

CRANE CREEK



Crane Creek (CRC-25)

Location:

River mile: 21

Watershed: 39038

U.S.G.S. quad: Saco; 44093-A3

Township: T107N R 21W S12

Lat./Long: 44°06'/93°18'

Other info.:

Type: Midsize Stream also known as Judicial Ditch 24 in Midreach

Stream Order: 3

Drainage area: 83

Riparian: Fields with wide riparian grass zone

Instream: Rip rap, cobble, and gravel in faster current; sand and silt in slow

Gradient: 1.52 ft/mi



QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/16/95 River Mile 21 Watershed Number _____
 Location CRC-25 U.S.G.S. quad Saco
 Township T107N R21W Section 12 Lat./Long. 44°05'30"/93°18'30"

56
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 checked="" 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 _____						

12
Substrate

2. INSTREAM COVER

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

3
Cover

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

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

8
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"/> Wide 50-100m (4) <input checked="" 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)	<input type="checkbox"/> Open pasture (1) <input type="checkbox"/> Fenced pasture (2) <input checked="" type="checkbox"/> Old field (3) <input type="checkbox"/> Rowcrop (1) <input type="checkbox"/> Conservation tillage (2)	<input type="checkbox"/> Forest, swamp (3) <input type="checkbox"/> Shrub (4) <input type="checkbox"/> Residential, Park (2) <input type="checkbox"/> Urban
		<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)
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 checked="" 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 checked="" type="checkbox"/> Pool width = riffle width (1) <input type="checkbox"/> Pool width < riffle width (0)

8
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"/> Generally >10cm Max <50 (2) <input type="checkbox"/> Generally >10cm Max >50 (3) <input 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)
Comments _____		

6. GRADIENT
(ft/mi) _____

4
Gradient

7. DRAINAGE AREA
(square mile) _____

11
Drainage Area

QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/14/96 River Mile 21 Watershed Number _____
 Location CRC-25 U.S.G.S. quad Saco
 Township T107N R21W Section 12 Lat./Long. 44°05'30"/93°18'30"

54

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 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)			

11

Substrate

Comments _____

2. INSTREAM COVER

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

3

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 type="checkbox"/> None (4)	<input type="checkbox"/> High (3)	<input type="checkbox"/> Impound
<input checked="" 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 checked="" 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)		

8

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

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 type="checkbox"/> 0.7-1m (2)	<input type="checkbox"/> Moderate (2)	<input type="checkbox"/> Fast (1)	<input checked="" type="checkbox"/> Pool width = riffle width (1)
<input checked="" type="checkbox"/> 0.4-0.7m (1)	<input checked="" 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 checked="" type="checkbox"/> Moderate (1)	
		<input checked="" type="checkbox"/> Slow (1)	
<input type="checkbox"/> No Pool		<input type="checkbox"/> Interstitial (-1)	

7

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 checked="" 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 type="checkbox"/> No riffle (0)		

Comments _____

6. GRADIENT

(ft/mi) 1.52

4

Gradient

7. DRAINAGE AREA

(square mile) 83

11

Drainage Area

SITE **CRC-25** Location CRANE CREEK 3 MILES WEST OF OWATONNA AT HIGHWAY 14

	1994	1995	1996
SUBSTRATE	11	12	11
INSTREAM COVER	3	3	3
CHANNEL MORPHOLOGY	8	8	8
RIPARIAN	10	10	10
CHANNEL QUALITY	7	8	7

GRADIENT 4
DRAINAGE 11

QHEI 1994 **54** QHEI 1995 **56** QHEI 1996 **54**

EXTENT OF CHANGE IN LOCATION
No change in location.

RAPID HABITAT BIOASSESSMENT 1995 **161**

FISH COVER 11
MACRO COVER 6
EMBEDDEDNESS 15
VELOCITY\DEPTH 10
CHANNEL 11
SEDIMENT 15
RIFFLES 6
CHANNEL FLOW 19
BANK EROSION 16
VEGETATION 18
GRAZING 19
RIPARIAN 15

CRANE CREEK (CRC-25)

At U.S. Highway 14

Riparian: Grass and fields

Instream: rip rap, 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	54	56	54	54.7	
ICI	31	29	27	29	Slight
Richness	13.5	15	22	16.8	Moderate
Diversity	2.1	2.7	2.9	2.7	Slight
Equitability	0.42	0.59	0.48	0.50	Moderate
Scraper/Filterer Ratio	1.06	0.20	1.81		
Tolerance Range	3-10	2-11	3-10	3-10	

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						
Glossiphoniidae [8]	-	-	-	-	1	-
Placobdella [8]	-	1	-	-	1	-
Amphipods						
Hyalella [5]	1	219	-	-	18	1
Gastropoda						
Ferrissa [7]	-	-	-	-	-	1
Physa [9]	-	-	-	-	2	3
Stoneflies						
Perlesta [3]	4	-	30	-	22	-
Beetles						
Dubiraphia [5]	-	5	-	24	286	13
Stenelmis [7]	-	1	-	-	2	-
Laccornis [?]	-	-	-	-	-	1
Mayflies						
Baetis [4]	3	-	2	-	204	2
Ephemerella [2]	-	-	2	-	-	-
Heptagenia [3]	69	36	90	8	54	5
Stenacron [4]	1	237	-	4	2	24
Stenonema [4]	1	-	-	76	-	4
Isonychia [3]	-	-	-	28	-	1
Pseudocloeon [4]	-	-	-	-	60	-
Caenis [6]	-	-	-	-	266	-
Tricorythodes [5]	1	-	-	-	-	-
Caddisflies						
Cheumatopsyche [6]	178	93	178	440	-	172
Hydropsyche [5]	71	53	31	308	4	146
Polycentropus [3]	-	4	-	-	-	-
Neuroclipsis [3]	2	-	-	-	-	-
Nectopsyche [?]	-	-	-	-	-	2
True Flies						
Simuliidae [4-6]	-	-	5	-	236	-
Atherix [4]	-	-	-	12	-	7

CRANE CREEK (CRC-25) page 2

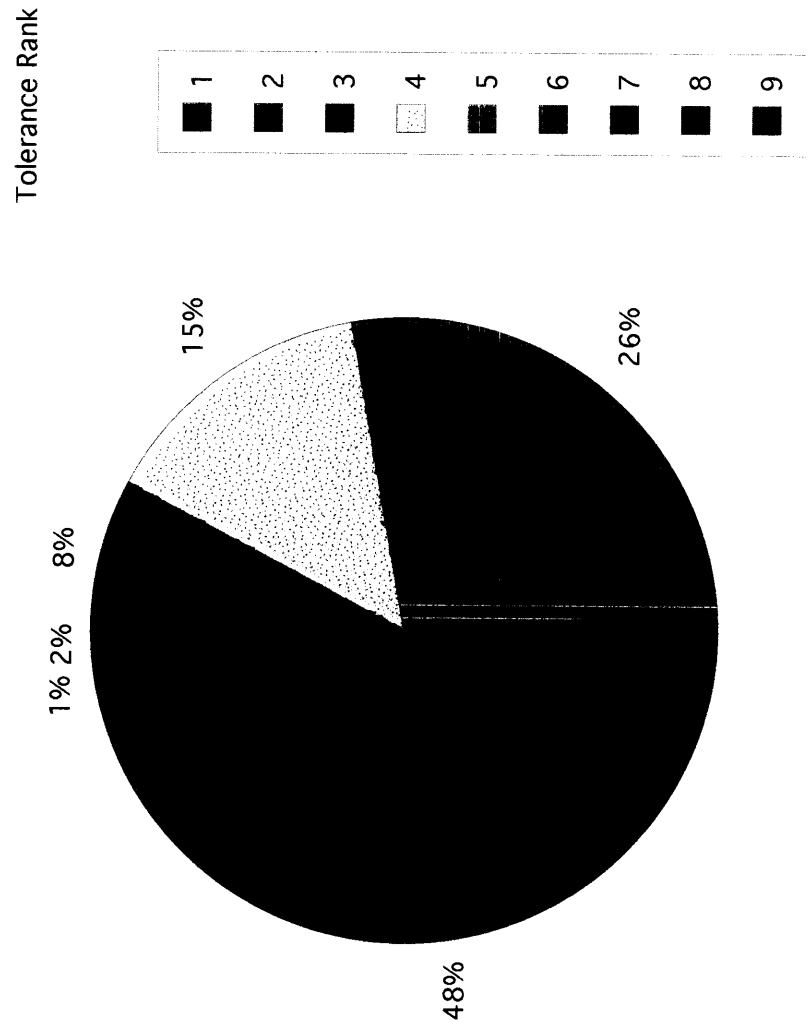
Midges

Ablabesmyia [6]	-	-	4	-	-	-
Cricotopus [8]	-	-	12	4	24	31
Microtendipes [6]	-	3	8	-	-	-
Dicrotendipes [6]	-	-	12	-	-	-
Polypedilum [6]	11	1	127	44	4	153
Tanytarsus [7]	-	-	-	12	-	-
Rheotanytarsus [6]	-	-	8	-	2	8
Paratanytarsus [?]	-	-	-	-	2	4
Thienemannimyia [6]	5	12	40	12	-	90
Phaenopsectra [4]	-	-	4	-	-	-
Endochironomus [6]	-	-	-	-	2	18
Glyptotendipes [10]	1	-	-	-	2	-
Cryptochironomus [8]	-	-	20	-	-	8
Chironomus [11]	-	-	12	-	-	-
Cladotanytarsus [7]	-	-	8	-	-	-
Parachironomus [8]	-	-	-	-	8	-
Phaenopsectra [4]	-	-	4	-	-	-
Pentaneara [3]	1	-	-	-	-	-

Crane Creek near Highway 14 (CRC-25)

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
CRC 1994	0	0	116	242	350	302	1	1	1	1013	0%	0%	11%	24%	35%	30%	0%	0%	0%
CRC 1995	0	2	156	104	363	878	20	36	12	1571	0%	0%	10%	7%	23%	56%	1%	2%	1%
CRC 1996	0	0	82	303	468	951	3	73	7	1887	0%	0%	4%	16%	25%	50%	0%	4%	0%
CRC TOTAL	0	2	354	649	1181	2131	24	110	20	4471	0%	0%	8%	15%	26%	48%	1%	2%	0%

Percent Macroinvertebrates by Tolerance Rank



CRANE CREEK AT HIGHWAY #14 [CRC]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
SURFACE WATER				
NITRATE NITROGEN	1.14	0.961	6.62	0.473
AMMONIA NITROGEN	0.047	0.081	LB	0.009
KJELDAHL NITROGEN	2.53	2.36	7.13	1.68
ORTHOPHOSPHATE	0.036	0.22	0.034	0.029
TOTAL PHOSPHORUS	0.096	0.273	0.127	0.087
PORE WATER				
NITRATE NITROGEN	0.013	0.739	5.12	0.0293
AMMONIA NITROGEN	1.41	0.145	0.276	0.246
KJELDAHL NITROGEN	6.09	1.98	5.94	1.68
ORTHOPHOSPHATE	0.041	0.079	0.018	0.021
TOTAL PHOSPHORUS	0.099	0.097	0.06	0.06
STREAM LOAD				
TURBIDITY	----	----	9	19
TOTAL SUSPENDED SOLIDS	----	----	24.46	20.36
TOTAL VOLATILE SOLIDS	----	----	6.5	5.42
CONDUCTIVITY	0.591	0.611	0.624	0.665
OTHER				
pH	8.7	8.6	8.2	8.2
ALKALINITY	----	----	----	260
TEMPERATURE	21.3	27.2	21.8	----

CRANE CREEK WEST OF OWATONNA

Crane Creek, also known as Judicial Ditch 24, is a 3rd order stream draining 83 square miles of agricultural land. Its start is near a large wetland area east of Waseca. Our monitoring site is located in the mid reach area of the stream. At this location the stream is a large drainage ditch for tile lines that drain farm fields in the area. There is a grass riparian zone about 50 feet wide on each side of the stream. The slopes are graded at about a 30 - 40 degree angle and are seeded with grasses. No trees or brush are allowed to grow on the banks as this would hinder the flow, so there is little shade for the stream channel. The channel has also been straightened in order to aid the flow. The gradient at the site is 1.52 feet/mile. Upstream from the site there is sand and silt in the slower current above the riffle. In the small riffle there is rip rap, cobble, and gravel. The QHEI score for the site is 54 which is the 3rd lowest behind Turtle Creek and the Little Cannon at Sogn. The instream cover and channel morphology metrics scored very low causing the overall low score. It is difficult to compare the flow at this site to other sites because of the very rapid entry of runoff into the waterway. During June the flow was about equal to that of Chub and Prairie Creeks, however in July the flow was so slow that it was difficult to determine.

The number of different taxa found at the site was quite surprising considering Crane Creek appears to be just a drainage ditch. Everything from leeches to stoneflies were found at the site. The diversity of the taxa present increased in each year of the study. Very large numbers of beetles, caddisflies, mayflies, and midges were collected in 1996. In 1994, when water levels were high a very large population of amphipods was found with the caddisflies and mayflies. In 1995 caddisflies and midges dominated the sample. The ICI and Diversity Indices ranked slight in impact while Richness and Equitability ranked moderate. The tolerance rank ranged from 2 to 11, a very broad range. Almost 90% of the insects collected were in the 4 - 6 range for tolerance rank with 48% in rank 6, 26% in rank 5, and 15% in rank 4.

Nitrogen concentrations in the surface water were surprisingly low especially when water levels were high because of a lot of runoff. The June of 1996 values (about 7 mg/l) were the highest, all other values were less than 3 mg/l. Nitrogen levels in pore water were also very low. Phosphorus levels were less than .1 mg/l, except for July of 1995 when they were about 2.5 mg/l. Stream load, pH, and alkalinity values were also at very good levels during the 3 years of the study.

Given the drainage ditch nature of the stream, the chemistry and macroinvertebrate community is surprisingly good. Several northern pike were found dead in the stream during a visit to the site in July of 1995. This was in the middle of a heat wave and air temperatures had been near 100°F for several days. Water temperature was 27.5°C and we speculated that heat and lack of dissolved oxygen may have contributed to their death. In the future, a second site nearer to the mouth should also be considered when monitoring this stream.