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**: 61  
**Location**: LCR-12  
**U.S.G.S. quad**: Randolph  
**Total QHEI**: 61  

#### 1. Substrate

- **Type**  
  - [ ] Boulder (7)  
  - [ ] Cobble (6)  
  - [ ] Hardpan (3)  
  - [ ] Silt (3)  
  - [ ] Muck (2)  

- **Quality**  
  - [ ] Gravel (5)  
  - [ ] Sand (4)  
  - [ ] Bedrock (3)  
  - [ ] Detritus (2)  
  - [ ] Sludge (1)  

- **% Pool/Riffle substrates optional.**

#### 2. Instream Cover

- **Type**  
  - [ ] Undercut banks (1)  
  - [ ] Overhanging vegetation (1)  
  - [ ] Shallows (in slow water) (1)  
  - [ ] Logs or woody debris (1)  
  - [ ] Deep pools (1)  
  - [ ] Oxbows (1)  
  - [ ] Boulders (1)  
  - [ ] Aquatic macrophytes (1)  

- **Amount**  
  - [ ] Extensive (7)  
  - [ ] Moderate (5)  
  - [ ] Sparse (3)  
  - [ ] Nearly absent (1)  

#### 3. Channel Morphology

- **Sinuosity**  
  - [ ] High (4)  
  - [ ] Moderate (3)  
  - [ ] Low (2)  
  - [ ] None (1)  

- **Channelization**  
  - [ ] None (4)  
  - [ ] Recovered (3)  
  - [ ] Recent (2)  
  - [ ] Recovery (1)  

- **Stability**  
  - [ ] High (3)  
  - [ ] Moderate (2)  
  - [ ] Low (1)  

- **Other**  
  - [ ] Impound  
  - [ ] Islands  
  - [ ] Leveed

#### 4. Riparian Zone and Bank Erosion

- **Riparian Width**  
  - [ ] Extensive >100m (3)  
  - [ ] Wide 50-100m (4)  
  - [ ] Moderate 10-50m (3)  
  - [ ] Narrow 5-10m (2)  
  - [ ] None (0)  

- **Flood Plain Quality**  
  - [ ] Open pasture (1)  
  - [ ] Fenced pasture (2)  
  - [ ] Old field (3)  
  - [ ] Rowcrop (1)  
  - [ ] Conservation tillage (2)  

- **Bank Erosion**  
  - [ ] None (5)  
  - [ ] Little (4)  
  - [ ] Moderate (3)  
  - [ ] Heavy (2)  
  - [ ] Severe (1)  

#### 5. Pool/Glide and Riffle/Run Quality

- **Maximum Depth**  
  - [ ] >1m (3)  
  - [ ] 0.7-1m (2)  
  - [ ] 0.4-0.7m (1)  
  - [ ] <0.4m (0)  

- **Pool Cover**  
  - [ ] Extensive (3)  
  - [ ] Moderate (2)  
  - [ ] Sparse (1)  
  - [ ] Nearly absent (0)  

- **Overall Current Velocity**  
  - [ ] Torrential (-1)  
  - [ ] Intermittent (-2)  
  - [ ] Fast (1)  
  - [ ] Eddies (1)  
  - [ ] Moderate (1)  
  - [ ] Interstitial (-1)  
  - [ ] Slow (1)  

- **Morphology**  
  - [ ] Pool width> riffle width (2)  
  - [ ] Pool width = riffle width (1)  
  - [ ] Pool width < riffle width (0)  

- **Riffle/Run Substrate**  
  - [ ] Stable (cobble, boulder) (1)  
  - [ ] Unstable (gravel, sand) (0)  

- **Riffle/Run Substrate Quality**  
  - [ ] Embedded (0)  
  - [ ] Not embedded (1)  

#### 6. Gradient

- **(ft/mi)**  
  - [ ] 4.2

#### 7. Drainage Area

- **(square mile)**  
  - [ ] 991

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**Comments**
QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

1. **SUBSTRATE** (Check ONLY two substrate TYPES). % Pool/Riffle substrates optional.
   - **Type**
     - Boulder (7)
     - Cobble (6)
     - Hardpan (3)
     - Silt (3)
     - Muck (2)
     - **Type**
     - Gravel (5)
     - Sand (4)
     - Bedrock (3)
     - Detritus (2)
     - Sludge (1)
   - **Quality**
     - Check all that apply:
       - Silt covered (-1)
       - Silt free (1)
       - Boulders as slabs (1)
       - Embedded (-2)

2. **INSTREAM COVER**
   - **Type** (Check ALL that apply)
     - Undercut banks (1)
     - Overhanging vegetation (1)
     - Shallow (in slow water) (1)
     - Logs or woody debris (1)
     - Deep pools (1)
     - Oxbows (1)
     - Boulders (1)
     - Aquatic macrophytes (1)
   - **Amount** (Check ONLY one)
     - Extensive (7)
     - Moderate (5)
     - Sparse (3)
     - Nearly absent (1)

3. **CHANNEL MORPHOLOGY** (Check ONLY one under each category)
   - **Sinuosity**
     - High (4)
     - Moderate (3)
     - Low (2)
     - None (1)
   - **Development**
     - Excellent (4)
     - Good (3)
     - Fair (2)
     - Poor (1)
   - **Channelization**
     - None (4)
     - Recovered (3)
     - Recovering (2)
     - Recent or no Recovery (1)
   - **Stability**
     - High (3)
     - Moderate (2)
     - Low (1)
   - **Other**
     - Impound
     - Islands
     - Leveed

4. **RIPARIAN ZONE AND BANK EROSION**
   - *River right looking downstream*
   - **Riparian Width**
     - Extensive >100m (5)
     - Wide 50-100m (4)
     - Moderate 10-50m (3)
     - Narrow 5-10m (2)
     - Very Narrow 1-5m (1)
     - None (0)
   - **Flood Plain Quality**
     - Open pasture (1)
     - Fenced pasture (2)
     - Old field (3)
     - Rowcrop (1)
     - Conservation tillage (2)
   - **Bank Erosion**
     - None (5)
     - Little (4)
     - Moderate (3)
     - Heavy (2)
     - Severe (1)

5. **POOL/GLIDE AND RIFFLE/RUN QUALITY**
   - **Maximum Depth**
     - > 1m (3)
     - 0.7-1m (2)
     - 0.4-0.7m (1)
     - < 0.4m (0)
     - No Pool
   - **Pool Cover**
     - Extensive (3)
     - Moderate (2)
     - Sparse (1)
     - Nearly absent (0)
   - **Overall Current Velocity**
     - Torrential (-1)
     - Intermittent (-2)
     - Fast (1)
     - Eddies (1)
     - Moderate (1)
     - Interstitial (-1)
     - Slow (1)
   - **Morphology**
     - Pool width > riffle width (2)
     - Pool width = riffle width (1)
     - Pool width < riffle width (0)

6. **Gradient**
   - ft/mi
   - 4.2

7. **DRAINAGE AREA**
   - (square mile)
   - 991

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**Date** 6/11/96  
**River Mile** 32  
**Watershed Number** 60  
**Location** LCR-12  
**Towmpship** T112N R18W  
**Lat./Long.** 44°31.03N 93°01.11W  
**Total QHEI** 88

**Comments**
SITE: LCR-12 | Location: LOWER CANNON NEAR RANDOLPH

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RAPID HABITAT BIOASSESSMENT 1995: 150

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

EXTENT OF CHANGE IN LOCATION
No change in location
## LOWER CANNON RIVER (LCR-12)

Near Randolph  
Riparian: Forest, old field, and pasture  
Instream: Gravel, sand, and silt

### Macroinvertebrate Metrics

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### Percent Macroinvertebrates by Tolerance Rank

- **5%**
- **11%**
- **23%**
- **50%**
- **10%**

**Tolerance Rank**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
## LOWER CANNON SOUTH OF RANDOLPH [LCR]

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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 Bylesby 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 Morristown 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 Bylesby 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.