

PRAIRIE CREEK NEAR RANDOLPH



Prairie Creek near Randolph (PCR-8)

Location:

River mile: 30

U.S.G.S. quad: Cannon Falls; 44092-E8

Township: T112N R18W S16

Lat./Long: 44°30'/93°59'30"

Other info.:

Type: Midsize stream 1/2 mile from the mouth

Stream Order: 4

Drainage area: 87 square miles

Riparian: Forest, Old field

Instream: Cobble, gravel, sand, and dusting of silt in slow current and pools

Gradient: 10.89 ft/mi



QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/16/95 River Mile 30 Watershed Number _____
 Location PCR-8 U.S.G.S. quad Cannon Falls
 Township T112N R18W Section 16 Lat./Long. 44°30'93°59'30"

78.5

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

11

Substrate

Comments _____

2. INSTREAM COVER

Type (Check ALL that apply)

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

12

Cover

Comments _____

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

Sinuosity	Development	Channelization	Stability	Other
<input checked="" type="checkbox"/> High (4)	<input checked="" 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 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)		

14

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
L R	L R	L R
<input type="checkbox"/> Extensive >100m (3)	<input 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 checked="" type="checkbox"/> Old field (3)	<input checked="" 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)		
	<input type="checkbox"/> Forest, swamp (3)	
	<input type="checkbox"/> Shrub (4)	
	<input type="checkbox"/> Residential, Park (2)	
	<input type="checkbox"/> Urban	

9.5

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 checked="" type="checkbox"/> Pool width > riffle width (2)
<input checked="" type="checkbox"/> 0.7-1m (2)	<input checked="" 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 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			

11

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

Comments _____

6. GRADIENT
(ft/mi)

10.9

10

Gradient

7. DRAINAGE AREA
(square mile)

87

11

Drainage Area

QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/11/96 River Mile 31 Watershed Number _____
 Location PCR-8 U.S.G.S. quad Cannon Falls
 Township T112N R18W Section 16 Lat./Long. 44 30.03N 92 59.55W

80

Total QHEI

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

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

12

Substrate

2. INSTREAM COVER

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

11

Cover

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

Sinuosity	Development	Channelization	Stability	Other
<input checked="" 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 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 _____				

13

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

11

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 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 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			
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; text-align: center;"> <h2 style="margin: 0;">12</h2> <p style="margin: 0;">Pool/ Riffle</p> </div>
<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)			

6. GRADIENT (ft/mi) _____

10

Gradient

7. DRAINAGE AREA (square mile) _____

11

Drainage Area

SITE **PCR-8** Location PRAIRIE CREEK NEAR LAKE BYLLESBY

	1994	1995	1996
SUBSTRATE	14	11	12
INSTREAM COVER	7	12	11
CHANNEL MORPHOLOGY	14	14	13
RIPARIAN	9.5	9.5	11
CHANNEL QUALITY	13	11	12
GRADIENT 10 DRAINAGE 11	QHEI 1994 78.5	QHEI 1995 78.5	QHEI 1996 80

EXTENT OF CHANGE IN LOCATION
 Moved upstream to south side of road instead of north of road. This location has a true riffle/run where the other did not. Total distance moved is about 50 meters.

RAPID HABITAT BIOASSESSMENT 1995 **210**

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

PRAIRIE CREEK (PCR-8)

Near Randolph, 1 mile South of Lake Byllesby

Riparian: Forest, old field

Instream: Cobble, gravel, sand

Macroinvertebrate Metrics

<u>Metric</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>Average</u>	<u>Overall Impact</u>
QHEI	78.5	78.5	80	79	
ICI	31	30	40	34	Slight
Richness	11.5	16.5	29.5	19.2	Slight
Diversity	1.6	3.1	4.0	3.0	Slight
Equitability	0.33	0.7	0.81	0.61	Non Impacted
Scraper/Filterer Ratio	0.2	5.03	5.17		
Tolerance Range	2-8	1-8	1-8	2-6	

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>
Leeches						
Hirudinae [8]	-	4	-	-	-	-
Stoneflies						
Perlesta [3]	18	-	70	-	34	-
Pteronarcys [2]	1	5	5	1	1	4
Phasganophora [?]	-	-	-	-	23	-
Beetles						
Dubiraphia [5]	-	-	-	-	1	6
Optioservus [4]	-	-	2	-	1	7
Stenelmis [7]	7	-	-	-	15	2
Macronychus [2]	-	1	-	4	32	19
Ancyronyx [2]	-	-	-	1	-	-
Mayflies						
Baetis [4]	-	1	-	-	39	-
Ephemerella [2]	-	-	-	-	10	-
Heptagenia [3]	3	33	40	9	62	20
Stenacron [4]	-	-	2	6	-	11
Stenonema [4]	4	24	10	16	51	44
Isonychia [3]	1	2	1	-	32	1
Caenis [6]	-	-	-	-	-	-
Tricorythodes [5]	-	1	-	-	-	25
Pseudocloeon [4]	-	-	-	-	24	-
Leucrocuta [?]	-	-	-	-	-	2
Dannella [2]	-	-	-	-	1	-
Caddisflies						
Brachycentrus [1]	-	-	3	42	1	10
Cheumatopsyche [6]	-	-	2	1	6	9
Hydropsyche [5]	67	-	16	-	10	-
Pycnopsyche [3]	1	-	-	1	1	11
Hydroptila [2]	-	-	-	-	11	-
Polycentropus [3]	-	-	-	2	-	1
Nectopsyche [3]	-	-	-	-	-	8
Ceraclea [3]	-	-	-	-	2	-
True Flies						
Simuliidae [4-6]	-	-	-	-	-	1
Hemerodromia [6]	-	-	-	-	3	-
Atherix [4]	3	-	1	-	11	1
Dicranota [4]	-	-	-	-	-	2

PRAIRIE CREEK (PCR-8) page 2

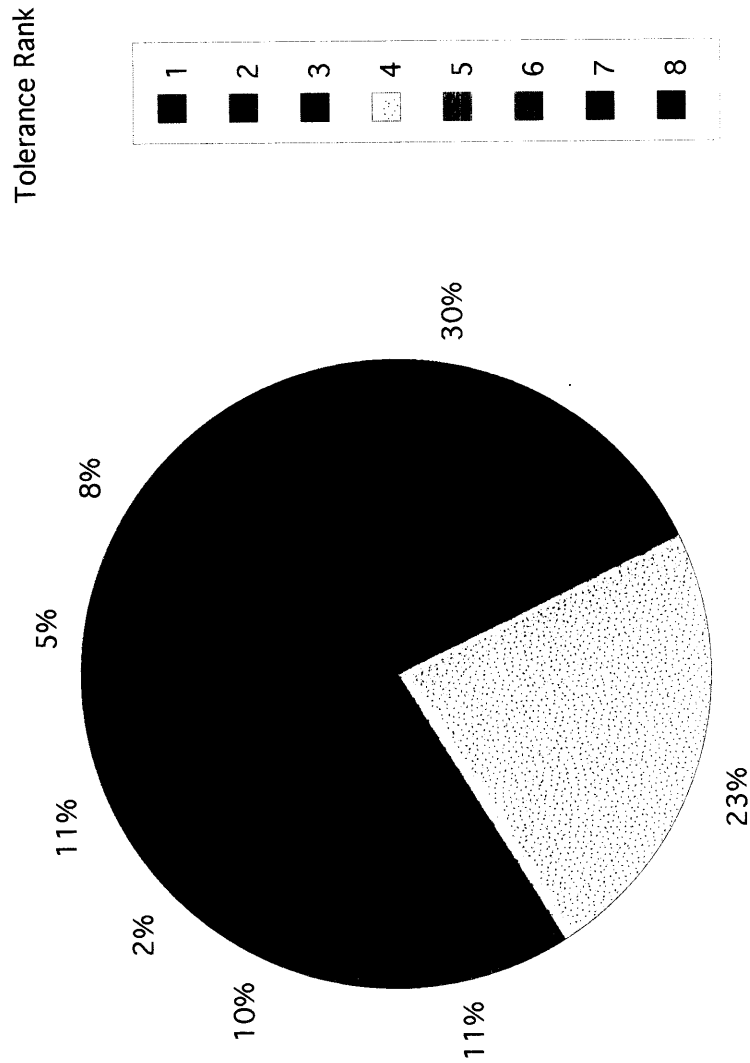
Midges

Brillia [?]	-	-	-	-	4	-
Cricotopus [8]	-	2	-	-	127	-
Microtendipes [6]	-	-	1	1	-	14
Polypedilum [6]	-	2	11	2	15	2
Eukiefferiella [4]	-	1	-	-	7	-
Microcricotopus [?]	-	-	-	-	7	-
Paratanytarsus [?]	-	-	-	-	4	-
Thienemannimyia [6]	-	1	1	2	-	6
Rheocricotopus [6]	-	-	-	-	-	2
Stenochironomus [3]	-	-	-	-	-	4
Rheotnytarsus [6]	-	-	-	-	-	6
Ablabesmyia [6]	-	-	-	-	-	24
Procladius [8]	-	-	-	1	-	-
Phaenopsectra [4]	-	-	-	2	-	-
Parametrioconemus [4]	-	-	-	-	7	-

Prairie Creek at Randolph (PCR-8)

Site	NUMBER OF INSECTS BY TOLERANCE RATING									PERCENT IN TOLERANCE RANK									
	1	2	3	4	5	6	7	8	9	TOTAL	1	2	3	4	5	6	7	8	9
PCR 1994	0	7	57	33	68	3	7	6	0	181	0%	4%	31%	18%	38%	2%	4%	3%	0%
PCR 1995	45	10	123	39	16	21	0	1	0	255	18%	4%	48%	15%	6%	8%	0%	0%	0%
PCR 1996	11	78	176	204	42	90	17	127	0	745	1%	10%	24%	27%	6%	12%	2%	17%	0%
PCR TOTAL	56	95	356	276	126	114	24	134	0	1181	5%	8%	30%	23%	11%	10%	2%	11%	0%

PERCENT MACROINVERTEBRATE BY TOLERANCE RANK



PRAIRIE CREEK NEAR RANDOLPH [PCR]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
SURFACE WATER				
NITRATE NITROGEN	3.48	3.92	5.26	3.55
AMMONIA NITROGEN	0.04	0.048	0.002	LB
KJELDAHL NITROGEN	3.94	4.54	5.34	3.74
ORTHOPHOSPHATE	0.005	0.015	0.008	0.006
TOTAL PHOSPHORUS	0.025	0.069	0.051	0.046
PORE WATER				
NITRATE NITROGEN	0.661	3.34	5.35	2.08
AMMONIA NITROGEN	0.656	0.087	0.298	0.417
KJELDAHL NITROGEN	5.75	3.79	6.15	2.98
ORTHOPHOSPHATE	0.038	0.019	0.012	0.007
TOTAL PHOSPHORUS	0.118	0.026	0.053	0.046
STREAM LOAD				
TURBIDITY	----	----	8	13
TOTAL SUSPENDED SOLIDS	----	----	21.35	20.36
TOTAL VOLATILE SOLIDS	----	----	6.21	5.23
CONDUCTIVITY	0.634	0.627	0.631	0.615
OTHER				
pH	8.4	8.6	8.2	8.3
ALKALINITY	----	----	300	260
TEMPERATURE	20.1	24.9	19.4	20.2

PRAIRIE CREEK NEAR RANDOLPH

Prairie Creek near Randolph is a 4th order stream with a drainage area of 87 square miles. The sample site is located about one half mile upstream from the mouth which empties into the Cannon River at the upper end of the Lake Byllesby Reservoir. The substrate is made up of cobble in the faster moving rapids, gravel and sand in the runs, and a dusting of silt in the slow current and pools. The average gradient is 10.9 feet per second. In 1995 the sample site was moved up stream from the 1994 location to a better defined riffle area. There are 3 large cement culverts that serve as the channel path for the stream under the road. In 1995 the Corps of Engineers dug out part of the east side of the channel in order to allow water to flow through the east culvert which was 60% silted shut. The QHEI at this site is 80, which is the highest score for any stream in the watershed. This site had a variety of riffles, runs, and pools and scored very high in channel morphology. The amount flow in this tributary ranks behind the Little Cannon, Belle Creek, and Chub Creek of the Lower Cannon tributaries.

The richness of species at this site was very broad with 3 types of stoneflies, 5 types of beetles, 11 types of mayflies, 8 types of caddisflies, 5 types of true flies, and 15 types of midges. The density of the populations was evenly distributed among the different species. The number of insects collected increased significantly from the first through third year of the study. Scrapers outnumbered filterers by a 5 to 1 ratio. The richness index was in the lower end of the slightly impacted range, however all other indices were in the top of the slightly impacted range or bottom of the non impacted range. The tolerance range was from 2 - 6 with 66% of the insects in tolerance range 1- 4 (5% rank 1, 8% rank 2, 30% rank 3, and 23% rank 4).

Chemistry results for the site were very good as well. Nitrogen values were in the 3 - 6 mg/l range for both surface and pore water. Phosphorus values were less than .07 for all sample periods except one when it reached 0.118 in July of 1994. TSS and TVS results were the lowest of all the sites tested. Water temperature ranked just behind Pine and Belle for the lowest in the watershed.

The amazing thing about this site is the fact that the Lake Byllesby Reservoir downstream from the site is severely impacted and the mid reach site on Prairie Creek is moderately impacted. However, this site, which lies between these two locations is one of the least impacted of all the sites monitored in the Cannon River Watershed.