ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1]
☑ SLOW [1]
☐ VERY FAST [1]
☐ INTERSTITIAL [-1]
☐ FAST [1]
☐ INTERMITTENT [-2]
☑ MODERATE [1]
☐ EDDIES [1]
Indicate for reach - pools and riffles.

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

Comments

Pool / Current *Maximum 12* 5

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

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

RUN DEPTH
☐ MAXIMUM > 50cm [2]
☐ MAXIMUM < 50cm [1]

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

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

Comments

Riffle / Run *Maximum 8* —

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

DRAINAGE AREA
(33 mi²)

%POOL: %GLIDE: 100% %RUN: %RIFFLE:

Gradient *Maximum 10* 4

A] SAMPLED REACH
Check ALL that apply

METHOD
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]

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

DISTANCE
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ OTHER

_____ meters

CLARITY
1st –sample pass– 2nd
- ☐ < [illegible] cm ☐
- ☐ [illegible] cm ☐
- ☐ 40-70 cm ☐
- ☐ > 70 cm / CTS ☐
- ☐ SECCHI DEPTH ☐

CANOPY
1st _____ cm
2nd _____ cm
- ☐ >[illegible]% OPEN
- ☐ [illegible]%
- ☐ [illegible]%
- ☐ [illegible]%
- ☐ [illegible]% CLOSED

B] AESTHETICS
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]
- ☐ [illegible]

C] RECREATION
AREA DEPTH
POOL: ☐ >100ft² ☐ >3ft

D] MAINTENANCE
Circle some & COMMENT
- 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

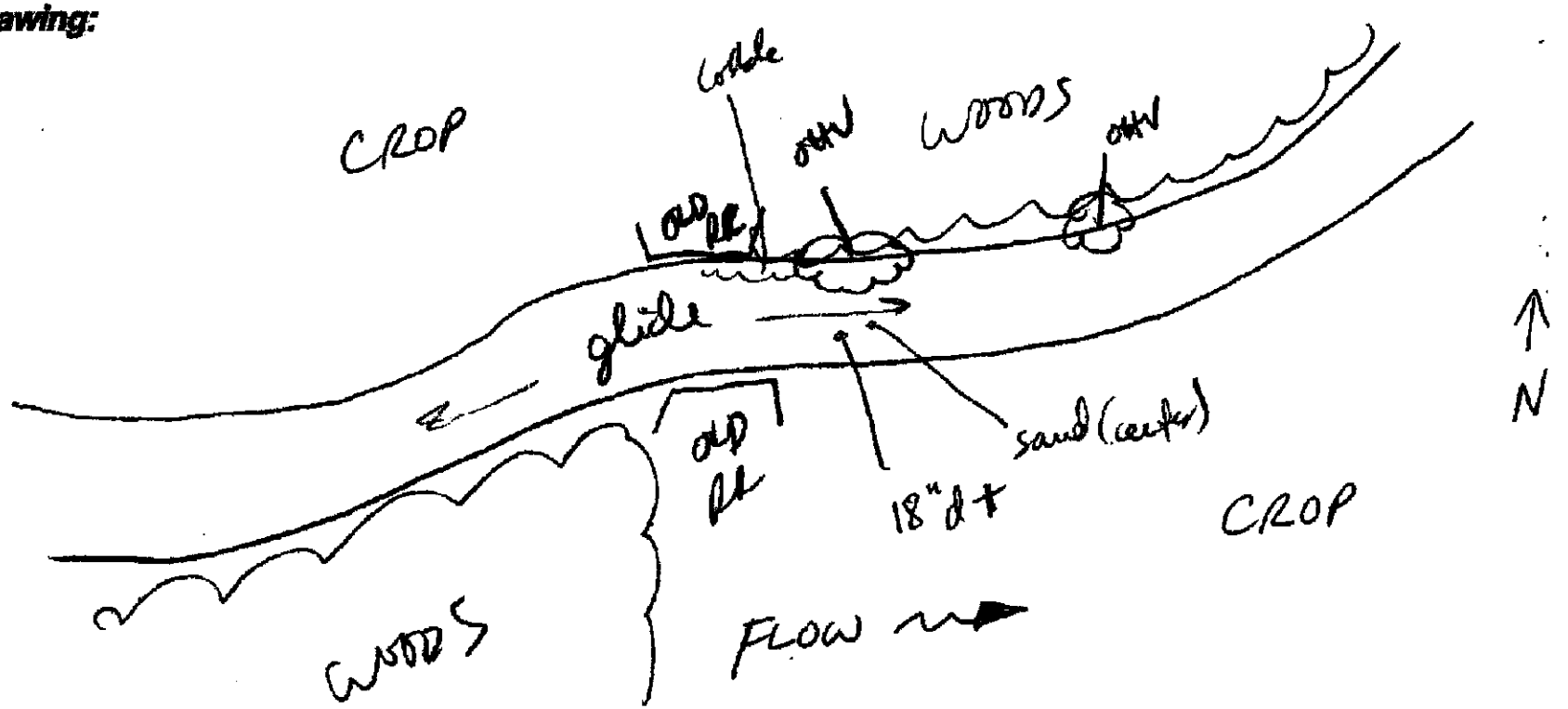
E] ISSUES
- WWTP / CSO / NPDES / INDUSTRY
- HARDENED / URBAN / DIRT&GRIME
- CONTAMINATED / LANDFILL
- BMPs-CONSTRUCTION-SEDIMENT
- LOGGING / IRRIGATION / COOLING
- BANK / EROSION / SURFACE
- FALSE BANK / MANURE / LAGOON
- WASH H_20 / TILE / H_20 TABLE
- ACID / MINE / QUARRY / FLOW
- NATURAL / WETLAND / STAGNANT
- PARK / GOLF / LAWN / HOME
- ATMOSPHERE / DATA PAUCITY

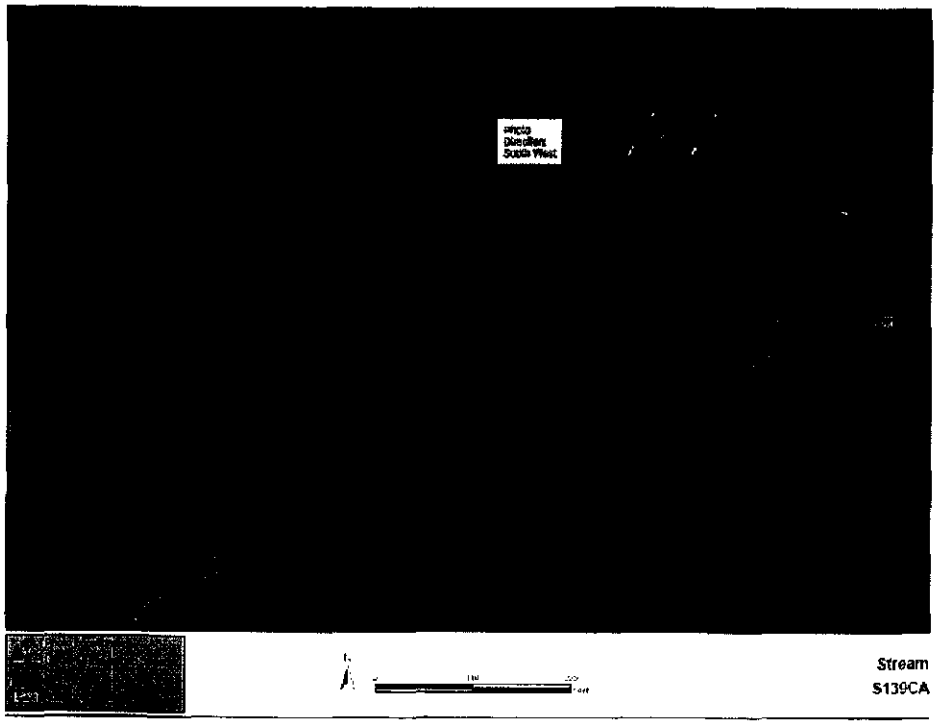
F] MEASUREMENTS
- [illegible] width
- [illegible] depth
- max. depth
- [illegible] bankfull width
- bankfull [illegible] depth
- W/D ratio
- [illegible] max. depth
- floodprone [illegible] width
- entrench. ratio

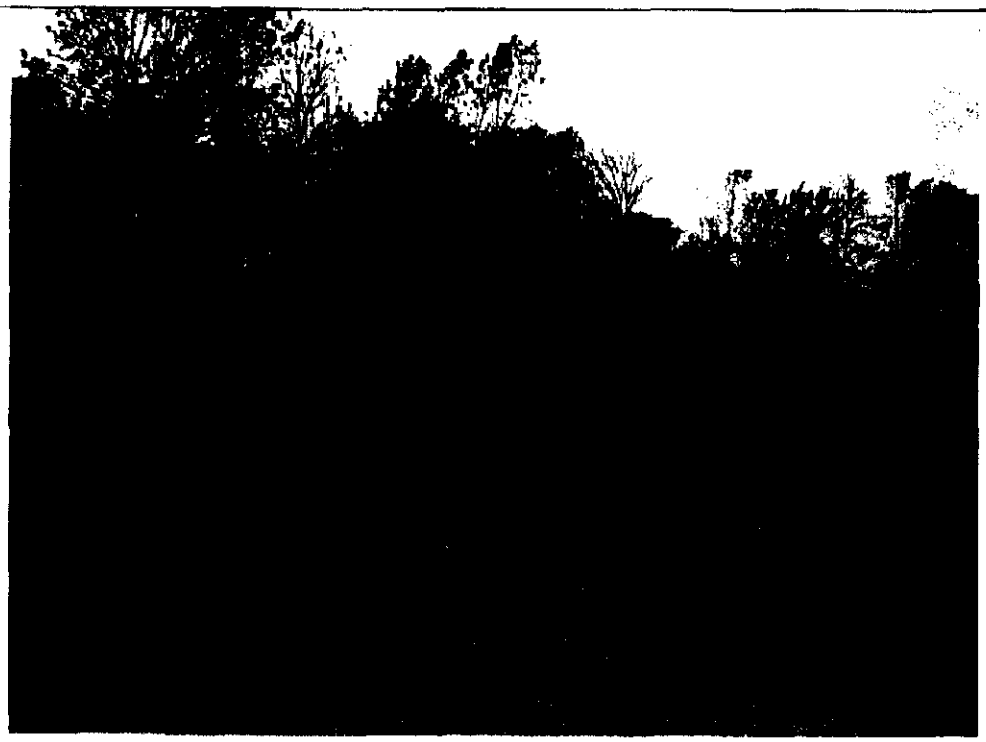
Legacy Tree:

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

Stream Drawing:







Stream S139CA

CH2MHILL

WATERBODY DATA SHEET

WATERBODY ID NO: **S139CA**	WATERBODY NAME: **Hoaglin Creek**
SITE NAME: **Blue Creek**	
DATE: **10/14/2009**	CLIENT/PROJECT NAME: Heartland Wind LLC./Blue Creek Wind Farm
INVESTIGATORS: AF RH	ROVER FILE: / QUAD NAME: Scott
STATE/COUNTY: Ohio/Van Wert	TOWNSHIP.: Hoaglin
	PHOTO NO:

WATERBODY CHARACTERISTICS

WATERBODY TYPE:	Stream		
FLOW EVENTS/YEAR:			
FLOW TYPE:	Perennial		
AVG. STREAM DEPTH:	36 (in)		
AVG. STREAM WIDTH:	25 (ft)	TOP OF BANK: 40 (ft)	ORDINARY HIGH WATER MARK WIDTH: 30 (ft)
AVG. BANK HEIGHT:	8 (ft)		
AVG. BANK SLOPE (RATIO):	2:1		

QUALITATIVE ATTRIBUTES

AVERAGE WATER APPEARANCE:	Turbid	
PRIMARY SUBSTRATE:	Silts	
POTENTIAL HABITAT FOR:	Aq/Wild Diversity	
DEFINED BED AND BANKS:	PRESENT	
RIPARIAN ZONE:	WIDTH OF NATURAL VEGETATION ZONE FROM EDGE OF ACTIVE CHANNEL OUT ONTO FLOOD PLAN: 15 (ft)	
	TYPE OF VEGETATION PRESENT: Forested	
WETLAND FRINGE (IF PRESENT):	N/A	
CHANNEL CONDITION:	Not Significant	
CHANNEL TYPE:	Manipulated	CHANNEL GEOMETRY MEANDERING

COMMENTS

STREAM QUALITY: Low

HIGH QUALITY: Natural channel (no structures or dikes; no evidence of downcutting or excessive lateral cutting); evidence of past channel alteration with significant recovery; any dikes/levies are set back to provide access to adequate flood plain; natural vegetation extends at least one or two active channel widths on each side; banks stable and protected by roots that extend to the base-flow elevation; water clear to tea-colored; no barriers to fish movement (seasonal water withdrawals prevent movement); many fish cover types available; diverse and stable aquatic habitat; no disturbance by livestock or man; intolerant microinvertebrates present.

MODERATE QUALITY: Altered channel evidenced by rip rap and/or channelization; dikes/levees restrict flood plain width; natural vegetation extends 1/3-1/2 of the active channel width on each side; filtering function of riparian vegetation only moderately compromised; banks moderately unstable (outside bends actively eroding with few fallen trees); considerable water cloudiness, submerged objects covered with green film; moderate odor; minor barriers to fish movement; 4-3 fish cover types available; fair aquatic habitat; minimum disturbance by livestock or man; Facultative microinvertebrates present.

LOW QUALITY: Channel is actively downcutting or widening; rip rap and channilization excessive; flood plain restricted by dikes/levees; natural vegetation less than 1/3 of the active channel width on each side; la[illegible] regeneration; filtering function severely compromised; Banks unstable (inside and outside bends actively eroding with numerous fallen trees); water very turbid to muddy; obvious pollutants (algal mats, surface scum, surface sheen); heavy odor; green color to water; severe barriers to fish movement; 2-0 fish cover types available; little to no aquatic habitat; severe disturbance by livestock or man; tolerant or no microinvertebrates present.

Blue Creek

IBERDROLA
RENEWABLES

6 of January, 2009

Keith Lott
Ohio Department of Natural Resources
Old Woman Creek Research Station
2514 Cleveland Road East
Huron. Ohio 44839

RE: Blue Creek Wind Project, Van Wert and Paulding Counties, Ohio

Dear Keith,

Iberdrola Renewables, Inc. (IBR) is providing this formal correspondence as a summary of the Blue Creek Wind Project introduction conference call on November 14 and agency field review conducted on November 21, 2008 with representatives of the United States Fish and Wildlife Service (FWS) and Ohio Department of Natural Resources Division of Wildlife (ODNR). A review of the site was conducted by vehicle that determined the site was predominantly active agricultural lands with a few sparse woodlot areas. Based on the existing land use conditions of the site, FWS and ODNR representatives indicated that the site would be considered a "minimum risk" for avian and bat impacts and that no records existed for federal or state listed species of concern within the project area.

It was agreed during the field review that the Flat Rock Creek corridor along the northwest border of the project area provided potential habitat conditions for bat species based on the 10 hectare or larger forested areas along this watercourse. ODNR requested that mist net surveys be conducted along this corridor if wind turbines were placed within 500 meters of the 10 hectare or larger forest areas. IBR has prepared the attached drawings in coordination with ODNR depicting the forested areas within the project limits that are 10 hectares or larger. A 500 meter buffer has been placed around each area, at this time IBR does not plan to site wind turbines within forest areas or the adjacent buffers.

According to the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio (OSMP)*, a minimum risk site would require the completion of the following surveys for avian and bat species:

- Breeding Bird Survey – According to the OSMP, if wind turbines are only sited in active agricultural areas then breeding bird surveys would not be required for the project. IBR will not conduct breeding bird surveys based on the current siting of all wind turbines in active agricultural fields, outside of the 500 meter buffers around forest areas that are 10 hectares or larger.

IBERDROLA RENEWABLES, Inc.
201 King of Prussia Road
Radnor, PA 19087
Phone: (610) 230-0333
Fax (866) 648-5913
www.iberdrolarenewables.us

IBERDROLA
RENEWABLES

- Raptor nest Search – According to the OSMP, one early season (1 February – 31 March) survey should be conducted on and within 1 mile of the proposed site. If nests for protected raptors are observed, then nest monitoring may be required. IBR proposes to conduct a raptor nest search between 1 February – 31 March on and within 1 mile of the proposed project area. If raptor nests are detected, then IBR will coordinate monitoring requirements with ODNR and FWS.
- Bat Acoustic Monitoring – According to the OSMP acoustic equipment should be installed on all METs proposed for the project. IBR has three existing METs that do not have apparatus for mounting the acoustic equipment. Based on the existing active agricultural land use comprising the project IBR would install one MET with the appropriate equipment to conduct acoustic monitoring. The proposed location of the MET is provided on the attached figure. IBR proposes to utilize two detectors on this tower to monitor bat activity at the site from 15 March to 15 November, 2009. The detectors will be mounted at 5 meters, and at approximately 48 meters above ground level. We will utilize Analook software to identify ultrasound passes of bats in a high frequency species group (above or equal to 35 kHz), and a low frequency species group (below 35 kHz).

As we move forward in the development of this project under the assumptions addressed in this letter, IBR requests that ODNR provide their approval of the surveys identified for moving forward and a confirmation that no records exist for state listed species of concern or their habitats within the immediate vicinity of the project area.

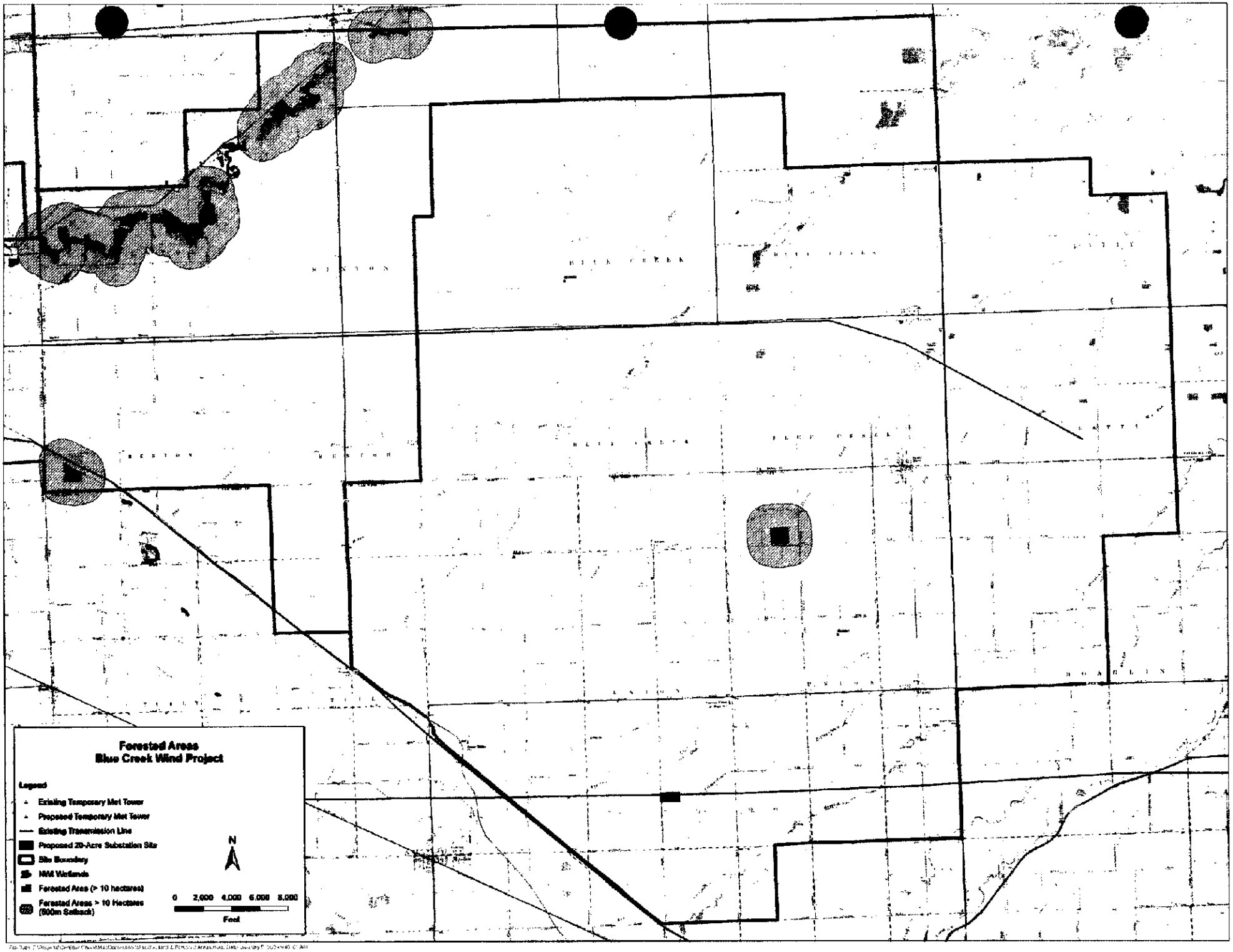
IBR appreciates the time and resources that ODNR has provided to our project and looks forward to our future communications on this project. Please feel free to contact me with questions or comments at (610) 230-0333 or ddecaro@iberdrolausa.com.

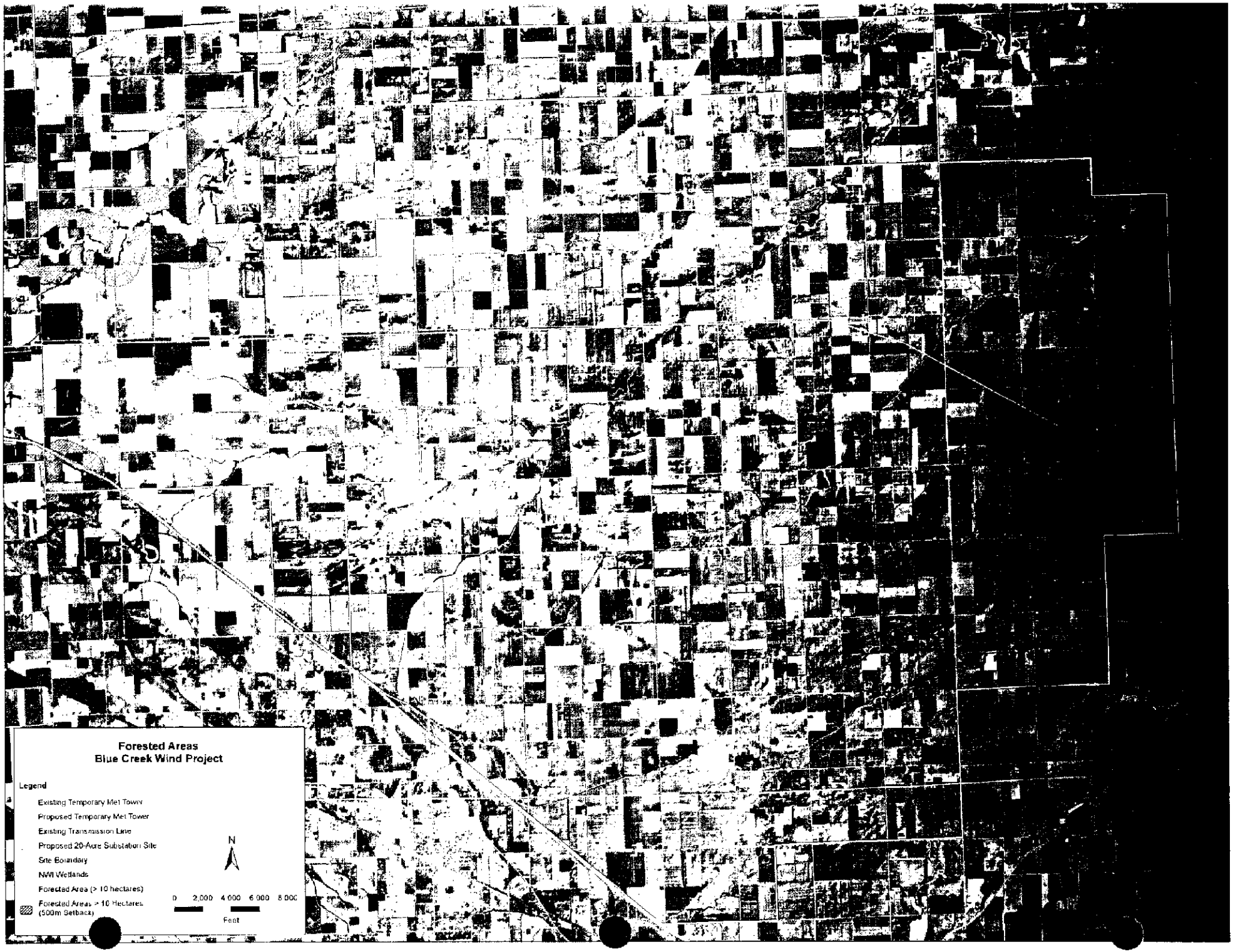
Yours Sincerely,

David De Caro
Senior Permit Manager

CC: D. Litchfield – IBR

Attachment: Blue Creek USGS and Aerial Base Maps – MET Circled for Clarity


Forested Areas
Blue Creek Wind Project
Legend
Existing Temporary Met Tower
Proposed Temporary Met Tower
Existing Transmission Line
Proposed 20-Acre Substation Site
Site Boundary
NWI Wetlands
Forested Area (> 10 hectares)
Forested Area > 10 Hectares (500m Setback)
N
0 2,000 4,000 6,000 8,000
Feet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IBERDROLA
RENEWABLES

6 of January, 2009

Megan Seymour
United States Fish and Wildlife Service
4625 Morse Rd.
Suite 104
Columbus, OH 43230

RE: Blue Creek Wind Project, Van Wert and Paulding Counties, Ohio

Dear Megan,

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RENEWABLES

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IBR appreciates the time and resources that FWS has provided to our project and looks forward to our future communications on this project. Please feel free to contact me with questions or comments at (610) 230-0333 or ddecaro@iberdrolausa.com.

Yours Sincerely,

David De Caro
Senior Permit Manager

CC: D. Litchfield – IBR

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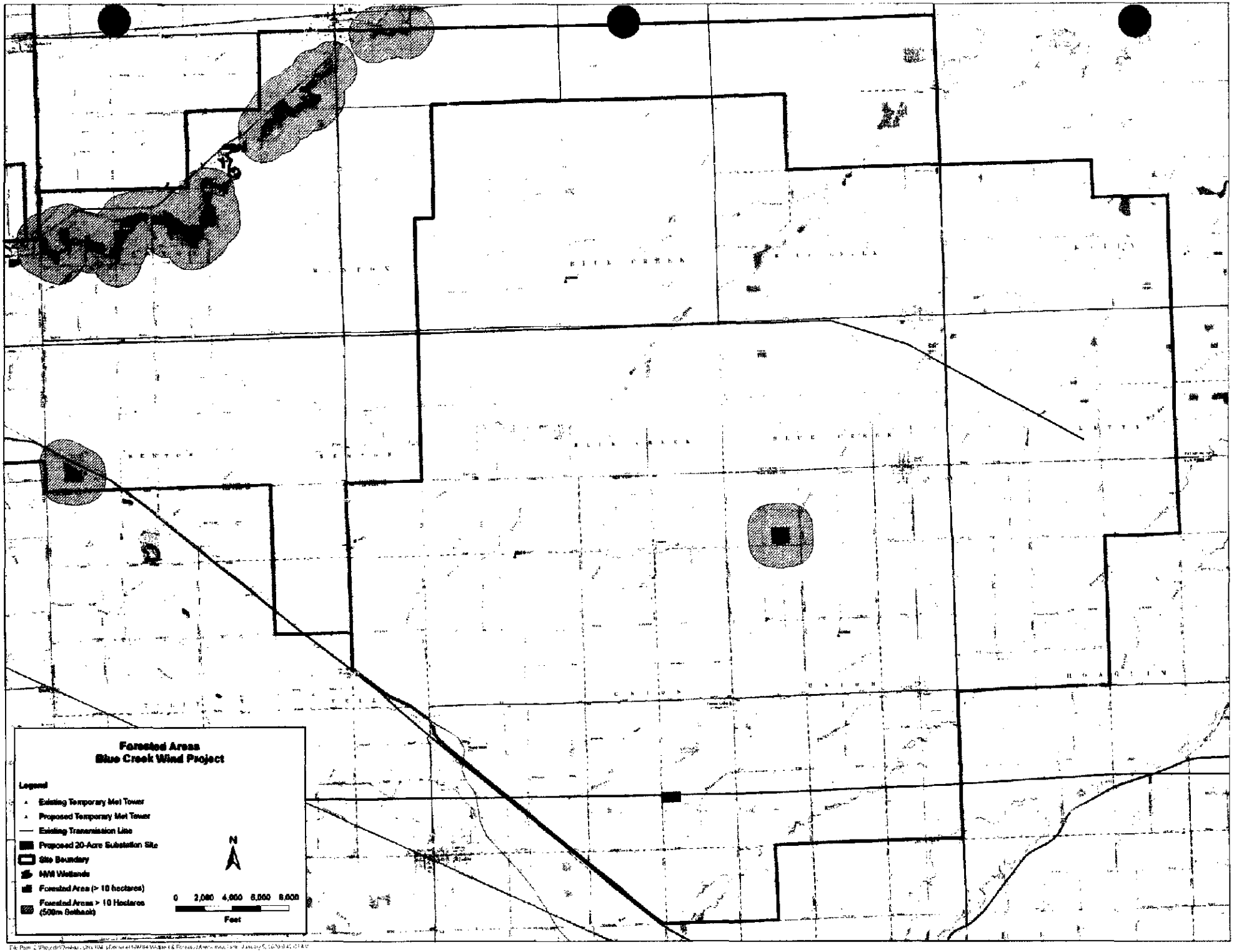
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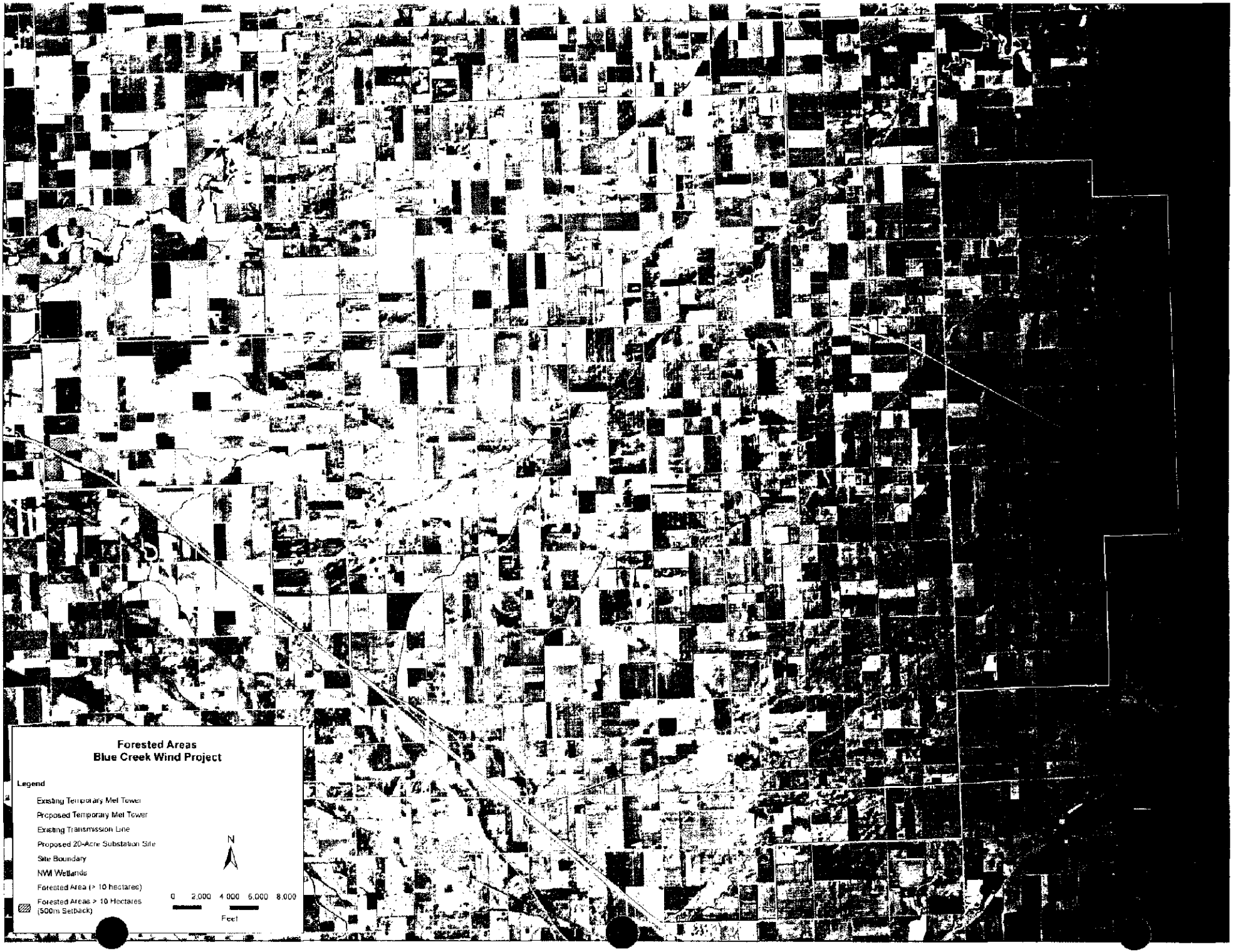
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Forested Area (> 10 hectares)
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Feet

From: Lott, Keith [mailto:Keith.Lott@dnr.state.oh.us]
Sent: Tuesday, January 27, 2009 2:15 PM
To: DeCaro, Dave
Cc: Megan_Seymour@fws.gov; Siegfried, Stuart
Subject: DOW Blue Creek letter response

See attached. <<DOW Blue Creek letter.doc>> <<Blue Creek map.pdf>> <<DNAP Blue Creek.doc>>

Keith Lott, Wind Energy Wildlife Biologist

Old Woman Creek Nat'l Estuarine Research Reserve and State Nature Preserve
Ohio Division of Wildlife
2514 Cleveland Road East
Huron, OH 44839
Office phone: 419-433-4601
Cell: 419-602-3141
Fax: 419-433-2851

Ohio Department of Natural Resources

TED STRICKLAND, GOVERNOR SEAN D. LOGAN, DIRECTOR

Division of Wildlife
David M. Graham, Chief
2045 Morse Rd., Bldg. G
Columbus, OH 43229-6693
Phone: (614) 265-6300

26 of January, 2009

To all interested parties,

The following comments have been prepared based upon a review of Iberdrola's proposed Blue Creek Wind Project. The methodologies outlined within the January 6th 2009 letter are consistent with those suggested by the Division of Wildlife (DOW) in the *On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocols for Commercial Wind Energy Facilities in Ohio (OSMP)*, with one exception. Typically, the DOW suggests acoustic monitoring of bats at all meteorological towers situated onsite. Due to the extensive agricultural nature of the proposed site, and "minimum" risk classification, the DOW waives that recommendation and does not object to Iberdrola's plan to monitor only 1 meteorological tower. For future projects proposed within the state, it is suggested that all meteorological towers be appropriately equipped for raising and lowering acoustic monitoring devices before they are installed onsite.

As indicated in the accompanying letter, the Division of Natural Areas and Preserves (DNAP) database does not contain any records of rare, threatened, or endangered species within the proposed project area. Records from the DNAP database did indicate the presence of a small (10-15 nest) great blue heron rookery within the project boundaries. Though not specifically addressed within the OSMP due to their uncommon occurrence, heron rookeries are an area of concentrated activity and thus of greater concern. This rookery was last surveyed in 2003; therefore the DOW requests that the number of active nests be assessed. If active nests are found, the DOW requests that the activity patterns of those individuals be determined. Protocols should commence following similar methodologies as the raptor nest monitoring outlined in the OSMP. Monitoring should begin mid-April and continue through June (maximum of 14 visits). The DOW is also suggesting a ½ mile buffer of the rookery in an effort to minimize both direct and indirect impacts to the colony. This region is completely encompassed within the existing 500 meter buffer of 10 hectare forests, so no additional land need be set aside. If this project proceeds, particular effort should be made to avoid staging or operating machinery within this zone during the breeding season (February-July).

Much of the proposed project area is extensively agricultural (>95%). Wind turbine facilities located in similar habitat in other parts of the nation have been

shown to have negligible impacts on wildlife (with a few notable exceptions). The DOW supports the development of green energy in these low impact regions and looks forward to working with Iberdrola on this project.

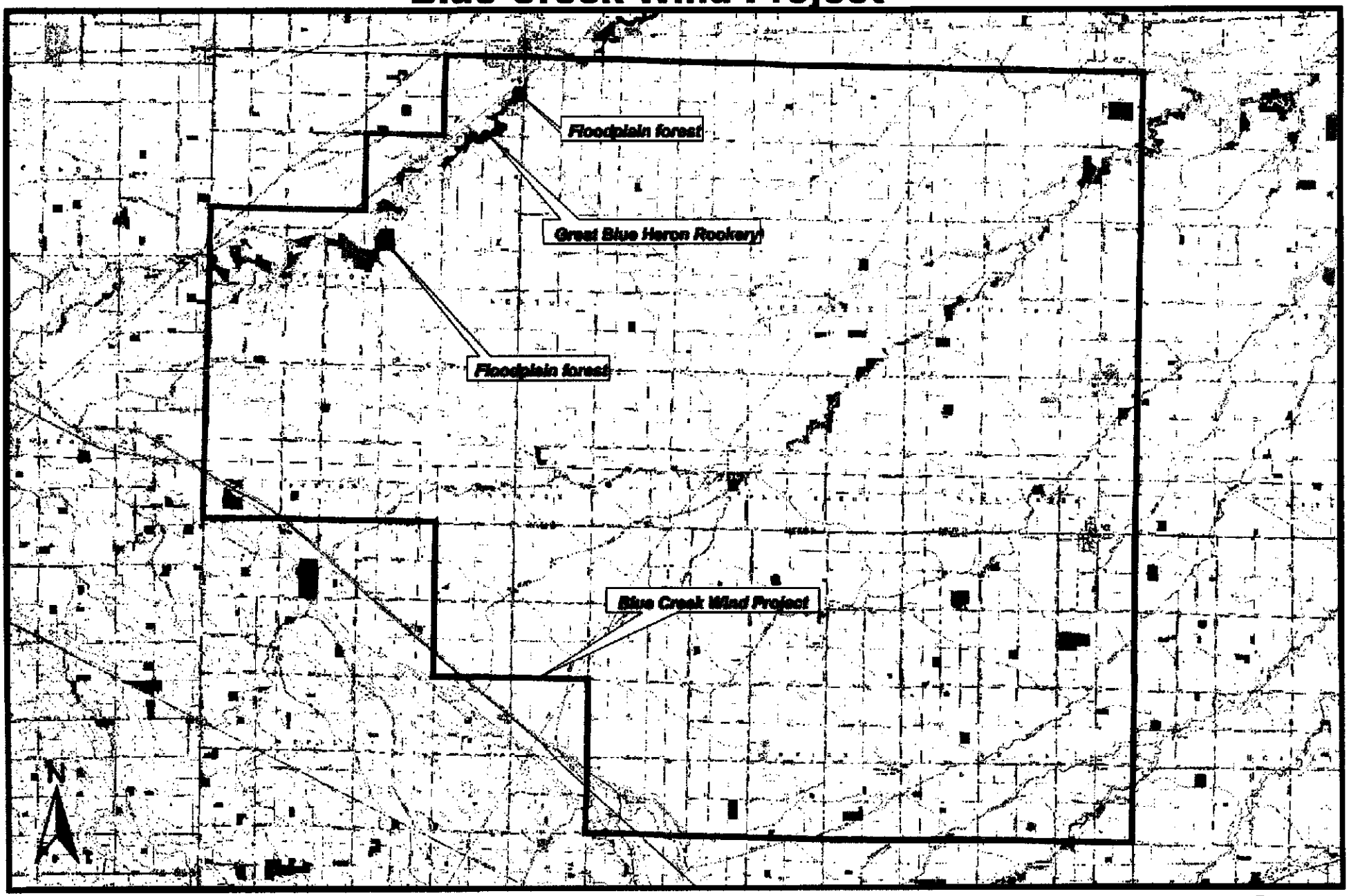
ODNR appreciates the opportunity to provide these comments. Please contact Keith Lott if you have questions about these survey protocols or need additional information.

Keith Lott, Wind Energy Wildlife Biologist

Old Woman Creek Nat'l Estuarine Research Reserve and State Nature Preserve
Ohio Division of Wildlife
2514 Cleveland Road East
Huron, OH 44839
Office: 419-433-4601
Mobile: 419-602-3141
Fax: 419-433-2851

cc: Mr. Stuart Siegfried, Ohio Power Siting Board
Ms. Megan Seymour, United States Fish and Wildlife Service

Blue Creek Wind Project



DNAP Natural Heritage Program
Data Services
Butch G[illegible]mer

January 20, 2009

Division of Natural Areas & Preserves
Steven D. Maurer, Chief
2045 Morse Road, F-1
Columbus, OH 43229-6693
Phone: (614) 265-6453 Fax: (614) 267-3096

January 20, 2009

Keith Lott
ODNR Division of Wildlife
2514 Cleveland Road East
Huron, OH 44839

Dear Mr. Lott:

After reviewing our Natural Heritage maps and files, I find the Division of Natural Areas and Preserves has no records of rare or endangered species near the ODNR Division of Wildlife Blue Creek Wind project. The site is located in Benton and Blue Creek Twps., Paulding Co., and Tully and Union Twps., Van Wert Co., Woodburn South, Payne, Latty, Dixon, Convoy, and Scott Quadrangles. However, the site is near a high quality Floodplain Forest. Best management practices should be employed to avoid impacting these areas. The site is also near a Great Blue Heron Rookery. Becky Jenkins of the Division of Wildlife should be contacted regarding possible impacts to rare animal species. She can be reached at (614) 265-6631.

There are no existing or proposed state nature preserves at the project site. We are also unaware of any unique ecological sites, geologic features, state parks, state forests, scenic rivers, or wildlife areas within the project area.

Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Although we inventory all types of plant communities, we only maintain records on the highest quality areas.

Please contact me at (614) 265-6409 if I can be of further assistance.

Sincerely,

Butch Grieszmer, Data Specialist
Resource Services Group

IBERDROLA
RENEWABLES

December 10, 2009

Lynn Army
Maumee Watershed Conservancy District
1464 Pinehurst Drive
Defiance, Ohio 43512

RE: Blue Creek Wind Farm Project

Dear Mr. Army:

Heartland Wind, LLC, a subsidiary of Iberdrola Renewables, (Heartland Wind) is submitting this letter in response to our discussions on November 19, 2009.

It is our understanding that the proposed project collector lines may cross ditches and streams that are under the jurisdiction of the Maumee Watershed Conservancy District (Maumee). In addition the project has requested the opportunity to use access routes adjacent to Maumee riparian areas. The following conditions are agreed to relative to the above activities:

- Underground collectors would be installed no less then 3 feet below the existing bottom of existing ditches and streams;
- *All disturbed areas would be restored to pre-existing conditions;*
- If access requires disturbance to Maumee constructed berms then all berms would be restored to pre-existing conditions.

We thank your offices for their continued open communication on this project and we look forward to moving forward with the review process. Please do not hesitate to contact me with any questions at 484-467-3345 or ddecaro@iberdrolausa.com.

Yours sincerely,

David R. De Caro
Senior Permit Manager

CC: Dan Litchfield, Heartland, LLC.

TECHNICAL MEMORANDUM

Blue Creek Wind Project – Special Hauling and Right-of-Way Permit Requirements

PREPARED FOR: Blue Creek Wind Project, Paulding and Van Wert Counties, Ohio

PREPARED BY: Jeromy Miceli, Iberdrola

DATE: December 16, 2009

Contacts made regarding special hauling and right-of-way permits with:

- **Duane Bennett, ODOT Special Hauling Permits Section, (614) 351-2804**
- **Steve Reichenbach, ODOT District 1 , Lima, (419) 222-9055**
- **Travis McGarvey, Paulding County Engineer, (419) 399-2366**
- **Kyle Wendel, Van Wert County Engineer, (419) 238-0210**

ODOT Special Hauling and Right-of-Way Permits

This morning I spoke with Duane Bennett with ODOT's Special Hauling Permits Section. Based on their specifications, all of the tower sections and the nacelle will need a Special Hauling Permit based on their height, width and weight. In addition, the blades will need a Special Hauling Permit based of length. We can apply for "90 Day Continuing" permits, which will allow for unlimited deliveries of a specified component using a specified type of trailer for a 90 day period. Multiple permits will be required as the 90 day periods expire.

As the permitted loads move from ODOT jurisdictional roads to County and Township roads, the permitting responsibility shifts to those entities. We will need to identify a detailed permitting process in the Roads Agreements that we sign with the Counties and Townships, as opposed to individual permits for each component.

This morning I also spoke with Steve Reichenbach with ODOT's District 1 office in Lima, Ohio regarding permits for right of way use. He indicated that the uses we would require permits for (underground cable crossings, access road entrances, and intersection improvements, all within ODOT jurisdictional rights of way) are all handled using the same permit application. The permit application in these instances will be through the local ODOT District 1 office (Van Wert or Paulding Counties).

Paulding and Van Wert County Hauling and Right-of Way Permits

In meetings held on December 15th, 2009 in the offices of the Paulding County Engineer, Travis McGarvey, representatives from Paulding County, along with Blue Creek, Benton, and Latty Townships, indicated that they were amenable to the idea. As the permitted loads move to County and Township roads, the permitting responsibility shifts to those entities. We will need to identify a detailed permitting process in the Roads Agreements that we sign with the Counties and Townships, as opposed to individual permits for each component. In addition, the representatives of Paulding County, and Blue Creek, Benton,

and Latty Townships indicated that they would be willing to work towards a single Roads Agreement that would cover all roads under those entities' jurisdictions.

In meetings held on December 16th, 2009 in the offices of the Van Wert County Engineer, Kyle Wendel, he also seemed to agree with the approach of having a single Roads Agreement in lieu of individual agreements. The details of the agreements, including sections regarding permit coverage, will be negotiated over the coming months. Mr. Wendel indicated that he would be willing to enter into a single Roads Agreement with the Townships in Van Wert County (Union, Tully, and Hoaglin), however, representatives of those Townships have not yet been contacted regarding the matter.

Right of way use permits for County and Township roads are handled at those levels. In conversations with the Counties and Townships over the past two days, I detailed the typical uses we would need permits for. There was no indication that there would be any problem with granting permits for our uses.

PN: 1848.005

October 2009

INTERIM SUMMARY
BAT ACOUSTIC MONITORING AT THE PROPOSED BLUE CREEK WIND FARM, PAULDING AND VAN WERT COUNTIES, OHIO

Prepared for:
Iberdrola Renewables, Inc.
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Radnor, Pennsylvania 19087

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EXECUTIVE SUMMARY

Iberdrola Renewables, Inc. proposes to construct the 350-MW Blue Creek Wind Farm near Van Wert in Paulding and Van Wert counties, Ohio. Because bats have been impacted by wind farms, the Ohio Department of Natural Resources requires pre-construction acoustic surveys within the proposed project planning area to assess bat activity. BHE Environmental, Inc. was contracted to install two Anabat units to a meteorological (MET) tower in Van Wert County and assess bat activity based on calls recorded from March 15, 2009 through November 15, 2009. This preliminary report summarizes call sequences recorded from March 5 to August 19, 2009. During 274 detector-nights, 264 calls were recorded, most (78 percent) of which were big brown/silver-haired bats and most (72 percent) were recorded by a detector mounted at 3 meters (m) above the ground rather than by the detector mounted at 45 m above ground level. Other bat species groups recorded were hoary bats (14 percent), red/evening bats (6 percent), and *Myotis* (2 percent). Bat activity increased throughout the season, peaking in late July, a pattern which has been seen at other wind farms. BHE is continuing to monitor bat activity and will submit a report when data collection and analysis is complete.

1.0 INTRODUCTION

The proposed 350 MW Blue Creek Wind Farm Project is located north of the town of Van Wert in Van Wert County and south of Paulding in Paulding County, Ohio. Iberdrola Renewables, Inc. (IBR) has proposed to install 175 Gamesa G90 2.0 MW wind turbines with 100-m hub heights on the approximately 63,919 acre site. Over 95 percent of the project planning area is cropland (Table 1).

Because bats have been impacted by wind energy projects the Ohio Department of Natural Resources (ODNR) has requested preconstruction acoustic surveys to detect ultrasound used to assess bat activity in the project planning area.

The amount of measured bat activity varies from season to season with many bats migrating between summer roosts and winter hibernacula in the spring and fall. During summer, bats rear young and spend nights foraging for insects. In late summer, young bats become volant, joining the adults in foraging bouts. In the fall, migrating bats may travel several hundred kilometers to appropriate winter habitat. Bats return to their summer roosts the following spring. In addition to migration, mating activity occurs during fall (fall swarming). Bats found in Paulding and Van Wert counties, Ohio in the spring and fall may be summer residents or migrants.

BHE Environmental, Inc. was contracted to assess temporal and spatial patterns of bat activity in the proposed project planning area during spring, fall, and summer. BHE coordinated with the ODNR to prepare a study plan for the investigation; the ODNR subsequently approved the study plan.

2.0 BATS OF OHIO

Eleven species of bat inhabit Ohio (Table 2) and may be found in most forested, urban, or rural areas during the summer months. Except for the eastern small-footed bat (*Myotis leibii*), and Rafinesque's big eared bat (*Corynorhinus rafinesquii*), each of these species has potential to occur in the project planning area. The range of the eastern small-footed bat includes the state of Ohio; however, the American Society of Mammalogists lists the species as extirpated from the state (ASM 2009). The Rafinesque's big-eared bat is also rare in Ohio, known only from Adams County, in extreme south central Ohio (ASM 2009). These two species do not have potential to occur in the project planning area. The other nine species of bats in Ohio include year-round residents as well as species present only during certain seasons or during periods of migration. The Indiana bat (*Myotis sodalis*) is federally listed as endangered. The State of Ohio lists both the eastern small-footed bat and Rafinesque's big-eared bat as Species of Concern (Table 2).

Big brown bats (*Eptesicus fuscus*) and little brown bats (*Myotis lucifugus*) are both common, year-round residents that roost in trees, buildings, and other man-made structures during the summer, and winter in buildings, caves, or mines. Big brown bats move short distances between summer and winter habitat; Whitaker and Hamilton (1998) report local migrations of 48 kilometers (km; 30 miles [mi]) or less.

Tree bats, so called because they tend to roost in trees year round, include silver-haired bats (*Lasionycteris noctivigans*), eastern red bats (*Lasiurus borealis*), hoary bats (*Lasiurus cinereus*), and evening bats (*Nycticeius humeralis*). These four species are thought to migrate long distances (>100 km; 62 mi; Cryan 2003) between summer and winter habitat.

Summer ranges of all four species extend into Ohio, but winter sites are typically south of 40 degrees N latitude (Cryan and Veilleux 2007). Migration typically occurs during March-April and late July-October. Hoary bats have been observed traveling in large migratory flocks (Whitaker and Hamilton 1998).

Indiana bats, northern long-eared bats (*Myotis septentrionalis*), and eastern pipistrelles (*Perimyotis [Pipistrellus] subflavus*) roost in trees in forested areas during summer and migrate to caves and mines to hibernate during the winter. Neither northern long-eared bats nor eastern pipistrelles migrate more than about 48 to 64 km (30 to 40 mi) between summer and winter habitat (Whitaker and Hamilton 1998). However, Indiana bats can migrate up to 575 km (357 mi; Winhold and Kurta 2006).

Because the project planning area is mostly agricultural and open land with small patches of trees, the project planning area does not appear to possess unique or otherwise high quality summer or winter habitat for any of the nine species of bats potentially present.

3.0 METHODS

The Ohio Department of Natural Resources (ODNR) On-Shore Bird and Bat Pre- and Post-Construction Monitoring Protocol for Commercial Wind Energy Facilities in Ohio, An Addendum to the Ohio Department of Natural Resource's Voluntary Cooperative Agreement (Protocol) was followed (Appendix A).

The Protocol states the following:

> "At least 1 full season (15 March - 15 November) of acoustic monitoring should be conducted. This can be accomplished by attaching AnaBat (either SD1 or those equipped with CF ZCAIMS) units to all meteorological towers, with 1 unit positioned at 5 meters of the ground, and 1 unit within or as close as possible to the rotor swept area. In an effort to standardize results among study sites, the AnaBat's sensitivity should be adjusted to detect a calibration tone-3 at 20 meters. AnaBat units must monitor from 0.5 hour before sunset until 0.5 hour after sunrise. A "pass" will be defined as any file with ≥2 echolocation pulses. When possible, detections should be identified to species or species group (e.g., big brown/silver-haired) within AnaLook. Copies of original and identified detections should be provided to the ODNR Division of Wildlife. In an effort to assess both potential attractant issues, and to correlate the number of detections with bat mortalities, acoustic monitoring should continue through the conclusion of post-construction monitoring."

Two Anabat II ultrasound recorders and compact flash storage zero-crossings analysis interface modules (Anabat II with CF ZCAIM; Titley Electronics, Ballina NSW, Australia) were attached to one MET tower within the project planning area. The instruments will record ultrasonic calls generated by bats nightly from March 15, 2009 through November 15, 2009. Microphones enclosed in weather-resistant housings (bat hat, EME Systems, Berkley, California) were attached to towers at 3 and 45 m above the ground, and connected to Anabat units on the ground via cables. The lower height of 3 meters was deemed acceptable due to the low growing soy bean crop surrounding the MET tower. Sound reflector plates beneath the microphone housings were positioned 15 degrees below horizontal so that the main acceptance angle was directed upward at 45 degrees (Figure 2). The CF ZCAIM units were programmed to record nightly from approximately 30 min before civil sunset to 30 min

after civil sunrise. Monitoring at the 3-m height began March 5, 2009; monitoring at the 45-m height began March 21, 2009.

Recorded files were scanned with a filter developed by Eric Britzke for the Indiana Bat Survey Guidance for the Commonwealth of Kentucky to identify and eliminate noise. All files not eliminated by the filter were viewed. Each file containing two or more complete bat pulses was tallied as a bat pass. Bat call sequences were sorted into two groups based upon the minimum frequency of the call. Big brown bats, silver-haired bats, and hoary bats typically produce calls with a minimum frequency below 35 kHz, and are therefore identified as the low frequency species group. Red bats, evening bats, Indiana bats, little brown bats, northern long-eared bats, and eastern pipistrelles typically produce calls ≥35 kHz and are identified as the high frequency species group. Where recording quality allowed, bat call sequences were also identified to the following species or species groups: hoary bats, big brown/silver-haired bats, red/evening bats, *Myotis*, and eastern pipistrelles.

This interim report summarizes bat calls recorded between March 5 and August 19, 2009. Bat calls recorded throughout the entire 36-week period (March 5 to November 15, 2009) will be presented, analyzed, and discussed in a report prepared after data collection is completed in November 2009.

4.0 RESULTS AND DISCUSSION

Data were recorded during a total of 274 detector-nights between the evening of March 5 and the morning of August 19, 2009. The two Anabat units recorded a total of 264 bat passes (Table 3; Figure 3). Seventy-two percent of calls were recorded at the 3-meter height, while 28 percent of calls were recorded at the 45-meter height (Table 3). Results of similar studies (e.g., Arnett et al. 2006, Redell 2006) have also shown greater activity of bats at lower elevations.

Low frequency calls comprised 90 percent (238) of the passes, while high frequency calls comprised 10 percent (26; Table 3; Figure 4). Approximately 78 percent of bats recorded were big brown/silver-haired bats (198 passes), while 14 percent (35) were hoary bats, 6 percent (15) were red/evening bats, and 2 percent (5) were *Myotis* (Table 4; Figure 5). No eastern pipistrelles were recorded.

The total number of bat passes recorded was greatest in late July (Figure 6). Relatively high levels of activity in July may be associated with young-of-the year becoming volant, the onset of breeding, or an increase in foraging to build up fat reserves for migration and hibernation. For the purposes of this interim report data collected through August 19, 2009 is summarized. Therefore the decline in bat passes recorded in August is, at least in part, a function of data being collected for only part of the month. When data collection is completed, it will allow complete months to be compared throughout the sampling period.