



Sample #	bioSample #	Stream Name	Location
AB11720	130722101	Burns Ditch	US 20

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/22/13	Porter	MHAB	<input checked="" type="checkbox"/>	45

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate
	TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	<div style="border: 1px solid black; padding: 5px; text-align: center;">11</div> Maximum 20
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	25 x x	
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	25 x	
◇ ◇ Sand (6)	30	x	x	◇ ◇ Artificial (0)	20 x	
◇ ◇ Bedrock (5)	_____	_____	_____	(Score natural substrates; ignore sludge from point-sources)		
NUMBER OF BEST TYPES:	◇ 4 or more (2) ◇ 3 or less (0)					

COMMENTS

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

				AMOUNT					
				Check ONE (or 2 & average)					
0	0	Undercut banks (1)	10	1	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)	◇ Extensive >75% (11)
0	0	Overhanging vegetation (1)	30	1	Rootwads (1)	20	1	Aquatic macrophytes (1)	◇ Moderate 25-75% (7)
0	0	Shallows (in slow water) (1)	0	0	Boulders (1)	40	2	Logs and woody debris (1)	◇ Sparse 5-<25% (3)
0	0	Rootmats (1)							◇ Nearly absent <5% (1)

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	<div style="border: 1px solid black; padding: 5px; text-align: center;">8</div> Maximum 20
◇ 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

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None <5m (1)				
	◇ ◇ None (0)				

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

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

COMMENTS

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run
◇ Best Areas >10cm (2)	◇ Maximum >50cm (2)	◇ Stable (e.g. cobble, boulder) (2)	◇ None (2)	<div style="border: 1px solid black; padding: 5px; text-align: center;">0</div> Maximum 8
◇ 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

6-GRADIENT	Very low – Low (2-4)	% POOL: 10	% GLIDE: #	Gradient
(1.226 ft/mi)	◇ Moderate (6-10)			<div style="border: 1px solid black; padding: 5px; text-align: center;">6</div> Maximum 10
DRAINAGE AREA (164.931 mi ²)	◇ High – Very high (10-6)	% RUN: 90	% RIFFLE: #	



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
35 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
63 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
74 Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11721	130722102	Willow Creek	Clem Road

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/22/13	Porter	MHAB	<input checked="" type="checkbox"/>	48

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ SILT Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	5	x	_____	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	_____	_____	_____	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	10	x	_____	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	70	x	x	◇ ◇ Artificial (0)	15	x	x	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ 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.

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	0	0	Pools > 70cm (2)	0	0	0	0
Overhanging vegetation (1)	0	0	0	0	Rootwads (1)	0	0	0	0
Shallows (in slow water) (1)	50	1	0	0	Boulders (1)	50	1	0	0
Rootmats (1)	0	0	0	0	Oxbows, Backwaters (1)	0	0	0	0
					Aquatic macrophytes (1)	0	0	0	0
					Logs and woody debris (1)	0	0	0	0

Cover
Maximum 20
7

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
10

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)

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	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

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!)

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
2

COMMENTS

6-GRADIENT

(16.774 ft/mi)	◇ Very low – Low (2-4)	% POOL: 40	% GLIDE: # \$	Gradient Maximum 10 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 40	% RIFFLE: 20	
(8.556 mi ²)	◇ High – Very high (10-6)			



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
3 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11722	130722104	Willow Creek	Stone Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/22/13	Porter	MHAB	<input checked="" type="checkbox"/>	40

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

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

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). Check ONE (or 2 & average)

AMOUNT
15 1 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)
40 1 Shallows (in slow water) (1) 0 0 Boulders (1) 15 1 Logs and woody debris (1)
20 1 Rootmats (1)

Cover
Maximum 20 8

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20 10

COMMENTS

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

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)

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

Riparian
Maximum 10 4

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Slow (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Very Fast (1)	
◇ 0.2-<0.4m (1)		◇ Fast (1)	
◇ <0.2m (0) (metric=0)		◇ Moderate (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

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!)

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	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 20	% GLIDE: #	% RUN: 80	% RIFFLE: #	Gradient
(3.917 ft/mi)								Maximum 10
DRAINAGE AREA (5.350 mi ²)								4



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
89 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11723	130722106	Deep River	29th Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	55

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate
	TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	<div style="border: 1px solid black; padding: 5px; text-align: center;">11</div> Maximum 20
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	10	
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	20	
◇ ◇ Sand (6)	60	x	x	◇ ◇ Artificial (0)	10	
◇ ◇ Bedrock (5)	_____	_____	_____			
NUMBER OF BEST TYPES:	◇ 4 or more (2) ◇ 3 or less (0)					

COMMENTS

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

		AMOUNT	
0	0	Undercut banks (1)	25
10	1	Overhanging vegetation (1)	15
0	0	Shallows (in slow water) (1)	0
0	0	Rootmats (1)	0
0	0	Pools > 70cm (2)	0
0	0	Rootwads (1)	0
0	0	Boulders (1)	50
0	0	Oxbows, Backwaters (1)	0
0	0	Aquatic macrophytes (1)	0
0	0	Logs and woody debris (1)	2

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	<div style="border: 1px solid black; padding: 5px; text-align: center;">13</div> Maximum 20
◇ 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

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)	Riparian Maximum 10	
	◇ ◇ None (0)			7	

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	
		Indicate for reach – pools and riffles.	
			Pool/Current Maximum 12
			8

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (ONLY!) Check ONE (or 2 & average) ◇ No Riffle (metric=0)

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run
◇ Best Areas >10cm (2)	◇ Maximum >50cm (2)	◇ Stable (e.g. cobble, boulder) (2)	◇ None (2)	<div style="border: 1px solid black; padding: 5px; text-align: center;">0</div> Maximum 8
◇ 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

6-GRADIENT			Gradient
(1.226 ft/mi)	◇ Very low – Low (2-4)	% POOL: 25	<div style="border: 1px solid black; padding: 5px; text-align: center;">6</div> Maximum 10
DRAINAGE AREA	◇ Moderate (6-10)	% GLIDE: #	
(150.342 mi ²)	◇ High – Very high (10-6)	% RUN: 75	
		% RIFFLE: #	



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
19 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
58 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
37 Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11724	130722107	Deep River	Liverpool Road

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	44

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	20	x		◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	15	x		◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	35	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	20	x		◇ ◇ Artificial (0)	10	x		◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ 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.

AMOUNT

Check ONE (or 2 & average)

	10	1		10	1		0	0	
Undercut banks (1)				Pools > 70cm (2)					Oxbows, Backwaters (1)
Overhanging vegetation (1)				Rootwads (1)		25	1		Aquatic macrophytes (1)
Shallows (in slow water) (1)	0	0		Boulders (1)	0	0	1		Logs and woody debris (1)
Rootmats (1)	5	1							

Cover

13

Maximum 20

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel

12

Maximum 20

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None (<5m) (1)				
	◇ ◇ None (0)				

Riparian

4

Maximum 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current

6

Maximum 12

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

0

Maximum 8

COMMENTS

6-GRADIENT

(1.388 ft/mi)	◇ Very low – Low (2-4)	% POOL: 20	% GLIDE: #	Gradient
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 80	% RIFFLE: #	
(150.171 mi ²)	◇ High – Very high (10-6)			

Gradient

6

Maximum 10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
93 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
100 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
33 Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11725	130722301	Tributary of Deep River	Shelby Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	34

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

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

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). Check ONE (or 2 & average)

AMOUNT
0 0 Undercut banks (1)
0 0 Pools > 70cm (2)
0 0 Oxbows, Backwaters (1)
70 2 Overhanging vegetation (1)
0 0 Rootwads (1)
10 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)

Cover
Maximum 20
5

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
13

COMMENTS

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

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)
		◇ ◇ 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	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Primary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Slow (1)	◇ Secondary Contact
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.2-<0.4m (1)		◇ Fast (1)	
◇ <0.2m (0) (metric=0)		◇ Moderate (1)	
		◇ Intertidal (-1)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current
Maximum 12
4

COMMENTS

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ONE (or 2 & average)	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	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 40	% GLIDE: #	% RUN: 60	% RIFFLE: #	Gradient
(1.936 ft/mi)								Maximum 10
DRAINAGE AREA (3.862 mi ²)								4



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
0 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11726	130723101	Deep River	Ridge Rd, D/S of Lake George Dam, Hobart
Surveyor	Sample Date	County	Macro Sample Type
KJC	7/23/13	Lake	MHAB
◆ Habitat Complete			QHEI Score: 33

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate	
	TOTAL	POOL	RIFFLE				TOTAL
◆ ◇ Bidrs/Slabs (10)	_____	_____	_____	◆ ◇ Hardpan (4)	_____	_____	<div style="border: 1px solid black; padding: 5px; text-align: center;">3</div> Maximum 20
◆ ◇ Boulders (9)	_____	_____	_____	◆ ◇ Detritus (3)	15	x	
◆ ◇ Cobble (8)	_____	_____	_____	◆ ◇ Muck (2)	_____	_____	
◆ ◇ Gravel (7)	_____	_____	_____	◆ ◇ Silt (2)	40	x x	
◆ ◇ Sand (6)	25	x	_____	◆ ◇ Artificial (0)	20	x	
◆ ◇ Bedrock (5)	_____	_____	_____				

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

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

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).

		AMOUNT	
		Check ONE (or 2 & average)	
0	0 Undercut banks (1)	0	0 Pools > 70cm (2)
15	1 Overhanging vegetation (1)	0	0 Rootwads (1)
35	1 Shallows (in slow water) (1)	0	0 Boulders (1)
0	0 Rootmats (1)	0	0 Oxbows, Backwaters (1)
		0	0 Aquatic macrophytes (1)
		50	1 Logs and woody debris (1)

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel
◆ High (4)	◆ Excellent (7)	◆ None (6)	◆ High (3)	<div style="border: 1px solid black; padding: 5px; text-align: center;">10</div> Maximum 20
◆ 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

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

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		Riparian
L	R	L	R	L	R	Maximum
◆ None or little (3)	◆ Wide >50m (4)	◆ Forest, Swamp (3)	◆ Conservation Tillage (1)	◆ Forest, Swamp (3)	◆ Urban or Industrial (0)	<div style="border: 1px solid black; padding: 5px; text-align: center;">5</div> Maximum 10
◆ Moderate (2)	◆ Moderate 10-50m (3)	◆ Shrub or Old field (2)	◆ Urban or Industrial (0)	◆ Residential, Park, New field (1)	◆ Mining, construction (0)	
◆ Heavy/Severe (1)	◆ Narrow 5-10m (2)	◆ Fenced pasture (1)	◆ Indicate predominant land use(s) past 100m riparian.	◆ Open Pasture/Rowcrop (0)		
	◆ None (0)					

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◆ Primary Contact
◆ >1m (6)	◆ Pool width > riffle width (2)	◆ Torrential (-1)	◆ Secondary Contact
◆ 0.7-<1m (4)	◆ Pool width = riffle width (1)	◆ Very Fast (1)	(circle one and comment on back)
◆ 0.4-<0.7m (2)	◆ Pool width < riffle width (0)	◆ Fast (1)	
◆ 0.2-<0.4m (1)		◆ Moderate (1)	
◆ <0.2m (0) (metric=0)		◆ Slow (1)	
		◆ Interstitial (-1)	
		◆ Intermittent (-2)	
		◆ Eddies (1)	

Indicate for reach – pools and riffles.

COMMENTS

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run
Check ONE (ONLY!)	Check ONE (or 2 & average)	◆ No Riffle (metric=0)		<div style="border: 1px solid black; padding: 5px; text-align: center;">0</div> Maximum 8
◆ 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

6-GRADIENT

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 15	% GLIDE: #	% RIFFLE: #	Gradient
(1.38 ft/mi)							<div style="border: 1px solid black; padding: 5px; text-align: center;">6</div> Maximum 10
(124.048 mi ²)							



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
35 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
60 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
37 Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11727	130723102	Duck Creek	Front Street
Surveyor	Sample Date	County	Macro Sample Type
KJC	7/23/13	Lake	MHAB
◆ Habitat Complete			QHEI Score: 31

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate
	TOTAL	POOL	RIFFLE			
◆ ◇ Bidrs/Slabs (10)	_____	_____	_____	◆ Limestone (1)	◆ Heavy (-2)	<div style="border: 1px solid black; padding: 5px; text-align: center;">1</div> Maximum 20
◆ ◇ Boulders (9)	_____	_____	_____	◆ Tills (1)	◆ Moderate (-1)	
◆ ◇ Cobble (8)	_____	_____	_____	◆ Wetlands (0)	◆ Normal (0)	
◆ ◇ Gravel (7)	_____	_____	_____	◆ Hardpan (0)	◆ Free (1)	
◆ ◇ Sand (6)	20	x	_____	◆ Sandstone (0)	EMBEDDEDNESS	
◆ ◇ Bedrock (5)	_____	_____	_____	◆ Rip/Rap (0)	◆ Extensive (-2)	
NUMBER OF BEST TYPES:	◆ 4 or more (2) ◆ 3 or less (0)			(Score natural substrates; ignore sludge from point-sources)	◆ Moderate (-1)	
				◆ Lacustrine (0)	◆ Normal (0)	
				◆ Shale (-1)	◆ None (1)	
				◆ Coal fines (-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).

				AMOUNT				
				Check ONE (or 2 & average)				
15	1	Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	◆ Extensive >75% (11)
0	0	Overhanging vegetation (1)	0	0	Rootwads (1)	0	0	◆ Moderate 25-75% (7)
20	1	Shallows (in slow water) (1)	0	0	Boulders (1)	50	2	◆ Sparse 5-<25% (3)
15	1	Rootmats (1)						◆ Nearly absent <5% (1)

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel
◆ High (4)	◆ Excellent (7)	◆ None (6)	◆ High (3)	<div style="border: 1px solid black; padding: 5px; text-align: center;">10</div> Maximum 20
◆ 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

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

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		Riparian
L	R	L	R	L	R	Maximum
◆ None or little (3)	◆ Wide >50m (4)	◆ Forest, Swamp (3)	◆ Conservation Tillage (1)	◆ Urban or Industrial (0)	◆ Mining, construction (0)	<div style="border: 1px solid black; padding: 5px; text-align: center;">6</div> Maximum 10
◆ Moderate (2)	◆ Moderate 10-50m (3)	◆ Shrub or Old field (2)	◆ Urban or Industrial (0)	◆ Mining, construction (0)		
◆ Heavy/Severe (1)	◆ Narrow 5-10m (2)	◆ Residential, Park, New field (1)	◆ Urban or Industrial (0)	◆ 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

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◆ Primary Contact
◆ >1m (6)	◆ Pool width > riffle width (2)	◆ Torrential (-1)	◆ Secondary Contact
◆ 0.7-<1m (4)	◆ Pool width = riffle width (1)	◆ Very Fast (1)	(circle one and comment on back)
◆ 0.4-<0.7m (2)	◆ Pool width < riffle width (0)	◆ Fast (1)	
◆ 0.2-<0.4m (1)		◆ Moderate (1)	
◆ <0.2m (0) (metric=0)		◆ Slow (1)	
		◆ Interstitial (-1)	
		◆ Intermittent (-2)	
		◆ Eddies (1)	
		Indicate for reach – pools and riffles.	
			Pool/Current Maximum 12
			3

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run
◆ Best Areas >10cm (2)	◆ Maximum >50cm (2)	◆ Stable (e.g. cobble, boulder) (2)	◆ None (2)	<div style="border: 1px solid black; padding: 5px; text-align: center;">0</div> Maximum 8
◆ 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

6-GRADIENT			Gradient
(1.302 ft/mi)	◆ Very low – Low (2-4)	% POOL: 50	<div style="border: 1px solid black; padding: 5px; text-align: center;">4</div> Maximum 10
DRAINAGE AREA	◆ Moderate (6-10)	% RUN: 50	
(15.822 mi ²)	◆ High – Very high (10-6)	% RIFFLE: #	



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
Middle		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11728	130722305	Tributary of Duck Creek	10th Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	48

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)	10	x	x	◇ Limestone (1)	◇ SILT	Substrate 1 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	20	x	x	◇ Tills (1)	◇ Heavy (-2)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	5	x	x	◇ Wetlands (0)	◇ Moderate (-1)	
◇ ◇ Gravel (7)	15	x	x	◇ ◇ Silt (2)	40	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)	

NUMBER OF BEST TYPES:

- ◇ 4 or more (2)
- ◇ 3 or less (0)

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

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.

AMOUNT

Check ONE (or 2 & average)

	5	1		10	1		0	0		
Undercut banks (1)										◇ Extensive >75% (11)
Overhanging vegetation (1)	5	1		0	0		55	2		◇ Moderate 25-75% (7)
Shallows (in slow water) (1)	0	0		0	0		10	1		◇ Sparse 5-<25% (3)
Rootmats (1)	15	2								◇ Nearly absent <5% (1)

COMMENTS

Cover
Maximum
20

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	Channel Maximum 20
◇ 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

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)	Riparian Maximum 10
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)		
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Residential, Park, New field (1)	◇ ◇ Urban or Industrial (0)	◇ ◇ 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

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

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)	Riffle/Run Maximum 8
◇ 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

6-GRADIENT

DRAINAGE AREA	Very low - Low (2-4)	% POOL: 20	% GLIDE: #	Gradient
(9.376 ft/mi)	◇ Moderate (6-10)			Maximum
(3.091 mi ²)	◇ High - Very high (10-6)	% RUN: 80	% RIFFLE: #	10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
36 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11729	130722306	Duck Creek	750 W

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/22/13	Porter	MHAB	<input checked="" type="checkbox"/>	45

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)	10	x	x	◇ Limestone (1)	◇ SILT	Substrate 2 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	30	x	x	◇ Tills (1)	◇ Heavy (-2)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	5	x	x	◇ Wetlands (0)	◇ Moderate (-1)	
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	35	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)	

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

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

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.

AMOUNT

Check ONE (or 2 & average)

	0	0		0	0		0	0		
Undercut banks (1)	0	0	◇ ◇ Pools > 70cm (2)	0	0	◇ ◇ Oxbows, Backwaters (1)			◇ Extensive >75% (11)	Cover Maximum 20 9
Overhanging vegetation (1)	0	0	◇ ◇ Rootwads (1)	0	0	◇ ◇ Aquatic macrophytes (1)			◇ Moderate 25-75% (7)	
Shallows (in slow water) (1)	0	0	◇ ◇ Boulders (1)	90	1	◇ ◇ Logs and woody debris (1)			◇ Sparse 5-<25% (3)	
Rootmats (1)	10	1							◇ Nearly absent <5% (1)	

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	Channel Maximum 20 14
◇ 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

4- BANK EROSION & RIPARIAN ZONE

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

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)			Riparian Maximum 10 7
◇ ◇ 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)				

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

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

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)	Riffle/Run Maximum 8 0
◇ 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

6-GRADIENT

DRAINAGE AREA	Very low – Low (2-4)	% POOL: 80	% GLIDE: #	Gradient
(15.843 ft/mi)	◇ Moderate (6-10)			Maximum
(6.517 mi ²)	◇ High – Very high (10-6)	% RUN: 20	% RIFFLE: #	10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
3 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



Sample #	bioSample #	Stream Name	Location
AB11730	130722108	Deep River	Arizona Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	46

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ SILT Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	30	X	_____	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	15	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	40	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	15	x	_____	◇ ◇ Artificial (0)	_____	_____	_____	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ None (1)

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

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

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.

AMOUNT

Check ONE (or 2 & average)

	0	1		0	1		0	1
Undercut banks (1)	5	1	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)		
Overhanging vegetation (1)	5	1	Rootwads (1)	10	1	Aquatic macrophytes (1)		
Shallows (in slow water) (1)	0	0	Boulders (1)	60	1	Logs and woody debris (1)		
Rootmats (1)	10	1						

Cover

12

Maximum 20

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel

13

Maximum 20

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None <5m (1)				
	◇ ◇ None (0)				

Riparian

9

Maximum 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current

6

Maximum 12

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

0

Maximum 8

COMMENTS

6-GRADIENT

(1.48 ft/mi)	◇ Very low – Low (2-4)	% POOL: 40	% GLIDE: # \$	Gradient
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 60	% RIFFLE: # \$	
(78.790 mi ²)	◇ High – Very high (10-6)			

Gradient

4

Maximum 10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
14 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
49 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
34 Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11731	130722308	Sprout Ditch	70th Avenue

Surveyor	Sample Date	County	Macro Sample Type	◆ Habitat Complete	QHEI Score:
PDM	7/22/13	Lake	MHAB		57

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

BEST TYPES	OTHER TYPES	ORIGIN	QUALITY	Substrate <div style="border: 1px solid black; padding: 5px; text-align: center;">13</div> Maximum 20
TOTAL POOL RIFFLE	TOTAL POOL RIFFLE			
◆ ◇ Bidrs/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)	◆ ◇ Artificial (0)	◆ Sandstone (0)	◆ Free (1)	
◆ ◇ Bedrock (5)		◆ Rip/Rap (0)	EMBEDDEDNESS	
NUMBER OF BEST TYPES: ◆ 4 or more (2) ◆ 3 or less (0)	(Score natural substrates; ignore sludge from point-sources)	◆ Lacustrine (0)	◆ Extensive (-2)	
		◆ Shale (-1)	◆ Moderate (-1)	
		◆ Coal fines (-2)	◆ Normal (0)	
			◆ None (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. AMOUNT
Check ONE (or 2 & average)

30	2	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)
0	0	Shallows (in slow water) (1)	0	0	Boulders (1)	30	2	Logs and woody debris (1)
10	1	Rootmats (1)						

COMMENTS

Cover
Maximum
20

9

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel Maximum 20 <div style="border: 1px solid black; padding: 5px; text-align: center;">13</div>
◆ 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

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

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)	◆ ◇ Urban or Industrial (0)	◆ ◇ Mining, construction (0)
◆ ◇ Moderate (2)	◆ ◇ Moderate 10-50m (3)	◆ ◇ Shrub or Old field (2)	◆ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◆ ◇ Heavy/Severe (1)	◆ ◇ Narrow 5-10m (2)	◆ ◇ Fenced pasture (1)	◆ ◇ Open Pasture/Rowcrop (0)	Riparian Maximum 10 <div style="border: 1px solid black; padding: 5px; text-align: center;">8</div>	
	◆ ◇ None (0)				

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◆ Primary Contact
◆ >1m (6)	◆ Pool width > riffle width (2)	◆ Torrential (-1)	◆ Secondary Contact
◆ 0.7-<1m (4)	◆ Pool width = riffle width (1)	◆ Very Fast (1)	(circle one and comment on back)
◆ 0.4-<0.7m (2)	◆ Pool width < riffle width (0)	◆ Fast (1)	
◆ 0.2-<0.4m (1)		◆ Moderate (1)	
◆ <0.2m (0) (metric=0)		◆ Slow (1)	
COMMENTS		◆ Interstitial (-1)	
		◆ Intermittent (-2)	
		◆ Eddies (1)	
		Indicate for reach – pools and riffles.	Pool/Current Maximum 12 <div style="border: 1px solid black; padding: 5px; text-align: center;">4</div>

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	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run Maximum 8 <div style="border: 1px solid black; padding: 5px; text-align: center;">0</div>
◆ 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

6-GRADIENT			Gradient Maximum 10 <div style="border: 1px solid black; padding: 5px; text-align: center;">10</div>
(19.999 ft/mi)	◆ Very low – Low (2-4)	% POOL: 25	% GLIDE: #
DRAINAGE AREA	◆ Moderate (6-10)	% RUN: 75	% RIFFLE: #
(3.628 mi ²)	◆ High – Very high (10-6)		



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
6 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11732	130722309	Deep River	Joliet Road

Surveyor	Sample Date	County	Macro Sample Type	◆ Habitat Complete	QHEI Score:
PDM	7/22/13	Lake	MHAB		80

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate
	TOTAL	POOL	RIFFLE			
◆ ◇ Bidrs/Slabs (10)				◆ Limestone (1)	◆ SILT	17 <i>Maximum</i> 20
◆ ◇ Boulders (9)	5	x	x	◆ Tills (1)	◆ Heavy (-2)	
◆ ◇ Cobble (8)	20	x	x	◆ Wetlands (0)	◆ Moderate (-1)	
◆ ◇ Gravel (7)	30	x	x	◆ Hardpan (0)	◆ Normal (0)	
◆ ◇ Sand (6)	30	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)

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. AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	60	2	Pools > 70cm (2)	0	0	0	Oxbows, Backwaters (1)
Overhanging vegetation (1)	15	1	0	0	Rootwads (1)	0	0	0	Aquatic macrophytes (1)
Shallows (in slow water) (1)	0	0	5	1	Boulders (1)	20	2	0	Logs and woody debris (1)
Rootmats (1)	0	0							

COMMENTS

Cover
Maximum
20 12

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel
◆ High (4)	◆ Excellent (7)	◆ None (6)	◆ High (3)	17 <i>Maximum</i> 20
◆ 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

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

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)	◆ Urban or Industrial (0)	◆ Mining, construction (0)
◆ Moderate (2)	◆ Moderate 10-50m (3)	◆ Shrub or Old field (2)	◆ Residential, Park, New field (1)	<i>Indicate predominant land use(s) past 100m riparian.</i>	
◆ Heavy/Severe (1)	◆ Narrow 5-10m (2)	◆ Fenced pasture (1)	◆ Open Pasture/Rowcrop (0)	Riparian Maximum 10 9	
	◆ Very narrow <5m (1)				
	◆ None (0)				

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◆ Primary Contact
◆ >1m (6)	◆ Pool width > riffle width (2)	◆ Torrential (-1)	◆ Secondary Contact
◆ 0.7-<1m (4)	◆ Pool width = riffle width (1)	◆ Very Fast (1)	(circle one and comment on back)
◆ 0.4-<0.7m (2)	◆ Pool width < riffle width (0)	◆ Fast (1)	
◆ 0.2-<0.4m (1)		◆ Moderate (1)	
◆ <0.2m (0) (metric=0)		◆ Slow (1)	
		◆ Interstitial (-1)	
		◆ Intermittent (-2)	
		◆ Eddies (1)	
		Indicate for reach – pools and riffles.	
			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)

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run
◆ Best Areas >10cm (2)	◆ Maximum >50cm (2)	◆ Stable (e.g. cobble, boulder) (2)	◆ None (2)	6 <i>Maximum</i> 8
◆ 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

6-GRADIENT				Gradient
(7.987 ft/mi)	◆ Very low – Low (2-4)	% POOL: 40	% GLIDE: #	10 <i>Maximum</i> 10
DRAINAGE AREA	◆ Moderate (6-10)	% RUN: 45	% RIFFLE: 15	
(66.707 mi ²)	◆ High – Very high (10-6)			



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
43 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
41 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
22 Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11733	130723301	Tributary of Deep River	750 W

Surveyor	Sample Date	County	Macro Sample Type	◆ Habitat Complete	QHEI Score: 50
PDM	7/23/13	Porter	MHAB		

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE			
◆ ◇ Bidrs/Slabs (10)				◆ ◇ Hardpan (4)				◆ Limestone (1)	◆ SILT	Substrate 12 Maximum 20
◆ ◇ Boulders (9)				◆ ◇ Detritus (3)	10	x	x	◆ Tills (1)	◆ Heavy (-2)	
◆ ◇ Cobble (8)				◆ ◇ Muck (2)				◆ Wetlands (0)	◆ Moderate (-1)	
◆ ◇ Gravel (7)	10	x	x	◆ ◇ Silt (2)	5	x	x	◆ Hardpan (0)	◆ Normal (0)	
◆ ◇ Sand (6)	75	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

2-INSTREAM COVER

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

AMOUNT

Check ONE (or 2 & average)

	25	1		0	0		0	0		
Undercut banks (1)						Pools > 70cm (2)			Oxbows, Backwaters (1)	◆ Extensive >75% (11)
Overhanging vegetation (1)	0	0		0	0	Rootwads (1)	0	0	Aquatic macrophytes (1)	◆ Moderate 25-75% (7)
Shallows (in slow water) (1)	0	0		0	0	Boulders (1)	75	1	Logs and woody debris (1)	◆ Sparse 5-<25% (3)
Rootmats (1)	0	0								◆ 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)	Channel Maximum 20
◆ 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

4- BANK EROSION & RIPARIAN ZONE

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

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)	◆ Urban or Industrial (0)	◆ Mining, construction (0)
◆ Moderate (2)	◆ Moderate 10-50m (3)	◆ Shrub or Old field (2)	◆ Urban or Industrial (0)	◆ Mining, construction (0)	
◆ Heavy/Severe (1)	◆ Narrow 5-10m (2)	◆ Residential, Park, New field (1)	◆ Fenced pasture (1)	◆ Open Pasture/Rowcrop (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	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◆ Primary Contact
◆ >1m (6)	◆ Pool width > riffle width (2)	◆ Torrential (-1)	◆ Secondary Contact
◆ 0.7-<1m (4)	◆ Pool width = riffle width (1)	◆ Very Fast (1)	
◆ 0.4-<0.7m (2)	◆ Pool width < riffle width (0)	◆ Fast (1)	
◆ 0.2-<0.4m (1)		◆ Moderate (1)	
◆ <0.2m (0) (metric=0)		◆ Slow (1)	
		◆ Interstitial (-1)	
		◆ Intermittent (-2)	
		◆ Eddies (1)	

Indicate for reach – pools and riffles.

COMMENTS

Pool/Current
Maximum
12

3

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

Check ONE (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)	Riffle/Run Maximum 8
◆ 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

6-GRADIENT

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 20	% GLIDE: #	% RUN: 80	% RIFFLE: #	Gradient Maximum 10
(27.7 ft/mi) (2.912 mi ²)								10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
1 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11734	130723302	Tributary of Deep River	89th Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	52

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate
	TOTAL	POOL	RIFFLE			
<ul style="list-style-type: none"> ◇ ◇ Bidrs/Slabs (10) ◇ ◇ Boulders (9) ◇ ◇ Cobble (8) ◇ ◇ Gravel (7) ◇ ◇ Sand (6) ◇ ◇ Bedrock (5) 	<ul style="list-style-type: none"> ◇ ◇ Hardpan (4) ◇ ◇ Detritus (3) ◇ ◇ Muck (2) ◇ ◇ Silt (2) ◇ ◇ Artificial (0) 	<ul style="list-style-type: none"> ◇ Limestone (1) ◇ Tills (1) ◇ Wetlands (0) ◇ Hardpan (0) ◇ Sandstone (0) ◇ Rip/Rap (0) ◇ Lacustrine (0) ◇ Shale (-1) ◇ Coal fines (-2) 	<ul style="list-style-type: none"> ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) 	EMBEDDEDNESS <ul style="list-style-type: none"> ◇ Extensive (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ None (1) 	SILT <ul style="list-style-type: none"> ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) 	10 <i>Maximum</i> 20
NUMBER OF BEST TYPES: ◇ 4 or more (2) ◇ 3 or less (0)	(Score natural substrates; ignore sludge from point-sources)					

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).

				AMOUNT					
				Check ONE (or 2 & average)					
5	1	Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)	<ul style="list-style-type: none"> ◇ Extensive >75% (11) ◇ Moderate 25-75% (7) ◇ Sparse 5-<25% (3) ◇ Nearly absent <5% (1)
5	1	Overhanging vegetation (1)	0	0	Rootwads (1)	0	0	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)							

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel
<ul style="list-style-type: none"> ◇ High (4) ◇ Moderate (3) ◇ Low (2) ◇ None (1) 	<ul style="list-style-type: none"> ◇ Excellent (7) ◇ Good (5) ◇ Fair (3) ◇ Poor (1) 	<ul style="list-style-type: none"> ◇ None (6) ◇ Recovered (4) ◇ Recovering (3) ◇ Recent or no recovery (1) 	<ul style="list-style-type: none"> ◇ High (3) ◇ Moderate (2) ◇ Low (1) 	14 <i>Maximum</i> 20

COMMENTS

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

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY		Riparian
L	R	L	R	L	R	
<ul style="list-style-type: none"> ◇ ◇ None or little (3) ◇ ◇ Moderate (2) ◇ ◇ Heavy/Severe (1) 	<ul style="list-style-type: none"> ◇ ◇ Wide >50m (4) ◇ ◇ Moderate 10-50m (3) ◇ ◇ Narrow 5-10m (2) ◇ ◇ Very narrow <5m (1) ◇ ◇ None (0) 	<ul style="list-style-type: none"> ◇ ◇ Forest, Swamp (3) ◇ ◇ Shrub or Old field (2) ◇ ◇ Residential, Park, New field (1) ◇ ◇ Fenced pasture (1) ◇ ◇ Open Pasture/Rowcrop (0) 	<ul style="list-style-type: none"> ◇ ◇ Conservation Tillage (1) ◇ ◇ Urban or Industrial (0) ◇ ◇ Mining, construction (0) 	Indicate predominant land use(s) past 100m riparian.		8 <i>Maximum</i> 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!) <ul style="list-style-type: none"> ◇ >1m (6) ◇ 0.7-<1m (4) ◇ 0.4-<0.7m (2) ◇ 0.2-<0.4m (1) ◇ <0.2m (0) (metric=0) 	Check ONE (or 2 & average) <ul style="list-style-type: none"> ◇ Pool width > riffle width (2) ◇ Pool width = riffle width (1) ◇ Pool width < riffle width (0) 	Check ALL that apply <ul style="list-style-type: none"> ◇ Torrential (-1) ◇ Very Fast (1) ◇ Fast (1) ◇ Moderate (1) ◇ Slow (1) ◇ Interstitial (-1) ◇ Intermittent (-2) ◇ Eddies (1) Indicate for reach – pools and riffles.	4 <i>Pool/Current</i> <i>Maximum</i> 12

COMMENTS

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run
Check ONE (ONLY!) <ul style="list-style-type: none"> ◇ Best Areas >10cm (2) ◇ Best Areas 5-10cm (1) ◇ Best Areas <5cm (metric=0) 	Check ONE (or 2 & average) <ul style="list-style-type: none"> ◇ Maximum >50cm (2) ◇ Maximum <50cm (1) 	<ul style="list-style-type: none"> ◇ Stable (e.g. cobble, boulder) (2) ◇ Mod. Stable (e.g. large gravel) (1) ◇ Unstable (e.g. sand, fine gravel) (0) 	<ul style="list-style-type: none"> ◇ None (2) ◇ Low (1) ◇ Moderate (0) ◇ Extensive (-1) 	0 <i>Maximum</i> 8

COMMENTS

6-GRADIENT	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 20	% GLIDE: #	% RUN: 80	% RIFFLE: #	Gradient
(2.3493 ft/mi) DRAINAGE AREA (2.364 mi ²)	<ul style="list-style-type: none"> ◇ Very low – Low (2-4) ◇ Moderate (6-10) ◇ High – Very high (10-6) 							10 <i>Maximum</i> 10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
11 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11735	130723303	Tributary of Deep River	93rd Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	53

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)				◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	35	x	X	◇ ◇ Silt (2)	5	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	50	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ 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.

AMOUNT

Check ONE (or 2 & average)

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

Cover
Maximum 20
6

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
15

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None (0)				

Riparian
Maximum 10
5

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current
Maximum 12
4

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

(15.289 ft/mi)	◇ Very low – Low (2-4)	% POOL: 20	% GLIDE: # \$	Gradient Maximum 10 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 80	% RIFFLE: # \$	
(3.505 mi ²)	◇ High – Very high (10-6)			



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
9 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11736	130723305	Deep River	Clay Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	59

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ SILT
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	20	x	x	◇ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	5	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)	20	x	x	◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	45	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)

Substrate
11
Maximum 20

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

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

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.

AMOUNT

Check ONE (or 2 & average)

	5	1		30	1		0	0	
Undercut banks (1)									Oxbows, Backwaters (1)
Overhanging vegetation (1)	0	0		0	0		30	3	Aquatic macrophytes (1)
Shallows (in slow water) (1)	0	0		0	0		30	3	Logs and woody debris (1)
Rootmats (1)	5	1							

◇ Extensive >75% (11)
◇ Moderate 25-75% (7)
◇ Sparse 5-<25% (3)
◇ Nearly absent <5% (1)

Cover
Maximum 20
15

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
13

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None (0)				

Riparian
Maximum 10
7

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

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

(3.348 ft/mi)	◇ Very low – Low (2-4)	% POOL: 60	% GLIDE: # \$	Gradient Maximum 10 6
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 40	% RIFFLE: # \$	
(44.481 mi ²)	◇ High – Very high (10-6)			



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
49 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
85 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
83 Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11737	130723307	Deer Creek	97th Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	41

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

BEST TYPES	OTHER TYPES	ORIGIN	QUALITY
<ul style="list-style-type: none"> ◇ ◇ Bidrs/Slabs (10) ◇ ◇ Boulders (9) ◇ ◇ Cobble (8) ◇ ◇ Gravel (7) ◇ ◇ Sand (6) ◇ ◇ Bedrock (5) 	<ul style="list-style-type: none"> ◇ ◇ Hardpan (4) ◇ ◇ Detritus (3) ◇ ◇ Muck (2) ◇ ◇ Silt (2) ◇ ◇ Artificial (0) 	<ul style="list-style-type: none"> ◇ Limestone (1) ◇ Tills (1) ◇ Wetlands (0) ◇ Hardpan (0) ◇ Sandstone (0) ◇ Rip/Rap (0) ◇ Lacustrine (0) ◇ Shale (-1) ◇ Coal fines (-2) 	SILT ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) EMBEDDEDNESS ◇ Extensive (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ None (1)
TOTAL POOL RIFFLE	TOTAL POOL RIFFLE		
5 30	35 10 5 15	x x x x	
NUMBER OF BEST TYPES:	◇ 4 or more (2) ◇ 3 or less (0)	(Score natural substrates; ignore sludge from point-sources)	

Substrate
8
Maximum 20

COMMENTS

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

AMOUNT
Check ONE (or 2 & average) ◇ Extensive >75% (11) ◇ Moderate 25-75% (7) ◇ Sparse 5-<25% (3) ◇ Nearly absent <5% (1)
0 0 Undercut banks (1) 0 0 Pools > 70cm (2) 0 0 Oxbows, Backwaters (1) 40 1 Overhanging vegetation (1) 0 0 Rootwads (1) 10 2 Aquatic macrophytes (1) 0 0 Shallows (in slow water) (1) 0 0 Boulders (1) 40 2 Logs and woody debris (1) 10 1 Rootmats (1)

Cover
Maximum 20
5

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4) ◇ Moderate (3) ◇ Low (2) ◇ None (1)	◇ Excellent (7) ◇ Good (5) ◇ Fair (3) ◇ Poor (1)	◇ None (6) ◇ Recovered (4) ◇ Recovering (3) ◇ Recent or no recovery (1)	◇ High (3) ◇ Moderate (2) ◇ Low (1)

Channel
Maximum 20
12

COMMENTS

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

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R ◇ ◇ None or little (3) ◇ ◇ Moderate (2) ◇ ◇ Heavy/Severe (1)	L R ◇ ◇ Wide >50m (4) ◇ ◇ Moderate 10-50m (3) ◇ ◇ Narrow 5-10m (2) ◇ ◇ Very narrow <5m (1) ◇ ◇ None (0)	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.

Riparian
Maximum 10
6

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!) ◇ >1m (6) ◇ 0.7-<1m (4) ◇ 0.4-<0.7m (2) ◇ 0.2-<0.4m (1) ◇ <0.2m (0) (metric=0)	Check ONE (or 2 & average) ◇ Pool width > riffle width (2) ◇ Pool width = riffle width (1) ◇ Pool width < riffle width (0)	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.			◇ 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:

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
Check ONE (ONLY!) ◇ Best Areas >10cm (2) ◇ Best Areas 5-10cm (1) ◇ Best Areas <5cm (metric=0)	Check ONE (or 2 & average) ◇ Maximum >50cm (2) ◇ Maximum <50cm (1)	◇ Stable (e.g. cobble, boulder) (2) ◇ Mod. Stable (e.g. large gravel) (1) ◇ Unstable (e.g. sand, fine gravel) (0)	◇ None (2) ◇ Low (1) ◇ Moderate (0) ◇ Extensive (-1)

Riffle/Run
Maximum 8
0

COMMENTS

6-GRADIENT	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 30	% GLIDE: #	% RUN: 70	% RIFFLE: #	Gradient
(9.535 ft/mi) DRAINAGE AREA (5.883 mi ²)								Maximum 10 6



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
50 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11738	130723308	Niles Ditch	Colorado Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	34

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

BEST TYPES	OTHER TYPES	ORIGIN	QUALITY
<ul style="list-style-type: none"> ◇ ◇ Bidrs/Slabs (10) ◇ ◇ Boulders (9) ◇ ◇ Cobble (8) ◇ ◇ Gravel (7) ◇ ◇ Sand (6) ◇ ◇ Bedrock (5) 	<ul style="list-style-type: none"> ◇ ◇ Hardpan (4) ◇ ◇ Detritus (3) ◇ ◇ Muck (2) ◇ ◇ Silt (2) ◇ ◇ Artificial (0) 	<ul style="list-style-type: none"> ◇ Limestone (1) ◇ Tills (1) ◇ Wetlands (0) ◇ Hardpan (0) ◇ Sandstone (0) ◇ Rip/Rap (0) ◇ Lacustrine (0) ◇ Shale (-1) ◇ Coal fines (-2) 	<ul style="list-style-type: none"> SILT ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) EMBEDDEDNESS ◇ Extensive (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ None (1)
TOTAL POOL RIFFLE	TOTAL POOL RIFFLE		
5 5 10 50 5	x x x x x		
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). Check ONE (or 2 & average)

AMOUNT
<ul style="list-style-type: none"> ◇ Extensive >75% (11) ◇ Moderate 25-75% (7) ◇ Sparse 5-<25% (3) ◇ Nearly absent <5% (1)

AMOUNT
<ul style="list-style-type: none"> 5 1 Undercut banks (1) 0 0 Overhanging vegetation (1) 0 0 Shallows (in slow water) (1) 5 1 Rootmats (1)

Cover
Maximum 20
11

3-CHANNEL MORPHOLOGY

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<ul style="list-style-type: none"> ◇ High (4) ◇ Moderate (3) ◇ Low (2) ◇ None (1) 	<ul style="list-style-type: none"> ◇ Excellent (7) ◇ Good (5) ◇ Fair (3) ◇ Poor (1) 	<ul style="list-style-type: none"> ◇ None (6) ◇ Recovered (4) ◇ Recovering (3) ◇ Recent or no recovery (1) 	<ul style="list-style-type: none"> ◇ High (3) ◇ Moderate (2) ◇ Low (1)

Channel
Maximum 20
8

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
<ul style="list-style-type: none"> ◇ None or little (3) ◇ Moderate (2) ◇ Heavy/Severe (1) 	<ul style="list-style-type: none"> ◇ Wide >50m (4) ◇ Moderate 10-50m (3) ◇ Narrow 5-10m (2) ◇ Very narrow <5m (1) ◇ None (0) 	<ul style="list-style-type: none"> ◇ Forest, Swamp (3) ◇ Shrub or Old field (2) ◇ Residential, Park, New field (1) ◇ Fenced pasture (1) ◇ Open Pasture/Rowcrop (0)

Indicate predominant land use(s) past 100m riparian.
Riparian
Maximum 10
4

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
<ul style="list-style-type: none"> ◇ >1m (6) ◇ 0.7-<1m (4) ◇ 0.4-<0.7m (2) ◇ 0.2-<0.4m (1) ◇ <0.2m (0) (metric=0) 	<ul style="list-style-type: none"> ◇ Pool width > riffle width (2) ◇ Pool width = riffle width (1) ◇ Pool width < riffle width (0) 	<ul style="list-style-type: none"> ◇ Torrential (-1) ◇ Very Fast (1) ◇ Fast (1) ◇ Moderate (1) 	<ul style="list-style-type: none"> ◇ Slow (1) ◇ Interstitial (-1) ◇ Intermittent (-2) ◇ Eddies (1)

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!) Check ONE (or 2 & average) ◇ No Riffle (metric=0)

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
<ul style="list-style-type: none"> ◇ Best Areas >10cm (2) ◇ Best Areas 5-10cm (1) ◇ Best Areas <5cm (metric=0) 	<ul style="list-style-type: none"> ◇ Maximum >50cm (2) ◇ Maximum <50cm (1) 	<ul style="list-style-type: none"> ◇ Stable (e.g. cobble, boulder) (2) ◇ Mod. Stable (e.g. large gravel) (1) ◇ Unstable (e.g. sand, fine gravel) (0) 	<ul style="list-style-type: none"> ◇ None (2) ◇ Low (1) ◇ Moderate (0) ◇ Extensive (-1)

Riffle/Run
Maximum 8
0

COMMENTS

6-GRADIENT	Very low - Low (2-4)	Moderate (6-10)	High - Very high (10-6)	% POOL: 80	% GLIDE: #	% RUN: 20	% RIFFLE: #	Gradient
(1.36 ft/mi) DRAINAGE AREA (10.029 mi ²)								Maximum 10

4



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
86 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11739	130723309	Niles Ditch	121st Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
PDM	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	27

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/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)

Substrate

0

Maximum 20

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

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

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.

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	0	0	Pools > 70cm (2)	0	0	0	0
Overhanging vegetation (1)	0	0	0	0	Rootwads (1)	80	2	0	0
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	20	1	0	0
Rootmats (1)	0	0	0	0	Oxbows, Backwaters (1)	0	0	0	0
					Aquatic macrophytes (1)	0	0	0	0
					Logs and woody debris (1)	0	0	0	0

◇ Extensive >75% (11)
◇ Moderate 25-75% (7)
◇ Sparse 5-<25% (3)
◇ Nearly absent <5% (1)

Cover

9

Maximum 20

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	Channel Maximum 20 <div style="border: 1px solid black; width: 40px; height: 40px; text-align: center; margin: 0 auto;">6</div>
◇ 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

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ Urban or Industrial (0)	◇ Mining, construction (0)
◇ Moderate (2)	◇ Moderate 10-50m (3)	◇ Shrub or Old field (2)	◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ Heavy/Severe (1)	◇ Narrow 5-10m (2)	◇ Fenced pasture (1)	◇ Open Pasture/Rowcrop (0)		
	◇ Very narrow <5m (1)				
	◇ None (0)				

Riparian

4

Maximum 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Pool/Current

4

Maximum 12

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)	Riffle/Run Maximum 8 <div style="border: 1px solid black; width: 40px; height: 40px; text-align: center; margin: 0 auto;">0</div>
◇ 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

6-GRADIENT

DRAINAGE AREA	Very low - Low (2-4)	Moderate (6-10)	High - Very high (10-6)	% POOL: #	% GLIDE: 100	% RUN: #	% RIFFLE: #	Gradient
(1.36 ft/mi) (7.238 mi ²)								Maximum 10

Gradient

4



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
65 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11740	130722401	Smith Ditch	113th Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	24

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	_____	_____	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	15	x	_____	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	80	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	5	_____	x	◇ ◇ Artificial (0)	_____	_____	_____	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____		_____	_____	_____	◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ None (1)

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

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

Substrate

0

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.

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	0	0	Pools > 70cm (2)	0	0	0	0
Overhanging vegetation (1)	80	1	0	0	Rootwads (1)	20	1	0	0
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	0	0	0	0
Rootmats (1)	0	0	0	0	Oxbows, Backwaters (1)	0	0	0	0
					Aquatic macrophytes (1)	0	0	0	0
					Logs and woody debris (1)	0	0	0	0

Cover

5

Maximum 20

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel

5

Maximum 20

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None <5m (1)				
	◇ ◇ None (0)				

Riparian

5

Maximum 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current

3

Maximum 12

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

0

Maximum 8

COMMENTS

6-GRADIENT

(9.559 ft/mi)	◇ Very low – Low (2-4)	% POOL: # \$	% GLIDE: 100	Gradient
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: # \$	% RIFFLE: # \$	
(2.962 mi ²)	◇ High – Very high (10-6)			

Gradient

6

Maximum 10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
96 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11741	130722402	Main Beaver Dam Ditch	Grant Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	52

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x		◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	15		x	◇ ◇ Muck (2)				◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	5	x		◇ ◇ Silt (2)	25	x		◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	45	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	◇ Extensive (-2)
NUMBER OF BEST TYPES:	◇ 4 or more (2)							◇ Lacustrine (0)	◇ Moderate (-1)
	◇ 3 or less (0)							◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ None (1)

(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.

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	30	1	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)	◇ Extensive >75% (11)
Overhanging vegetation (1)	0	0	0	0	Rootwads (1)	30	1	Aquatic macrophytes (1)	◇ Moderate 25-75% (7)
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	40	1	Logs and woody debris (1)	◇ Sparse 5-<25% (3)
Rootmats (1)	0	0							◇ Nearly absent <5% (1)

Cover
Maximum 20
7

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	Channel Maximum 20 10
◇ 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

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)	Riparian Maximum 10 5	
	◇ ◇ None (0)				

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

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

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)	Riffle/Run Maximum 8 6
◇ 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

6-GRADIENT

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 20	% GLIDE: #	% RUN: 70	% RIFFLE: 10	Gradient
(2.607 ft/mi)								Maximum 10 4
(19.073 mi ²)								



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
38 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11742	130722404	Tributary of Main Beaver Dam Ditch	Summit Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	22

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ Heavy (-2)	Substrate <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">1</div> Maximum 20
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	5	_____	x	◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	70	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Free (1)	
◇ ◇ Sand (6)	_____	_____	_____	◇ ◇ Artificial (0)	5	x	x	◇ Sandstone (0)	EMBEDDEDNESS	
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	◇ Extensive (-2)	
NUMBER OF BEST TYPES:								◇ Lacustrine (0)	◇ Moderate (-1)	
	◇ 4 or more (2)							◇ Shale (-1)	◇ Normal (0)	
	◇ 3 or less (0)							◇ Coal fines (-2)	◇ None (1)	

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

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.

AMOUNT

Check ONE (or 2 & average)

	0	0		0	0		0	0	
Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)			◇ Extensive >75% (11)
Overhanging vegetation (1)	0	0	Rootwads (1)	0	0	Aquatic macrophytes (1)			◇ Moderate 25-75% (7)
Shallows (in slow water) (1)	0	0	Boulders (1)	100	1	Logs and woody debris (1)			◇ Sparse 5-<25% (3)
Rootmats (1)	0	0							◇ Nearly absent <5% (1)

COMMENTS

Cover
Maximum
20

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	Channel Maximum 20
◇ 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

4- BANK EROSION & RIPARIAN ZONE

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

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)	Indicate predominant land use(s) past 100m riparian.		
	◇ ◇ None (0)	◇ ◇ Open Pasture/Rowcrop (0)			

COMMENTS

Riparian
Maximum
10

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Slow (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Very Fast (1)	
◇ 0.2-<0.4m (1)		◇ Fast (1)	
◇ <0.2m (0) (metric=0)		◇ Moderate (1)	
COMMENTS		Indicate for reach – pools and riffles.	

Pool/Current
Maximum
12

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)	Riffle/Run Maximum 8
◇ 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

6-GRADIENT

DRAINAGE AREA	Very low – Low (2-4)	% POOL: #	% GLIDE: 100	Gradient
(4.037 ft/mi)	◇ Moderate (6-10)			Maximum
(2.793 mi ²)	◇ High – Very high (10-6)	% RUN: #	% RIFFLE: #	10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
25 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11743	130723109	Main Beaver Dam Ditch	Clark Road

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	24

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	_____	_____	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	_____	X	X	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	_____	X	_____	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	_____	_____	_____	◇ ◇ Artificial (0)	_____	_____	_____	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	◇ Extensive (-2)
NUMBER OF BEST TYPES:								◇ Lacustrine (0)	◇ Moderate (-1)
	◇ 4 or more (2)							◇ Shale (-1)	◇ Normal (0)
	◇ 3 or less (0)							◇ Coal fines (-2)	◇ None (1)

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

Substrate

0

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.

AMOUNT

Check ONE (or 2 & average)

	0	0		0	0		0	0	
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)	20	1	Logs and woody debris (1)	0	0	
Rootmats (1)	0	0							

- ◇ Extensive >75% (11)
- ◇ Moderate 25-75% (7)
- ◇ Sparse 5-<25% (3)
- ◇ Nearly absent <5% (1)

Cover

5

Maximum 20

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)	
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)	
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)		

Channel

7

Maximum 20

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ Very narrow <5m (1)				
	◇ ◇ None (0)				

Riparian

4

Maximum 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current

4

Maximum 12

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

0

Maximum 8

COMMENTS

6-GRADIENT

DRAINAGE AREA	Very low – Low (2-4)	% POOL: #	% GLIDE: 100	Gradient
(2.892 ft/mi)	◇ Moderate (6-10)			Maximum 10
(9.860 mi ²)	◇ High – Very high (10-6)	% RUN: #	% RIFFLE: #	

Gradient

4



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
92 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11744	130723107	Tributary of Main Beaver Dam Ditch	101st Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	27

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	_____	_____	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	80	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	20	x	_____	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	_____	_____	_____	◇ ◇ Artificial (0)	_____	_____	_____	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ None (1)

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

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

Substrate

0

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.

AMOUNT

Check ONE (or 2 & average)

	0	0		0	0		
Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)	◇ Extensive >75% (11)
Overhanging vegetation (1)	0	0	Rootwads (1)	30	1	Aquatic macrophytes (1)	◇ Moderate 25-75% (7)
Shallows (in slow water) (1)	0	0	Boulders (1)	0	0	Logs and woody debris (1)	◇ Sparse 5-<25% (3)
Rootmats (1)	0	0					◇ Nearly absent <5% (1)

Cover

6

Maximum 20

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY		
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	Channel Maximum 20 <table border="1"> <tr><td>7</td></tr> </table>	7
7					
◇ 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

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Residential, Park, New field (1)	◇ ◇ Fenced pasture (1)	Indicate predominant land use(s) past 100m riparian.	
	◇ ◇ Very narrow <5m (1)	◇ ◇ Open Pasture/Rowcrop (0)			
	◇ ◇ None (0)				

Riparian

6

Maximum 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current

4

Maximum 12

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)	Riffle/Run Maximum 8 <table border="1"> <tr><td>0</td></tr> </table>	0
0					
◇ 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

6-GRADIENT

DRAINAGE AREA	Gradient	% POOL: #	% GLIDE: 100	Gradient
(2.593 ft/mi)	◇ Very low – Low (2-4)			Maximum 10
(1.536 mi ²)	◇ Moderate (6-10)			4
	◇ High – Very high (10-6)	% RUN: #	% RIFFLE: #	



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
74 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11745	130723105	Main Beaver Dam Ditch	Blaine Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	25

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	_____	_____	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	80	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	20	x	_____	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	_____	_____	_____	◇ ◇ Artificial (0)	_____	_____	_____	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	◇ Extensive (-2)
NUMBER OF BEST TYPES:								◇ Lacustrine (0)	◇ Moderate (-1)
	◇ 4 or more (2)							◇ Shale (-1)	◇ Normal (0)
	◇ 3 or less (0)							◇ Coal fines (-2)	◇ None (1)

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

Substrate

0

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.

AMOUNT

Check ONE (or 2 & average)

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

Cover

5

Maximum 20

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel

7

Maximum 20

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◇ None or little (3)	◇ Moderate (2)	◇ Wide >50m (4)	◇ Moderate 10-50m (3)	◇ Forest, Swamp (3)	◇ Shrub or Old field (2)
◇ Heavy/Severe (1)		◇ Narrow 5-10m (2)	◇ Very narrow <5m (1)	◇ Residential, Park, New field (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

5

Maximum 10

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current

4

Maximum 12

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

0

Maximum 8

COMMENTS

6-GRADIENT

(2.899 ft/mi)	◇ Very low – Low (2-4)	% POOL: #	% GLIDE: 100	Gradient
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: #	% RIFFLE: #	
(2.347 mi ²)	◇ High – Very high (10-6)			

Gradient

4

Maximum 10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
98 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11747	130724410	Turkey Creek	Broad Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	42

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	5	x	x	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)				◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	60	x	x	◇ ◇ Silt (2)	5	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	30	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ None (1)

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

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

Substrate
10
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.

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	0	0	Pools > 70cm (2)	0	0	0	0
Overhanging vegetation (1)	20	1	40	2	Rootwads (1)	10	1	10	1
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	30	2	30	2
Rootmats (1)	0	0	0	0	Oxbows, Backwaters (1)				
					Aquatic macrophytes (1)				
					Logs and woody debris (1)				

Cover
Maximum 20
7

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
8

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None (0)				

Riparian
Maximum 10
8

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

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!)

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

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: #	% GLIDE: #	% RUN: 100	% RIFFLE: #	Gradient
(6.888 ft/mi)								Maximum 10
(5.543 mi ²)								6



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
100 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11748	130723408	Johnson Ditch	Oak Ridge Prairie County Park

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	35

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

BEST TYPES	OTHER TYPES	ORIGIN	QUALITY
TOTAL POOL RIFFLE	TOTAL POOL RIFFLE		
<ul style="list-style-type: none"> ◇ ◇ Bidrs/Slabs (10) ◇ ◇ Boulders (9) ◇ ◇ Cobble (8) ◇ ◇ Gravel (7) ◇ ◇ Sand (6) ◇ ◇ Bedrock (5) 	<ul style="list-style-type: none"> ◇ ◇ Hardpan (4) ◇ ◇ Detritus (3) ◇ ◇ Muck (2) ◇ ◇ Silt (2) ◇ ◇ Artificial (0) 	<ul style="list-style-type: none"> ◇ Limestone (1) ◇ Tills (1) ◇ Wetlands (0) ◇ Hardpan (0) ◇ Sandstone (0) ◇ Rip/Rap (0) ◇ Lacustrine (0) ◇ Shale (-1) ◇ Coal fines (-2) 	SILT ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) EMBEDDEDNESS ◇ Extensive (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ None (1)
NUMBER OF BEST TYPES: <ul style="list-style-type: none"> ◇ 4 or more (2) ◇ 3 or less (0) 	(Score natural substrates; ignore sludge from point-sources)		Substrate <div style="border: 1px solid black; width: 40px; height: 40px; text-align: center; margin: 0 auto;">5</div> 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). Check ONE (or 2 & average)

	AMOUNT
0 0 Undercut banks (1) 20 1 Pools > 70cm (2) 0 0 Oxbows, Backwaters (1)	◇ Extensive >75% (11)
0 0 Overhanging vegetation (1) 0 0 Rootwads (1) 50 1 Aquatic macrophytes (1)	◇ Moderate 25-75% (7)
0 0 Shallows (in slow water) (1) 0 0 Boulders (1) 30 1 Logs and woody debris (1)	◇ Sparse 5-<25% (3)
0 0 Rootmats (1)	◇ Nearly absent <5% (1)

COMMENTS

Cover
Maximum 20

7

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<ul style="list-style-type: none"> ◇ High (4) ◇ Moderate (3) ◇ Low (2) ◇ None (1) 	<ul style="list-style-type: none"> ◇ Excellent (7) ◇ Good (5) ◇ Fair (3) ◇ Poor (1) 	<ul style="list-style-type: none"> ◇ None (6) ◇ Recovered (4) ◇ Recovering (3) ◇ Recent or no recovery (1) 	<ul style="list-style-type: none"> ◇ High (3) ◇ Moderate (2) ◇ Low (1)

COMMENTS

Channel
Maximum 20

8

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

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R	L R	L R
<ul style="list-style-type: none"> ◇ ◇ None or little (3) ◇ ◇ Moderate (2) ◇ ◇ Heavy/Severe (1) 	<ul style="list-style-type: none"> ◇ ◇ Wide >50m (4) ◇ ◇ Moderate 10-50m (3) ◇ ◇ Narrow 5-10m (2) ◇ ◇ Very narrow <5m (1) ◇ ◇ None (0) 	<ul style="list-style-type: none"> ◇ ◇ Forest, Swamp (3) ◇ ◇ Shrub or Old field (2) ◇ ◇ Residential, Park, New field (1) ◇ ◇ Fenced pasture (1) ◇ ◇ Open Pasture/Rowcrop (0)

COMMENTS

Indicate predominant land use(s) past 100m riparian.
Riparian
Maximum 10

7

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!) ◇ >1m (6) ◇ 0.7-<1m (4) ◇ 0.4-<0.7m (2) ◇ 0.2-<0.4m (1) ◇ <0.2m (0) (metric=0)	Check ONE (or 2 & average) ◇ Pool width > riffle width (2) ◇ Pool width = riffle width (1) ◇ Pool width < riffle width (0)	Check ALL that apply ◇ Torrential (-1) ◇ Very Fast (1) ◇ Fast (1) ◇ Moderate (1)	Check ONE (or 2 & average) ◇ Slow (1) ◇ Interstitial (-1) ◇ Intermittent (-2) ◇ Eddies (1)

COMMENTS

Indicate for reach – pools and riffles.
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!)

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
<ul style="list-style-type: none"> ◇ Best Areas >10cm (2) ◇ Best Areas 5-10cm (1) ◇ Best Areas <5cm (metric=0) 	<ul style="list-style-type: none"> ◇ Maximum >50cm (2) ◇ Maximum <50cm (1) 	<ul style="list-style-type: none"> ◇ Stable (e.g. cobble, boulder) (2) ◇ Mod. Stable (e.g. large gravel) (1) ◇ Unstable (e.g. sand, fine gravel) (0) 	<ul style="list-style-type: none"> ◇ None (2) ◇ Low (1) ◇ Moderate (0) ◇ Extensive (-1)

COMMENTS

Check ONE (or 2 & average) **No Riffle (metric=0)**
Riffle/Run
Maximum 8

0

6-GRADIENT (3.986 ft/mi) ◇ Very low – Low (2-4) % POOL: # % GLIDE: 100 **Gradient**

DRAINAGE AREA			
(2.131 mi ²)	◇ Moderate (6-10)	% RUN: #	% RIFFLE: #
	◇ High – Very high (10-6)		

Maximum 10

4



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
31.2 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11749	130723407	Tributary of Turkey Creek	W Old Lincoln Hwy
Surveyor	Sample Date	County	Macro Sample Type
TED	7/23/13	Lake	MHAB
◆ Habitat Complete			QHEI Score: 42

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate
	TOTAL	POOL	RIFFLE			
◆ ◇ Bidrs/Slabs (10)	_____	_____	_____	◆ ◇ Hardpan (4)	_____	<div style="border: 1px solid black; padding: 5px; text-align: center;">11</div> Maximum 20
◆ ◇ Boulders (9)	_____	_____	_____	◆ ◇ Detritus (3)	_____	
◆ ◇ Cobble (8)	_____	_____	_____	◆ ◇ Muck (2)	_____	
◆ ◇ Gravel (7)	60	x	x	◆ ◇ Silt (2)	5	
◆ ◇ Sand (6)	30	x	x	◆ ◇ Artificial (0)	5	
◆ ◇ Bedrock (5)	_____	_____	_____	◆ ◇ Limestone (1)	_____	
				◆ ◇ Tills (1)	_____	
NUMBER OF BEST TYPES:	◆ 4 or more (2)			◆ 3 or less (0)		

COMMENTS

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

		AMOUNT	
		Check ONE (or 2 & average)	
0	0	Undercut banks (1)	0
0	0	Overhanging vegetation (1)	10
80	2	Shallows (in slow water) (1)	0
0	0	Rootmats (1)	0
0	0	Pools > 70cm (2)	0
0	0	Rootwads (1)	0
10	1	Boulders (1)	10
0	0	Oxbows, Backwaters (1)	0
0	0	Aquatic macrophytes (1)	0
0	1	Logs and woody debris (1)	1

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel
◆ High (4)	◆ Excellent (7)	◆ None (6)	◆ High (3)	<div style="border: 1px solid black; padding: 5px; text-align: center;">8</div> Maximum 20
◆ 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

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

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)	◆ Urban or Industrial (0)	◆ Mining, construction (0)
◆ Moderate (2)	◆ Moderate 10-50m (3)	◆ Shrub or Old field (2)	◆ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◆ Heavy/Severe (1)	◆ Narrow 5-10m (2)	◆ Fenced pasture (1)	◆ Open Pasture/Rowcrop (0)	Riparian Maximum 10	
	◆ Very narrow <5m (1)			8	
	◆ None (0)			6	

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◆ Primary Contact
◆ >1m (6)	◆ Pool width > riffle width (2)	◆ Torrential (-1)	◆ Secondary Contact
◆ 0.7-<1m (4)	◆ Pool width = riffle width (1)	◆ Very Fast (1)	(circle one and comment on back)
◆ 0.4-<0.7m (2)	◆ Pool width < riffle width (0)	◆ Fast (1)	
◆ 0.2-<0.4m (1)		◆ Moderate (1)	
◆ <0.2m (0) (metric=0)		◆ Slow (1)	
		◆ Interstitial (-1)	
		◆ Intermittent (-2)	
		◆ Eddies (1)	
		Indicate for reach – pools and riffles.	
			Pool/Current Maximum 12
			3

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS	Riffle/Run
◆ Best Areas >10cm (2)	◆ Maximum >50cm (2)	◆ Stable (e.g. cobble, boulder) (2)	◆ None (2)	<div style="border: 1px solid black; padding: 5px; text-align: center;">0</div> Maximum 8
◆ 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

6-GRADIENT			Gradient
(14.199 ft/mi)	◆ Very low – Low (2-4)	% POOL: 5	<div style="border: 1px solid black; padding: 5px; text-align: center;">8</div> Maximum 10
DRAINAGE AREA	◆ Moderate (6-10)	% RUN: 95	
(2.642 mi ²)	◆ High – Very high (10-6)	% RIFFLE: #	



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
100 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11750	130723403	Turkey Creek	SR 55

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	41

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

BEST TYPES	OTHER TYPES	ORIGIN	QUALITY
TOTAL POOL RIFFLE	TOTAL POOL RIFFLE		
<ul style="list-style-type: none"> ◇ ◇ Bidrs/Slabs (10) ◇ ◇ Boulders (9) ◇ ◇ Cobble (8) ◇ ◇ Gravel (7) ◇ ◇ Sand (6) ◇ ◇ Bedrock (5) 	<ul style="list-style-type: none"> ◇ ◇ Hardpan (4) ◇ ◇ Detritus (3) ◇ ◇ Muck (2) ◇ ◇ Silt (2) ◇ ◇ Artificial (0) 	<ul style="list-style-type: none"> ◇ Limestone (1) ◇ Tills (1) ◇ Wetlands (0) ◇ Hardpan (0) ◇ Sandstone (0) ◇ Rip/Rap (0) ◇ Lacustrine (0) ◇ Shale (-1) ◇ Coal fines (-2) 	SILT ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) EMBEDDEDNESS ◇ Extensive (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ None (1)
NUMBER OF BEST TYPES: <ul style="list-style-type: none"> ◇ 4 or more (2) ◇ 3 or less (0) 	(Score natural substrates; ignore sludge from point-sources)		Substrate <div style="border: 1px solid black; width: 40px; height: 40px; text-align: center; margin: 0 auto;">5</div> 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). Check ONE (or 2 & average)

AMOUNT
Check ONE (or 2 & average) ◇ Extensive >75% (11) ◇ Moderate 25-75% (7) ◇ Sparse 5-<25% (3) ◇ Nearly absent <5% (1)

<table border="1"> <tr> <th>10</th> <th>2</th> <th>Undercut banks (1)</th> <th>10</th> <th>2</th> <th>Pools > 70cm (2)</th> <th>0</th> <th>0</th> <th>Oxbows, Backwaters (1)</th> </tr> <tr> <td>35</td> <td>1</td> <td>Overhanging vegetation (1)</td> <td>10</td> <td>1</td> <td>Rootwads (1)</td> <td>30</td> <td>2</td> <td>Aquatic macrophytes (1)</td> </tr> <tr> <td>0</td> <td>0</td> <td>Shallows (in slow water) (1)</td> <td>0</td> <td>0</td> <td>Boulders (1)</td> <td>5</td> <td>1</td> <td>Logs and woody debris (1)</td> </tr> <tr> <td>0</td> <td>0</td> <td>Rootmats (1)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>	10	2	Undercut banks (1)	10	2	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)	35	1	Overhanging vegetation (1)	10	1	Rootwads (1)	30	2	Aquatic macrophytes (1)	0	0	Shallows (in slow water) (1)	0	0	Boulders (1)	5	1	Logs and woody debris (1)	0	0	Rootmats (1)							Cover Maximum 20 <div style="border: 1px solid black; width: 40px; height: 40px; text-align: center;">12</div>
10	2	Undercut banks (1)	10	2	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)																													
35	1	Overhanging vegetation (1)	10	1	Rootwads (1)	30	2	Aquatic macrophytes (1)																													
0	0	Shallows (in slow water) (1)	0	0	Boulders (1)	5	1	Logs and woody debris (1)																													
0	0	Rootmats (1)																																			

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<ul style="list-style-type: none"> ◇ High (4) ◇ Moderate (3) ◇ Low (2) ◇ None (1) 	<ul style="list-style-type: none"> ◇ Excellent (7) ◇ Good (5) ◇ Fair (3) ◇ Poor (1) 	<ul style="list-style-type: none"> ◇ None (6) ◇ Recovered (4) ◇ Recovering (3) ◇ Recent or no recovery (1) 	<ul style="list-style-type: none"> ◇ 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)

EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY							
<table border="1"> <tr> <th>L</th> <th>R</th> </tr> <tr> <td> <ul style="list-style-type: none"> ◇ ◇ None or little (3) ◇ ◇ Moderate (2) ◇ ◇ Heavy/Severe (1) </td> <td> <ul style="list-style-type: none"> ◇ ◇ Wide >50m (4) ◇ ◇ Moderate 10-50m (3) ◇ ◇ Narrow 5-10m (2) ◇ ◇ Very narrow <5m (1) ◇ ◇ None (0) </td> </tr> </table>	L	R	<ul style="list-style-type: none"> ◇ ◇ None or little (3) ◇ ◇ Moderate (2) ◇ ◇ Heavy/Severe (1) 	<ul style="list-style-type: none"> ◇ ◇ Wide >50m (4) ◇ ◇ Moderate 10-50m (3) ◇ ◇ Narrow 5-10m (2) ◇ ◇ Very narrow <5m (1) ◇ ◇ None (0) 	<table border="1"> <tr> <th>L</th> <th>R</th> </tr> <tr> <td> <ul style="list-style-type: none"> ◇ ◇ Forest, Swamp (3) ◇ ◇ Shrub or Old field (2) ◇ ◇ Residential, Park, New field (1) ◇ ◇ Fenced pasture (1) ◇ ◇ Open Pasture/Rowcrop (0) </td> <td> <ul style="list-style-type: none"> ◇ ◇ Conservation Tillage (1) ◇ ◇ Urban or Industrial (0) ◇ ◇ Mining, construction (0) </td> </tr> </table>	L	R	<ul style="list-style-type: none"> ◇ ◇ Forest, Swamp (3) ◇ ◇ Shrub or Old field (2) ◇ ◇ Residential, Park, New field (1) ◇ ◇ Fenced pasture (1) ◇ ◇ Open Pasture/Rowcrop (0) 	<ul style="list-style-type: none"> ◇ ◇ Conservation Tillage (1) ◇ ◇ Urban or Industrial (0) ◇ ◇ Mining, construction (0)
L	R								
<ul style="list-style-type: none"> ◇ ◇ None or little (3) ◇ ◇ Moderate (2) ◇ ◇ Heavy/Severe (1) 	<ul style="list-style-type: none"> ◇ ◇ Wide >50m (4) ◇ ◇ Moderate 10-50m (3) ◇ ◇ Narrow 5-10m (2) ◇ ◇ Very narrow <5m (1) ◇ ◇ None (0) 								
L	R								
<ul style="list-style-type: none"> ◇ ◇ Forest, Swamp (3) ◇ ◇ Shrub or Old field (2) ◇ ◇ Residential, Park, New field (1) ◇ ◇ Fenced pasture (1) ◇ ◇ Open Pasture/Rowcrop (0) 	<ul style="list-style-type: none"> ◇ ◇ Conservation Tillage (1) ◇ ◇ Urban or Industrial (0) ◇ ◇ Mining, construction (0) 								

COMMENTS

Riparian
 Maximum 10

6

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!) ◇ >1m (6) ◇ 0.7-<1m (4) ◇ 0.4-<0.7m (2) ◇ 0.2-<0.4m (1) ◇ <0.2m (0) (metric=0)	Check ONE (or 2 & average) ◇ Pool width > riffle width (2) ◇ Pool width = riffle width (1) ◇ Pool width < riffle width (0)	Check ALL that apply ◇ Torrential (-1) ◇ Very Fast (1) ◇ Fast (1) ◇ Moderate (1)	Check ONE (or 2 & average) ◇ Slow (1) ◇ Interstitial (-1) ◇ Intermittent (-2) ◇ Eddies (1)

COMMENTS

Pool/Current
 Maximum 12

8

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
Check ONE (or 2 & average) ◇ Best Areas >10cm (2) ◇ Best Areas 5-10cm (1) ◇ Best Areas <5cm (metric=0)	Check ONE (or 2 & average) ◇ Maximum >50cm (2) ◇ Maximum <50cm (1)	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)	Check ONE (or 2 & average) ◇ No Riffle (metric=0) ◇ None (2) ◇ Low (1) ◇ Moderate (0) ◇ Extensive (-1)

COMMENTS

Riffle/Run
 Maximum 8

0

6-GRADIENT

(2.388 ft/mi) DRAINAGE AREA (21.179 mi ²)	<ul style="list-style-type: none"> ◇ Very low – Low (2-4) ◇ Moderate (6-10) ◇ High – Very high (10-6) 	% POOL: 5 % RUN: 95	% GLIDE: # % RIFFLE: #	Gradient Maximum 10 <div style="border: 1px solid black; width: 40px; height: 40px; text-align: center;">0</div>
--	--	------------------------	---------------------------	---



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
98.8 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11751	130723406	Tributary of Turkey Creek	73rd Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	30

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ SILT Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	10	x	x	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	30	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	50	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	10	x	x	◇ ◇ Artificial (0)	_____	_____	_____	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ 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.

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	_____	_____	_____	_____	0	Pools > 70cm (2)	_____	_____	_____
Overhanging vegetation (1)	60	1	_____	_____	0	Rootwads (1)	40	1	_____
Shallows (in slow water) (1)	_____	_____	_____	_____	0	Boulders (1)	_____	_____	_____
Rootmats (1)	_____	_____	_____	_____	0	Oxbows, Backwaters (1)	_____	_____	_____
						Aquatic macrophytes (1)			
						Logs and woody debris (1)			

Cover
Maximum 20
5

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
5

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None <5m (1)				
	◇ ◇ None (0)				

Riparian
Maximum 10
5

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	(circle one and comment on back)
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	
◇ 0.2-<0.4m (1)		◇ Moderate (1)	
◇ <0.2m (0) (metric=0)		◇ Slow (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current
Maximum 12
4

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

(19.835 ft/mi)	◇ Very low – Low (2-4)	% POOL: 5	% GLIDE: # \$	Gradient Maximum 10 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 95	% RIFFLE: # \$	
(1.731 mi ²)	◇ High – Very high (10-6)			



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
99.8 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11752	130723401	Tributary of Turkey Creek	Arthur Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	27

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	50	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	30	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	5	x	x	◇ ◇ Artificial (0)	5		x	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	◇ Extensive (-2)
								◇ Lacustrine (0)	◇ Moderate (-1)
								◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ 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.

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	0	0	Pools > 70cm (2)	0	0	0	0
Overhanging vegetation (1)	5	1	0	0	Rootwads (1)	90	2	0	0
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	5	1	0	0
Rootmats (1)	0	0	0	0	Oxbows, Backwaters (1)				
					Aquatic macrophytes (1)				
					Logs and woody debris (1)				

Cover
Maximum 20
8

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
5

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)

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	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Secondary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Slow (1)	
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Very Fast (1)	
◇ 0.2-<0.4m (1)		◇ Fast (1)	
◇ <0.2m (0) (metric=0)		◇ Moderate (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current
Maximum 12
4

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

(3.392 ft/mi)	◇ Very low – Low (2-4)	% POOL: #	% GLIDE: 100	Gradient Maximum 10 4
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: #	% RIFFLE: #	
(5.595 mi ²)	◇ High – Very high (10-6)			



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
49.4 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11753	130722405	Tributary of Turkey Creek	73rd Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
TED	7/22/13	Lake	MHAB	<input checked="" type="checkbox"/>	52

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x		◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	20	x	x	◇ ◇ Muck (2)				◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	45	x	x	◇ ◇ Silt (2)	5	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	20	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	◇ Extensive (-2)
NUMBER OF BEST TYPES:	◇ 4 or more (2)			(Score natural substrates; ignore sludge from point-sources)				◇ Lacustrine (0)	◇ Moderate (-1)
	◇ 3 or less (0)							◇ Shale (-1)	◇ Normal (0)
								◇ Coal fines (-2)	◇ None (1)

Substrate
13
Maximum 20

COMMENTS

2-INSTREAM COVER

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

AMOUNT

Check ONE (or 2 & average)

	0	1	2	3		0	1	2	3
Undercut banks (1)	0	0	0	0	Pools > 70cm (2)	0	0	0	0
Overhanging vegetation (1)	0	0	45	2	Rootwads (1)	0	0	0	0
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	55	1	0	0
Rootmats (1)	0	0	0	0	Oxbows, Backwaters (1)				
					Aquatic macrophytes (1)				
					Logs and woody debris (1)				

Cover
Maximum 20
7

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
11

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Residential, Park, New field (1)	Indicate predominant land use(s) past 100m riparian.	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Fenced pasture (1)	◇ ◇ Open Pasture/Rowcrop (0)		
	◇ ◇ None <5m (1)				
	◇ ◇ None (0)				

Riparian
Maximum 10
4

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

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

Pool/Current
Maximum 12
4

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
3

COMMENTS

6-GRADIENT

(17.016 ft/mi)	◇ Very low – Low (2-4)	% POOL: 15	% GLIDE: #	Gradient Maximum 10 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 80	% RIFFLE: 5	
(3.973 mi ²)	◇ High – Very high (10-6)			



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
0 Middle	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
Left		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Sample #	bioSample #	Stream Name	Location
AB11754	130723104	Turkey Creek	Liverpool Road

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	7/23/13	Lake	MHAB	<input checked="" type="checkbox"/>	43

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	_____	_____	◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	x	_____	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	_____	x	_____	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	_____	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	_____	x	_____	◇ ◇ Artificial (0)	_____	x	_____	◇ Sandstone (0)	EMBEDDEDNESS
◇ ◇ Bedrock (5)	_____	_____	_____		_____	_____	_____	◇ Rip/Rap (0)	◇ Extensive (-2)

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

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

◇ Limestone (1)
◇ Tills (1)
◇ Wetlands (0)
◇ Hardpan (0)
◇ Sandstone (0)
◇ Rip/Rap (0)
◇ Lacustrine (0)
◇ Shale (-1)
◇ Coal fines (-2)

◇ Moderate (-1)
◇ Normal (0)
◇ None (1)

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.

AMOUNT

Check ONE (or 2 & average)

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

◇ Extensive >75% (11)
◇ Moderate 25-75% (7)
◇ Sparse 5-<25% (3)
◇ Nearly absent <5% (1)

Cover
Maximum 20
14

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
Maximum 20
10

COMMENTS

4- BANK EROSION & RIPARIAN ZONE

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

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)

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

Riparian
Maximum 10
8

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact ◇ Secondary Contact (circle one and comment on back)
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Slow (1)	
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Very Fast (1)	
◇ 0.2-<0.4m (1)		◇ Fast (1)	
◇ <0.2m (0) (metric=0)		◇ Moderate (1)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current
Maximum 12
6

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

RIFFLE DEPTH	RUN DEPTH	RIFFLE/RUN SUBSTRATE	RIFFLE/RUN EMBEDDEDNESS
Check ONE (ONLY!)	Check ONE (or 2 & average)		◇ No Riffle (metric=0)
◇ 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

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 20	% GLIDE: #	% RUN: 80	% RIFFLE: #	Gradient
(1.44 ft/mi) (37.922 mi ²)								Maximum 10 4



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

<u>A-CANOPY</u>	<u>B-AESTHETICS</u>	<u>C-MAINTENANCE</u>		<u>D-ISSUES</u>		
◇ >85% - Open	◇ Nuisance algae	◇ Public /	◇ Private / Both / NA	◇ WWTP /	◇ NPDES /	◇ CSO /
◇ 55%-<85%	◇ Invasive macrophytes	◇ Active /	◇ Historic / Both / NA	◇ Hardened /	◇ Urban /	◇ Dirt & Grime
◇ 30%-<55%	◇ Excess turbidity	◇ Young - Succession - Old		◇ Contaminated /	◇ Landfill	◇ Industry
◇ 10%-<30%	◇ Discoloration	◇ Spray /	◇ Removed	◇ BMPs – Construction – Sediment		
◇ <10% - Closed	◇ Foam/Scum	◇ Modified /	◇ Dipped out / NA	◇ Logging /	◇ Irrigation /	◇ Cooling
	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
Canopy Upstream Reading	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
80 Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ CSOs/SSOs/Outfalls	◇ Relocated /	◇ Cutoffs	◇ Natural /	◇ Wetlands /	◇ Stagnant
98 Middle		◇ Impounded /	◇ Desiccated	◇ Park /	◇ Golf /	◇ Lawn /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow
80 Left						

Stream Drawing