# Appendix Q: Qualitative Habitat Evaluation Index

# Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 73

**River Code:** **RM:** **Stream:** TRAIL CREEK - M1
**Date:** **Location:**
**Scorers Full Name:** **Affiliation:** American Consulting

1] SUBSTRATE (Check ONLY Two SubstrateTYPE BOXES, Estimate % present

| TYPE | POOL | RIFFLE | SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE) | SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE) |
|---|---|---|---|---|
| ☐☐-BLDR /SLBS(10) | | ☐☐-GRAVEL [7] | ☐-LIMESTONE [1] | ☐- SILT HEAVY [-2] |
| ☐☐-BOULDER (9) | | ☑☐-SAND [6] | SILT. | ☑-SILT MODERATE [-1] |
| ☑☐-COBBLE [8] | | ☐☐-BEDROCK(5) | ☑-TILLS [1] | ☐-SILT NORMAL [0] |
| ☐☐-HARDPAN [4] | | ☐☐-DETRITUS(3) | ☐-WETLANDS[0] | ☐-SILT FREE [1] |
| ☐☐-MUCK [2] | | ☐☐-ARTIFICIAL(0) | ☐-HARDPAN [0] | ☐-EXTENSIVE [-2] |
| ☐☐-SILT [2] | | NOTE: Ignore Sludge Originating From Point Sources | ☐-SANDSTONE [0] | ☑-MODERATE [-1] |
| | | | ☐-RIP/RAP [0] | ☐-NORMAL [0] |
| | | | ☐-LACUSTRINE [0] | ☐-NONE [1] |
| | | | ☐-SHALE [-1] | |
| | | | ☐-COAL FINES [-2] | |

EMBEDDEDNESS

NUMBER OF SUBSTRATE TYPES: ☑4 or More [2] (High Quality Only, Score 5 or >) ☐3 or Less [0]

COMMENTS: [illegible]

Substrate: 13 Max 20

2] INSTREAM COVER (Give each cover type a score of 0 to 3; see back for instructions)

| (Structure) | TYPE: Score All That Occur | | AMOUNT (Check ONLY One or check 2 and AVERAGE) |
|---|---|---|---|
| 1 UNDERCUT BANKS [1] | 2 POOLS> 70 cm [2] | OXBOWS, BACKWATERS [1] | ☐- EXTENSIVE > 75% [11] |
| 1 OVERHANGING VEGETATION [1] | ROOTWADS [1] | AQUATIC MACROPHYTES [1] | ☑- MODERATE 25-75% [7] |
| SHALLOWS (IN SLOW WATER) [1] | 2 BOULDERS [1] | 1 LOGS OR WOODY DEBRIS [1] | ☐- SPARSE 5-25% [3] |
| ROOTMATS [1] | | | ☐- NEARLY ABSENT < 5%[1] |

COMMENTS:

Cover: 17 Max 20

3] CHANNEL MORPHOLOGY (Check ONLY One PER Category OR check 2 and AVERAGE )

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐- HIGH [4] | ☐- EXCELLENT [7] | ☑-NONE [6] | ☐- HIGH [3] | ☐- SNAGGING | ☐- IMPOUND. |
| ☑- MODERATE [3] | ☑-GOOD [5] | ☐- RECOVERED [4] | ☑-MODERATE [2] | ☐- RELOCATION | ☐- ISLANDS |
| ☐- LOW [2] | ☐- FAIR [3] | ☐- RECOVERING [3] | ☐- LOW [1] | ☐- CANOPY REMOVAL | ☐- LEVEED |
| ☐- NONE [1] | ☐- POOR [1] | ☐- RECENT OR NO RECOVERY [1] | | ☐- DREDGING | ☑- BANK SHAPING |
| | | | | ☑- ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS:

Channel: 16 Max 20

4] RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) * River Right Looking Downstream *

| RIPARIAN WIDTH L R (Per Bank) | FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) L R (Most Predominant Per Bank) | L R | BANK EROSION L R (Per Bank) |
|---|---|---|---|
| ☐☐- WIDE > 50m [4] | ☑☑-FOREST, SWAMP [3] | ☐☐-CONSERVATION TILLAGE [1] | ☐☐-NONE/LITTLE [3] |
| ☑☑-MODERATE 10-50m [3] | ☐☐-SHRUB OR OLD FIELD [2] | ☑☑-URBAN OR INDUSTRIAL [0] | ☑☑-MODERATE [2] |
| ☐☐- NARROW 5-10 m [2] | ☐☐-RESIDENTIAL,PARK,NEW FIELD [1] | ☐☐-OPEN PASTURE,ROWCROP [0] | ☐☐-HEAVY/SEVERE[1] |
| ☐☐- VERY NARROW <5 m[1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐- NONE [0] | | | |

COMMENTS:

Riparian: 5 Max 10

5 ]POOL/GLIDE AND RIFFLE/RUN QUALITY

| MAX. DEPTH (Check 1 ONLY*) | MORPHOLOGY (Check 1 or 2 & AVERAGE) | CURRENT VELOCITY : POOLS & RIFFLES* (Check All That Apply) | |
|---|---|---|---|
| ☑- >1m [6] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☑-EDDIES[1] | ☐-TORRENTIAL[-1] |
| ☐- 0.7-1m [4] | ☑-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST[1] | ☐-INTERSTITIAL[-1] |
| ☐- 0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☑-MODERATE [1] | ☐-INTERMITTENT[-2] |
| ☐- 0.2-0.4m [1] | | ☐-SLOW [1] | ☐-VERY FAST[1] |
| ☐- < 0.2m [POOL=0] | | | |

COMMENTS:

Pool/Current: 9 Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

| RIFFLE DEPTH | RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|---|
| ☑- Best Areas >10 cm [2] | ☐- MAX > 50 [2] | ☑-STABLE (e.g.,Cobble, Boulder) [2] | ☐- NONE [2] |
| ☐- Best Areas 5-10 cm[1] | ☑-MAX < 50[1] | ☐-MOD. STABLE (e.g.,Large Gravel) [1] | ☐- LOW [1] |
| ☐- Best Areas < 5 cm [RIFFLE=0] * | | ☐-UNSTABLE (Fine Gravel,Sand) [0] | ☑-MODERATE [0] |
| | | | ☐- EXTENSIVE [-1] |

COMMENTS: [illegible] ☐- NO RIFFLE [Metric=0]

Riffle/Run: 5 Max 8

Gradient: 8 Max 10

6] GRADIENT (ft/mi). 5.7 DRAINAGE AREA (sq mi.) 45.8 %POOL: %GLIDE: %RIFFLE: %RUN:

* Best areas must be large enough to support a population of riffle-obligate species

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Is Sampling Reach Representative of the Stream (Y/N)___ If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
- None ☐
- Industrial ☐
- WWTP ☐
- Ag ☐
- Livestock ☐
- Silviculture ☐
- Construction ☐
- Urban Runoff ☐
- CSOs ☐
- Suburban Impacts ☐
- Mining ☐
- Channelization ☐
- Riparian Removal ☐
- Landfills ☐
- Natural ☐
- Dams ☐
- Other Flow Alteration ☐
- Other: _____

| | Gear. | Distance. | Water Clarity: | Water Stage: | Canopy -% Open |
|---|---|---|---|---|---|
| First Sampling Pass | | | | | |

Subjective Rating (1-10) ☐

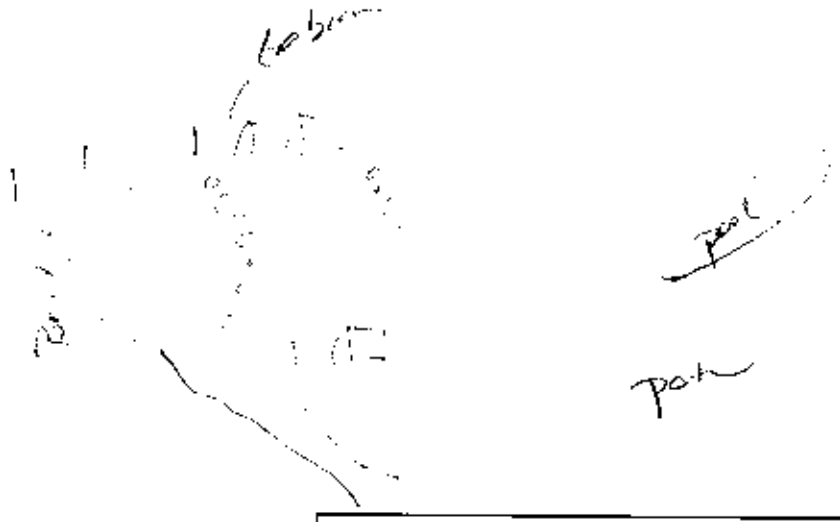
Aesthetic Rating (1-10) ☐

Gradient. ☐ - Low. ☐ - Moderate. ☐ -High

Stream Measurements:

| Average Width | Average Depth | Maximum Depth | Av. Bankfull Width | Bankfull Mean Depth | W/D Ratio | Bankfull Max Depth | Floodprone Area Width | Entrench. Ratio |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

## Stream Drawing:




Instructions for scoring the alternate cover metric: Each cover type should receive a score of between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

| Yes/No | |
|---|---|
| ☐ ☐ | Is Stream Ephemeral (no pools, totally dry or only damp spots)? |
| ☐ ☐ | Is there water upstream? How Far: _____ |
| ☐ ☐ | Is There Water Close Downstream? How Far _____ |
| ☐ ☐ | Is Dry Channel Mostly Natural? |

# Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 63

**River Code:** **RM:** **Stream:** [illegible]
**Date:** **Location:**
**Scorers Full Name:** **Affiliation:** [illegible]

1] SUBSTRATE (Check ONLY Two SubstrateTYPE BOXES, Estimate % present

| TYPE | POOL | RIFFLE | SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE) | SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE) |
|---|---|---|---|---|
| ☐☐-BLDR /SLBS[10] | | ☐☑-GRAVEL [7] | ☐ -LIMESTONE [1] SILT | ☐- SILT HEAVY [-2] |
| ☐☐-BOULDER [9] | | ☐☐-SAND [6] | ☑-TILLS [1] | ☑-SILT MODERATE [-1] |
| ☐☐-COBBLE [8] | | ☐☐-BEDROCK[5] | ☐ -WETLANDS[0] | ☐-SILT NORMAL [0] |
| ☐☐-HARDPAN [4] | | ☐☐-DETRITUS[3] | ☐ -HARDPAN [0] | ☐-SILT FREE [1] |
| ☐☐-MUCK [2] | | ☐☐-ARTIFICIAL[0] | ☐ -SANDSTONE [0] EMBEDDED | ☐-EXTENSIVE [-2] |
| ☑☐-SILT [2] | | NOTE: Ignore Sludge Originating From Point Sources | ☐ -RIP/RAP [0] NESS | ☑-MODERATE [-1] |
| | | | ☐ -LACUSTRINE [0] | ☐-NORMAL [0] |
| | | | ☐ -SHALE [-1] | ☐-NONE [1] |
| | | | ☐-COAL FINES [-2] | |

NUMBER OF SUBSTRATE TYPES: (High Quality Only, Score 5 or >) ☑-4 or More [2] ☐-3 or Less [0]

COMMENTS

Substrate: 10 Max 20

2] INSTREAM COVER (Give each cover type a score of 0 to 3. see back for instructions)

| (Structure) | TYPE: Score All That Occur | | AMOUNT (Check ONLY One or check 2 and AVERAGE) |
|---|---|---|---|
| 2 UNDERCUT BANKS [1] | 2 POOLS> 70 cm [2] | ___OXBOWS, BACKWATERS [1] | ☐ - EXTENSIVE > 75% [11] |
| 1 OVERHANGING VEGETATION [1] | ___ROOTWADS [1] | ___AQUATIC MACROPHYTES [1] | ☑ - MODERATE 25-75% [7] |
| 1 SHALLOWS (IN SLOW WATER) [1] | 1 BOULDERS [1] | 2 LOGS OR WOODY DEBRIS [1] | ☐ - SPARSE 5-25% [3] |
| ___ROOTMATS [1] | COMMENTS: | | ☐ - NEARLY ABSENT < 5%[1] |

Cover: 14 Max 20

3] CHANNEL MORPHOLOGY (Check ONLY One PER Category OR check 2 and AVERAGE )

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☑ NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☑ MODERATE [3] | ☑ GOOD [5] | ☐ - RECOVERED [4] | ☑ MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| ☐ - LOW [2] | ☐ - FAIR [3] | ☐ - RECOVERING [3] | ☐ - LOW [1] | ☐ - CANOPY REMOVAL | ☐ - LEVEED |
| ☐ - NONE [1] | ☐ - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS:

Channel: 16 Max 20

4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) * River Right Looking Downstream *

| RIPARIAN WIDTH L R (Per Bank) | FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) L R (Most Predominant Per Bank) | L R | BANK EROSION L R (Per Bank) |
|---|---|---|---|
| ☑☑ WIDE > 50m [4] | ☐ ☐-FOREST, SWAMP [3] | ☐ ☐-CONSERVATION TILLAGE [1] | ☐ ☐-NONE/LITTLE [3] |
| ☐☐ - MODERATE 10-50m [3] | ☐ ☐-SHRUB OR OLD FIELD [2] | ☑☑-URBAN OR INDUSTRIAL [0] | ☐ ☐-MODERATE [2] |
| ☐☐ - NARROW 5-10 m [2] | ☐ ☐-RESIDENTIAL,PARK,NEW FIELD [1] | ☐ ☐-OPEN PASTURE,ROWCROP [0] | ☑☑-HEAVY/SEVERE[1] |
| ☐☐ - VERY NARROW <5 m[1] | ☐ ☐-FENCED PASTURE [1] | ☐ ☐-MINING/CONSTRUCTION [0] | |
| ☐☐ - NONE [0] | | | |

COMMENTS:

Riparian: 5 Max 10

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

| MAX. DEPTH (Check 1 ONLY!) | MORPHOLOGY (Check 1 or 2 & AVERAGE) | CURRENT VELOCITY ; POOLS & RIFFLES!] (Check All That Apply) | |
|---|---|---|---|
| ☑ - >1m [6] | ☐ -POOL WIDTH > RIFFLE WIDTH [2] | ☑ EDDIES[1] | ☐-TORRENTIAL[-1] |
| ☐ - 0.7-1m [4] | ☑ POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST[1] | ☐-INTERSTITIAL[-1] |
| ☐ - 0.4-0.7m [2] | ☐ -POOL WIDTH < RIFFLE W. [0] | ☑ MODERATE [1] | ☐-INTERMITTENT[-2] |
| ☐ - 0.2- 0.4m [1] | | ☐-SLOW [1] | ☐-VERY FAST[1] |
| ☐ - < 0.2m [POOL=0] | COMMENTS: | | |

Pool/Current: 9 Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

| RIFFLE DEPTH | RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|---|
| ☑ - Best Areas >10 cm [2] | ☐ - MAX > 50 [2] | ☑ STABLE (e.g.,Cobble, Boulder) [2] | ☐ - NONE [2] |
| ☐ - Best Areas 5-10 cm[1] | ☑ - MAX < 50[1] | ☐-MOD. STABLE (e.g.,Large Gravel) [1] | ☐ - LOW [1] |
| ☐ - Best Areas < 5 cm [RIFFLE-0] | | ☐-UNSTABLE (Fine Gravel,Sand) [0] | ☑ MODERATE [0] |
| | | | ☐ - EXTENSIVE [-1] |

COMMENTS: ☐ - NO RIFFLE [Metric=0]

Riffle/Run: 5 Max 8

6] GRADIENT (ft/mi) 2.12 DRAINAGE AREA (sq mi) 54.7 %POOL: ___ %GLIDE: ___ %RIFFLE: ___ %RUN: ___

Gradient: 4 Max 10

* Best areas must be large enough to support a population of Micropterus species

EPA 4520 06/24/01

Is Sampling Reach Representative of the Stream (Y/N)____ If Not, Explain: _____

Major Suspected Sources of Impacts (Check All That Apply):
- None ☐
- Industrial ☐
- WWTP ☐
- Ag ☐
- Livestock ☐
- Silviculture ☐
- Construction ☐
- Urban Runoff ☐
- CSOs ☐
- Suburban Impacts ☐
- Mining ☐
- Channelization ☐
- Riparian Removal ☐
- Landfills ☐
- Natural ☐
- Dams ☐
- Other Flow Alteration ☐
- Other _____

| | Gear: | Distance: | Water Clarity: | Water Stage: | Canopy -% Open |
|---|---|---|---|---|---|
| First Sampling Pass | | | | | |

Subjective Rating (1-10) ☐

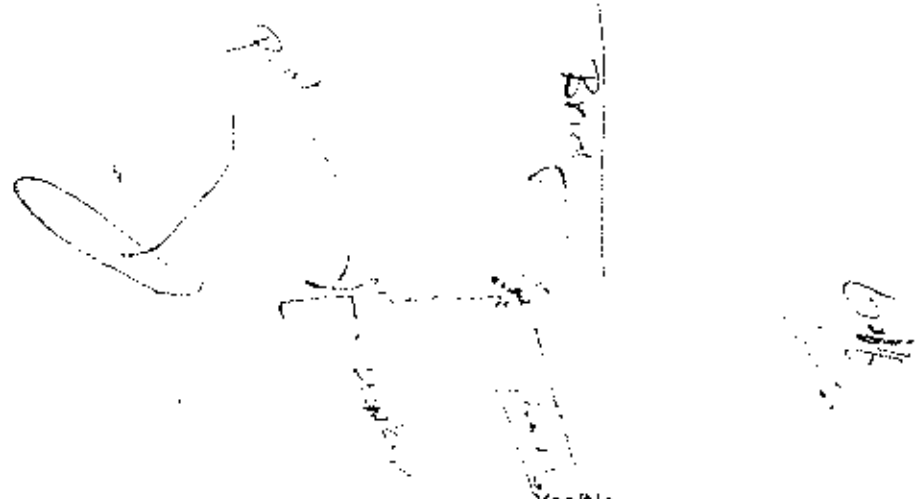
Aesthetic Rating (1-10) ☐

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

| Average Width | Average Depth | Maximum Depth | Av. Bankfull Width | Bankfull Mean Depth | W/D Ratio | Bankfull Max Depth | Floodprone Area Width | Entrench. Ratio |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

## Stream Drawing:



Instructions for scoring the alternate cover metric: Each cover type should receive a score of between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

| Yes/No | |
|---|---|
| ☐ ☐ | Is Stream Ephemeral (no pools, totally dry or only damp spots)? |
| ☐ ☐ | Is there water upstream? How Far:_____ |
| ☐ ☐ | Is There Water Close Downstream? How Far:_____ |
| ☐ ☐ | Is Dry Channel Mostly Natural? |



4/8

# Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 41.5

**River Code:** ___ **RM:** ___ **Stream:** [illegible]
**Date:** ___ **Location:** ___
**Scorers Full Name:** ___ **Affiliation:** ___

1] SUBSTRATE (Check ONLY Two SubstrateTYPE BOXES, Estimate % present

| TYPE | POOL | RIFFLE | | POOL | RIFFLE |
|---|---|---|---|---|---|
| ☐☐-BLDR /SLBS[10] | ___ | ___ | ☐☐-GRAVEL [7] | ___ | ___ |
| ☐☐-BOULDER [9] | ___ | ___ | ☐☐-SAND [6] | ___ | ___ |
| ☐☐-COBBLE [8] | ___ | ___ | ☐☐-BEDROCK[5] | ___ | ___ |
| ☐☐-HARDPAN [4] | ___ | ___ | ☐☐-DETRITUS[3] | ___ | ___ |
| ☑☑-MUCK [2] | ___ | ___ | ☐☐-ARTIFICIAL[0] | ___ | ___ |
| ☑☑-SILT [2] | ___ | ___ | NOTE: Ignore Sludge Originating From Point Sources | | |

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)
☐ -LIMESTONE [1] SILT
☑ -TILLS [1]
☐ -WETLANDS[0]
☐ -HARDPAN [0]
☐ -SANDSTONE [0]
☐ -RIP/RAP [0]
☐ -LACUSTRINE [0]
☐ -SHALE [-1]
☐ -COAL FINES [-2]

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE)
☑ - SILT HEAVY [-2]
☐ -SILT MODERATE [-1]
☐ -SILT NORMAL [0]
☐ -SILT FREE [1]

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

NUMBER OF SUBSTRATE TYPES: (High Quality Only, Score 5 or >)
☐ 4 or More [2]
☑ 3 or Less [0]

COMMENTS: ___

Substrate: 3 (Max 20)

2] INSTREAM COVER (Give each cover type a score of 0 to 3; see back for instructions)

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

COMMENTS: [illegible]

AMOUNT: (Check ONLY One or check 2 and AVERAGE)
☐ - EXTENSIVE > 75% [11]
☐ - MODERATE 25-75% [7]
☑ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5%[1]

Cover: 6 (Max 20)

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE )

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☐ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☐ - MODERATE [3] | ☑ - GOOD [5] | ☑ - RECOVERED [4] | ☑ - MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| ☑ - LOW [2] | ☐ - FAIR [3] | ☐ - RECOVERING [3] | ☐ - LOW [1] | ☑ - CANOPY REMOVAL | ☐ - LEVEED |
| ☐ - NONE [1] | ☐ - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: [illegible]

Channel: 13 (Max 20)

4]. RIPARIAN ZONE AND BANK EROSION (check ONE box per bank or check 2 and AVERAGE per bank) ? River Right Looking Downstream ?

| RIPARIAN WIDTH L R (Per Bank) | L R (Most Predominant Per Bank) | FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) L R | BANK EROSION L R (Per Bank) |
|---|---|---|---|
| ☐☐ - WIDE > 50m [4] | ☐☐ FOREST, SWAMP [3] | ☐☐ CONSERVATION TILLAGE [1] | ☐☐ -NONE/LITTLE [3] |
| ☑☐ - MODERATE 10-50m [3] | ☐☐ SHRUB OR OLD FIELD [2] | ☐☐ -URBAN OR INDUSTRIAL [0] | ☐☐ -MODERATE [2] |
| ☐☑ - NARROW 5-10 m [2] | ☐☐ RESIDENTIAL,PARK,NEW FIELD [1] | ☑☑ -OPEN PASTURE,ROWCROP [0] | ☑☑ -HEAVY/SEVERE[1] |
| ☐☐ - VERY NARROW <5 m[1] | ☑☑ -FENCED PASTURE [1] | ☐☐ -MINING/CONSTRUCTION [0] | |
| ☐☐ - NONE [0] | | | |

COMMENTS: ___

Riparian: 4.0 (Max 10)

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!)
☐ - >1m [6]
☐ - 0.7-1m [4]
☑ - 0.4-0.7m [2]
☐ - 0.2-0.4m [1]
☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE)
☐ -POOL WIDTH > RIFFLE WIDTH [2]
☑ -POOL WIDTH ~ RIFFLE WIDTH [1]
☐ -POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY ( POOLS & RIFFLES!] (Check All That Apply)
☐ -EDDIES[1]
☐ -FAST[1]
☑ -MODERATE [1]
☑ -SLOW [1]
☐ -TORRENTIAL[-1]
☐ -INTERSTITIAL[-1]
☐ -INTERMITTENT[-2]
☐ -VERY FAST[1]

COMMENTS: ___

Pool/Current: 5 (Max 12)

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH
☐ - Best Areas >10 cm [2]
☐ - Best Areas 5-10 cm[1]
☑ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH
☐ - MAX > 50 [2]
☑ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE
☐ -STABLE (e.g.,Cobble, Boulder) [2]
☐ -MOD. STABLE (e.g.,Large Gravel) [1]
☑ -UNSTABLE (Fine Gravel,Sand) [0]

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

COMMENTS: ___ ☐ - NO RIFFLE [Metric=0]

Riffle/Run: 0 (Max 8)

6] GRADIENT (ft/mi): 7.75 DRAINAGE AREA (sq mi ) 14.7 %POOL: ___ %GLIDE: ___ %RIFFLE: ___ %RUN: ___

Gradient: 10 (Max 10)

* Best areas must be large enough to support a population of riffle-obligate species

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Is Sampling Reach Representative of the Stream (Y/N)___ If Not, Explain:

| | Gear: | Distance: | Water Clarity: | Water Stage: | Canopy -% Open |
|---|---|---|---|---|---|
| First Sampling Pass | | | | | |

Subjective Rating (1-10)

Aesthetic Rating (1-10)

Gradient: ☐ - Low, ☐ - Moderate, ☐ -High

Stream Measurements:

| Average Width | Average Depth | Maximum Depth | Av. Bankfull Width | Bankfull Mean Depth | W/D Ratio | Bankfull Max Depth | Floodprone Area Width | Entrench. Ratio |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |

Major Suspected Sources of Impacts (Check All That Apply):

- None ☐
- Industrial ☐
- WWTP ☐
- Ag ☐
- Livestock ☐
- Silviculture ☐
- Construction ☐
- Urban Runoff ☐
- CSOs ☐
- Suburban Impacts ☐
- Mining ☐
- Channelization ☐
- Riparian Removal ☐
- Landfills ☐
- Natural ☐
- Dams ☐
- Other Flow Alteration ☐
- Other:_____

## Stream Drawing:

Instructions for scoring the alternate cover metric: Each cover type should receive a score of between 0 and 3, Where: 0 - Cover type absent; 1 - Cover type present in very small amounts or if more common of marginal quality; 2 - Cover type present in moderate amounts, but not of highest quality or in small amounts of highest quality; 3 - Cover type of highest quality in moderate or greater amounts. Examples of highest quality include very large boulders in deep or fast water, large diameter logs that are stable, well developed rootwads in deep/fast water, or deep, well-defined, functional pools.

| Yes/No | |
|---|---|
| ☐ ☐ | Is Stream Ephemeral (no pools, totally dry or only damp spots)? |
| ☐ ☐ | Is there water upstream? How Far:_____ |
| ☐ ☐ | Is There Water Close Downstream? How Far:_____ |
| ☐ ☐ | Is Dry Channel Mostly Natural? |

# Qualitative Habitat Evaluation Index Field Sheet QHEI Score: 58.5

**River Code:** ____ **RM:** ____ **Stream:** East Fork Little Miami - E3
**Date:** ____ **Location:** ____
**Scorers Full Name:** ____ **Affiliation:** ____

1] SUBSTRATE (Check ONLY Two SubstrateTYPE BOXES, Estimate % present

| TYPE | POOL | RIFFLE | POOL | RIFFLE |
|---|---|---|---|---|
| ☐ ☐-BLDR /SLBS(10) | | ☐ ☑-GRAVEL [7] | | |
| ☐ ☐-BOULDER [9] | | ☑ ☑-SAND [6] | | |
| ☐ ☐-COBBLE [8] | | ☐ ☐-BEDROCK[5] | | |
| ☐ ☐-HARDPAN [4] | | ☐ ☐-DETRITUS[3] | | |
| ☐ ☐-MUCK [2] | | ☐ ☐-ARTIFICIAL[0] | | |
| ☐ ☑-SILT [2] | | NOTE: Ignore Sludge Originating From Point Sources | | |

SUBSTRATE ORIGIN (Check ONE (OR 2 & AVERAGE)): ☐ -LIMESTONE [1] ☑-TILLS [1] ☐ -WETLANDS[0] ☐ -HARDPAN [0] ☐ -SANDSTONE [0] ☐ -RIP/RAP [0] ☐ -LACUSTRINE [0] ☐ -SHALE [-1] ☐ -COAL FINES [-2]

SUBSTRATE QUALITY (Check ONE (OR 2 & AVERAGE)): ☐ - SILT HEAVY [-2] ☐ -SILT MODERATE [-1] ☑ -SILT NORMAL [0] ☐ -SILT FREE [1]

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

NUMBER OF SUBSTRATE TYPES: (High Quality Only, Score 5 or >) ☐ 4 or More [2] ☑ 3 or Less [0]

COMMENTS____

Substrate: 9 Max 20

2] INSTREAM COVER (Give each cover type a score of 0 to 3; see back for instructions)

(Structure) TYPE: Score All That Occur

2 UNDERCUT BANKS [1]
2 OVERHANGING VEGETATION [1]
___SHALLOWS (IN SLOW WATER) [1]
___ROOTMATS [1]
___POOLS> 70 cm [2]
___ROOTWADS [1]
___BOULDERS [1]
1 OXBOWS, BACKWATERS [1]
1 AQUATIC MACROPHYTES [1]
1 LOGS OR WOODY DEBRIS [1]

COMMENTS:____

AMOUNT: (Check ONLY One or check 2 and AVERAGE) ☐ - EXTENSIVE > 75% [11] ☑ - MODERATE 25-75% [7] ☐ - SPARSE 5-25% [3] ☐ - NEARLY ABSENT < 5%[1]

Cover: 15 Max 20

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE )

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☑ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☑ - MODERATE [3] | ☑ - GOOD [5] | ☐ - RECOVERED [4] | ☑ - MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| ☐ - LOW [2] | ☐ - FAIR [3] | ☐ - RECOVERING [3] | ☐ - LOW [1] | ☐ - CANOPY REMOVAL | ☐ - LEVEED |
| ☐ - NONE [1] | ☐ - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS:____

Channel: 11 Max 20

4]. RIPARIAN ZONE AND BANK EROSION(check ONE box per bank or check 2 and AVERAGE per bank) ? River Right Looking Downstream ?

RIPARIAN WIDTH (L R (Per Bank)): ☐☐- WIDE > 50m [4] ☑☐ - MODERATE 10-50m [3] ☐☑- NARROW 5-10 m [2] ☐☐- VERY NARROW <5 m[1] ☐☐ - NONE [0]

FLOOD PLAIN QUALITY (PAST 100 Meter RIPARIAN) (L R (Most Predominant Per Bank)): ☑☑FOREST, SWAMP [3] ☐☐SHRUB OR OLD FIELD [2] ☐☐RESIDENTIAL,PARK,NEW FIELD [1] ☐☐-FENCED PASTURE [1] ☐☐-CONSERVATION TILLAGE [1] ☐☐-URBAN OR INDUSTRIAL [0] ☑☑OPEN PASTURE,ROWCROP [0] ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION (L R (Per Bank)): ☐☐-NONE/LITTLE [3] ☑☑-MODERATE [2] ☐☐-HEAVY/SEVERE[1]

COMMENTS:____

Riparian: 5.5 Max 10

5.]POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1 ONLY!): ☐ - >1m [6] ☐ - 0.7-1m [4] ☑ - 0.4-0.7m [2] ☐ - 0.2- 0.4m [1] ☐ - < 0.2m [POOL=0]

MORPHOLOGY (Check 1 or 2 & AVERAGE): ☐-POOL WIDTH > RIFFLE WIDTH [2] ☑-POOL WIDTH = RIFFLE WIDTH [1] ☐ -POOL WIDTH < RIFFLE W. [0]

CURRENT VELOCITY [POOLS & RIFFLES!] (Check All That Apply): ☐ -EDDIES[1] ☐ -FAST[1] ☑-MODERATE [1] ☑-SLOW [1] ☐ -TORRENTIAL[-1] ☐ -INTERSTITIAL[-1] ☐ -INTERMITTENT[-2] ☐ -VERY FAST[1]

COMMENTS:____

Pool/Current: 4 Max 12

CHECK ONE OR CHECK 2 AND AVERAGE

RIFFLE DEPTH: ☐ - Best Areas >10 cm [2] ☑ - Best Areas 5-10 cm[1] ☐ - Best Areas < 5 cm [RIFFLE=0]

RUN DEPTH: ☐ - MAX > 50 [2] ☑ - MAX < 50[1]

RIFFLE/RUN SUBSTRATE: ☐-STABLE (e.g.,Cobble, Boulder) [2] ☐-MOD. STABLE (e.g.,Large Gravel) [1] ☑-UNSTABLE (Fine Gravel,Sand) [0]

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

COMMENTS:____ ☐ - NO RIFFLE [Metric=0]

Riffle/Run: 2 Max 8

Gradient: 6 Max 10

6] GRADIENT (ft/mi). ____ DRAINAGE AREA (sq.mi.) : ____ %POOL: ____ %GLIDE: ____ %RIFFLE: ____ %RUN: ____

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8/8