

# WOLF CREEK



## Wolf Creek near Rice County 8 (WCH-17)

Location:

River mile: 46

U.S.G.S. quad: Northfield; 44093-D2

Township: T111N R20W S22

Lat./Long: 44°24'30"/93°13'

Other info.:

Type: Small Stream within 1 mile of mouth

Stream Order: 2

Drainage area: 43

Riparian: Forest

Instream: Rock, cobble, and gravel in fast current; sand and silt in slow current

Gradient: 4.5 ft/mi



# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/14/95 River Mile 46 Watershed Number \_\_\_\_\_  
 Location WCH-17 U.S.G.S. quad Northfield  
 Township T111N R20W Section 22 Lat./Long. 44°24'30"/93°13'

**71.5**  
Total QHEI

**1. SUBSTRATE** (Check ONLY two substrate TYPES). % Pool/Riffle substrates optional.

Type	Pool	Riffle	Type	Pool	Riffle	Quality
<input type="checkbox"/> Boulder (7)	_____	_____	<input checked="" type="checkbox"/> Gravel (5)	_____	_____	<i>Check all that apply:</i> <input checked="" type="checkbox"/> Silt covered (-1) <input checked="" type="checkbox"/> Silt free (1) <input type="checkbox"/> Boulders as slabs (1) <input type="checkbox"/> Embedded (-2)
<input checked="" type="checkbox"/> Cobble (6)	_____	_____	<input type="checkbox"/> Sand (4)	_____	_____	
<input type="checkbox"/> Hardpan (3)	_____	_____	<input type="checkbox"/> Bedrock (3)	_____	_____	
<input type="checkbox"/> Silt (3)	_____	_____	<input type="checkbox"/> Detritus (2)	_____	_____	
<input type="checkbox"/> Muck (2)	_____	_____	<input type="checkbox"/> Sludge (1)	_____	_____	
Comments _____						

**11**  
Substrate

**2. INSTREAM COVER**

Type (Check ALL that apply)	Amount (Check ONLY one)
<input checked="" type="checkbox"/> Undercut banks (1)	<input type="checkbox"/> Extensive (7) <input checked="" type="checkbox"/> Moderate (5) <input type="checkbox"/> Sparse (3) <input type="checkbox"/> Nearly absent (1)
<input checked="" type="checkbox"/> Overhanging vegetation (1)	
<input checked="" type="checkbox"/> Shallows (in slow water) (1)	
<input checked="" type="checkbox"/> Logs or woody debris (1)	
<input type="checkbox"/> Deep pools (1)	
<input type="checkbox"/> Oxbows (1)	
<input type="checkbox"/> Boulders (1)	
<input type="checkbox"/> Aquatic macrophytes (1)	
Comments _____	

**9**  
Cover

**3. CHANNEL MORPHOLOGY** (Check ONLY one under each category)

Sinuosity	Development	Channelization	Stability	Other
<input type="checkbox"/> High (4)	<input type="checkbox"/> Excellent (4)	<input checked="" type="checkbox"/> None (4)	<input type="checkbox"/> High (3)	<input type="checkbox"/> Impound
<input checked="" type="checkbox"/> Moderate (3)	<input checked="" type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input checked="" type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input type="checkbox"/> Low (2)	<input type="checkbox"/> Fair (2)	<input type="checkbox"/> Recovering (2)	<input type="checkbox"/> Low (1)	<input type="checkbox"/> Leveed
<input type="checkbox"/> None (1)	<input type="checkbox"/> Poor (1)	<input type="checkbox"/> Recent or no Recovery (1)		
Comments _____				

**12**  
Channel

**4. RIPARIAN ZONE AND BANK EROSION** \*River right looking downstream\*

(Check single most predominant, on each bank, under each category)

Riparian Width	Flood Plain Quality	Bank Erosion
L R	L R	L R
<input type="checkbox"/> Extensive >100m (3)	<input type="checkbox"/> Open pasture (1)	<input checked="" type="checkbox"/> Forest, swamp (3)
<input checked="" type="checkbox"/> Wide 50-100m (4)	<input type="checkbox"/> Fenced pasture (2)	<input type="checkbox"/> Shrub (4)
<input type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input type="checkbox"/> Residential, Park (2)
<input type="checkbox"/> Narrow 5-10m (2)	<input type="checkbox"/> Rowcrop (1)	<input type="checkbox"/> Urban
<input type="checkbox"/> Very Narrow 1-5m (1)	<input type="checkbox"/> Conservation tillage (2)	<input type="checkbox"/> None (5)
<input type="checkbox"/> None (0)		<input checked="" type="checkbox"/> Little (4)
		<input type="checkbox"/> Moderate (3)
		<input type="checkbox"/> Heavy (2)
		<input type="checkbox"/> Severe (1)
Comments _____		

**10.5**  
Riparian

**5. POOL/GLIDE AND RIFFLE/RUN QUALITY**

Maximum Depth (Check 1)	Pool Cover (Check 1)	Overall Current Velocity (Check ALL that apply)	Morphology (Check 1)
<input type="checkbox"/> > 1m (3)	<input type="checkbox"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input checked="" type="checkbox"/> Pool width > riffle width (2)
<input checked="" type="checkbox"/> 0.7-1m (2)	<input checked="" type="checkbox"/> Moderate (2)	<input checked="" type="checkbox"/> Fast (1)	<input type="checkbox"/> Pool width = riffle width (1)
<input type="checkbox"/> 0.4-0.7m (1)	<input type="checkbox"/> Sparse (1)	<input type="checkbox"/> Intermittent (-2)	<input type="checkbox"/> Pool width < riffle width (0)
<input type="checkbox"/> < 0.4m (0)	<input type="checkbox"/> Nearly absent (0)	<input type="checkbox"/> Eddies (1)	
<input type="checkbox"/> No Pool		<input type="checkbox"/> Interstitial (-1)	
<input checked="" type="checkbox"/> Slow (1)			
Comments _____			
Riffle/Run Depth (Check 1)	Riffle/Run Substrate (Check 1)	Riffle/Run Substrate Quality (Check 1)	
<input type="checkbox"/> Generally <10cm (1)	<input checked="" type="checkbox"/> Stable (cobble, boulder) (1)	<input type="checkbox"/> Embedded (0)	<div style="border: 2px solid black; padding: 5px; font-size: 24pt; text-align: center;"><b>13</b></div> Pool/ Riffle
<input checked="" type="checkbox"/> Generally >10cm Max <50 (2)	<input type="checkbox"/> Unstable (gravel, sand) (0)	<input checked="" type="checkbox"/> Not embedded (1)	
<input type="checkbox"/> Generally >10cm Max >50 (3)			
<input type="checkbox"/> No riffle (0)			
Comments _____			

**6. GRADIENT** (ft/mi) 4.50

**6**  
Gradient

**7. DRAINAGE AREA** (square mile) 37

**10**  
Drainage Area

# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/12/96 River Mile 46 Watershed Number \_\_\_\_\_  
 Location WCH-17 U.S.G.S. quad Northfield  
 Township T111NR20W Section 22 Lat./Long. 44°24.39N 93°13.15W

71.5

Total QHEI

## 1. SUBSTRATE (Check ONLY two substrate TYPES). % Pool/Riffle substrates optional.

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<input type="checkbox"/> Boulder (7)	_____	_____	<input checked="" type="checkbox"/> Gravel (5)	_____	_____	Check all that apply: <input checked="" type="checkbox"/> Silt covered (-1) <input checked="" type="checkbox"/> Silt free (1) <input type="checkbox"/> Boulders as slabs (1) <input type="checkbox"/> Embedded (-2)
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<input type="checkbox"/> Silt (3)	_____	_____	<input type="checkbox"/> Detritus (2)	_____	_____	
<input type="checkbox"/> Muck (2)	_____	_____	<input type="checkbox"/> Sludge (1)	_____	_____	

11

Substrate

Comments \_\_\_\_\_

## 2. INSTREAM COVER

Type (Check ALL that apply)	Amount (Check ONLY one)
<input checked="" type="checkbox"/> Undercut banks (1)	<input type="checkbox"/> Extensive (7)
<input checked="" type="checkbox"/> Overhanging vegetation (1)	<input checked="" type="checkbox"/> Moderate (5)
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<input type="checkbox"/> Deep pools (1)	
<input type="checkbox"/> Oxbows (1)	
<input type="checkbox"/> Boulders (1)	
<input type="checkbox"/> Aquatic macrophytes (1)	

9

Cover

Comments \_\_\_\_\_

## 3. CHANNEL MORPHOLOGY (Check ONLY one under each category)

Sinuosity	Development	Channelization	Stability	Other
<input type="checkbox"/> High (4)	<input type="checkbox"/> Excellent (4)	<input checked="" type="checkbox"/> None (4)	<input type="checkbox"/> High (3)	<input type="checkbox"/> Impound
<input checked="" type="checkbox"/> Moderate (3)	<input checked="" type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input checked="" type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input type="checkbox"/> Low (2)	<input type="checkbox"/> Fair (2)	<input type="checkbox"/> Recovering (2)	<input type="checkbox"/> Low (1)	<input type="checkbox"/> Leveed
<input type="checkbox"/> None (1)	<input type="checkbox"/> Poor (1)	<input type="checkbox"/> Recent or no Recovery (1)		

12

Channel

Comments \_\_\_\_\_

## 4. RIPARIAN ZONE AND BANK EROSION \*River right looking downstream\*

(Check single most predominant, on each bank, under each category)

Riparian Width	Flood Plain Quality	Bank Erosion
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<input type="checkbox"/> Narrow 5-10m (2)	<input type="checkbox"/> Rowcrop (1)	<input type="checkbox"/> Heavy (2)
<input type="checkbox"/> Very Narrow 1-5m (1)	<input type="checkbox"/> Conservation tillage (2)	<input type="checkbox"/> Severe (1)
<input type="checkbox"/> None (0)		
	<input checked="" type="checkbox"/> Forest, swamp (3)	
	<input type="checkbox"/> Shrub (4)	
	<input type="checkbox"/> Residential, Park (2)	
	<input type="checkbox"/> Urban	

10.5

Riparian

Comments \_\_\_\_\_

## 5. POOL/GLIDE AND RIFFLE/RUN QUALITY

Maximum Depth (Check 1)	Pool Cover (Check 1)	Overall Current Velocity (Check ALL that apply)	Morphology (Check 1)
<input type="checkbox"/> > 1m (3)	<input type="checkbox"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input type="checkbox"/> Pool width > riffle width (2)
<input checked="" type="checkbox"/> 0.7-1m (2)	<input checked="" type="checkbox"/> Moderate (2)	<input checked="" type="checkbox"/> Fast (1)	<input checked="" type="checkbox"/> Pool width = riffle width (1)
<input type="checkbox"/> 0.4-0.7m (1)	<input type="checkbox"/> Sparse (1)	<input checked="" type="checkbox"/> Moderate (1)	<input type="checkbox"/> Pool width < riffle width (0)
<input type="checkbox"/> < 0.4m (0)	<input type="checkbox"/> Nearly absent (0)	<input checked="" type="checkbox"/> Slow (1)	
<input type="checkbox"/> No Pool		<input type="checkbox"/> Intermittent (-2)	
		<input checked="" type="checkbox"/> Eddies (1)	
		<input type="checkbox"/> Interstitial (-1)	

13

Pool/  
Riffle

Riffle/Run Depth (Check 1)	Riffle/Run Substrate (Check 1)	Riffle/Run Substrate Quality (Check 1)
<input type="checkbox"/> Generally <10cm (1)	<input checked="" type="checkbox"/> Stable (cobble, boulder) (1)	<input type="checkbox"/> Embedded (0)
<input checked="" type="checkbox"/> Generally >10cm Max <50 (2)	<input type="checkbox"/> Unstable (gravel, sand) (0)	<input checked="" type="checkbox"/> Not embedded (1)
<input type="checkbox"/> Generally >10cm Max >50 (3)		
<input type="checkbox"/> No riffle (0)		

Comments \_\_\_\_\_

6. GRADIENT (ft/mi) 4.50

6

Gradient

7. DRAINAGE AREA (square mile) 37

10

Drainage Area

SITE **WCH-17** Location WOLF CREEK AT RICE COUNTY 8 S. OF DUNDAS

	1994	1995	1996
SUBSTRATE	9	11	11
INSTREAM COVER	11	9	9
CHANNEL MORPHOLOGY	14	12	12
RIPARIAN	10.5	10.5	10.5
CHANNEL QUALITY	11	13	13
GRADIENT 6			
DRAINAGE 10			
QHEI 1994	<b>71.5</b>	QHEI 1995	<b>71.5</b>
		QHEI 1996	<b>71.5</b>

EXTENT OF CHANGE IN LOCATION  
No change in location

RAPID HABITAT BIOASSESSMENT 1995 **204**

FISH COVER	16
MACRO COVER	15
EMBEDDEDNESS	16
VELOCITY\DEPTH	15
CHANNEL	17
SEDIMENT	14
RIFFLES	17
CHANNEL FLOW	18
BANK EROSION	18
VEGETATION	19
GRAZING	20
RIPARIAN	19

# WOLF CREEK (WCH-17)

Rice County 8 near South of Dundas

Riparian: Forest

Instream: cobble, gravel, sand, and silt

## Macroinvertebrate Metrics

<u>Metric</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>Average</u>	<u>Overall Impact</u>
QHEI	71.5	71.5	71.5	71.5	
ICI	22	30	38	30	Slight
Richness	11	19.5	22	17.5	Moderate
Diversity	2.3	2.8	2.9	2.7	Slight
Equitability	0.62	0.52	0.48	0.54	Slight
Scraper/Filterer Ratio	9.91	0.62	2.56		
Tolerance Range	2-7	2-8	2-9	2-7	

## Macroinvertebrate Taxa and Numbers of Individuals

[#] = Tolerance Values (Source is Illinois Environmental Protection Agency)

	<u>June 94</u>	<u>July 94</u>	<u>June 95</u>	<u>July 95</u>	<u>June 96</u>	<u>July 96</u>
<b>Leeches</b>						
Hirudinidae [7]	2	-	2	-	-	-
Erobdella [8]	-	-	-	1	-	-
<b>Amphipods</b>						
Gammarus [3]	6	66	1	13	-	269
<b>Gastropoda</b>						
Helisoma [7]	-	-	-	-	1	-
Physa [9]	-	-	-	-	-	2
<b>Stoneflies</b>						
Perlesta [3]	5	-	16	-	47	-
Pteronarcys [2]	-	-	-	-	-	1
<b>Beetles</b>						
Dubiraphia [5]	-	-	-	-	-	1
Optioservus [4]	21	-	7	2	12	31
Stenelmis [7]	69	4	23	3	119	25
Macronychus [2]	-	13	3	6	13	46
Agabus [?]	-	-	1	-	-	-
<b>Mayflies</b>						
Baetis [4]	-	1	3	9	5	4
Heptagenia [3]	73	12	84	14	22	94
Stenacron [4]	13	61	9	10	5	15
Stenonema [4]	-	-	4	1	10	11
Tricorythodes [5]	-	-	-	-	-	1
Leucrocuta [?]	-	-	-	2	-	4
<b>Caddisflies</b>						
Cheumatopsyche [6]105	-	4	13	19	1	80
Hydropsyche [5] 278	-	-	58	50	49	10
Pycnopsyche [3]	-	-	1	21	5	29
Helicopsyche [2]	-	-	-	-	1	-
<b>True Flies</b>						
Simuliidae [4-6]	-	-	-	286	3	1
Atherix [4]	-	-	-	-	-	1

**WOLF CREEK (WCH-17) Page 2**

**Midges**

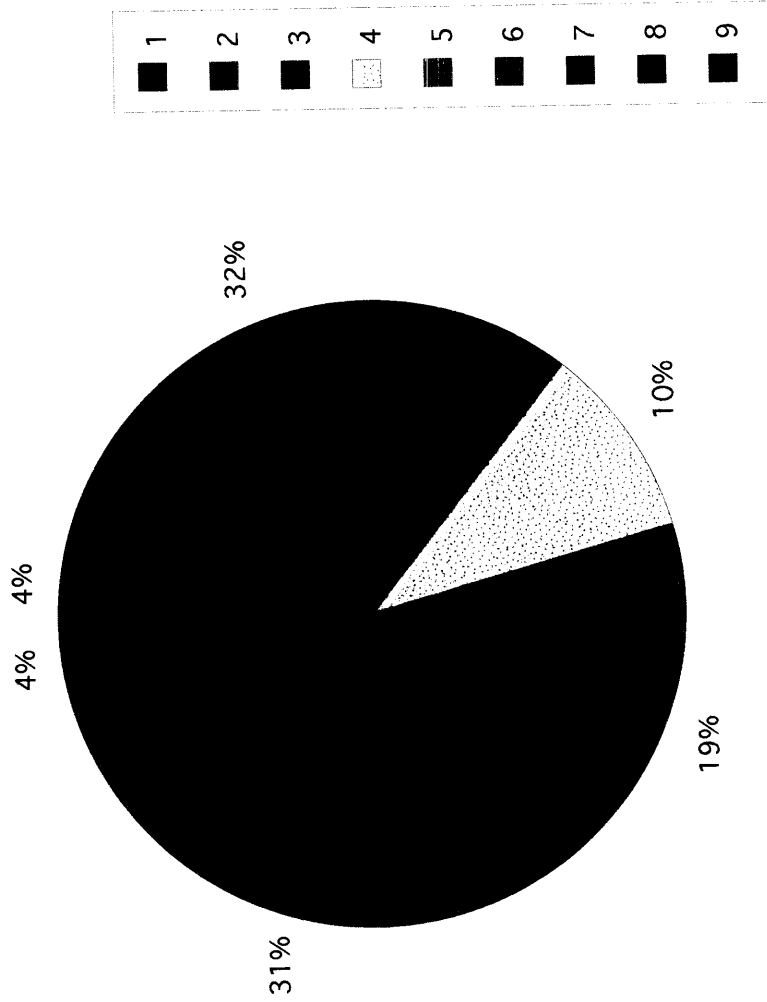
Brillia	[?]	-	-	3	-	-	-
Microtendipes	[6]	12	-	11	-	-	-
Polypedilum	[6]	140	-	33	12	4	7
Eukiefferiella	[4]	-	-	3	-	2	-
Rheotanytarsus	[6]	-	-	14	-	2	4
Parametriocnemus	[4]	4	-	-	-	-	-
Stenochironomus	[3]	-	-	-	2	-	4
Thienemannimyia	[6]	4	-	3	-	-	5
Nanoclaudius	[8]	-	-	3	-	-	-
Pentaneura	[3]	-	-	-	1	-	-
Nilotanypus	[?]	-	-	-	-	-	2

### Wolf Creek near Dundas (WCH-17)

Site	NUMBER OF INSECTS BY TOLERANCE RATING									TOTAL	PERCENT IN TOLERANCE RANK								
	1	2	3	4	5	6	7	8	9		1	2	3	4	5	6	7	8	9
WCH 1994	0	13	162	100	278	265	75	0	0	893	0%	1%	18%	11%	31%	30%	8%	0%	0%
WCH 1995	0	9	153	43	108	359	26	4	0	702	0%	1%	22%	6%	15%	51%	4%	1%	0%
WCH 1996	0	61	448	96	61	107	1	0	2	776	0%	8%	58%	12%	8%	14%	0%	0%	0%
WCH TOTAL	0	83	763	239	447	731	102	4	2	2371	0%	4%	32%	10%	19%	31%	4%	0%	0%

Percent Macroinvertebrates by Tolerance Rank

Tolerance Rank



## WOLF CREEK SOUTH OF DUNDAS [WCH]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
<b>SURFACE WATER</b>				
NITRATE NITROGEN	3.11	1.61	0.958	4.79
AMMONIA NITROGEN	0.121	0.028	LB	0.035
KJELDAHL NITROGEN	4.3	2.95	2.02	5.56
ORTHOPHOSPHATE	0.192	0.333	0.081	0.076
TOTAL PHOSPHORUS	0.32	0.42	0.148	0.155
<b>PORE WATER</b>				
NITRATE NITROGEN	1.57	0.311	0.749	2.77
AMMONIA NITROGEN	1.17	2.08	LB	0.035
KJELDAHL NITROGEN	6.67	3.48	2.57	4.98
ORTHOPHOSPHATE	0.295	0.039	0.027	0.024
TOTAL PHOSPHORUS	0.333	0.057	0.088	0.072
<b>STREAM LOAD</b>				
TURBIDITY	----	----	14	11
TOTAL SUSPENDED SOLIDS	----	----	22.41	20.03
TOTAL VOLATILE SOLIDS	----	----	8.93	5.38
CONDUCTIVITY	0.559	0.53	----	0.493
<b>OTHER</b>				
pH	7.9	8.9	8.2	8.5
ALKALINITY	----	----	180	240
TEMPERATURE	19.3	29.5	21	24.1

## WOLF CREEK SUMMARY

Wolf Creek is a 2nd order stream that drains 43 square miles west of Dundas. The stream flows through Fox and Circle Lakes in the mid reach area before flowing into the Cannon River near highway 3 south of Dundas. The gradient in the sample area is 4.5 feet/mile and the substrate is composed of cobble and gravel in the faster current and sand and silt in the slow current. This stream is a little larger than Heath Creek, but smaller than Chub and Prairie Creeks. The location of the artificial samplers did not change over the 3 years of the study and the QHEI score was consistent at 71.5 which was slightly above average.

There is good diversity in the macroinvertebrate community with 2 species of stoneflies, 5 species of beetles, 6 species of mayflies, and 4 species of caddisflies. The ICI, Diversity, and Equitability Indices were all in the slight impact range and Richness was in the upper part of the moderate range. Scrapers outnumbered filterers in 1994 and 1996, filterers dominated in 1995. This site had a higher number of beetles collected in the sampler than any other site during the 3 years of the study. In 1995 there was a very large number (286) of black fly larva collected in the July set. In 1996, the July set had 269 amphipods. The range of tolerance levels was primarily from 3 to 6 with 31% in rank 6, 19% in rank 5, 10% in rank 4, and 32% in rank 3. The tolerance rank tended to be lower (better) in 1996 than the previous 2 years.

Water temperature was warmer in July of 1995 than the other 2 years primarily because of a heat wave during the July sample period. Nitrogen values were low in both surface and pore water samples compared to most other sites. Phosphorus values however, were very high in 1994 and 1995 in surface water and pore water. During these 2 years there was a very dense algae bloom in the stream during the July sample period. The total phosphorus level was over .4 mg/l in the surface water. This algae bloom coincided with extremely high algae blooms in both Fox and Circle Lakes. In 1996 phosphorus levels were much lower and there was no major algae bloom in Wolf Creek during the sample period. TSS and TVS were low and in line with all of the other tributaries of similar flow and gradient.

It appears that phosphorus loading is a serious problem in this sub watershed and may be related to the phosphorus level in Fox and Circle Lakes. It is recommended that a study be conducted to determine the source of the phosphorus and determine if it has a cause and effect relationship with the algae blooms that occur in the lakes and the stream.