

PRAIRIE CREEK AT GOODHUE AVENUE



Prairie Creek at 100th Street East (PCH-9.1)

Location:

River mile: 30

U.S.G.S. quad: Dennison; 44093-D1

Township: T111N R19W S1

Lat./Long: 44°26'/93°03'30"

Other info.:

Type: Small stream in the midreach

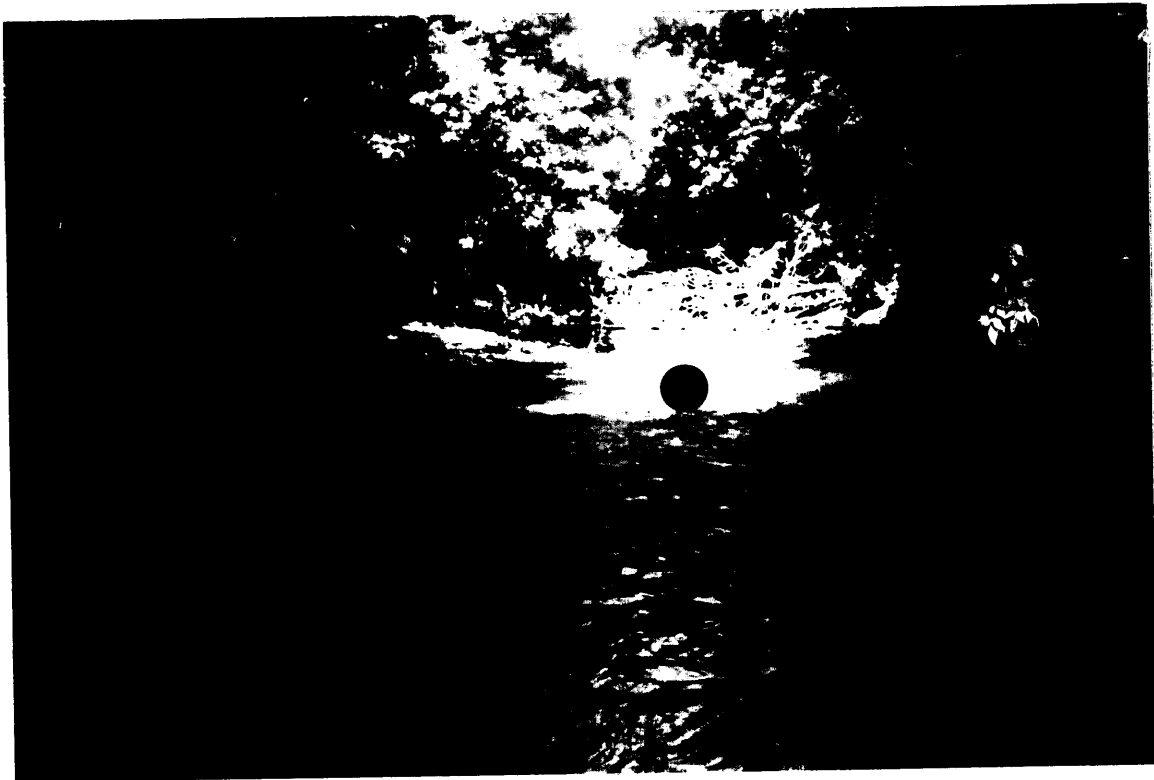
Stream Order: 4

Drainage area: 65 square miles

Riparian: Wooded area near fields with row crops

Instream: Gravel and sand with some cobble in current, silt in slow current

Gradient: ft/mi 9.2



QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/14/95 River Mile 31 Watershed Number _____
 Location PCH-9.1 U.S.G.S. quad Dennison
 Township T11N R19W Section 1 Lat./Long. 44°26'//93°03'30"

63

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)	_____	_____	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)
<input type="checkbox"/> Cobble (6)	_____	_____	<input checked="" 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 _____						

9

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 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 checked="" type="checkbox"/> Deep pools (1)	
<input type="checkbox"/> Oxbows (1)	
<input type="checkbox"/> Boulders (1)	
<input type="checkbox"/> Aquatic macrophytes (1)	
Comments _____	

8

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 checked="" 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 _____				

10

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 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 checked="" type="checkbox"/> Narrow 5-10m (2)	<input checked="" 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 (0)		
Comments _____		

6

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 type="checkbox"/> Intermittent (-2)	
		<input type="checkbox"/> Eddies (1)	
		<input checked="" type="checkbox"/> Slow (1)	
<input type="checkbox"/> No Pool		<input type="checkbox"/> Interstitial (-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 type="checkbox"/> Stable (cobble, boulder) (1)	<input type="checkbox"/> Embedded (0)
<input checked="" type="checkbox"/> Generally >10cm Max <50 (2)	<input checked="" 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 _____		

11

Pool/
Riffle

6. GRADIENT (ft/mi) 9.2

8

Gradient

7. DRAINAGE AREA (square mile) 65

11

Drainage Area

QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/11/96 River Mile 31 Watershed Number _____
 Location PCH-9.1 U.S.G.S. quad Dennison
 Township T11NR19W Section 13 Lat./Long. 44°26.59N 93°02.67W

59

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

8

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 type="checkbox"/> Moderate (5) <input checked="" 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 _____	

7

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)		
Comments _____				

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	L R	L R
<input type="checkbox"/> Extensive >100m (5)	<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 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)		
Comments _____		

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 type="checkbox"/> > 1m (3)	<input type="checkbox"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input checked="" 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 checked="" type="checkbox"/> 0.4-0.7m (1)	<input checked="" 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 _____			

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

6. GRADIENT (ft/mi) _____

8

Gradient

7. DRAINAGE AREA (square mile) _____

11

Drainage Area

SITE **PCH-9.1** Location PRAIRIE CREEK NEAR DENNISON [MIDREACH]

	1994	1995	1996
SUBSTRATE	6	9	8
INSTREAM COVER	7	8	7
CHANNEL MORPHOLOGY	9	10	9
RIPARIAN	8	6	10
CHANNEL QUALITY	7	11	6

GRADIENT 8
DRAINAGE 11

QHEI 1994 **56** QHEI 1995 **63** QHEI 1996 **59**

EXTENT OF CHANGE IN LOCATION
 Moved location downstream about a mile and one half due to unfriendly owners. This location has a true riffle/run and is below the confluence of a major tributary which drains much of the area west of Dennison.
 Moved upstream of bridge in 1996 because of bridge construction.

RAPID HABITAT BIOASSESSMENT 1995 **179**

- FISH COVER 16
- MACRO COVER 18
- EMBEDDEDNESS 17
- VELOCITY\DEPTH 16
- CHANNEL 18
- SEDIMENT 10
- RIFFLES 12
- CHANNEL FLOW 16
- BANK EROSION 11
- VEGETATION 12
- GRAZING 18
- RIPARIAN 15

PRAIRIE CREEK (PCH-9)

1994 County 42, 2 miles NW of Dennison 1995 North of 100th street E 1996 South of 100th street E
 Riparian: 1994 pasture 1995 row crop / wooded buffer strip 1996 row crop / grass buffer strip
 Instream: 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	56	63	59	59	
ICI	25	35	18	26	Moderate
Richness	7	17.5	21.5	15.3	Moderate
Diversity	1.5	2.0	3.0	2.2	Slight
Equitability	0.57	0.29	0.54	0.47	Moderate
Scraper/Filterer Ratio	0.24	0.20	1.69		
Tolerance Range	3-7	2-8	2-9	3-7	

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>
Amphipods						
Gammarus [3]	41	89	62	-	82	2
Hyalella [5]	-	-	-	-	3	-
Gastropoda						
Ferrissa [7]	-	-	-	-	-	8
Physa [9]	-	-	-	-	-	1
Megaloptera						
Sialis [4]	-	-	-	-	-	2
Stoneflies						
Perlesta [3]	3	-	32	-	6	5
Beetles						
Dubiraphia [5]	-	-	-	-	-	1
Optioservus [4]	-	-	-	4	-	-
Stenelmis [7]	-	1	-	1	-	-
Macronychus [2]	-	-	-	1	1	-
Mayflies						
Baetis [4]	-	-	10	31	7	4
Ephemerella [2]	-	-	2	-	-	-
Heptagenia [3]	23	16	64	21	23	31
Stenacron [4]	-	-	-	-	1	3
Stenonema [4]	-	-	2	24	11	-
Isonychia [3]	-	-	6	11	-	-
Pseudocloeon [4]	-	-	-	-	15	-
Caddisflies						
Cheumatopsyche [6]	2	6	33	3	1	6
Hydropsyche [5]	51	255	975	243	8	13
Pycnopsyche [3]	-	1	-	-	-	-
Psychomyia [2]	-	-	-	-	-	1
True Flies						
Simulidae [4-6]	-	-	57	-	4	5
Antocha [5]	-	-	-	2	-	9
Hemerodromia [6]	-	-	-	1	-	-
Atherix [4]	-	3	14	62	1	90
Midges						
Brillia [?]	-	-	13	-	-	-
Cricotopus [8]	-	-	2	8	66	172
Microtendipes [6]	-	-	-	-	3	16
Polypedilum [6]	-	2	8	3	7	3
Eukiefferiella [4]	-	-	8	-	-	-

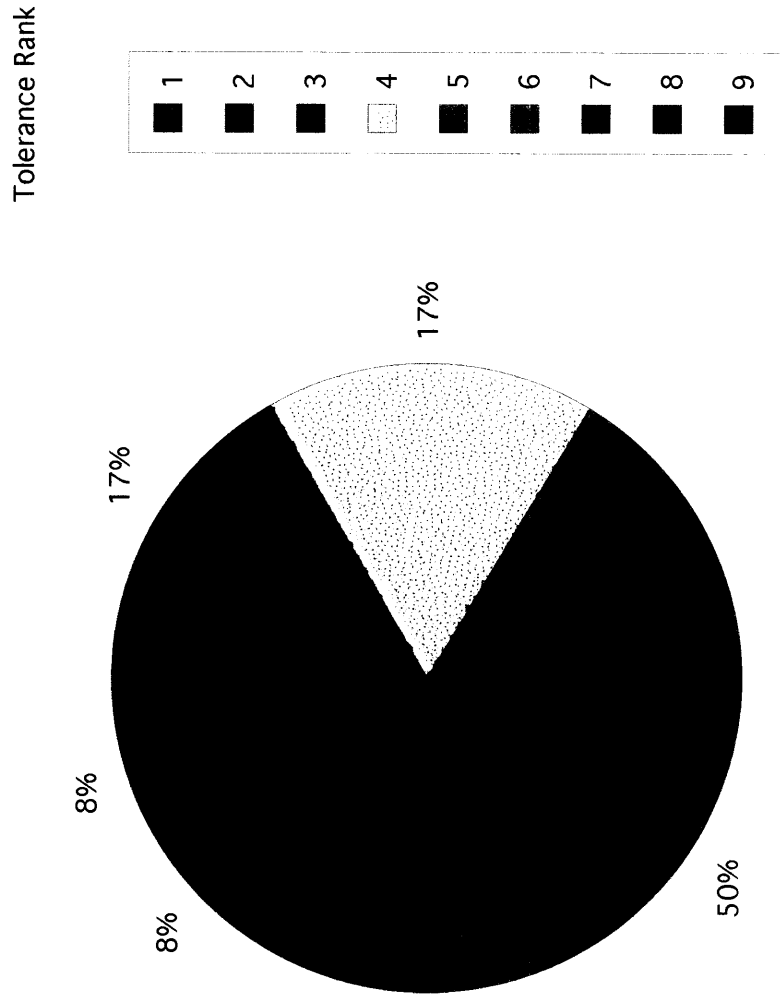
PRAIRIE CREEK (PHC-9) page 2

Rheotanytarsus	[6]	-	-	4	-	-	5
Paratanytarsus	[?]	-	-	-	-	7	3
Parametricnemus	[4]	-	-	46	-	20	116
Nanoclaudius	[6]	-	-	-	-	-	3
Thienemannimyia	[6]	-	-	-	1	3	53
Thienemaniella	[2]	-	-	-	-	-	3
Microcricotopus	[?]	-	-	2	-	-	-
Phaenopsectra	[4]	-	-	-	2	-	-
Dicrotendipes	[6]	-	-	-	-	-	3

Prairie Creek by Goodhue Avenue (PCH-9)

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
PCH 1994	0	0	169	49	306	10	1	0	0	535	0%	0%	32%	9%	57%	2%	0%	0%	0%
PCH 1995	0	3	196	203	1220	110	1	10	0	1743	0%	0%	11%	12%	70%	6%	0%	1%	0%
PCH 1996	0	5	149	270	34	112	0	238	1	809	0%	1%	18%	33%	4%	14%	0%	29%	0%
PCH TOTAL	0	8	514	522	1560	232	2	248	1	3087	0%	0%	17%	17%	51%	8%	0%	8%	0%

Percent Macroinvertebrates by Tolerance Rank



PRAIRIE CREEK NEAR GOODHUE AVENUE [PCH]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
SURFACE WATER				
NITRATE NITROGEN	----	----	5.56	3.7
AMMONIA NITROGEN	----	----	LB	0.006
KJELDAHL NITROGEN	----	----	5.55	4.01
ORTHOPHOSPHATE	----	----	0.011	0.009
TOTAL PHOSPHORUS	----	----	0.048	0.079
PORE WATER				
NITRATE NITROGEN	----	----	0.721	0.811
AMMONIA NITROGEN	----	----	3.59	2.25
KJELDAHL NITROGEN	----	----	5.92	4.42
ORTHOPHOSPHATE	----	----	0.005	0.008
TOTAL PHOSPHORUS	----	----	0.192	0.121
STREAM LOAD				
TURBIDITY	----	----	13	11
TOTAL SUSPENDED SOLIDS	----	----	29.37	32.71
TOTAL VOLATILE SOLIDS	----	----	5.6	8
CONDUCTIVITY	0.533	----	0.631	0.607
OTHER				
pH	8.3	----	8.3	8.3
ALKALINITY	----	----	340	260
TEMPERATURE	18.9	----	21.3	22.9

PRAIRIE CREEK AT 100th STREET EAST AND GOODHUE AVENUE

The location of this site changed each year during the course of the study. In 1994 it was located in a pasture about a mile upstream from its present location. It was moved because the property owners denied us access. In 1995 it was about 50 yards downstream from the 100th street bridge and in 1996 it was moved about 100 yards upstream from the bridge. Rice county was scheduled to replace the bridge in the summer of 1996 and it was felt that the construction might interfere with the artificial samplers. As it turned out, construction did not begin until after the last sample period. About a half mile upstream from this location two major tributaries come together, one drains an area from Cannon City and Nerstrand Woods while the other drains the Dennison area. The one that drains the Dennison area also drains any waste water overflow from the sewage lagoons that serve Dennison. Prairie Creek is a 4th order stream draining 65 square miles at this location. The gradient is 9.2 feet/mile and the substrate consists mostly of sand and fine gravel with some cobble in fast current and silt in slow current. The QHEI in 1994 was 56, in 1995 it was 63, and in 1996 was 59. The flow in June was 79% of what it was at the site near the mouth and in July it was 56% of that flow.

The dominant species collected in 1994 and 95 were caddisflies, in 1996 midges made up the largest percentage of the sample. The location of the artificial samplers in 1996 was in a run with a slower current than the previous two years. The scraper-filterer ratio also reflects this change. It was .24 and .20 in 1994 and 95 and 1.69 in 1996. All indices were in the moderate impact range except for the diversity which was in the slight impact range. Richness and diversity increased each year, the ICI increased and then dropped significantly in 1996, while the equitability was high (.57 and .54) in 1994 and 96 and dropped to .29 in 1995. Because there is little correlation it is difficult to draw any conclusions. There was a large variety of insects collected at the site over the 3 years of the study. 50% of all the insects collected were ranked 5 for tolerance with 17% each of rank 3 and 4 and 8% each of rank 6 and 7.

The TSS and TVS values for the 1996 site were very low. Nitrate and total nitrogen values for surface water were average compared with other sites. Pore water nitrate levels were lower than all tributaries but the ammonia levels were the highest of all tributaries resulting in total nitrogen from pore water being about average. Phosphorus levels were also very low except for the pore water total phosphorus which was higher than all other tributaries. During the July sample period there was a lot of organic material flowing in the stream that looked like it may have been stirred up from the bottom somewhere upstream. Its source was not investigated but it could be related to the high ammonia and total phosphorus levels in the pore water. The nutrients as a whole however were not high enough to be considered a serious problem.

The lack of consistency at this sample site makes it difficult to form any firm conclusions about the water quality. It is recommended that more data be collected at the site especially to monitor the impact of the Dennison sewage lagoons.