OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11703	13T022	Smith Ditch	113th Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	25
KRW	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	70	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	30	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate *Maximum 20*: 2

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.

90	2	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	1	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	0	0	**Logs and woody debris (1)**
0	0	**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 & 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 or 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*: 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)** **(metric=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: ◈ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8*: 0

6-GRADIENT

(9.559 ft/mi)
DRAINAGE AREA (2.962 mi²)

◇ **Very low – Low (2-4)**
◈ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 100 **% GLIDE: 0**
% RUN: 0 **% RIFFLE: 0**

Gradient *Maximum 10*: 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◈ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

100 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◈ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11701	13T020	Niles Ditch	Colorado Street

Surveyor	Sample Date	County	Macro Sample Type
JCR	6/26/13	Lake	

◇ **Habitat Complete**

QHEI Score: 44

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)	10		x	◇ ◇ Muck (2)	20	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)	30	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 11 *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.

10	1	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	1	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	80	2	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	0	0	**Logs and woody debris (1)**
0	0	**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)**	

Channel *Maximum 20* 9

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ **None or 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.

Riparian *Maximum 10* 3

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)** **(metric=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)

Pool/Current *Maximum 12* 7

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** (*ONLY!*)

RIFFLE DEPTH

◇ **Best Areas >10cm (2)**
◇ **Best Areas 5-10cm (1)**
◇ **Best Areas <5cm** **(metric=0)**

RUN DEPTH

◇ **Maximum >50cm (2)**
◇ **Maximum <50cm (1)**

Check ONE (*or 2 & average*)

RIFFLE/RUN SUBSTRATE

◇ **Stable (e.g. cobble, boulder) (2)**
◇ **Mod. Stable (e.g. large gravel) (1)**
◇ **Unstable (e.g. sand, fine gravel) (0)**

RIFFLE/RUN EMBEDDEDNESS

◇ **None (2)**
◇ **Low (1)**
◇ **Moderate (0)**
◇ **Extensive (-1)**

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(1.36 ft/mi)
DRAINAGE AREA
(10.029 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 10 **% GLIDE: 0**
% RUN: 90 **% RIFFLE: 0**

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

57 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11705	13T024	Tributary of Main Beaver Dam Ditch	Summit Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	26
TAF	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	40	x	x	◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)	5	x	x	◈ ◈ Muck (2)	50	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)				◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate *Maximum 20*: 1

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.

0	0	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	10	1	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	90	1	**Logs and woody debris (1)**
0	0	**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*: 3

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 & 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 or 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 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

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)** **(metric=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: ◈ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8*: 0

6-GRADIENT

(4.037 ft/mi)
DRAINAGE AREA (2.793 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 0 **% GLIDE: 100** **% RUN: 0** **% RIFFLE: 0**

Gradient *Maximum 10*: 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

37 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◈ **Oil sheen**
- ◇ **Trash/Litter**
- ◈ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11710	13T030	Johnson Ditch	Oak Ridge Prairie County Park

Surveyor	Sample Date	County	Macro Sample Type
TAF	6/26/13	Lake	

◇ **Habitat Complete**

QHEI Score: 36

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)	40	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	40	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 1 *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.

20	2	**Undercut banks (1)**	30	2	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
20	2	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	10	1	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	10	1	**Logs and woody debris (1)**
10	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* 6

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◈ ◈ **None or 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* 8

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)** **(metric=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* 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** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(3.986 ft/mi)
DRAINAGE AREA
(2.131 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 100 **% GLIDE: 0**
% RUN: 0 **% RIFFLE: 0**

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◈ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

14 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11689	13T008	Deep River	Ridge Rd, D/S of Lake George Dam, Hobart

Surveyor	Sample Date	County	Macro Sample Type
JCR	6/25/13	Lake	

◇ **Habitat Complete**

QHEI Score: 74

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	X		◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)	10		X	◇ ◇ Muck (2)	10	X		◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	10	X	X	◇ ◇ Silt (2)	10	X	X	◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)	40	X	X	◇ ◇ Artificial (0)	10	X	X	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 11 *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.

10	1 **Undercut banks (1)**	20	2 **Pools > 70cm (2)**	5	1 **Oxbows, Backwaters (1)**
5	1 **Overhanging vegetation (1)**	10	2 **Rootwads (1)**	5	1 **Aquatic macrophytes (1)**
5	1 **Shallows (in slow water) (1)**	0	0 **Boulders (1)**	20	2 **Logs and woody debris (1)**
20	2 **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* 17

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 *Maximum 20* 16

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	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.

Riparian *Maximum 10* 7

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)** **(metric=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)

Pool/Current *Maximum 12* 11

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◇ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 6

COMMENTS

6-GRADIENT

(1.38 ft/mi)
DRAINAGE AREA
(124.048 mi²)

◇ **Very low – Low (2-4)**
◈ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 30 **% GLIDE: #$**
% RUN: 60 **% RIFFLE: 10**

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

35 Right

60 Middle

37 Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11709	13T029	Turkey Creek	Broad Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
	6/26/13	Lake			49

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)			x	◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)		x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)			x	◇ ◇ Silt (2)				◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)		x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 11 *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.

20	1	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
20	1	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
20	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	40	2	**Logs and woody debris (1)**
0	0	**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)	

Channel *Maximum 20* 7

COMMENTS

4- BANK EROSION & 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 or 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 *Maximum 10* 9

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)** **(metric=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)

Pool/Current *Maximum 12* 5

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(6.888 ft/mi)
DRAINAGE AREA
(5.543 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 5 **% GLIDE: 0**
% RUN: 95 **% RIFFLE: 0**

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

82 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11694	13T013	Sprout Ditch	70th Avenue

Surveyor	Sample Date	County	Macro Sample Type
KAG	6/26/13	Lake	

◈ **Habitat Complete**

QHEI Score: 66

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)		x		◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)	10	x	x	◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◈ ◈ Gravel (7)	60	x	x	◇ ◇ Silt (2)	5	x		◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	15	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

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.

10	1	**Undercut banks (1)**	10	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
25	2	**Overhanging vegetation (1)**	10	1	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
10	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	35	3	**Logs and woody debris (1)**
0	0	**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* 14

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 *Maximum 20* 12

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ **None or 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.

Riparian *Maximum 10* 5

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)** **(metric=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)

Pool/Current *Maximum 12* 7

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◇ **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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

Riffle/Run *Maximum 8* 5

COMMENTS

6-GRADIENT

(19.999 ft/mi)
DRAINAGE AREA
(3.628 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 35 **% GLIDE: 0**
% RUN: 55 **% RIFFLE: 10**

Gradient *Maximum 10* 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

35 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11707	13T027	Main Beaver Dam Ditch	Blaine Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	27
JCR	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	70	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 1 *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.

0	0 **Undercut banks (1)**	0	0 **Pools > 70cm (2)**	0	0 **Oxbows, Backwaters (1)**
0	0 **Overhanging vegetation (1)**	30	1 **Rootwads (1)**	0	0 **Aquatic macrophytes (1)**
0	0 **Shallows (in slow water) (1)**	0	0 **Boulders (1)**	70	1 **Logs and woody debris (1)**
0	0 **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)	

Channel *Maximum 20* 7

COMMENTS

4- BANK EROSION & 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 or 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.

Riparian *Maximum 10* 4

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)** **(metric=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)

Pool/Current *Maximum 12* 6

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(2.899 ft/mi)
DRAINAGE AREA
(2.347 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: #$ **% GLIDE: 100**
% RUN: #$** **% RIFFLE: #$

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◈ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

98 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11695	13T014	Deep River	Joliet Road

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	75
TAF	6/25/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)	10	x	x	◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)				◇ Hardpan (0)	◈ Normal (0)
◈ ◈ Sand (6)	60	x	x	◇ ◇ Artificial (0)	10	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◈ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

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.

0	0	**Undercut banks (1)**	60	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	10	1	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
10	1	**Shallows (in slow water) (1)**	10	1	**Boulders (1)**	10	1	**Logs and woody debris (1)**
0	0	**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)**	

Channel *Maximum 20* 16

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ **None or 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.

Riparian *Maximum 10* 6

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)** **(metric=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 *Maximum 12* 10

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** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

Riffle/Run *Maximum 8* 7

COMMENTS

6-GRADIENT

(7.987 ft/mi)
DRAINAGE AREA
(66.707 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 40 **% GLIDE: 20**
% RUN: 20 **% RIFFLE: 20**

Gradient *Maximum 10* 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

42 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11717	13T026	Tributary of Main Beaver Dam Ditch	101st Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	40
JCR	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	20	x	x	◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	60	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate *Maximum 20*: 1

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.

0	0	**Undercut banks (1)**	10	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	10	1	**Rootwads (1)**	20	1	**Aquatic macrophytes (1)**
10	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	40	1	**Logs and woody debris (1)**
10	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*: 14

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 & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	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*: 6

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)** **(metric=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: ◈ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8*: 0

6-GRADIENT

(2.593 ft/mi)
DRAINAGE AREA
(1.536 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 20 **% GLIDE: 80**
% RUN: 0 **% RIFFLE: 0**

Gradient *Maximum 10*: 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

75 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11696	13T015	Tributary of Deep River	750 W

Surveyor	Sample Date	County	Macro Sample Type
TAF	6/24/13	Porter	

◇ **Habitat Complete**

QHEI Score: 64

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)	10	x	x	◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◈ Normal (0)
◈ ◈ Sand (6)	70	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◈ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

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.

0	0 **Undercut banks (1)**	0	0 **Pools > 70cm (2)**	0	0 **Oxbows, Backwaters (1)**
20	1 **Overhanging vegetation (1)**	0	0 **Rootwads (1)**	0	0 **Aquatic macrophytes (1)**
40	1 **Shallows (in slow water) (1)**	10	1 **Boulders (1)**	30	1 **Logs and woody debris (1)**
0	0 **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* 16

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	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* 8

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)** **(metric=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: ◇ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)	◈ Moderate (0)
			◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8* 2

6-GRADIENT

(27.7 ft/mi)
DRAINAGE AREA
(2.912 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

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

Gradient *Maximum 10* 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◈ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

16 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11706	13T025	Main Beaver Dam Ditch	Clark Road

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/24/13	Lake			37

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	40	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	30	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate *Maximum 20*: 2

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.

10	1	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
20	1	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	40	1	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	20	1	**Logs and woody debris (1)**
10	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 & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◇ ◇ **None or 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)** **(metric=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*: 9

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ◈ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8*: 0

6-GRADIENT

(2.892 ft/mi)
DRAINAGE AREA
(9.860 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 20 **% GLIDE: 60**
% RUN: 20 **% RIFFLE: 0**

Gradient *Maximum 10*: 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◈ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

91 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11698	13T017	Tributary of Deep River	93rd Avenue

Surveyor	Sample Date	County	Macro Sample Type
TAF	6/24/13	Lake	

◇ **Habitat Complete**

QHEI Score: 51

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◈ ◈ Hardpan (4)	65	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)				◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	5		x	◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	5	x	x	◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate *Maximum 20*: 7

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.

0	0	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	1	**Overhanging vegetation (1)**	40	1	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	50	2	**Logs and woody debris (1)**
0	0	**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

4- BANK EROSION & 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 or 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*: 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)** **(metric=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*: 3

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ◇ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)	◈ Moderate (0)
			◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8*: 4

6-GRADIENT

(15.289 ft/mi)
DRAINAGE AREA (3.505 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

% POOL: 30 **% GLIDE: 0**
% RUN: 60 **% RIFFLE: 10**

Gradient *Maximum 10*: 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
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A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◈ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

11 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11690	13T009	Duck Creek	Front Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/26/13	Lake			52

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	20	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	20	x	x	◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)	40	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate *Maximum 20*: **10**

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.

20	3	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	30	2	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
20	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	20	1	**Logs and woody debris (1)**
10	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*: **12**

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◈ ◈ None or 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*: **7**

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check **ONE** (*ONLY!*)	Check ONE (*or 2 & average*)	Check ALL that apply
◇ **>1m (6)**	◇ **Pool width > riffle width (2)**	◇ **Torrential (-1)** ◈ **Slow (1)**
◈ **0.7-<1m (4)**	◈ **Pool width = riffle width (1)**	◇ **Very Fast (1)** ◇ **Interstitial (-1)**
◇ **0.4-<0.7m (2)**	◇ **Pool width < riffle width (0)**	◇ **Fast (1)** ◇ **Intermittent (-2)**
◇ **0.2-<0.4m (1)**		◈ **Moderate (1)** ◇ **Eddies (1)**
◇ **<0.2m (0)** (metric=0)		Indicate for reach – pools and riffles.

RECREATION POTENTIAL
◇ ***Primary Contact***
◇ ***Secondary Contact***
(circle one and comment on back)

COMMENTS

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** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8*: **0**

6-GRADIENT

(1.302 ft/mi)
DRAINAGE AREA
(15.822 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 30 **% GLIDE: 0**
% RUN: 70 **% RIFFLE: 0**

Gradient *Maximum 10*: **4**

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◈ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

21 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11700	13T019	Deer Creek	97th Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	36
TAF	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	60	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	20	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 1 *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.

20	1	**Undercut banks (1)**	10	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	2	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	10	1	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	50	2	**Logs and woody debris (1)**
0	0	**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 & 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 or 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)** **(metric=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* 6

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ◇ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)**	◈ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8* 2

6-GRADIENT

(9.535 ft/mi)
DRAINAGE AREA
(5.883 mi²)

◇ **Very low – Low (2-4)**
◈ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 50 **% GLIDE: 30**
% RUN: 10 **% RIFFLE: 10**

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◈ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

23 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11702	13T021	Niles Ditch	121st Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/26/13	Lake			33

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES

	TOTAL	POOL	RIFFLE
◇ ◇ Bldrs/Slabs (10)			
◇ ◇ Boulders (9)			
◇ ◇ Cobble (8)			
◇ ◇ Gravel (7)			
◇ ◇ Sand (6)	10	x	x
◇ ◇ Bedrock (5)			

OTHER TYPES

	TOTAL	POOL	RIFFLE
◇ ◇ Hardpan (4)			
◇ ◇ Detritus (3)	20	x	x
◈ ◈ Muck (2)	50	x	x
◇ ◇ Silt (2)	15	x	x
◇ ◇ Artificial (0)	5	x	x

ORIGIN

◇ Limestone (1)
◈ Tills (1)
◇ Wetlands (0)
◇ Hardpan (0)
◇ Sandstone (0)
◇ Rip/Rap (0)
◇ Lacustrine (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)

NUMBER OF BEST TYPES: ◇ 4 or more (2) ◈ 3 or less (0)

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

Substrate 1 *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.

0	0	Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)
5	1	Overhanging vegetation (1)	0	0	Rootwads (1)	80	2	Aquatic macrophytes (1)
0	0	Shallows (in slow water) (1)	0	0	Boulders (1)	15	1	Logs and woody debris (1)
0	0	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
◇ 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* 7

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION

L	R	
◇	◇	None or 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* 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) (metric=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* 6

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ No Riffle (metric=0)

RIFFLE DEPTH
◇ Best Areas >10cm (2)
◇ Best Areas 5-10cm (1)
◇ Best Areas <5cm (metric=0)

RUN DEPTH
Check ONE (*or 2 & average*)
◇ 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. sand, fine gravel) (0)

RIFFLE/RUN EMBEDDEDNESS
◇ None (2)
◇ Low (1)
◇ Moderate (0)
◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(1.36 ft/mi)
DRAINAGE AREA
(7.238 mi²)

◈ Very low – Low (2-4)
◇ Moderate (6-10)
◇ High – Very high (10-6)

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

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

66 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11704	13T023	Main Beaver Dam Ditch	Grant Street

Surveyor	Sample Date	County	Macro Sample Type
TAF	6/25/13	Lake	

◇ **Habitat Complete**

QHEI Score: 58

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ **Bldrs/Slabs (10)**				◇ ◇ **Hardpan (4)**	20	x	x	◇ **Limestone (1)**	SILT
◇ ◇ **Boulders (9)**				◇ ◇ **Detritus (3)**				◈ **Tills (1)**	◇ **Heavy (-2)**
◇ ◇ **Cobble (8)**	10	x	x	◇ ◇ **Muck (2)**	10	x	x	◇ **Wetlands (0)**	◇ **Moderate (-1)**
◇ ◇ **Gravel (7)**	20	x	x	◇ ◇ **Silt (2)**	10	x	x	◇ **Hardpan (0)**	◈ **Normal (0)**
◈ ◈ **Sand (6)**	30	x	x	◇ ◇ **Artificial (0)**				◇ **Sandstone (0)**	◇ **Free (1)**
◇ ◇ **Bedrock (5)**								◇ **Rip/Rap (0)**	EMBEDDEDNESS
								◇ **Lacustrine (0)**	◇ **Extensive (-2)**
								◇ **Shale (-1)**	◇ **Moderate (-1)**
								◇ **Coal fines (-2)**	◈ **Normal (0)**
									◇ **None (1)**

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

COMMENTS

Substrate 13 *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.

20	1	**Undercut banks (1)**	20	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	1	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	20	2	**Aquatic macrophytes (1)**
10	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	10	1	**Logs and woody debris (1)**
10	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* 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* 6

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ **None or 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* 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)** **(metric=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* 10

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ◇ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8* 5

6-GRADIENT

(2.607 ft/mi)
DRAINAGE AREA
(19.073 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 20 **% GLIDE: 40**
% RUN: 20 **% RIFFLE: 20**

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____

_____

_____

_____

_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◈ **<10% - Closed**

Canopy Upstream Reading

Right

8 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◈ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11708	13T028	Tributary of Turkey Creek	77th Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	37
JCR	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	15	x	x	◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	60	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	5	x	x	◇ ◇ Silt (2)	15	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ 4 or more (2) ◈ 3 or less (0)

Substrate 3 *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.

0	0 Undercut banks (1)	0	0 Pools > 70cm (2)	0	0 Oxbows, Backwaters (1)
80	2 Overhanging vegetation (1)	0	0 Rootwads (1)	20	1 Aquatic macrophytes (1)
0	0 Shallows (in slow water) (1)	0	0 Boulders (1)	0	0 Logs and woody debris (1)
0	0 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)	

Channel *Maximum 20* 8

COMMENTS

4- BANK EROSION & 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 or 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.

Riparian *Maximum 10* 5

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check **ONE** (*ONLY!*)	Check ONE (*or 2 & average*)	Check ALL that apply
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1) ◈ Slow (1)
◇ 0.7-<1m (4)	◈ Pool width = riffle width (1)	◇ Very Fast (1) ◇ Interstitial (-1)
◈ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1) ◇ Intermittent (-2)
◇ 0.2-<0.4m (1)		◇ Moderate (1) ◇ Eddies (1)
◇ <0.2m (0) (metric=0)		Indicate for reach – pools and riffles.

RECREATION POTENTIAL
◇ ***Primary Contact***
◇ ***Secondary Contact***
(circle one and comment on back)

Pool/Current *Maximum 12* 4

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** (*ONLY!*) 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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(7.809 ft/mi)
DRAINAGE AREA
(2.840 mi²)

◇ Very low – Low (2-4)
◈ Moderate (6-10)
◇ High – Very high (10-6)

% POOL: 20 % GLIDE: 60
% RUN: 20 % RIFFLE: 0

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

77 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11715	13T035	Tributary of Turkey Creek	73rd Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	43
TAF	6/25/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)				◇ Hardpan (0)	◈ Normal (0)
◇ ◇ Sand (6)	10	x	x	◈ ◈ Artificial (0)	70	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◈ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 1 *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.

0	0	**Undercut banks (1)**	30	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
15	1	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	40	1	**Logs and woody debris (1)**
15	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* 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)**	

Channel *Maximum 20* 10

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◇ ◇ **None or 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.

Riparian *Maximum 10* 3

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)** **(metric=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)

Pool/Current *Maximum 12* 7

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** (*ONLY!*) 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. sand, fine gravel) (0)**	◈ **Moderate (0)**
			◇ **Extensive (-1)**

Riffle/Run *Maximum 8* 4

COMMENTS

6-GRADIENT

(17.016 ft/mi)
DRAINAGE AREA
(3.973 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

% POOL: 10 **% GLIDE: 20**
% RUN: 35 **% RIFFLE: 35**

Gradient *Maximum 10* 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

59 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11712	13T032	Turkey Creek	SR 55

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
TAF	6/26/13	Lake			51

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)	20	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	20	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)	30	x	x	◇ ◇ Artificial (0)	20	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 11 *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.

10	1	**Undercut banks (1)**	35	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	1	**Overhanging vegetation (1)**	10	1	**Rootwads (1)**	15	1	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	10	1	**Logs and woody debris (1)**
10	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* 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)	

Channel *Maximum 20* 8

COMMENTS

4- BANK EROSION & 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 or 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 *Maximum 10* 4

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)** (metric=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)

Pool/Current *Maximum 12* 9

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(2.388 ft/mi)
DRAINAGE AREA
(21.179 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 30 **% GLIDE: 70**
% RUN: 0 **% RIFFLE: 0**

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◈ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

100 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11711	13T031	Tributary of Turkey Creek	W Old Lincoln Hwy

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	41
JCR	6/25/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	40	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	15	x	x	◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	30	x	x	◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
				(Score natural substrates; ignore sludge from point-sources)				◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 2 *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.

25	1 **Undercut banks (1)**	0	0 **Pools > 70cm (2)**	0	0 **Oxbows, Backwaters (1)**
25	1 **Overhanging vegetation (1)**	25	1 **Rootwads (1)**	0	0 **Aquatic macrophytes (1)**
0	0 **Shallows (in slow water) (1)**	0	0 **Boulders (1)**	25	1 **Logs and woody debris (1)**
0	0 **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* 12

4- BANK EROSION & 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 or 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* 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)** **(metric=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** (*ONLY!*)

◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(14.199 ft/mi)
DRAINAGE AREA
(2.642 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

% POOL: 20 **% GLIDE: 0**
% RUN: 80 **% RIFFLE: 0**

Gradient *Maximum 10* 8

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

19 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11713	13T033	Tributary of Turkey Creek	73rd Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	41
JCR	6/25/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	40	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	30	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 3 *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.

10	1	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	80	2	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	10	1	**Logs and woody debris (1)**
0	0	**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* 11

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◇ ◇ **None or 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)** **(metric=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** (*ONLY!*)
◈ **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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(19.835 ft/mi)
DRAINAGE AREA
(1.731 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

% POOL: 10 **% GLIDE: 0**
% RUN: 90 **% RIFFLE: 0**

Gradient *Maximum 10* 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◈ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

100 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11686	13T005	Deep River	29th Avenue

Surveyor	Sample Date	County	Macro Sample Type	◈ Habitat Complete	QHEI Score:	48
KJC	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES

	TOTAL	POOL	RIFFLE
◇ ◇ Bldrs/Slabs (10)			
◇ ◇ Boulders (9)			
◇ ◇ Cobble (8)			
◇ ◇ Gravel (7)			
◈ ◈ Sand (6)	35	x	x
◇ ◇ Bedrock (5)			

OTHER TYPES

	TOTAL	POOL	RIFFLE
◇ ◇ Hardpan (4)			
◇ ◇ Detritus (3)	5	x	
◇ ◇ Muck (2)	20	x	x
◇ ◇ Silt (2)	30	x	x
◇ ◇ Artificial (0)	10	x	x

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

ORIGIN

◇ Limestone (1)
◈ Tills (1)
◇ Wetlands (0)
◇ Hardpan (0)
◇ Sandstone (0)
◇ Rip/Rap (0)
◇ Lacustrine (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)

NUMBER OF BEST TYPES: ◇ 4 or more (2) ◈ 3 or less (0)

Substrate 11 *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.

0	0	Undercut banks (1)	20	1	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)
0	0	Overhanging vegetation (1)	15	1	Rootwads (1)	25	1	Aquatic macrophytes (1)
0	0	Shallows (in slow water) (1)	0	0	Boulders (1)	40	2	Logs and woody debris (1)
0	0	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
◇ 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 & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION

L	R	
◇	◇	None or 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* 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) (metric=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* 6

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ 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. sand, fine gravel) (0)

RIFFLE/RUN EMBEDDEDNESS
◇ None (2)
◇ Low (1)
◇ Moderate (0)
◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(1.226 ft/mi)
DRAINAGE AREA
(150.342 mi²)

◇ Very low – Low (2-4)
◈ Moderate (6-10)
◇ High – Very high (10-6)

% POOL: 35 **% GLIDE:** 0
% RUN: 65 **% RIFFLE:** 0

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

19 Right

58 Middle

36 Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11693	13T012	Deep River	Arizona Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
TAF	6/26/13	Lake			56

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◈ ◈ Hardpan (4)	50	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	20	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 7 *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.

10	1	**Undercut banks (1)**	20	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	1	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
10	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	40	3	**Logs and woody debris (1)**
10	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* 14

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 *Maximum 20* 14

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ None or 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.

Riparian *Maximum 10* 8

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)** **(metric=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)

Pool/Current *Maximum 12* 9

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(1.48 ft/mi)
DRAINAGE AREA
(78.790 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

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

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

34 Right

49 Middle

14 Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11687	13T006	Deep River	Liverpool Road

Surveyor	Sample Date	County	Macro Sample Type	◈ Habitat Complete	QHEI Score:	52
KJC	6/24/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	30	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	30	x	x	◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)	40	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 11 *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.

0	0 **Undercut banks (1)**	10	1 **Pools > 70cm (2)**	0	0 **Oxbows, Backwaters (1)**
0	0 **Overhanging vegetation (1)**	0	0 **Rootwads (1)**	80	2 **Aquatic macrophytes (1)**
0	0 **Shallows (in slow water) (1)**	0	0 **Boulders (1)**	10	1 **Logs and woody debris (1)**
0	0 **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* 7

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 *Maximum 20* 13

COMMENTS

4- BANK EROSION & 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 or 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 *Maximum 10* 7

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)** (metric=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 *Maximum 12* 8

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(1.388 ft/mi)
DRAINAGE AREA (150.171 mi²)

◇ **Very low – Low (2-4)**
◈ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 20 **% GLIDE: 0**
% RUN: 80 **% RIFFLE: 0**

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

93 Right

100 Middle

33 Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11716	13T036	Turkey Creek	Liverpool Road

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	40
JCR	6/26/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)	20	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	50	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	20	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 1 *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.

20	1 **Undercut banks (1)**	20	1 **Pools > 70cm (2)**	0	0 **Oxbows, Backwaters (1)**
0	0 **Overhanging vegetation (1)**	20	1 **Rootwads (1)**	20	1 **Aquatic macrophytes (1)**
0	0 **Shallows (in slow water) (1)**	0	0 **Boulders (1)**	20	1 **Logs and woody debris (1)**
0	0 **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)	

Channel *Maximum 20* 10

COMMENTS

4- BANK EROSION & 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 or 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 *Maximum 10* 7

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)** **(metric=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)

Pool/Current *Maximum 12* 9

COMMENTS

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

◈ **No Riffle (metric=0)**

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
Check **ONE** (*ONLY!*)	Check ONE (*or 2 & average*)		
◇ **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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(1.44 ft/mi)
DRAINAGE AREA
(37.922 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 10 **% GLIDE: 40**
% RUN: 50 **% RIFFLE: 0**

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◈ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

80 Right

98 Middle

81 Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11697	13T016	Tributary of Deep River	89th Avenue

Surveyor	Sample Date	County	Macro Sample Type
TAF	6/24/13	Lake	

◇ **Habitat Complete**

QHEI Score: 52

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	70	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	10	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 2 *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.

50	2	**Undercut banks (1)**	0	0	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
10	1	**Overhanging vegetation (1)**	10	1	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
20	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	10	1	**Logs and woody debris (1)**
0	0	**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* 15

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ **None or 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* 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)** **(metric=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** (*ONLY!*)

◇ **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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(23.493 ft/mi)
DRAINAGE AREA
(2.364 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

% POOL: 70 **% GLIDE: 30**
% RUN: 0 **% RIFFLE: 0**

Gradient *Maximum 10* 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

Bridge recently removed and cilvert put in bank has been black topped.

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◈ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

24 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11684	13T002	Willow Creek	Clem Road

Surveyor	Sample Date	County	Macro Sample Type	◈ Habitat Complete	QHEI Score:	58
KAG	6/25/13	Porter				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)				◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)				◇ Hardpan (0)	◈ Normal (0)
◈ ◈ Sand (6)	95	x	x	◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◈ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

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.

25	1	**Undercut banks (1)**	50	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	25	1	**Logs and woody debris (1)**
0	0	**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*: 7

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 & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ **None or 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*: 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)** **(metric=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: ◇ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8*: 5

6-GRADIENT

(16.774 ft/mi)
DRAINAGE AREA
(8.556 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

% POOL: 25 **% GLIDE:** 0
% RUN: 50 **% RIFFLE:** 25

Gradient *Maximum 10*: 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◈ **<10% - Closed**

Canopy Upstream Reading

Right

3 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11699	13T018	Deep River	Clay Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
KRW	6/25/13	Lake			57

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)	10	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)	10	x	x	◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)	50	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate 11 *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.

10	1	**Undercut banks (1)**	50	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
10	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	15	1	**Logs and woody debris (1)**
15	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* 13

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY	
L R	L R	L R	L 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)**	*Indicate predominant land use(s) past 100m riparian.*
	◇ ◇ **None (0)**	◇ ◇ **Open Pasture/Rowcrop (0)**	

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)** **(metric=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* 9

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ **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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(3.348 ft/mi)
DRAINAGE AREA
(44.481 mi²)

◇ **Very low – Low (2-4)**
◈ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 60 **% GLIDE: 40**
% RUN: 0 **% RIFFLE: 0**

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

72 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11688	13T007	Tributary of Deep River	Shelby Street

Surveyor	Sample Date	County	Macro Sample Type
KAG	6/25/13	Lake	

◈ **Habitat Complete**

QHEI Score: 44

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)			
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)			
◇ ◇ Cobble (8)				◈ ◈ Muck (2)		x	x
◇ ◇ Gravel (7)				◇ ◇ Silt (2)		x	x
◇ ◇ Sand (6)				◇ ◇ Artificial (0)			
◇ ◇ Bedrock (5)							

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

ORIGIN
- ◇ Limestone (1)
- ◈ Tills (1)
- ◇ Wetlands (0)
- ◇ Hardpan (0)
- ◇ Sandstone (0)
- ◇ Rip/Rap (0)
- ◇ Lacustrine (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 2 *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.

20	1	Undercut banks (1)	0	0	Pools > 70cm (2)	20	1	Oxbows, Backwaters (1)
0	0	Overhanging vegetation (1)	0	0	Rootwads (1)	40	2	Aquatic macrophytes (1)
0	0	Shallows (in slow water) (1)	0	0	Boulders (1)	20	1	Logs and woody debris (1)
0	0	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
- ◇ 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* 11

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION

L	R	
◇	◇	None or 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* 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) **(metric=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:

◇ **No Riffle (metric=0)**

RIFFLE DEPTH

Check **ONE** (*ONLY!*)
- ◇ 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

Check ONE (*or 2 & average*)
- ◇ Stable (e.g. cobble, boulder) (2)
- ◇ Mod. Stable (e.g. large gravel) (1)
- ◈ Unstable (e.g. sand, fine gravel) (0)

RIFFLE/RUN EMBEDDEDNESS
- ◇ None (2)
- ◇ Low (1)
- ◈ Moderate (0)
- ◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8* 3

6-GRADIENT

(1.936 ft/mi)

DRAINAGE AREA (3.862 mi²)
- ◈ Very low – Low (2-4)
- ◇ Moderate (6-10)
- ◇ High – Very high (10-6)

% POOL: 10 **% GLIDE: 0**

% RUN: 90 **% RIFFLE: 0**

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11714	13T034	Tributary of Turkey Creek	Arthur Street

Surveyor	Sample Date	County	Macro Sample Type	◈ Habitat Complete	QHEI Score:	31
KAG	6/25/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◈ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	95	x		◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)				◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)	5	x		◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◈ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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

Substrate *Maximum 20*: 1

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.

20	1 **Undercut banks (1)**	0	0 **Pools > 70cm (2)**	0	0 **Oxbows, Backwaters (1)**
0	0 **Overhanging vegetation (1)**	0	0 **Rootwads (1)**	60	3 **Aquatic macrophytes (1)**
0	0 **Shallows (in slow water) (1)**	0	0 **Boulders (1)**	20	1 **Logs and woody debris (1)**
0	0 **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*: 14

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*: 4

4- BANK EROSION & 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 or 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-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)** **(metric=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: ◈ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8*: 0

6-GRADIENT

(3.392 ft/mi)
DRAINAGE AREA
(5.595 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: #$ **% GLIDE: 100**
% RUN: #$** **% RIFFLE: #$

Gradient *Maximum 10*: 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

41 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11691	13T010	Tributary of Duck Creek	10th Street

Surveyor	Sample Date	County	Macro Sample Type	◈ Habitat Complete	QHEI Score:	41
KAG	6/25/13	Lake				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)	5	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	85			◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	5	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate *Maximum 20*: 3

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.

0	0	**Undercut banks (1)**	20	2	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
35	2	**Overhanging vegetation (1)**	0	0	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	35	2	**Logs and woody debris (1)**
10	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*: 5

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◈ ◈ **None or 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*: 6

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)** **(metric=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*: 9

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ◈ **No Riffle (metric=0)**

Check **ONE** (*ONLY!*)

RIFFLE DEPTH
◇ **Best Areas >10cm (2)**
◇ **Best Areas 5-10cm (1)**
◇ **Best Areas <5cm** **(metric=0)**

RUN DEPTH
◇ **Maximum >50cm (2)**
◇ **Maximum <50cm (1)**

Check ONE (*or 2 & average*)

RIFFLE/RUN SUBSTRATE
◇ **Stable (e.g. cobble, boulder) (2)**
◇ **Mod. Stable (e.g. large gravel) (1)**
◇ **Unstable (e.g. sand, fine gravel) (0)**

RIFFLE/RUN EMBEDDEDNESS
◇ **None (2)**
◇ **Low (1)**
◇ **Moderate (0)**
◇ **Extensive (-1)**

COMMENTS

Riffle/Run *Maximum 8*: 0

6-GRADIENT

(9.376 ft/mi)
DRAINAGE AREA (3.091 mi²)

◇ **Very low – Low (2-4)**
◈ **Moderate (6-10)**
◇ **High – Very high (10-6)**

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

Gradient *Maximum 10*: 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◈ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

36 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11692	13T011	Duck Creek	750 W

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:	49
TAF	7/9/13	Porter				

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)	10	x	x	◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◈ ◈ Muck (2)	50	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	10	x	x	◇ ◇ Artificial (0)	10	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 3 *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.

10	1	**Undercut banks (1)**	30	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	10	1	**Rootwads (1)**	0	0	**Aquatic macrophytes (1)**
20	1	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	40	1	**Logs and woody debris (1)**
0	0	**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)**	

Channel *Maximum 20* 14

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
◇ ◇ **None or 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.

Riparian *Maximum 10* 6

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)** **(metric=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)

Pool/Current *Maximum 12* 7

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*) 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. sand, fine gravel) (0)**	◇ **Moderate (0)**
			◇ **Extensive (-1)**

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(15.843 ft/mi)
DRAINAGE AREA
(6.517 mi²)

◇ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◈ **High – Very high (10-6)**

% POOL: 50 **% GLIDE: 50**
% RUN: #$** **% RIFFLE: #$

Gradient *Maximum 10* 10

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◇ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◈ **<10% - Closed**

Canopy Upstream Reading

Right

4 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11683	13T001	Burns Ditch	US 20

Surveyor	Sample Date	County	Macro Sample Type
KJC	6/24/13	Porter	

◈ **Habitat Complete**

QHEI Score: 48

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	25	x	x	◇ Wetlands (0)	◈ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	25	x	x	◇ Hardpan (0)	◇ Normal (0)
◈ ◈ Sand (6)	40	x		◇ ◇ Artificial (0)	10	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◈ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

Substrate 11 *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.

0	0	**Undercut banks (1)**	20	1	**Pools > 70cm (2)**	0	0	**Oxbows, Backwaters (1)**
0	0	**Overhanging vegetation (1)**	10	1	**Rootwads (1)**	30	1	**Aquatic macrophytes (1)**
0	0	**Shallows (in slow water) (1)**	0	0	**Boulders (1)**	40	2	**Logs and woody debris (1)**
0	0	**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* 8

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◇	◇ None or 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* 6

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)** **(metric=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* 7

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)

◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

COMMENTS

Riffle/Run *Maximum 8* 0

6-GRADIENT

(1.226 ft/mi)
DRAINAGE AREA
(164.931 mi²)

◇ **Very low – Low (2-4)**
◈ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 20 **% GLIDE: 0**
% RUN: 80 **% RIFFLE: 0**

Gradient *Maximum 10* 6

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

35 Right

62 Middle

74 Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11685	13T003	Willow Creek	Stone Avenue

Surveyor	Sample Date	County	Macro Sample Type
KAG	6/25/13	Porter	

◈ **Habitat Complete**

QHEI Score: 40

1-SUBSTRATE

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

Check ONE (*or 2 & average*)

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◈ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)				◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	5	x	X	◇ Hardpan (0)	◈ Normal (0)
◈ ◈ Sand (6)	90	x	x	◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◈ Normal (0)
									◇ None (1)

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

NUMBER OF BEST TYPES: ◇ **4 or more (2)** ◈ **3 or less (0)**

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.

0	0 **Undercut banks (1)**	0	0 **Pools > 70cm (2)**	0	0 **Oxbows, Backwaters (1)**
50	1 **Overhanging vegetation (1)**	0	0 **Rootwads (1)**	25	1 **Aquatic macrophytes (1)**
0	0 **Shallows (in slow water) (1)**	0	0 **Boulders (1)**	25	1 **Logs and woody debris (1)**
0	0 **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* 6

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 *Maximum 20* 9

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

Check **ONE** in each category for ***EACH BANK*** (*Or 2 per bank & average*)

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◇	◇ None or 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.

Riparian *Maximum 10* 5

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)** (metric=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)

Pool/Current *Maximum 12* 3

COMMENTS

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species:
Check **ONE** (*ONLY!*)
◈ **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. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run *Maximum 8* 0

COMMENTS

6-GRADIENT

(3.917 ft/mi)
DRAINAGE AREA
(5.350 mi²)

◈ **Very low – Low (2-4)**
◇ **Moderate (6-10)**
◇ **High – Very high (10-6)**

% POOL: 0 **% GLIDE: 0**
% RUN: 100 **% RIFFLE: 0**

Gradient *Maximum 10* 4

OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

_____
_____
_____
_____
_____

A-CANOPY

- ◇ **>85% - Open**
- ◈ **55%-<85%**
- ◇ **30%-<55%**
- ◇ **10%-<30%**
- ◇ **<10% - Closed**

Canopy Upstream Reading

Right

57 Middle

Left

B-AESTHETICS

- ◇ **Nuisance algae**
- ◇ **Invasive macrophytes**
- ◇ **Excess turbidity**
- ◇ **Discoloration**
- ◇ **Foam/Scum**
- ◇ **Oil sheen**
- ◇ **Trash/Litter**
- ◇ **Nuisance odor**
- ◇ **Sludge deposits**
- ◇ **CSOs/SSOs/Outfalls**

C-MAINTENANCE

- ◇ **Public /** ◇ **Private / Both / NA**
- ◇ **Active /** ◇ **Historic / Both / NA**
- ◇ **Young - Succession - Old**
- ◇ **Spray /** ◇ **Removed**
- ◇ **Modified /** ◇ **Dipped out / NA**
- ◇ **Leveed /** ◇ **One sided**
- ◇ **Moving - Bedload – Stable**
- ◇ **Armoured** ◇ **Slumps**
- ◇ **Islands /** ◇ **Scoured**
- ◇ **Relocated /** ◇ **Cutoffs**
- ◇ **Impounded /** ◇ **Desiccated**
- ◇ **Flood Control /** ◇ **Drainage**
- ◇ **Snag /**

D-ISSUES

- ◇ **WWTP /** ◇ **NPDES /** ◇ **CSO /**
- ◇ **Hardened /** ◇ **Urban /** ◇ **Dirt & Grime**
- ◇ **Contaminated /** ◇ **Landfill** ◇ **Industry**
- ◇ **BMPs – Construction – Sediment**
- ◇ **Logging /** ◇ **Irrigation /** ◇ **Cooling**
- ◇ **Bank/** ◇ **Erosion /** ◇ **Surface**
- ◇ **False bank /** ◇ **Manure /** ◇ **Lagoon**
- ◇ **Wash H2O /** ◇ **Tile /** ◇ **H2O table**
- ◇ **Acid /** ◇ **Mine /** ◇ **Quarry /**
- ◇ **Natural /** ◇ **Wetlands /** ◇ **Stagnant**
- ◇ **Park /** ◇ **Golf /** ◇ **Lawn /**
- ◇ **Atmosphere /** ◇ **Data Paucity** ◇ **Home**
- ◇ **Agriculture /** ◇ **Livestock** ◇ **Flow**

Stream Drawing