

# STRAIGHT RIVER AT CLINTON FALLS



## Straight River at Clinton Falls (SRH-29)

Location:

River mile: 22

Watershed: 39044

U.S.G.S. quad: Medford East; 44093-B2

Township: T108N R20W Sec21

Lat./Long: 44°07'/93°14'30"

Other info.:

Type: Large Stream at midreach 4 miles north of Owatonna

Stream Order: 4

Drainage area: 280 square miles

Riparian: Residential and wooded areas

Instream: Boulders and cobble below the old spillway

Gradient: 9.8 ft/mi



# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/16/95 River Mile 21.5 Watershed Number \_\_\_\_\_  
 Location SCF- 29 U.S.G.S. quad Medford East  
 Township T107N R20W Section 28 Lat./Long. 44 9' 93 15'

**77**  
Total QHEI

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

Type	Pool	Riffle	Type	Pool	Riffle	Quality
<input checked="" type="checkbox"/> Boulder (7)	_____	_____	<input type="checkbox"/> Gravel (5)	_____	_____	Check all that apply: <input 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 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)	_____	_____	

**13**  
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"/> 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 checked="" type="checkbox"/> Boulders (1)	
<input type="checkbox"/> Aquatic macrophytes (1)	

**8**  
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 checked="" type="checkbox"/> High (3)	<input type="checkbox"/> Impound
<input checked="" type="checkbox"/> Moderate (3)	<input checked="" type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input 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 type="checkbox"/> Poor (1)	<input type="checkbox"/> Recent or no Recovery (1)		

**11**  
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 type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input type="checkbox"/> Moderate (3)
<input checked="" 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)		

**9**  
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 checked="" type="checkbox"/> Pool width > riffle width (2)
<input type="checkbox"/> 0.7-1m (2)	<input checked="" type="checkbox"/> Moderate (2)	<input checked="" 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 checked="" type="checkbox"/> Eddies (1)	
		<input type="checkbox"/> Interstitial (-1)	
<input type="checkbox"/> No Pool		<input checked="" type="checkbox"/> Slow (1)	

**15**  
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 type="checkbox"/> Embedded (0)
<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)		

Comments \_\_\_\_\_

6. GRADIENT (ft/mi) 9.8

**8**  
Gradient

7. DRAINAGE AREA (square mile) 280

**13**  
Drainage Area

# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/14/96 River Mile 21.5 Watershed Number \_\_\_\_\_  
 Location SCF-29 U.S.G.S. quad Medford East  
 Township T107N R20W Section 28 Lat./Long. 44°06.08N 93°11.36W

**77.5**  
Total QHEI

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

Type	Pool	Riffle	Type	Pool	Riffle	Quality
<input checked="" type="checkbox"/> Boulder (7)	_____	_____	<input type="checkbox"/> Gravel (5)	_____	_____	Check all that apply: <input type="checkbox"/> Silt covered (-1) <input type="checkbox"/> Silt free (1) <input checked="" 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 _____						

**12**  
Substrate

## 2. INSTREAM COVER

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

**10**  
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 type="checkbox"/> None (4)	<input type="checkbox"/> High (3)	<input type="checkbox"/> Impound
<input checked="" 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 checked="" 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
<b>L R</b>	<b>L R</b>	<b>L R</b>
<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 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)		
	<input checked="" type="checkbox"/> Forest, swamp (3)	
	<input type="checkbox"/> Shrub (4)	
	<input checked="" type="checkbox"/> Residential, Park (2)	
	<input type="checkbox"/> Urban	
Comments _____		

**9.5**  
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"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input checked="" type="checkbox"/> Pool width > riffle width (2)
<input type="checkbox"/> 0.7-1m (2)	<input checked="" type="checkbox"/> Moderate (2)	<input checked="" 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		<input type="checkbox"/> Intermittent (-2)	
		<input checked="" type="checkbox"/> Eddies (1)	
		<input type="checkbox"/> Interstitial (-1)	
Comments _____			

**15**  
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 type="checkbox"/> Embedded (0)
<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)		
Comments _____		

6. GRADIENT (ft/mi) \_\_\_\_\_

**8**  
Gradient

7. DRAINAGE AREA (square mile) \_\_\_\_\_

**13**  
Drainage Area

9.8

280

SITE **SCF-29** Location STRAIGHT RIVER AT CLINTON FALLS

	1994	1995	1996
SUBSTRATE	10	13	12
INSTREAM COVER	6	8	10
CHANNEL MORPHOLOGY	12	11	10
RIPARIAN	8.5	9	9.5
CHANNEL QUALITY	9	15	15
GRADIENT 8 DRAINAGE 13	QHEI 1994 <b>66.5</b>	QHEI 1995 <b>77</b>	QHEI 1996 <b>77.5</b>

EXTENT OF CHANGE IN LOCATION  
 Comparison is with the 94 Medford site on the  
 Straight. Site was moved upstream to this  
 location.

RAPID HABITAT BIOASSESSMENT 1995 **196**

FISH COVER	19
MACRO COVER	18
EMBEDDEDNESS	17
VELOCITY\DEPTH	19
CHANNEL	15
SEDIMENT	17
RIFFLES	11
CHANNEL FLOW	16
BANK EROSION	14
VEGETATION	15
GRAZING	20
RIPARIAN	15

## STRAIGHT RIVER (SCF-29)

1994 At Medford Community Park      1995-95 At Clinton falls below old dam and mill

\*\* Site was moved because of influence of Medford's Waste Water Treatment Plant

Riparian: Residential, wooded

Instream: Boulders, cobble, gravel, and sand

### Macroinvertebrate Metrics

<u>Metric</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>Average</u>	<u>Overall Impact</u>
QHEI	66.5	77	77.5	74	
ICI	29	30	31	30	Slight
Richness	14	12	21.5	15.8	Moderate
Diversity	2.6	2.5	3.1	2.7	Slight
Equitability	0.66	0.65	.59	.63	Slight
Scraper/Filterer Ratio	0.99	0.99	5.27		
Tolerance Range	2-8	2-7	1-10	2-8	

### Macroinvertebrate Taxa and Numbers of Individuals

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

	MEDFORD		<u>June 95</u>	CLINTON FALLS		<u>July 96</u>
	<u>June 94</u>	<u>July 94</u>		<u>July 95</u>	<u>June 96</u>	
<b>Earthworms</b>						
Oligochaeta [10]	-	-	-	-	9	-
<b>Amphipods</b>						
Gammarus [3]	-	-	-	-	1	-
Hyalella [5]	-	1	-	-	-	-
<b>Gastropoda</b>						
Ferrissa [7]	-	-	-	-	3	-
<b>Stoneflies</b>						
Perlesta [3]	24		3	-	35	2
Pteronarcys [2]	5		-	10	2	36
Acroneuria [1]			-	-	-	2
<b>Beetles</b>						
Stenelmis [7]	-	1	-	1	3	2
Macronychus [2]	3	5	2	2	7	4
<b>Mayflies</b>						
Baetis [4]	-	-	-	-	8	-
Heptagenia [3]	74	4	118	9	109	26
Stenacron [4]	3	17	-	1	8	4
Stenonema [4]	27	131	7	46	9	172
Isonychia [3]	-	2	2	2	26	5
Pseudocloeon [4]	-	-	-	-	57	1
Caenis [6]	-	-	-	-	-	1
Tricorythodes [5]	2	7	-	2	-	160
<b>Caddisflies</b>						
Cheumatopsyche [6]	87	36	8	2	-	6
Hydropsyche [5]	57	52	49	75	10	27
Ceraclea [3]	-	-	-	-	3	-
Hydroptila [2]	-	-	-	-	7	-
<b>True Flies</b>						
Simuliidae [4-6]	-	-	-	-	4	-
Atherix [4]	-	1	-	17	-	2

**STRAIGHT RIVER (SCF-29) page 2**

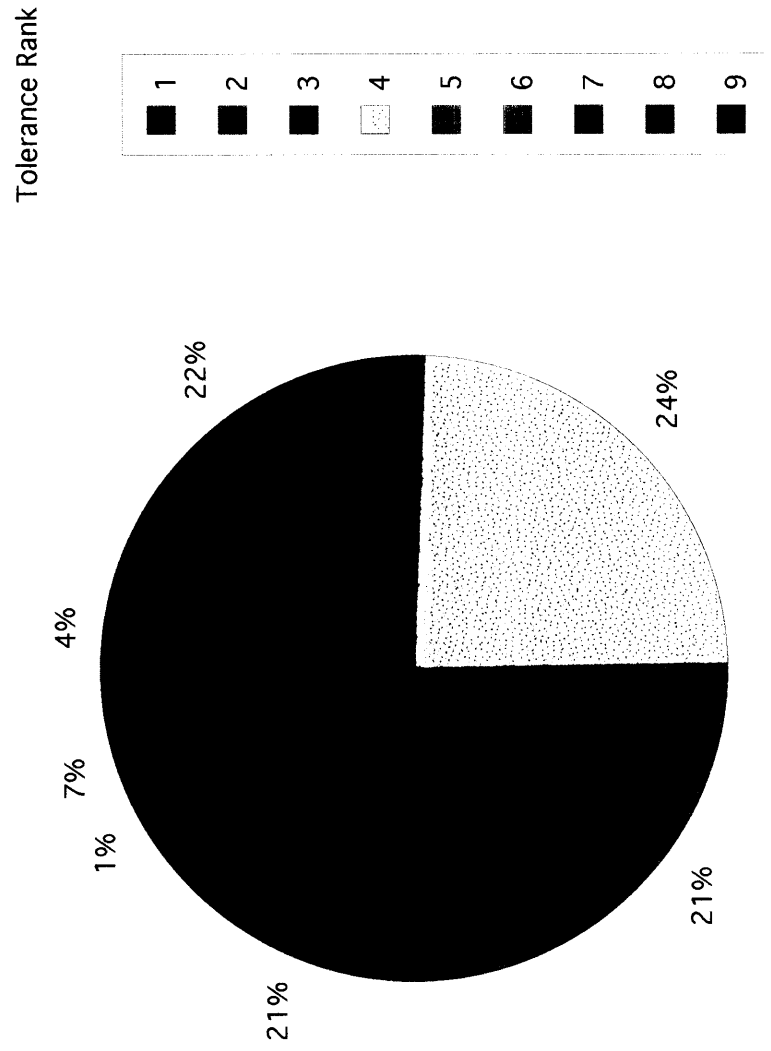
**Midges**

Brillia [?]	-	-	26	-	36	-
Cricotopus [8]	-	64	-	-	68	-
Microtendipes [6]	-	-	4	-	-	-
Polypedilum [6]	-	84	8	-	16	8
Tanytarsus [7]	-	16	-	-	-	-
Rheotanytarsus [6]	-	-	23	-	4	-
Procladius [8]	2	-	-	-	-	2
Thienemannimyia [6]	1	32	23	-	8	42
Harnischia [6]	-	-	-	-	-	2
Rheocricotopus [6]	-	16	8	-	4	-
Endochironomus [6]	-	4	-	-	-	-
Stenochironomus [3]	-	16	-	-	-	-
Nilotanypus	1	-	-	-	-	-
Cryptochironomus [8]	-	-	-	-	-	8

## Straight River at Medford (1994) and Clinton Falls (1995-96)

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
SRM 1994	0	13	120	179	119	260	17	66	0	774	0%	2%	16%	23%	15%	34%	2%	9%	0%
SCF 1995	0	14	134	71	126	86	1	0	0	432	0%	3%	31%	16%	29%	20%	0%	0%	0%
SCF 1996	2	56	207	261	197	95	6	78	9	911	0%	6%	23%	29%	22%	10%	1%	9%	1%
SCF TOTAL	2	83	461	511	442	441	24	144	9	2117	0%	4%	22%	24%	21%	21%	1%	7%	0%

**Percent Macroinvertebrates by Tolerance Rank**



## STRAIGHT RIVER AT CLINTON FALLS [SCF]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
<b>SURFACE WATER</b>				
NITRATE NITROGEN	2.99	3.29	3.4	2.4
AMMONIA NITROGEN	0.033	0.017	0.018	0.015
KJELDAHL NITROGEN	3.65	2.87	7.32	6.73
ORTHOPHOSPHATE	0.059	0.185	0.22	0.24
TOTAL PHOSPHORUS	0.095	0.22	0.424	0.426
<b>PORE WATER</b>				
NITRATE NITROGEN	2.2	2.33	----	----
AMMONIA NITROGEN	0.632	0.061	----	----
KJELDAHL NITROGEN	5.57	2.95	----	----
ORTHOPHOSPHATE	0.28	0.128	----	----
TOTAL PHOSPHORUS	0.354	0.138	----	----
<b>STREAM LOAD</b>				
TURBIDITY	----	----	7	27
TOTAL SUSPENDED SOLIDS	----	----	25.48	20.48
TOTAL VOLATILE SOLIDS	----	----	7.34	5.43
CONDUCTIVITY	0.762	0.75	0.73	0.744
<b>OTHER</b>				
pH	8.3	8.6	8.4	8.2
ALKALINITY	----	----	340	260
TEMPERATURE	18.5	27.8	24.5	21.6

## STRAIGHT RIVER AT CLINTON FALLS

The Straight River at this location is a 4th order stream that drains 280 square miles and would be considered a mid reach stream at this location. The monitoring site is at river mile 22, just downstream from the spillway of the old mill dam that was removed. Much of the debris from the old dam makes up the substrate at this site. Beyond the boulder and cobble rubble is a natural riffle with a gravel substrate. The gradient at the site is almost 10 feet/mile. In 1994 the site monitored was in Medford at the community park. The site was moved upstream to Clinton Falls for a variety of reasons. First of all the Medford waste water treatment plant was just across the stream of the 1994 site. Second, there was no riffle at the site, and third it was felt that a site closer to Owatonna would be more beneficial. The Clinton Falls site is four miles downstream of Owatonna. The QHEI score at the Medford site was 66.5 compared to 77.5 for the Clinton Falls site. The score of 77.6 represents the highest score of all main stem sites and the second highest score of all the sites monitored. The flow at this sight was not determined however it is comparable to the flow of the Upper Cannon at Morristown.

Mayflies dominated the taxa at this location with midges, caddisflies, and stoneflies also being fairly abundant. The ICI, Diversity, and Equitability Indices were all in the slight impact range with the Richness falling in the moderate impact range. The ratio of scrapers to filterers was about even in 1994 and 95, but in 1996 scrapers outnumbered filterers by more than 5 to 1. The tolerance rank ranged from 2 - 9 with 7% in rank 8, 21% in rank 6, 21% in rank 5, 24% in rank 4, and 22% in rank 3.

Nutrient loading appears to be somewhat of a problem in the Straight River north of Owatonna compared to the other sites sampled. Nitrogen and phosphorus values were relatively higher here than most of the other sites tested, however the nitrogen levels (2.0-4.0 mg/L range) were not high enough to be considered a problem. Above 10.0 mg/L is considered a potential problem. Orthophosphate values (greater than 0.2 mg/L) and total phosphorus values (greater than 0.4 mg/L) appear to be a more serious problem. A value over 0.1 mg/L is considered too much in fresh water sources. Turbidity, TSS, and TVS values were quite low and it appears that suspended bed load is not a problem, however, when current slows along this stretch of the river there is a lot of sediment deposited. 1996 chemistry samples were taken when water levels were stable because there had been no major rain events, this may account for the low values. The conductivity values were high however indicating a high amount of dissolved material in the water. Alkalinity, pH, and temperature were in line with the values obtained from other streams in the Cannon River Basin.