

LOWER CANNON AT RANDOLPH



Lower Cannon River near Randolph (LCR-12)

Location:

River mile: 32

U.S.G.S. quad: Randolph; 44093-E1

Township: T112N R18W S8

Lat./Long: 44°31'93"01'

Other info.:

Type: Small River

Stream Order 5

Drainage area:

Riparian: Old field and forest

Instream: Sand and gravel in faster current; silt in slow current

Gradient: 4.16 ft/mi



QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/19/95 River Mile 32 Watershed Number _____
 Location LCR-12 U.S.G.S. quad Randolph
 Township T112N R18W Section 8 Lat./Long. 44°31'93"01'

61

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)	_____	_____	<input checked="" type="checkbox"/> Silt covered (-1)
<input type="checkbox"/> Cobble (6)	_____	_____	<input checked="" type="checkbox"/> Sand (4)	_____	_____	<input type="checkbox"/> Silt free (1)
<input type="checkbox"/> Hardpan (3)	_____	_____	<input type="checkbox"/> Bedrock (3)	_____	_____	<input type="checkbox"/> Boulders as slabs (1)
<input type="checkbox"/> Silt (3)	_____	_____	<input type="checkbox"/> Detritus (2)	_____	_____	<input type="checkbox"/> Embedded (-2)
<input type="checkbox"/> Muck (2)	_____	_____	<input type="checkbox"/> Sludge (1)	_____	_____	

8

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 type="checkbox"/> Moderate (5)
<input type="checkbox"/> Shallows (in slow water) (1)	<input type="checkbox"/> Sparse (3)
<input checked="" type="checkbox"/> Logs or woody debris (1)	<input type="checkbox"/> Nearly absent (1)
<input checked="" type="checkbox"/> Deep pools (1)	
<input type="checkbox"/> Oxbows (1)	
<input type="checkbox"/> Boulders (1)	
<input type="checkbox"/> Aquatic macrophytes (1)	

7

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 type="checkbox"/> Moderate (3)	<input type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input checked="" type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input checked="" 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 checked="" type="checkbox"/> Poor (1)	<input type="checkbox"/> Recent or no Recovery (1)		

9

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
<input checked="" type="checkbox"/> Extensive >100m (3)	<input checked="" type="checkbox"/> Open pasture (1)	<input type="checkbox"/> None (5)
<input type="checkbox"/> Wide 50-100m (4)	<input type="checkbox"/> Fenced pasture (2)	<input checked="" type="checkbox"/> Little (4)
<input checked="" type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input type="checkbox"/> Moderate (3)
<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)		

10

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 checked="" type="checkbox"/> > 1m (3)	<input type="checkbox"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input type="checkbox"/> Pool width > riffle width (2)
<input type="checkbox"/> 0.7-1m (2)	<input type="checkbox"/> Moderate (2)	<input type="checkbox"/> Fast (1)	<input type="checkbox"/> Pool width = riffle width (1)
<input type="checkbox"/> 0.4-0.7m (1)	<input checked="" type="checkbox"/> Sparse (1)	<input checked="" type="checkbox"/> Moderate (1)	<input checked="" 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 type="checkbox"/> Eddies (1)	
		<input type="checkbox"/> Interstitial (-1)	

6

Pool/
Riffle

Riffle/Run Depth (Check 1)

- Generally <10cm (1)
- Generally >10cm Max <50 (2)
- Generally >10cm Max >50 (3)
- No riffle (0)

Riffle/Run Substrate (Check 1)

- Stable (cobble, boulder) (1)
- Unstable (gravel, sand) (0)

Riffle/Run Substrate Quality (Check 1)

- Embedded (0)
- Not embedded (1)

Comments _____

6. GRADIENT (ft/mi)

4.2

6

Gradient

7. DRAINAGE AREA (square mile)

991

15

Drainage Area

QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/11/96 River Mile 32 Watershed Number _____
 Location LCR-12 U.S.G.S. quad Randolph
 Township T112N R18W Section 8 Lat./Long. 44°31.03N 93°01.11W

60

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)	_____	_____	<input checked="" type="checkbox"/> Silt covered (-1)
<input type="checkbox"/> Cobble (6)	_____	_____	<input checked="" type="checkbox"/> Sand (4)	_____	_____	<input type="checkbox"/> Silt free (1)
<input type="checkbox"/> Hardpan (3)	_____	_____	<input type="checkbox"/> Bedrock (3)	_____	_____	<input type="checkbox"/> Boulders as slabs (1)
<input type="checkbox"/> Silt (3)	_____	_____	<input type="checkbox"/> Detritus (2)	_____	_____	<input type="checkbox"/> Embedded (-2)
<input type="checkbox"/> Muck (2)	_____	_____	<input type="checkbox"/> Sludge (1)	_____	_____	

8

Substrate

2. INSTREAM COVER

Type (Check ALL that apply)

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

6

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 type="checkbox"/> Moderate (3)	<input type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input checked="" type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input checked="" 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 checked="" type="checkbox"/> Poor (1)	<input type="checkbox"/> Recent or no Recovery (1)		

9

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

10

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 checked="" type="checkbox"/> > 1m (3) <input type="checkbox"/> 0.7-1m (2) <input type="checkbox"/> 0.4-0.7m (1) <input type="checkbox"/> < 0.4m (0) <input type="checkbox"/> No Pool	<input type="checkbox"/> Extensive (3) <input type="checkbox"/> Moderate (2) <input checked="" type="checkbox"/> Sparse (1) <input type="checkbox"/> Nearly absent (0)	<input type="checkbox"/> Torrential (-1) <input type="checkbox"/> Fast (1) <input checked="" type="checkbox"/> Moderate (1) <input checked="" type="checkbox"/> Slow (1) <input type="checkbox"/> Intermittent (-2) <input type="checkbox"/> Eddies (1) <input type="checkbox"/> Interstitial (-1)	<input type="checkbox"/> Pool width > riffle width (2) <input type="checkbox"/> Pool width = riffle width (1) <input checked="" type="checkbox"/> Pool width < riffle width (0)

6

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

6. GRADIENT (ft/mi)

_____ 4.2 _____

6

Gradient

7. DRAINAGE AREA (square mile)

_____ 991 _____

15

Drainage Area

SITE **LCR-12** Location LOWER CANNON NEAR RANDOLPH

	1994	1995	1996
SUBSTRATE	8	8	8
INSTREAM COVER	6	7	6
CHANNEL MORPHOLOGY	9	9	9
RIPARIAN	10	10	10
CHANNEL QUALITY	6	6	6
GRADIENT 6			
DRAINAGE 15			
QHEI 1994	60	QHEI 1995	61
		QHEI 1996	60

EXTENT OF CHANGE IN LOCATION
No change in location

RAPID HABITAT BIOASSESSMENT 1995 **150**

FISH COVER	15
MACRO COVER	5
EMBEDDEDNESS	8
VELOCITY\DEPTH	11
CHANNEL	18
SEDIMENT	5
RIFFLES	6
CHANNEL FLOW	15
BANK EROSION	13
VEGETATION	15
GRAZING	20
RIPARIAN	19

LOWER CANNON RIVER (LCR-12)

Near Randolph

Riparian: Forest, old field, and pasture

Instream: Gravel, sand, and silt

Macroinvertebrate Metrics		1994	1995	1996	Average	Overall Impact
Metric		60	61	60	60.3	
QHEI		33	34	35	34	Slight
ICI		13	18	28.5	19.8	Slight
Richness		1.6	2.5	3.1	2.4	Slight
Diversity		0.3	0.42	0.49	0.40	Moderate
Equitability		0.09	0.28	0.80		
Scraper/Filterer Ratio		2-6	2-10	1-10	2-7	
Tolerance Range						

Macroinvertebrate Taxa and Numbers of Individuals

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

	June 94	July 94	June 95	July 95	June 96	July 96
Amphipods					16	-
Gammarus [3]	-	-	-	-	-	2
Gastropoda						5
Ferrissa [7]	-	-	-	-	-	-
Physa [9]	-	-	-	-	-	-
Stoneflies			15		32	-
Perlesta [3]	14	-	2	4	1	-
Pteronarcys [2]	5	-	-	-	-	-
Beetles					1	-
Dubiraphia [5]	-	-	-	2	-	-
Optioservus [4]	-	-	-	-	1	2
Stenelmis [7]	-	-	-	-	4	1
Macronychus [2]	-	-	-	-	-	5
Dineutus [4]	-	-	-	-	-	-
Mayflies					3	-
Baetis [4]	-	-	-	-	212	4
Heptagenia [3]	15	1	68	-	12	6
Stenacron [4]	-	-	1	-	73	27
Stenonema [4]	44	99	15	146	79	-
Isonychia [3]	10	-	11	-	10	-
Pseudocloeon [4]	-	-	-	-	2	2
Caenis [6]	2	-	8	-	13	153
Tricorythodes [5]	21	2	24	2	37	-
Ephoron [2]	-	-	-	-	5	-
Dannella [2]	-	-	-	-	-	2
Leucrocuta [?]	-	-	-	-	-	-
Caddisflies					64	1
Cheumatopsyche [6]396		876	160	528	64	1
Hydropsyche [5] 203		222	72	253	120	-
Pycnopsyche [3]	-	-	1	-	-	1
Polycentropus [3]	-	-	1	-	-	-
Potamyia [4]	-	-	-	-	3	-
Ceraclea [3]	-	-	-	-	25	1
Nyctiophylax [1]	-	-	-	-	-	-
True Flies						2
Hemerodromia [6]	-	-	-	-	-	-
Atherix [4]	1	-	-	-	-	-

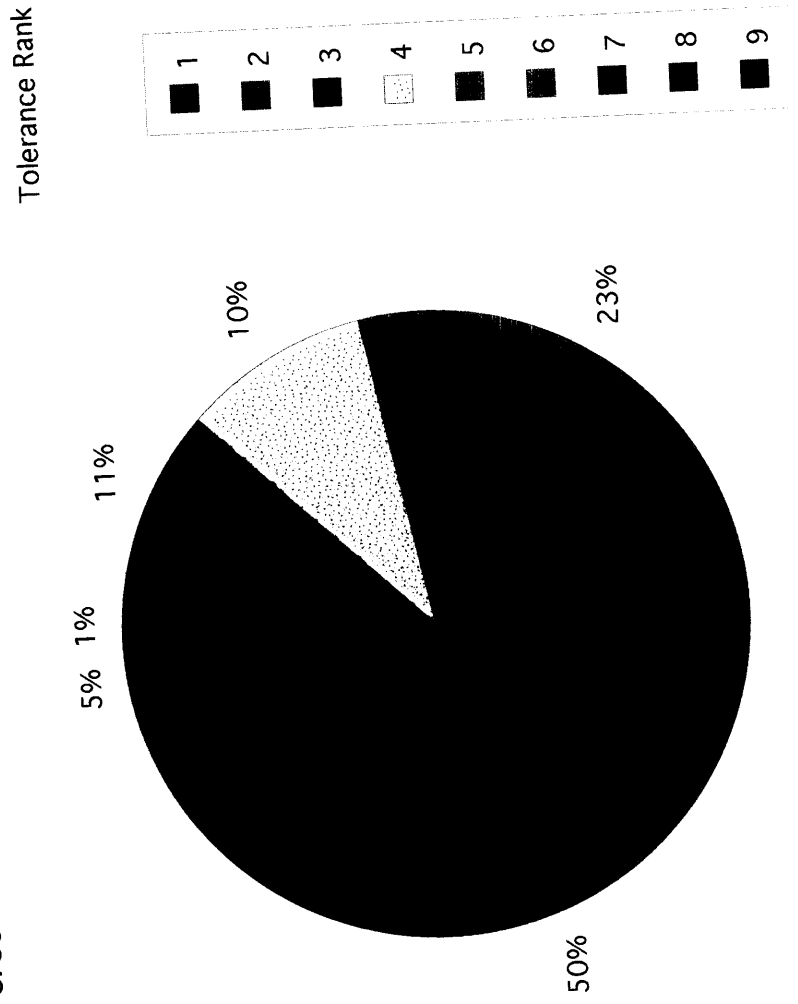
LOWER CANNON RIVER (LCR-12) page 2

Midges							
Ablabesmyia	[6]	-	-	-	-	18	-
Brillia	[?]	-	-	-	-	15	-
Cricotopus	[8]	-	-	2	-	30	-
Microtendipes	[6]	-	-	-	7	-	3
Dicrotendipes	[6]	-	-	-	7	21	193
Glytotendipes	[10]	-	-	-	91	18	3
Polypedilum	[6]	1	23	1	49	-	-
Rheotanytarsus	[6]	2	4	7	-	9	3
Paratanytarsus	[?]	-	-	-	-	3	-
Parametriocnemus	[4]	-	-	-	-	9	-
Nanocladius	[6]	-	-	1	-	6	6
Thienemannimyia	[6]	3	-	1	-	-	-
Pentaneura	[3]	-	-	1	7	-	-
Cryptochironomus	[8]	-	-	1	-	-	-
Stenochironomus	[3]	1	2	1	7	21	3
Parachironomus	[8]	-	-	-	-	3	-
Rheocricotopus	[6]	-	-	-	-	3	-
Cladopelma	[?]	-	-	-	-	-	16

Lower Cannon at Randolph (LCR-12)

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
LCR 1994	0	5	43	144	448	1307	0	0	0	1947	0%	0%	2%	7%	23%	67%	0%	0%	
LCR 1995	0	6	97	164	351	853	0	3	0	1474	0%	0%	7%	11%	24%	58%	0%	0%	
LCR 1996	1	48	369	142	287	163	5	15	219	1249	0%	4%	30%	11%	23%	13%	1%	18%	
LCR TOTAL	1	59	509	450	1086	2323	5	18	219	4670	0%	1%	11%	10%	23%	50%	0%	5%	

Percent Macroinvertebrates by Tolerance Rank



LOWER CANNON SOUTH OF RANDOLPH [LCR]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
SURFACE WATER				
NITRATE NITROGEN	3.18	----	4.5	3.3
AMMONIA NITROGEN	0.067	----	0.021	0.021
KJELDAHL NITROGEN	3.92	----	4.9	4.88
ORTHOPHOSPHATE	0.038	----	0.2	0.122
TOTAL PHOSPHORUS	0.086	----	0.281	0.179
PORE WATER				
NITRATE NITROGEN	0.074	----	----	----
AMMONIA NITROGEN	4.25	----	----	----
KJELDAHL NITROGEN	8.87	----	----	----
ORTHOPHOSPHATE	0.093	----	----	----
TOTAL PHOSPHORUS	0.225	----	----	----
STREAM LOAD				
TURBIDITY	----	----	9	12
TOTAL SUSPENDED SOLIDS	----	----	27.86	19.11
TOTAL VOLATILE SOLIDS	----	----	8.46	5.11
CONDUCTIVITY	0.589	0.637	0.588	0.603
OTHER				
pH	8.6	----	8.4	8.5
ALKALINITY	----	----	260	260
TEMPERATURE	23.8	----	24.9	----

LOWER CANNON AT RANDOLPH

The Lower Cannon at Randolph is a 5th order stream that drains 991 square miles. The sample site is at river mile 32, about a mile upstream of the Lake Byllesby Reservoir. There is no real riffle in the area and the stream gradient is only 4.1 feet/mile. The stream is beginning to slow at this location and there are significant deposits of silt, especially when the flow is low. In the main current, the substrate is composed primarily of gravel and sand. The QHEI at this site is 60, scoring lowest in riffle/run quality and instream cover. flow was not determined at this location as it was impossible to cross the stream during much of the year at this location.

The predominant species at this location were caddisflies, mayflies, and midges. The number of mayflies and midges collected increased over the course of the study while the number of caddisflies decreased. The 1996 set had the highest number of insects in tolerance rank 3 whereas the 1994 and 95 highest tolerance rank was 6. Fifty percent of the insects collected were in tolerance rank 6. Overall, the total number of insects collected decreased each year during the course of the study, however the diversity increased. Eleven different mayflies, 4 different beetles, six different caddisflies, and fourteen different midges were in the 1996 collection. All indices were in the slight impact range except for the Equitability Index which was in the moderate range. Filterers outnumbered the scrapers each year of the study.

Nitrate and total nitrogen values are all below 5.0 mg/L. It should be noted that the nitrogen values are very low at the Upper Cannon River at Morrystown and increase at the Cannon River at Dundas and continue to increase slightly higher at the Cannon River near Randolph. The increase could be a response to the higher nitrogen concentration of the Straight River flowing into the Cannon River at Faribault. The nitrogen concentration at Faribault does not show the increase because the site where the sampling was done is only about 100 feet downstream from where the Straight River and Cannon River come together. We sampled on the Cannon River side of the stream and it is likely that mixing had not yet taken place. Phosphorus values for the Straight River (greater than .25 mg/L) are much higher than the Cannon River (less than .25 mg/L) and are probably the reason for increases as you go downstream from Faribault. Whenever water slows, as in a reservoir behind a dam, some of the phosphorus begins to settle out and the phosphorus values begin to decrease. The dam at Northfield appears to have a little of this effect, however the Lake Byllesby Reservoir has a much longer retention time and seems to remove more phosphorus. The TSS and TVS values were much lower than expected at this location, however this may be due to the fact that in June the water in the reservoir was backed up all the way to this site and the flow in July was low and there was little current at the time of either sampling. The substrate, however, was covered with a layer of silt that had settled out at this location indicating that sediment load is a problem at this site. Alkalinity and pH values indicate there are no problems with acidity at this site.