OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 65

Stream & Location: Hemlock Creek SE of Hemlock Rd. trib to Cuyahoga **RM:** 0.10 **Date:** 08/20/15

Zabolotny (Amidon / Matheson) **Scorers Full Name & Affiliation:** Northeast Ohio Regional Sewer District

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** 41.3796 / 81.6204 (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]	∅	∅	☐ ☐ 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]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☒ MODERATE [-1]
- ☒ NORMAL [0]
- ☐ FREE [1]

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

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.

- 2 UNDERCUT BANKS [1]
- 3 OVERHANGING VEGETATION [1]
- ∅ SHALLOWS (IN SLOW WATER) [1]
- 3 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

9 6

Cover *Maximum 20* 15

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* 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 / 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 predominant land use(s) past 100m riparian

Comments

Riparian *Maximum 10* 9

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* 2

6] GRADIENT (11.36 ft/mi) ☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (.67 mi²)

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

Gradient *Maximum 10* 8

A] SAMPLE 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 pass _____ cm

2nd _____ cm

CANOPY

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

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

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 56

Stream & Location: Hemlock Creek End of Oakwood Drive **RM:** 2.50 **Date:** 8/13/15

D. Friedman (M. McMaheson) **Scorers Full Name & Affiliation:** Northeast Ohio Regional Sewer District

River Code: __ - ___ - ___ **STORET #:** ______ **Lat./ Long.:** (NAD 83 - decimal °) 41.3775 /81.6597 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)
- ☐☐ BLDR /SLABS [10] ✓ ✓
- ☐☐ BOULDER [9] ✓ ✓
- ☑☐ COBBLE [8] ✓ ✓
- ☐☑ GRAVEL [7] ✓ ✓
- ☐☐ SAND [6] ✓ ✓
- ☐☐ BEDROCK [5] ✓

OTHER TYPES (POOL / RIFFLE)
- ☐☐ HARDPAN [4]
- ☐☐ DETRITUS [3]
- ☐☐ MUCK [2]
- ☐☐ SILT [2] ✓ ✓
- ☐☐ ARTIFICIAL [0]

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

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

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

QUALITY

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

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

Comments: 8+7+2+1+-0.5 - 0.5

Substrate (Maximum 20): 17

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]
- 1 SHALLOWS (IN SLOW WATER) [1]
- ___ ROOTMATS [1]
- ___ POOLS > 70cm [2]
- 1 ROOTWADS [1]
- 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: 3+3

Cover (Maximum 20): 6

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: 2.5 +3 +6+2

Channel (Maximum 20): 13.5

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

Indicate predominant land use(s) past 100m riparian

Comments: 1.5 +3 +2 =

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]
- ☐ 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: 2+0 +3

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: 2 +1 + 1 +0

Riffle / Run (Maximum 8): 4

6] GRADIENT
(105.2 ft/mi)
DRAINAGE AREA (0.73 mi²)

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

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

Gradient (Maximum 10): 4

EPA 4520 Stream width 6' 06/16/06

A] SAMP[illegible] REACH

Check ALL that apply

Comment RE Reach consistency/ Is reach typical of steam?. *F[illegible]ation/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access direc[illegible] etc.

METHOD

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

STAGE

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

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 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 pass _____ cm

2nd _____ cm

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

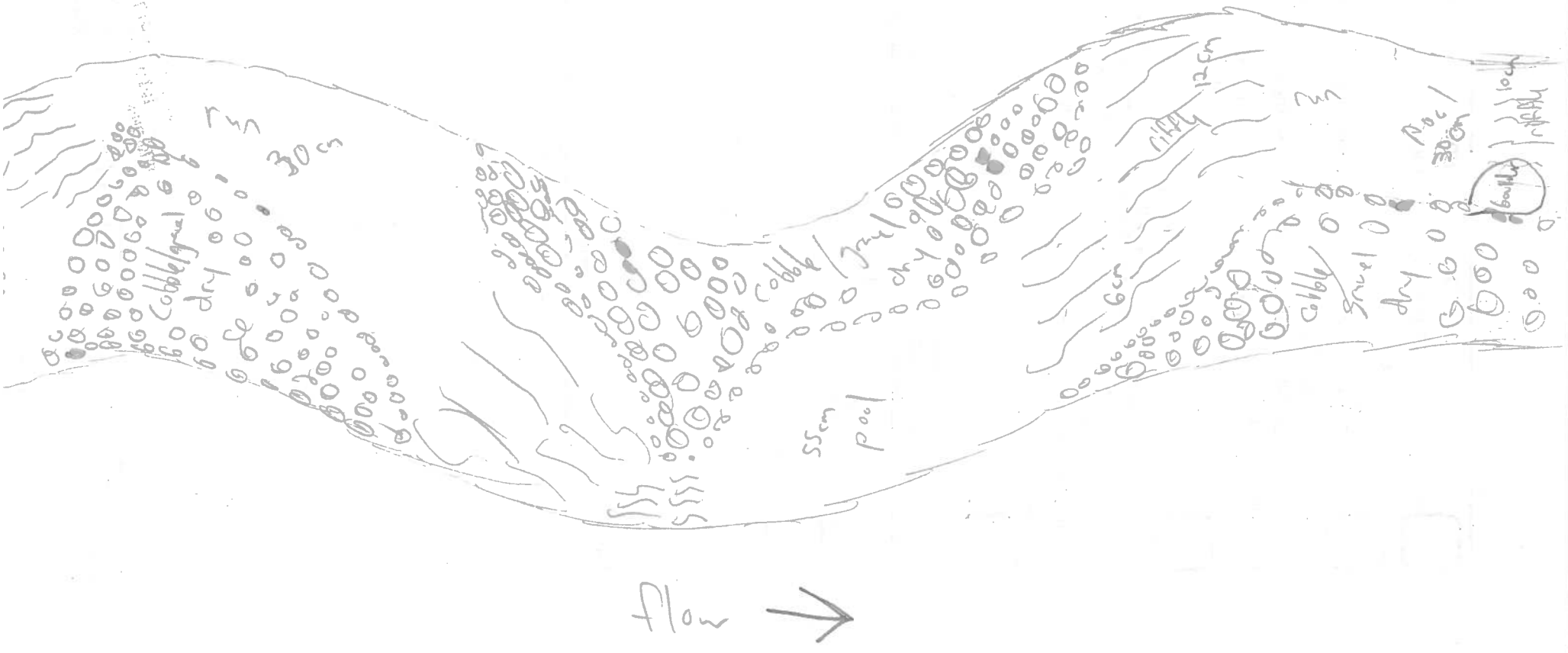
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN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



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 62.75

Stream & Location: Hemlock Creek **RM:** 1.15 **Date:** 08/31/15

Francisco Rivera, Zambrsky, Knittel **Scorers Full Name & Affiliation:** Northeast Ohio Regional Sewer District

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** (NAD 83 - decimal °) 41.3767 / 81.6386 ☐ 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
- ☐ LIMESTONE [1]
- ☒ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☒ NORMAL [0]
- ☐ FREE [1]

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

Comments

Substrate 17.5 (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)

- 0 UNDERCUT BANKS [1]
- 0 OVERHANGING VEGETATION [1]
- 1 SHALLOWS (IN SLOW WATER) [1]
- 1 ROOTMATS [1]
- 0 POOLS > 70cm [2]
- 0 ROOTWADS [1]
- 2 BOULDERS [1]
- 0 OXBOWS, BACKWATERS [1]
- 2 AQUATIC MACROPHYTES [1]
- 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 7 (Maximum 20)

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 12.5 (Maximum 20)

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

River right looking downstream

EROSION (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 predominant land use(s) past 100m riparian

Comments Could see residential property on river right

Riparian 6.75 (Maximum 10)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

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

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

CURRENT VELOCITY Check ALL that apply
- ☐ TORRENTIAL [-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 6 (Maximum 12)

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 5 (Maximum 8)

6] GRADIENT
(115.30 ft/mi)

DRAINAGE AREA
(2.43 mi²)

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

%POOL: ____ %GLIDE: ____

%RUN: ____ %RIFFLE: ____

Gradient 8 (Maximum 10)

A] SAMPLE REACH

Check All that apply

Comment RE Reach consistency/ Is reach typical of steam? *Re[illegible]tion/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directi[illegible]etc.

METHOD

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

STAGE

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

DISTANCE

- ☐ 0.5 Km
- ☐ 0.2 Km
- ☐ 0.15 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 pass _____ cm

2nd _____ cm

CANOPY

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

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

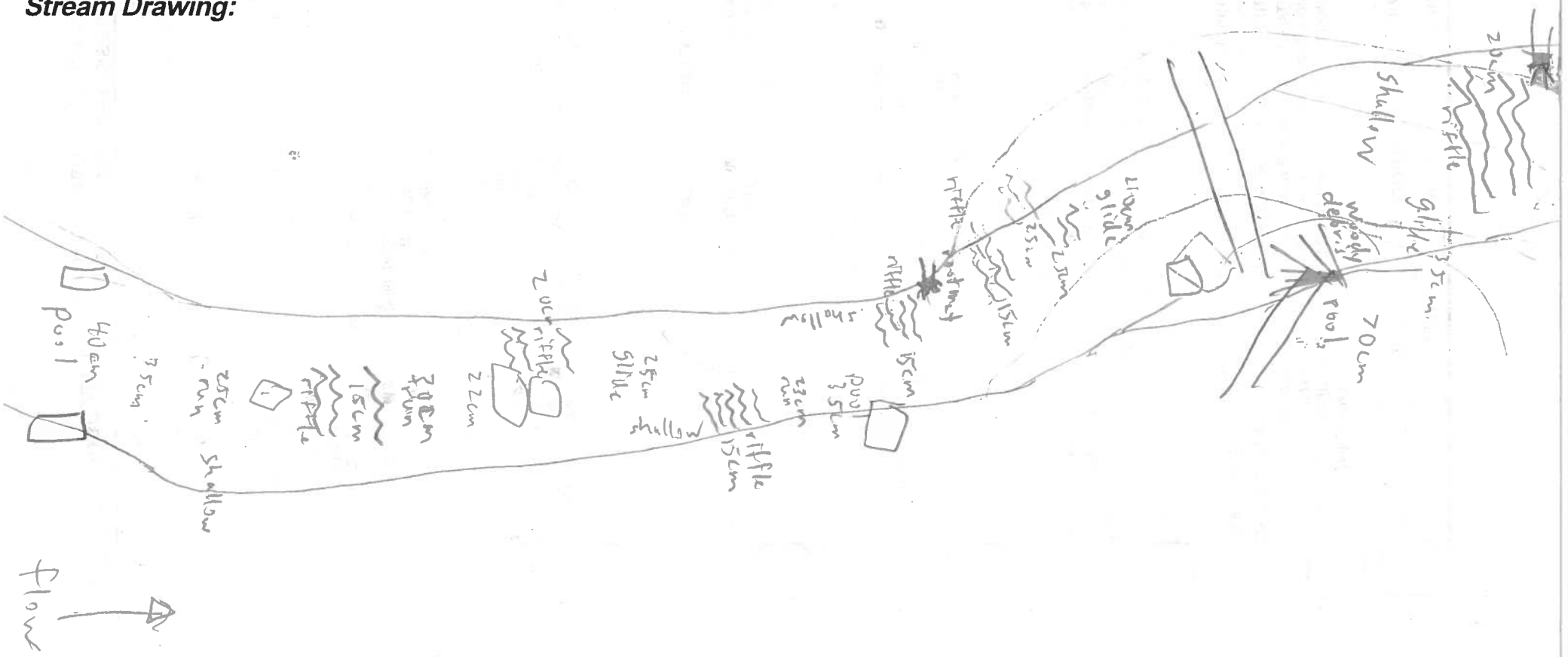
WWTP / CSO / NPDES / INDUSTRY
HARDENED / URBAN / DIRT&GRIME
CONTAMINATED / LANDFILL
BMPs-CONSTRUCTION-SEDIMENT
LOGGING / IRRIGATION / COOLING
BANK / EROSION / SURFACE
FALSE BANK / MANURE / LAGOON
WASH H_20 / TILE / H_20 TABLE
ACID / MINE / QUARRY / FLOW
NATURAL / WETLAND / STAGNANT
PARK / GOLF / LAWN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



OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 67

Stream & Location: Hemlock Creek DS Hemlock Rd. **RM:** 0.15 **Date:** 08/12/15

Scorers Full Name & Affiliation: D. Friedman, Northeast Ohio Regional Sewer District

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** (NAD 83 - decimal °) 41.3805 / 81.6245 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]	X	X	☐ ☐ HARDPAN [4]		
■ ☐ BOULDER [9]	X	X	☐ ☐ DETRITUS [3]		
☒ ☒ COBBLE [8]	X	X	☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]	X		☐ ☐ SILT [2]		
☐ ☐ SAND [6]	X		☐ ☐ ARTIFICIAL [0]	X	X
☐ ■ BEDROCK [5]	X	X	(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

SILT:
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ■ FREE [1]

EMBEDDEDNESS:
- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ■ NORMAL [0]
- ☐ NONE [1]

Comments: 8+7+2+1+1

Substrate 19 / 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]
1 OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
1 SHALLOWS (IN SLOW WATER) [1]	3 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: 5+7

Cover Maximum 20: 12

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: DS/upstream channelization 3.5+5+6+1.5

Channel Maximum 20: 16

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: 1+2.5+1.5

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: 2+1+4

Pool / Current Maximum 12: 7

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
- ☐ 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: 5

Riffle / Run Maximum 8: 5

6] GRADIENT
(1.25 ft/mi)

DRAINAGE AREA (3.27 mi²)

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

%POOL: ____ %GLIDE: ____

%RUN: ____ %RIFFLE: ____

Gradient Maximum 10: 4

A] SAMPL[illegible]REACH

Check A[illegible]lat apply

Comment RE: Reach consistency/ Is reach typical of steam?. *Re[illegible]tion/* Observed - Inferred, *Other/* Sampling observations, Concerns, Access directi[illegible]etc.

METHOD

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

STAGE

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

DISTANCE

- ☐ 0.5 Km
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- ☐ 0.12 Km
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_____ meters

CLARITY

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☐ SECCHI DEPTH	☐

1st pass _____ cm

2nd _____ cm

CANOPY

- ☐ > 85%- OPEN
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B] AESTHETICS

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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

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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: