



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

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

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
KRW	6/24/13	Lake			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)	Substrate <div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">2</div> Maximum 20
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	_____	_____	◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	70	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	30	x	x	◇ 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)							◇ 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)

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

COMMENTS

Riparian
Maximum
10

4

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

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: 100	% GLIDE: 0	% RUN: 0	% RIFFLE: 0	Gradient Maximum 10
(9.559 ft/mi) (2.962 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
AB11701	13T020	Niles Ditch	Colorado Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/26/13	Lake			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)	10	x	x	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)	10		x	◇ ◇ Muck (2)	20	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	20	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
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		0	0		0	2	
10 1 Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)			
10 1 Overhanging vegetation (1)	0	0	Rootwads (1)	80	2	Aquatic macrophytes (1)			
0 0 Shallows (in slow water) (1)	0	0	Boulders (1)	0	0	Logs and woody debris (1)			
0 0 Rootmats (1)									

Cover
Maximum 20
10

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
9

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
3

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

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)	% POOL:	% GLIDE:	Gradient
(1.36 ft/mi)	◇ Moderate (6-10)	10	0	Maximum 10
(10.029 mi ²)	◇ High – Very high (10-6)	90	0	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 /
57 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
AB11705	13T024	Tributary of Main Beaver Dam Ditch	Summit Street
Surveyor	Sample Date	County	Macro Sample Type
TAF	6/24/13	Lake	
			QHEI Score: 26

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) 	<ul style="list-style-type: none"> EMBEDDEDNESS ◇ ◇ Extensive (-2) ◇ ◇ Moderate (-1) ◇ ◇ Normal (0) ◇ ◇ None (1) 	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">1</div> <p>Maximum 20</p>	
<p>NUMBER OF BEST TYPES:</p> <ul style="list-style-type: none"> ◇ 4 or more (2) ◇ 3 or less (0) 	<p>(Score natural substrates; ignore sludge from point-sources)</p>					

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)
0	0	Overhanging vegetation (1)	0	0	Rootwads (1)
0	0	Shallows (in slow water) (1)	0	0	Boulders (1)
0	0	Rootmats (1)			
					Oxbows, Backwaters (1)
					Aquatic macrophytes (1)
					Logs and woody debris (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) 	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">8</div> <p>Maximum 20</p>
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
<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) 	<p>Indicate predominant land use(s) past 100m riparian.</p>	
<p>Maximum 10</p>					

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL
<p>Check ONE (ONLY!)</p> <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) 	<p>Check ONE (or 2 & average)</p> <ul style="list-style-type: none"> ◇ Pool width > riffle width (2) ◇ Pool width = riffle width (1) ◇ Pool width < riffle width (0) 	<p>Check ALL that apply</p> <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)
<p>Indicate for reach – pools and riffles.</p>			<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">4</div> <p>Maximum 12</p>
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	Riffle/Run
<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) 	<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">0</div> <p>Maximum 8</p>
COMMENTS				

6-GRADIENT (4.037 ft/mi)

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 0	% GLIDE: 100	% RUN: 0	% RIFFLE: 0	Gradient
(2.793 mi ²)								<div style="border: 1px solid black; width: 40px; height: 40px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">4</div> <p>Maximum 10</p>
COMMENTS								



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 /
37 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
AB11710	13T030	Johnson Ditch	Oak Ridge Prairie County Park

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
TAF	6/26/13	Lake			36

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

BEST TYPES	OTHER TYPES	ORIGIN	QUALITY
TOTAL POOL RIFFLE ◇ ◇ Bidrs/Slabs (10) _____ ◇ ◇ Boulders (9) _____ ◇ ◇ Cobble (8) _____ ◇ ◇ Gravel (7) _____ ◇ ◇ Sand (6) _____ ◇ ◇ Bedrock (5) _____ NUMBER OF BEST TYPES:	TOTAL POOL RIFFLE ◇ ◇ Hardpan (4) 40 x x ◇ ◇ Detritus (3) 10 x x ◇ ◇ Muck (2) 40 x x ◇ ◇ Silt (2) 10 x x ◇ ◇ Artificial (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)	SILT ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) EMBEDDEDNESS ◇ Extensive (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ None (1)

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

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

COMMENTS

3-CHANNEL MORPHOLOGY	
Check ONE in each category (Or 2 & average) SINUOSITY ◇ High (4) ◇ Moderate (3) ◇ Low (2) ◇ None (1) DEVELOPMENT ◇ Excellent (7) ◇ Good (5) ◇ Fair (3) ◇ Poor (1) CHANNELIZATION ◇ None (6) ◇ Recovered (4) ◇ Recovering (3) ◇ Recent or no recovery (1) STABILITY ◇ High (3) ◇ Moderate (2) ◇ Low (1)	Channel Maximum 20 6

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) ◇ Conservation Tillage (1) ◇ Urban or Industrial (0) ◇ Mining, construction (0)

Riparian
 Maximum 10
 8

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

Pool/Current
 Maximum 12
 7

COMMENTS

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

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				
(3.986 ft/mi) DRAINAGE AREA (2.131 mi ²)	◇ Very low – Low (2-4) ◇ Moderate (6-10) ◇ High – Very high (10-6)	% POOL: 100 % RUN: 0	% GLIDE: 0 % RIFFLE: 0	Gradient 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 /
14 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
AB11689	13T008	Deep River	Ridge Rd, D/S of Lake George Dam, Hobart
Surveyor	Sample Date	County	Macro Sample Type
JCR	6/25/13	Lake	
◇ Habitat Complete			QHEI Score: 74

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

BEST TYPES	OTHER TYPES			ORIGIN			QUALITY
	TOTAL	POOL	RIFFLE	TOTAL	POOL	RIFFLE	
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)			◇ Limestone (1)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	X	◇ Tills (1)
◇ ◇ Cobble (8)	10		X	◇ ◇ Muck (2)	10	X	◇ Wetlands (0)
◇ ◇ Gravel (7)	10	X	X	◇ ◇ Silt (2)	10	X	◇ Hardpan (0)
◇ ◇ Sand (6)	40	X	X	◇ ◇ Artificial (0)	10	X	◇ Sandstone (0)
◇ ◇ Bedrock (5)							◇ Rip/Rap (0)
							◇ Lacustrine (0)
							◇ Shale (-1)
							◇ Coal fines (-2)

Check ONE (or 2 & average)

EMBEDDEDNESS
 ◇ Heavy (-2)
 ◇ Moderate (-1)
 ◇ Normal (0)
 ◇ Free (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)	
10	1 Undercut banks (1)	20	2 Pools > 70cm (2)
5	1 Overhanging vegetation (1)	10	2 Rootwads (1)
5	1 Shallows (in slow water) (1)	0	0 Boulders (1)
20	2 Rootmats (1)	5	1 Oxbows, Backwaters (1)
		5	1 Aquatic macrophytes (1)
		20	2 Logs and woody debris (1)

Check ONE (or 2 & average)

◇ Extensive >75% (11)
 ◇ Moderate 25-75% (7)
 ◇ Sparse 5-<25% (3)
 ◇ 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)
◇ Moderate (3)	◇ Good (5)	◇ Recovered (4)	◇ Moderate (2)
◇ Low (2)	◇ Fair (3)	◇ Recovering (3)	◇ Low (1)
◇ None (1)	◇ Poor (1)	◇ Recent or no recovery (1)	

Channel
 Maximum 20
 16

COMMENTS

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

River right looking downstream

EROSION		RIPARIAN WIDTH		FLOOD PLAIN QUALITY	
L	R	L	R	L	R
◇ ◇ None or little (3)	◇ ◇ Wide >50m (4)	◇ ◇ Forest, Swamp (3)	◇ ◇ Conservation Tillage (1)	◇ ◇ 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!) ◇ >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
 11

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) ◇ Best Areas 5-10cm (1) ◇ Best Areas <5cm (metric=0)	◇ 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
 6

COMMENTS

6-GRADIENT

DRAINAGE AREA	VELOCITY	% POOL	% GLIDE	% RIFFLE
(1.38 ft/mi) (124.048 mi ²)	◇ Very low – Low (2-4) ◇ Moderate (6-10) ◇ High – Very high (10-6)	% POOL: 30	% GLIDE: #	% RIFFLE: 10

Gradient
 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
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
AB11709	13T029	Turkey Creek	Broad Street

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

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

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;">11</div> Maximum 20
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	_____	
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	_____	_____	
◇ ◇ Gravel (7)	_____	_____	X	◇ ◇ Silt (2)	_____	_____	
◇ ◇ Sand (6)	_____	X	X	◇ ◇ Artificial (0)	_____	_____	
◇ ◇ Bedrock (5)	_____	_____	_____		_____	_____	
NUMBER OF BEST TYPES:	◇ 4 or more (2)			(Score natural substrates; ignore sludge from point-sources)			
	◇ 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)				
20	1	Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	◇ Extensive >75% (11)
20	1	Overhanging vegetation (1)	0	0	Rootwads (1)	0	0	◇ Moderate 25-75% (7)
20	1	Shallows (in slow water) (1)	0	0	Boulders (1)	40	2	◇ 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;">7</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 (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: 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
(6.888 ft/mi)	◇ Very low – Low (2-4)	% POOL: 5	<div style="border: 1px solid black; padding: 5px; text-align: center;">6</div> Maximum 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 95	
(5.543 mi ²)	◇ High – Very high (10-6)	% RIFFLE: 0	



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 /
82 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
AB11694	13T013	Sprout Ditch	70th Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KAG	6/26/13	Lake		<input checked="" type="checkbox"/>	66

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)		x		◇ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)	10	x	x	◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)	60	x	x	◇ ◇ Silt (2)	5	x		◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	15	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

Substrate
13
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)

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

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)	Channel Maximum 20 12
◇ 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 5
◇ 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: 35	% GLIDE: 0	% RUN: 55	% RIFFLE: 10	Gradient
(19.999 ft/mi) (3.628 mi ²)								Maximum 10 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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
35 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11707	13T027	Main Beaver Dam Ditch	Blaine Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/24/13	Lake			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)	70	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	20	x	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
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	0		0	0		0	0	
Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)			
Overhanging vegetation (1)	0	0	Rootwads (1)	30	1	Aquatic macrophytes (1)			
Shallows (in slow water) (1)	0	0	Boulders (1)	0	0	Logs and woody debris (1)			
Rootmats (1)	0	0		70	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
7

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
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	
◇ 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)	% POOL: #	% GLIDE: 100	Gradient
(2.899 ft/mi)	◇ Moderate (6-10)			Maximum 10
(2.347 mi ²)	◇ High – Very high (10-6)	% RUN: #	% RIFFLE: #	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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
98 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11695	13T014	Deep River	Joliet Road

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

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 13 <i>Maximum</i> 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)	10	x	x	◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)				◇ Hardpan (0)	◇ Free (1)	
◇ ◇ Sand (6)	60	x	x	◇ ◇ Artificial (0)	10	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)

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		60	1		0	0		
Undercut banks (1)										◇ Extensive >75% (11)
Overhanging vegetation (1)										◇ Moderate 25-75% (7)
Shallows (in slow water) (1)	10	1		10	1		10	1		◇ Sparse 5-<25% (3)
Rootmats (1)										◇ Nearly absent <5% (1)

COMMENTS

Cover
Maximum
20

13

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	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)	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)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)	
	◇ ◇ None (0)	◇ ◇ Open Pasture/Rowcrop (0)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)	

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

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

Pool/Current
Maximum
12

10

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

Check ONE (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

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



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 /
42 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
AB11717	13T026	Tributary of Main Beaver Dam Ditch	101st Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/24/13	Lake			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)	◇ SILT
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	20	x	x	◇ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	60	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)	_____	_____	_____	◇ ◇ Silt (2)	20	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	_____	_____	_____	◇ ◇ Artificial (0)	_____	_____	_____	◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)	_____	_____	_____					◇ Rip/Rap (0)	EMBEDDEDNESS
NUMBER OF BEST TYPES:								◇ Lacustrine (0)	◇ Extensive (-2)
	◇ 4 or more (2)							◇ Shale (-1)	◇ Moderate (-1)
	◇ 3 or less (0)							◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

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

Substrate
1
Maximum
20

COMMENTS

2-INSTREAM COVER

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

AMOUNT

Check ONE (or 2 & average)

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

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

Cover
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
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
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
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
Maximum
8

COMMENTS

6-GRADIENT

(2.593 ft/mi)	◇ Very low – Low (2-4)	% POOL: 20	% GLIDE: 80	Gradient Maximum 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 0	% RIFFLE: 0	
(1.536 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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
75 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11696	13T015	Tributary of Deep River	750 W

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
TAF	6/24/13	Porter			64

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)	10	x	x	◇ ◇ Detritus (3)				◇ Tills (1)	◇ Heavy (-2)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Moderate (-1)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)
◇ ◇ Sand (6)	70	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS
								◇ Lacustrine (0)	◇ Extensive (-2)
								◇ Shale (-1)	◇ Moderate (-1)
								◇ Coal fines (-2)	◇ Normal (0)
									◇ None (1)

Substrate
13
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)	20	1	0	0	Rootwads (1)	0	0	0	0
Shallows (in slow water) (1)	40	1	10	1	Boulders (1)	30	1	0	0
Rootmats (1)	0	0	0	0					

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

Cover
Maximum 20
11

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
16

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
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)	

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
2

COMMENTS

6-GRADIENT

DRAINAGE AREA	Very low - Low (2-4)	Moderate (6-10)	High - Very high (10-6)	% POOL: 40	% GLIDE: 40	% RUN: 10	% RIFFLE: 10	Gradient
(27.7 ft/mi) (2.912 mi ²)								Maximum 10 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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
16 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11706	13T025	Main Beaver Dam Ditch	Clark Road

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
JCR	6/24/13	Lake		<input type="checkbox"/>	37

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 2 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	40	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	20	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)

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)	0	0	Rootwads (1)	40	1	Aquatic macrophytes (1)		
Shallows (in slow water) (1)	0	0	Boulders (1)	20	1	Logs and woody debris (1)		
Rootmats (1)	10	1						

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

COMMENTS

Cover
Maximum
20
12

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

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

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)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	
		Indicate for reach – pools and riffles.	

COMMENTS

Pool/Current
Maximum
12
9

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

Check ONE (ONLY!)

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

(2.892 ft/mi)	◇ Very low – Low (2-4)	% POOL: 20	% GLIDE: 60	Gradient Maximum 10 4
DRAINAGE AREA	◇ Moderate (6-10)			
(9.860 mi ²)	◇ High – Very high (10-6)	% RUN: 20	% RIFFLE: 0	



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 /
91 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
AB11698	13T017	Tributary of Deep River	93rd Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
TAF	6/24/13	Lake			51

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate Maximum 20
	TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)				◇ Limestone (1)	◇ Heavy (-2)	7
◇ ◇ Boulders (9)				◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)				◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	5		X	◇ Hardpan (0)	◇ Free (1)	
◇ ◇ Sand (6)	5	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)

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
10	1	Overhanging vegetation (1)	40
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	2	Logs and woody debris (1)	2

COMMENTS

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel Maximum 20
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	12
◇ 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 Maximum 10
L	R	L	R	L	R	
◇ ◇ None or little (3)	◇ ◇ Wide >50m (4)	◇ ◇ Forest, Swamp (3)	◇ ◇ Conservation Tillage (1)	◇ ◇ Forest, Swamp (3)	◇ ◇ Conservation Tillage (1)	5
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Urban or Industrial (0)	◇ ◇ Shrub or Old field (2)	◇ ◇ Urban or Industrial (0)	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Residential, Park, New field (1)	◇ ◇ Mining, construction (0)	◇ ◇ Residential, Park, New field (1)	◇ ◇ Mining, construction (0)	
	◇ ◇ Very narrow <5m (1)	◇ ◇ Fenced pasture (1)	Indicate predominant land use(s) past 100m riparian.	◇ ◇ Fenced pasture (1)		
	◇ ◇ None (0)	◇ ◇ Open Pasture/Rowcrop (0)		◇ ◇ Open Pasture/Rowcrop (0)		

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL	Pool/Current Maximum 12
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact	3
◇ >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.

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 Maximum 8
◇ Best Areas >10cm (2)	◇ Maximum >50cm (2)	◇ Stable (e.g. cobble, boulder) (2)	◇ None (2)	4
◇ 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
(15.289 ft/mi)	◇ Very low – Low (2-4)	% POOL: 30	10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 60	
(3.505 mi ²)	◇ High – Very high (10-6)	% 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 /
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
AB11690	13T009	Duck Creek	Front Street

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

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)	Substrate 10 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	10	x	x	◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	20	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	20	x	x	◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Free (1)	
◇ ◇ Sand (6)	40	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)

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)

	20	3		0	0		0	0		
Undercut banks (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)			◇ Extensive >75% (11)	Cover Maximum 20 12
Overhanging vegetation (1)	0	0	Rootwads (1)	0	0	Aquatic macrophytes (1)			◇ Moderate 25-75% (7)	
Shallows (in slow water) (1)	20	1	Boulders (1)	0	0	Logs and woody debris (1)			◇ Sparse 5-<25% (3)	
Rootmats (1)	10	1		20	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 12
◇ 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)	

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: 30	% GLIDE: 0	Gradient
(1.302 ft/mi)	◇ Moderate (6-10)			Maximum
(15.822 mi ²)	◇ High - Very high (10-6)	% RUN: 70	% RIFFLE: 0	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 /
21 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
AB11700	13T019	Deer Creek	97th Avenue

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

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:	(Score natural substrates; ignore sludge from point-sources)	◇ Lacustrine (0)	◇ Moderate (-1)
◇ 4 or more (2)		◇ Shale (-1)	◇ Normal (0)
◇ 3 or less (0)		◇ Coal fines (-2)	◇ None (1)

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). 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)

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

Cover
Maximum 20
9

3-CHANNEL MORPHOLOGY

 Check ONE in each category (Or 2 & average)

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

Channel
Maximum 20
9

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
3

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
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
2

COMMENTS

6-GRADIENT

(9.535 ft/mi)	◇ Very low – Low (2-4)	% POOL: 50	% GLIDE: 30	Gradient Maximum 10 6
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 10	% RIFFLE: 10	
(5.883 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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
23 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11702	13T021	Niles Ditch	121st Avenue

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

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

BEST TYPES	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:	(Score natural substrates; ignore sludge from point-sources)	◇ Lacustrine (0)	◇ Moderate (-1)
◇ 4 or more (2)		◇ Shale (-1)	◇ Normal (0)
◇ 3 or less (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)
5 1 Overhanging vegetation (1)
0 0 Shallows (in slow water) (1)
0 0 Rootmats (1)
0 0 Pools > 70cm (2)
80 2 Rootwads (1)
15 1 Boulders (1)
0 0 Oxbows, Backwaters (1)
80 2 Aquatic macrophytes (1)
15 1 Logs and woody debris (1)

Cover
Maximum 20
10

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
7

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	
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)	◇ Primary Contact
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)	◇ Secondary Contact
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)	(circle one and comment on back)
◇ 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
6

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

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 0	% GLIDE: 50	% RUN: 50	% RIFFLE: 0	Gradient
(1.36 ft/mi) 7.238 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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
66 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11704	13T023	Main Beaver Dam Ditch	Grant Street

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
TAF	6/25/13	Lake			58

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			
◇ ◇ Bldrs/Slabs (10)				◇ ◇ Hardpan (4)	20	x	x	◇ Limestone (1)	◇ SILT	Substrate 13 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◇ Tills (1)	◇ Heavy (-2)	
◇ ◇ Cobble (8)	10	x	x	◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Moderate (-1)	
◇ ◇ Gravel (7)	20	x	x	◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Normal (0)	
◇ ◇ Sand (6)	30	x	x	◇ ◇ Artificial (0)				◇ Sandstone (0)	◇ Free (1)	
◇ ◇ Bedrock (5)								◇ Rip/Rap (0)	EMBEDDEDNESS	
								◇ Lacustrine (0)	◇ Extensive (-2)	
								◇ Shale (-1)	◇ Moderate (-1)	
								◇ Coal fines (-2)	◇ Normal (0)	
									◇ None (1)	

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

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

COMMENTS

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)

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

◇ Extensive >75% (11)
◇ Moderate 25-75% (7)
◇ Sparse 5-<25% (3)
◇ 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)	
		◇ Interstitial (-1)	
		◇ Intermittent (-2)	
		◇ Eddies (1)	

COMMENTS

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)	Moderate (6-10)	High - Very high (10-6)	% POOL: 20	% GLIDE: 40	% RUN: 20	% RIFFLE: 20	Gradient Maximum 10
(2.607 ft/mi) (19.073 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 /
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
AB11708	13T028	Tributary of Turkey Creek	77th Avenue

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

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE		
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	15	x	x	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	60	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)	5	x	x	◇ ◇ Silt (2)	15	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)				◇ ◇ Artificial (0)	5	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
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)

	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	2	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
Maximum 20
11

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)
◇ ◇ 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
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

(7.809 ft/mi)	◇ Very low – Low (2-4)	% POOL: 20	% GLIDE: 60	Gradient Maximum 10 6
DRAINAGE AREA	◇ Moderate (6-10)			
(2.840 mi ²)	◇ High – Very high (10-6)	% RUN: 20	% RIFFLE: 0	



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 /
77 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
AB11715	13T035	Tributary of Turkey Creek	73rd Avenue

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

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

BEST TYPES	OTHER TYPES			ORIGIN	QUALITY	Substrate Maximum 20
	TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)	_____	_____	_____	◇ ◇ Hardpan (4)	_____	SILT ◇ Heavy (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ Free (1) EMBEDDEDNESS ◇ Extensive (-2) ◇ Moderate (-1) ◇ Normal (0) ◇ None (1)
◇ ◇ Boulders (9)	_____	_____	_____	◇ ◇ Detritus (3)	_____	
◇ ◇ Cobble (8)	_____	_____	_____	◇ ◇ Muck (2)	10 x x	
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	_____	
◇ ◇ Sand (6)	10	x	x	◇ ◇ Artificial (0)	70 x x	
◇ ◇ 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.)

		AMOUNT	
		Check ONE (or 2 & average)	
0	0 Undercut banks (1)	30	1 Pools > 70cm (2)
15	1 Overhanging vegetation (1)	0	0 Rootwads (1)
0	0 Shallows (in slow water) (1)	0	0 Boulders (1)
15	1 Rootmats (1)	40	1 Logs and woody debris (1)

COMMENTS

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

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

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL	Pool/Current Maximum 12
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact ◇ Secondary Contact (circle one and comment on back)	7
◇ >1m (6)	◇ Pool width > riffle width (2)	◇ Torrential (-1)		
◇ 0.7-<1m (4)	◇ Pool width = riffle width (1)	◇ Very Fast (1)		
◇ 0.4-<0.7m (2)	◇ Pool width < riffle width (0)	◇ Fast (1)		

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 Maximum 8
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ONE (or 2 & average)	◇ No Riffle (metric=0)	4
◇ 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
(17.016 ft/mi)	◇ Very low – Low (2-4)	% POOL: 10	% GLIDE: 20
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 35	% RIFFLE: 35
(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 /
59 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
AB11712	13T032	Turkey Creek	SR 55

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

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)	20	x	x	◇ Limestone (1)	◇ Heavy (-2)	Substrate 11 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	20	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Free (1)	
◇ ◇ Sand (6)	30	x	x	◇ ◇ Artificial (0)	20	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)

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		35	1		0	0		
Undercut banks (1)										◇ Extensive >75% (11)
Overhanging vegetation (1)										◇ Moderate 25-75% (7)
Shallows (in slow water) (1)										◇ Sparse 5-<25% (3)
Rootmats (1)										◇ 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)	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)	◇ ◇ Mining, construction (0)	Indicate predominant land use(s) past 100m riparian.	
	◇ ◇ 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)	◇ 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)	
		◇ 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
◇ 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

(2.388 ft/mi)	◇ Very low – Low (2-4)	% POOL: 30	% GLIDE: 70	Gradient Maximum 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 0	% RIFFLE: 0	
(21.179 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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
100 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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		
AB11711	13T031	Tributary of Turkey Creek	W Old Lincoln Hwy		
Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/25/13	Lake			41

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

BEST TYPES	TOTAL	POOL	RIFFLE	OTHER TYPES	TOTAL	POOL	RIFFLE	ORIGIN	QUALITY	Substrate
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)	2 <i>Maximum</i> 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	40	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	15	x	x	◇ ◇ Silt (2)	10	x	x	◇ Hardpan (0)	◇ Free (1)	
◇ ◇ Sand (6)	30	x	x	◇ ◇ 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). Check ONE (or 2 & average)

AMOUNT	Check ONE (or 2 & average)	
25 1 Undercut banks (1)	0 0 Pools > 70cm (2)	0 0 Oxbows, Backwaters (1)
25 1 Overhanging vegetation (1)	25 1 Rootwads (1)	0 0 Aquatic macrophytes (1)
0 0 Shallows (in slow water) (1)	0 0 Boulders (1)	25 1 Logs and woody debris (1)
0 0 Rootmats (1)		

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)	12 <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	Riparian
L R	L R	L R	5 <i>Maximum</i> 10
◇ ◇ 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)	

COMMENTS

5-POOL/GLIDE AND RIFFLE/RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY	RECREATION POTENTIAL	Pool/Current
Check ONE (ONLY!)	Check ONE (or 2 & average)	Check ALL that apply	◇ Primary Contact	5 <i>Maximum</i> 12
◇ >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!)

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)	0 <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	Very low - Low (2-4)	% POOL: 20	% GLIDE: 0	Gradient
(14.199 ft/mi)	◇ Moderate (6-10)			8 <i>Maximum</i> 10
DRAINAGE AREA (2.642 mi ²)	◇ High - Very high (10-6)	% RUN: 80	% RIFFLE: 0	



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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
19 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11713	13T033	Tributary of Turkey Creek	73rd Avenue

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
JCR	6/25/13	Lake			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			
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)				◇ Limestone (1)	◇ Heavy (-2)	Substrate 3 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	40	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	20	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)

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

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)
◇ ◇ 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)				

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)	◇ 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

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		% POOL:	% GLIDE:	Gradient
(19.835 ft/mi)	◇ Very low – Low (2-4)	10	0	Maximum 10
(1.731 mi ²)	◇ Moderate (6-10)			
	◇ High – Very high (10-6)	90	0	



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
AB11686	13T005	Deep River	29th Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	6/24/13	Lake		<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)	◇ Heavy (-2)
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)	5	x		◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	20	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	30	x	x	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	35	x	x	◇ ◇ Artificial (0)	10	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	
Undercut banks (1)	0	0	20	1	Pools > 70cm (2)
Overhanging vegetation (1)	0	0	15	1	Rootwads (1)
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)
Rootmats (1)	0	0			Oxbows, Backwaters (1)
					Aquatic macrophytes (1)
					Logs and woody debris (1)

Cover
Maximum 20
10

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
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
◇ Best Areas >10cm (2)	◇ Maximum >50cm (2)	◇ Stable (e.g. cobble, boulder) (2)	◇ None (2)
◇ Best Areas 5-10cm (1)	◇ Maximum <50cm (1)	◇ Mod. Stable (e.g. large gravel) (1)	◇ Low (1)
◇ Best Areas <5cm (metric=0)		◇ Unstable (e.g. sand, fine gravel) (0)	◇ Moderate (0)
			◇ Extensive (-1)

Riffle/Run
Maximum 8
0

COMMENTS

6-GRADIENT

(1.226 ft/mi)	◇ Very low – Low (2-4)	% POOL: 35	% GLIDE: 0	Gradient Maximum 10 6
DRAINAGE AREA	◇ Moderate (6-10)			
(150.342 mi ²)	◇ High – Very high (10-6)	% RUN: 65	% RIFFLE: 0	



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
36 Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

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

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

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

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

NUMBER OF BEST TYPES:

- ◇ 4 or more (2)
- ◇ 3 or less (0)

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

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

- ◇ Extensive >75% (11)
- ◇ Moderate 25-75% (7)
- ◇ Sparse 5-<25% (3)
- ◇ 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)	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)	◇ ◇ Mining, construction (0)	Indicate predominant land use(s) past 100m riparian.	
	◇ ◇ 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)	(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		% POOL:	% GLIDE:	Gradient
(1.48 ft/mi)	◇ Very low – Low (2-4)	45	45	Gradient Maximum 10
(78.790 mi ²)	◇ Moderate (6-10)			
	◇ High – Very high (10-6)	% RUN: 10	% RIFFLE: 0	



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
34 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 /
14 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
AB11687	13T006	Deep River	Liverpool Road

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	6/24/13	Lake		<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		
<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; padding: 5px; display: inline-block;">11</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)

0 0 Undercut banks (1) 10 1 Pools > 70cm (2) 0 0 Oxbows, Backwaters (1) 0 0 Overhanging vegetation (1) 0 0 Rootwads (1) 80 2 Aquatic macrophytes (1) 0 0 Shallows (in slow water) (1) 0 0 Boulders (1) 10 1 Logs and woody debris (1) 0 0 Rootmats (1)	Cover Maximum 20 <div style="border: 1px solid black; padding: 5px; display: inline-block;">7</div>
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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

13

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)

COMMENTS

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

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

COMMENTS

Riffle/Run
 Maximum 8

0

6-GRADIENT	Very low - Low (2-4)	Moderate (6-10)	High - Very high (10-6)	% POOL: 20	% GLIDE: 0	% RUN: 80	% RIFFLE: 0
(1.388 ft/mi) DRAINAGE AREA (150.171 mi ²)	◇ Very low - Low (2-4) ◇ Moderate (6-10) ◇ High - Very high (10-6)						

Gradient
 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
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 /
		◇ Flood Control /	◇ Drainage	◇ Atmosphere /	◇ Data Paucity	◇ Home
33 Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

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

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

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

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

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

COMMENTS

Cover
Maximum
20

9

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel Maximum 20
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	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		Riparian Maximum 10
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)	7
◇ ◇ Moderate (2)	◇ ◇ Moderate 10-50m (3)	◇ ◇ Shrub or Old field (2)	◇ ◇ Urban or Industrial (0)	◇ ◇ Urban or Industrial (0)	◇ ◇ Mining, construction (0)	
◇ ◇ Heavy/Severe (1)	◇ ◇ Narrow 5-10m (2)	◇ ◇ Residential, Park, New field (1)	◇ ◇ Fenced pasture (1)	◇ ◇ Fenced pasture (1)	Indicate predominant land use(s) past 100m riparian.	
	◇ ◇ None <5m (1)	◇ ◇ 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.

COMMENTS

Pool/Current
Maximum
12

9

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 Maximum 8
◇ Best Areas >10cm (2)	◇ Maximum >50cm (2)	◇ Stable (e.g. cobble, boulder) (2)	◇ None (2)	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				Gradient Maximum 10
(1.44 ft/mi)	◇ Very low – Low (2-4)	% POOL: 10	% GLIDE: 40	4
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 50	% RIFFLE: 0	
(37.922 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
80 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
81 Left		◇ Snag /		◇ Agriculture /	◇ Livestock	◇ Flow

Stream Drawing



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

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

Surveyor	Sample Date	County	Macro Sample Type	◇ Habitat Complete	QHEI Score:
TAF	6/24/13	Lake			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	x	◇ Tills (1)	◇ Moderate (-1)
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	70	x	x	◇ Wetlands (0)	◇ Normal (0)
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	10	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
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	2	3		0	1	2	3
Undercut banks (1)	0	0	0	0	Pools > 70cm (2)	0	0	0	0
Overhanging vegetation (1)	10	1	1	1	Rootwads (1)	0	0	0	0
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	10	1	1	1
Rootmats (1)	0	0	0	0					

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

Cover
Maximum 20
12

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)
◇ ◇ 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
9

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

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 70	% GLIDE: 30	% RUN: 0	% RIFFLE: 0	Gradient
(23.493 ft/mi) 2.364 mi ²								Maximum 10

Gradient
Maximum 10
10



OWQ Biological Studies QHEI (Qualitative Habitat Evaluation Index)

Circle some &
COMMENT

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

<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 /
24 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
AB11684	13T002	Willow Creek	Clem Road

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KAG	6/25/13	Porter		<input checked="" type="checkbox"/>	58

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)	95	x	x	◇ ◇ Artificial (0)	5	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
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)

	25	1		50	1		0	0	
Undercut banks (1)	0	0	Overhanging vegetation (1)	0	0	Pools > 70cm (2)	0	0	Oxbows, Backwaters (1)
Shallows (in slow water) (1)	0	0	Rootwads (1)	0	0	Aquatic macrophytes (1)	0	0	Logs and woody debris (1)
Rootmats (1)	0	0	Boulders (1)	25	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 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)	◇ ◇ 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)	Riffle/Run Maximum 8 5
◇ 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

(16.774 ft/mi)	◇ Very low – Low (2-4)	% POOL: 25	% GLIDE: 0	Gradient Maximum 10 10
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: 50	% RIFFLE: 25	
(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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
3 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11699	13T018	Deep River	Clay Street

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

1-SUBSTRATE

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

Check ONE (or 2 & average)

BEST TYPES

OTHER TYPES

ORIGIN

QUALITY

	TOTAL	POOL	RIFFLE		TOTAL	POOL	RIFFLE			
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)	10	x	x	◇ Limestone (1)	◇ Heavy (-2)	Substrate 11 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)	10	x	x	◇ ◇ Muck (2)	10	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	10	x	x	◇ ◇ Silt (2)	10	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)

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

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)	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)	◇ ◇ Mining, construction (0)	Indicate predominant land use(s) past 100m riparian.	
	◇ ◇ 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)	(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:

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:	Gradient
(3.348 ft/mi)	◇ Moderate (6-10)	60	40	Gradient Maximum 10
(44.481 mi ²)	◇ High – Very high (10-6)	0	0	



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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
72 Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11688	13T007	Tributary of Deep River	Shelby Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KAG	6/25/13	Lake		<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		
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Bidrs/Slabs (10)	_____	_____	_____	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Hardpan (4)	_____	_____	_____	<input checked="" type="checkbox"/> Limestone (1)	<input checked="" type="checkbox"/> Heavy (-2)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Boulders (9)	_____	_____	_____	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Detritus (3)	_____	_____	_____	<input checked="" type="checkbox"/> Tills (1)	<input checked="" type="checkbox"/> Moderate (-1)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Cobble (8)	_____	_____	_____	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Muck (2)	_____	X	X	<input checked="" type="checkbox"/> Wetlands (0)	<input checked="" type="checkbox"/> Normal (0)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Gravel (7)	_____	_____	_____	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Silt (2)	_____	X	X	<input checked="" type="checkbox"/> Hardpan (0)	<input checked="" type="checkbox"/> Free (1)
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Sand (6)	_____	_____	_____	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Artificial (0)	_____	_____	_____	<input checked="" type="checkbox"/> Sandstone (0)	<input checked="" type="checkbox"/> EMBEDDEDNESS
<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> Bedrock (5)	_____	_____	_____		_____	_____	_____	<input checked="" type="checkbox"/> Rip/Rap (0)	<input checked="" type="checkbox"/> Extensive (-2)
NUMBER OF BEST TYPES:								<input checked="" type="checkbox"/> Lacustrine (0)	<input checked="" type="checkbox"/> Moderate (-1)
	◇ 4 or more (2)							<input checked="" type="checkbox"/> Shale (-1)	<input checked="" type="checkbox"/> Normal (0)
	◇ 3 or less (0)							<input checked="" type="checkbox"/> Coal fines (-2)	<input checked="" type="checkbox"/> None (1)

(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)

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

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

Cover
Maximum 20
11

COMMENTS

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
<input checked="" type="checkbox"/> High (4)	<input checked="" type="checkbox"/> Excellent (7)	<input checked="" type="checkbox"/> None (6)	<input checked="" type="checkbox"/> High (3)
<input checked="" type="checkbox"/> Moderate (3)	<input checked="" type="checkbox"/> Good (5)	<input checked="" type="checkbox"/> Recovered (4)	<input checked="" type="checkbox"/> Moderate (2)
<input checked="" type="checkbox"/> Low (2)	<input checked="" type="checkbox"/> Fair (3)	<input checked="" type="checkbox"/> Recovering (3)	<input checked="" type="checkbox"/> Low (1)
<input checked="" type="checkbox"/> None (1)	<input checked="" type="checkbox"/> Poor (1)	<input checked="" type="checkbox"/> 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
<input checked="" type="checkbox"/> None or little (3)	<input checked="" type="checkbox"/> Moderate (2)	<input checked="" type="checkbox"/> Wide >50m (4)	<input checked="" type="checkbox"/> Moderate 10-50m (3)	<input checked="" type="checkbox"/> Forest, Swamp (3)	<input checked="" type="checkbox"/> Shrub or Old field (2)
<input checked="" type="checkbox"/> Moderate (2)	<input checked="" type="checkbox"/> Heavy/Severe (1)	<input checked="" type="checkbox"/> Narrow 5-10m (2)	<input checked="" type="checkbox"/> Very narrow <5m (1)	<input checked="" type="checkbox"/> Residential, Park, New field (1)	<input checked="" type="checkbox"/> Fenced pasture (1)
		<input checked="" type="checkbox"/> None (0)		<input checked="" type="checkbox"/> 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
<input checked="" type="checkbox"/> >1m (6)	<input checked="" type="checkbox"/> Pool width > riffle width (2)	<input checked="" type="checkbox"/> Torrential (-1)	◇ Secondary Contact
<input checked="" type="checkbox"/> 0.7-<1m (4)	<input checked="" type="checkbox"/> Pool width = riffle width (1)	<input checked="" type="checkbox"/> Very Fast (1)	(circle one and comment on back)
<input checked="" type="checkbox"/> 0.4-<0.7m (2)	<input checked="" type="checkbox"/> Pool width < riffle width (0)	<input checked="" type="checkbox"/> Fast (1)	
<input checked="" type="checkbox"/> 0.2-<0.4m (1)		<input checked="" type="checkbox"/> Moderate (1)	
<input checked="" type="checkbox"/> <0.2m (0) (metric=0)		<input checked="" type="checkbox"/> Slow (1)	
		<input checked="" type="checkbox"/> Interstitial (-1)	
		<input checked="" type="checkbox"/> Intermittent (-2)	
		<input checked="" type="checkbox"/> Eddies (1)	

Indicate for reach – pools and riffles.

Pool/Current
Maximum 12
8

COMMENTS

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

Check ONE (ONLY!)

Check ONE (or 2 & average)

◇ No Riffle (metric=0)

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

Riffle/Run
Maximum 8
3

COMMENTS

6-GRADIENT

(1.936 ft/mi)	<input checked="" type="checkbox"/> Very low – Low (2-4)	% POOL: 10	% GLIDE: 0	Gradient Maximum 10 4
DRAINAGE AREA	<input checked="" type="checkbox"/> Moderate (6-10)	% RUN: 90	% RIFFLE: 0	
(3.862 mi ²)	<input checked="" type="checkbox"/> 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
Canopy Upstream Reading	◇ Oil sheen	◇ Leveed /	◇ One sided	◇ Bank/	◇ Erosion /	◇ Surface
	◇ Trash/Litter	◇ Moving - Bedload – Stable		◇ False bank /	◇ Manure /	◇ Lagoon
Right	◇ Nuisance odor	◇ Armoured	◇ Slumps	◇ Wash H2O /	◇ Tile /	◇ H2O table
Middle	◇ Sludge deposits	◇ Islands /	◇ Scoured	◇ Acid /	◇ Mine /	◇ Quarry /
	◇ 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
AB11714	13T034	Tributary of Turkey Creek	Arthur Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KAG	6/25/13	Lake		<input checked="" type="checkbox"/>	31

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"> <input checked="" type="checkbox"/> Bldrs/Slabs (10) <input checked="" type="checkbox"/> Boulders (9) <input checked="" type="checkbox"/> Cobble (8) <input checked="" type="checkbox"/> Gravel (7) <input checked="" type="checkbox"/> Sand (6) <input checked="" type="checkbox"/> Bedrock (5) 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Hardpan (4) <input checked="" type="checkbox"/> Detritus (3) <input checked="" type="checkbox"/> Muck (2) <input checked="" type="checkbox"/> Silt (2) <input checked="" type="checkbox"/> Artificial (0) 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Limestone (1) <input checked="" type="checkbox"/> Tills (1) <input checked="" type="checkbox"/> Wetlands (0) <input checked="" type="checkbox"/> Hardpan (0) <input checked="" type="checkbox"/> Sandstone (0) <input checked="" type="checkbox"/> Rip/Rap (0) <input checked="" type="checkbox"/> Lacustrine (0) <input checked="" type="checkbox"/> Shale (-1) <input checked="" type="checkbox"/> Coal fines (-2) 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Heavy (-2) <input checked="" type="checkbox"/> Moderate (-1) <input checked="" type="checkbox"/> Normal (0) <input checked="" type="checkbox"/> Free (1)
NUMBER OF BEST TYPES: <input checked="" type="checkbox"/> 4 or more (2) <input checked="" type="checkbox"/> 3 or less (0)		(Score natural substrates; ignore sludge from point-sources)	

Substrate
1
Maximum 20

COMMENTS

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

AMOUNT
Check ONE (or 2 & average) <input checked="" type="checkbox"/> Extensive >75% (11) <input checked="" type="checkbox"/> Moderate 25-75% (7) <input checked="" type="checkbox"/> Sparse 5-<25% (3) <input checked="" type="checkbox"/> Nearly absent <5% (1)

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

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

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

Channel
Maximum 20
4

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
<ul style="list-style-type: none"> <input checked="" type="checkbox"/> None or little (3) <input checked="" type="checkbox"/> Moderate (2) <input checked="" type="checkbox"/> Heavy/Severe (1) 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Wide >50m (4) <input checked="" type="checkbox"/> Moderate 10-50m (3) <input checked="" type="checkbox"/> Narrow 5-10m (2) <input checked="" type="checkbox"/> Very narrow <5m (1) <input checked="" type="checkbox"/> None (0) 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> Forest, Swamp (3) <input checked="" type="checkbox"/> Shrub or Old field (2) <input checked="" type="checkbox"/> Residential, Park, New field (1) <input checked="" type="checkbox"/> Fenced pasture (1) <input checked="" type="checkbox"/> 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!) <input checked="" type="checkbox"/> >1m (6) <input checked="" type="checkbox"/> 0.7-<1m (4) <input checked="" type="checkbox"/> 0.4-<0.7m (2) <input checked="" type="checkbox"/> 0.2-<0.4m (1) <input checked="" type="checkbox"/> <0.2m (0) (metric=0)	Check ONE (or 2 & average) <input checked="" type="checkbox"/> Pool width > riffle width (2) <input checked="" type="checkbox"/> Pool width = riffle width (1) <input checked="" type="checkbox"/> Pool width < riffle width (0)	Check ALL that apply <input checked="" type="checkbox"/> Torrential (-1) <input checked="" type="checkbox"/> Very Fast (1) <input checked="" type="checkbox"/> Fast (1) <input checked="" type="checkbox"/> Moderate (1)	<input checked="" type="checkbox"/> Slow (1) <input checked="" type="checkbox"/> Interstitial (-1) <input checked="" type="checkbox"/> Intermittent (-2) <input checked="" type="checkbox"/> Eddies (1)

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

Pool/Current
Maximum 12
4

COMMENTS

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

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

Riffle/Run
Maximum 8
0

COMMENTS

6-GRADIENT	Very low - Low (2-4)	Moderate (6-10)	High - Very high (10-6)	% POOL: #	% GLIDE: 100	% RUN: #	% RIFFLE: #	Gradient
(3.392 ft/mi) DRAINAGE AREA (5.595 mi ²)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					Maximum 10

Gradient
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 /
41 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
AB11691	13T010	Tributary of Duck Creek	10th Street

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KAG	6/25/13	Lake		<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			
◇ ◇ Bidrs/Slabs (10)				◇ ◇ Hardpan (4)	5	x	x	◇ Limestone (1)	◇ Heavy (-2)	Substrate 3 Maximum 20
◇ ◇ Boulders (9)				◇ ◇ Detritus (3)				◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)				◇ ◇ Muck (2)	85			◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)				◇ ◇ Silt (2)	5	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:	◇ 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)

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

COMMENTS

Cover
Maximum
20

12

3-CHANNEL MORPHOLOGY

Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	
◇ High (4)	◇ Excellent (7)	◇ None (6)	◇ High (3)	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)	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)	◇ ◇ Mining, construction (0)	Indicate predominant land use(s) past 100m riparian.	
	◇ ◇ 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)	(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

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!)

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: 30	% RUN: 50	% RIFFLE: 0	Gradient Maximum 10
(9.376 ft/mi) (3.091 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 /
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
AB11692	13T011	Duck Creek	750 W

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

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 3 Maximum 20
TOTAL POOL RIFFLE	TOTAL POOL RIFFLE	TOTAL POOL RIFFLE				
◇ ◇ Bidrs/Slabs (10)	10	x	x	◇ Limestone (1)	◇ SILT Heavy (-2)	
◇ ◇ Boulders (9)	10	x	x	◇ Tills (1)	◇ Moderate (-1)	
◇ ◇ Cobble (8)	50	x	x	◇ Wetlands (0)	◇ Normal (0)	
◇ ◇ Gravel (7)	10	x	x	◇ Hardpan (0)	◇ Free (1)	
◇ ◇ Sand (6)	10	x	x	◇ Sandstone (0)	EMBEDDEDNESS	
◇ ◇ Bedrock (5)	10	x	x	◇ 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)

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	Undercut banks (1)		Pools > 70cm (2)		Oxbows, Backwaters (1)	
◇ Extensive >75% (11)	10	1	0	0	0	0
◇ Moderate 25-75% (7)	0	0	10	1	0	0
◇ Sparse 5-<25% (3)	20	1	0	0	40	1
◇ Nearly absent <5% (1)	0	0	0	0	0	0

COMMENTS

Cover
Maximum
20
9

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

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY	Channel Maximum 20 14
◇ 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	Riparian Maximum 10 6
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

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

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	Riffle/Run Maximum 8 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)	

COMMENTS

6-GRADIENT			Gradient Maximum 10 10
(15.843 ft/mi)	◇ Very low – Low (2-4)	% POOL: 50	% GLIDE: 50
DRAINAGE AREA	◇ Moderate (6-10)	% RUN: #	% RIFFLE: #
(6.517 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 /
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
AB11683	13T001	Burns Ditch	US 20

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KJC	6/24/13	Porter		<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		
<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; padding: 5px; display: inline-block;">11</div> <i>Maximum</i> 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) 20 1 Pools > 70cm (2) 0 0 Oxbows, Backwaters (1) 0 0 Overhanging vegetation (1) 10 1 Rootwads (1) 30 1 Aquatic macrophytes (1) 0 0 Shallows (in slow water) (1) 0 0 Boulders (1) 40 2 Logs and woody debris (1) 0 0 Rootmats (1)	Cover <i>Maximum</i> 20	<div style="border: 1px solid black; padding: 5px; display: inline-block;">10</div>
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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

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)

Indicate predominant land use(s) past 100m riparian. ◇ ◇ Conservation Tillage (1) ◇ ◇ Urban or Industrial (0) ◇ ◇ Mining, construction (0)	Riparian <i>Maximum</i> 10	<div style="border: 1px solid black; padding: 5px; display: inline-block;">6</div>
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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)	◇ Primary Contact ◇ Secondary Contact (circle one and comment on back)

Pool/Current <i>Maximum</i> 12	<div style="border: 1px solid black; padding: 5px; display: inline-block;">7</div>
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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) ◇ Best Areas 5-10cm (1) ◇ Best Areas <5cm (metric=0)	◇ 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)

COMMENTS

6-GRADIENT (1.226 ft/mi) ◇ Very low – Low (2-4) % POOL: 20 % GLIDE: 0

DRAINAGE AREA (164.931 mi ²)	◇ Moderate (6-10) % RUN: 80	◇ High – Very high (10-6) % RIFFLE: 0	Gradient <i>Maximum</i> 10	<div style="border: 1px solid black; padding: 5px; display: inline-block;">6</div>
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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 /
62 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
AB11685	13T003	Willow Creek	Stone Avenue

Surveyor	Sample Date	County	Macro Sample Type	Habitat Complete	QHEI Score:
KAG	6/25/13	Porter		<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)	5	x	X	◇ Hardpan (0)	◇ Free (1)
◇ ◇ Sand (6)	90	x	x	◇ ◇ Artificial (0)	5	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
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)	50	1	0	0	Rootwads (1)	25	1	0	0
Shallows (in slow water) (1)	0	0	0	0	Boulders (1)	25	1	0	0
Rootmats (1)	0	0	0	0	Oxbows, Backwaters (1)				
					Aquatic macrophytes (1)				
					Logs and woody debris (1)				

Cover
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
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
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
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
Maximum 8

COMMENTS

6-GRADIENT

DRAINAGE AREA	Very low – Low (2-4)	Moderate (6-10)	High – Very high (10-6)	% POOL: 0	% GLIDE: 0	% RUN: 100	% RIFFLE: 0	Gradient
(3.917 ft/mi) (5.350 mi ²)								Maximum 10

Gradient
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 /
57 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