

STRAIGHT RIVER AT FARIBAULT



Straight River at Rice County Hwy. 19 (SRF-30)

Location:

River mile: 38

Watershed:

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

Township: T109N R20W Sec 16

Lat./Long: 44°014'30"/93°14'30"

Other info.:

Type: Small River at midreach 3 miles south of Faribault

Stream Order: 4

Drainage area: 450 square miles

Riparian: Wooded slopes on the banks with row crops on the floodplain

Instream: Rip rap boulders below bridge with silt, sand, and gravel in channel

Gradient: 6.6 ft/mi



QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/16/95 River Mile 10 Watershed Number _____
 Location SRF-30 U.S.G.S. quad Medford East
 Township T109N R19W Section 16 Lat./Long. 44 15' / 93 15'

61

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 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 _____						

10

Substrate

2. INSTREAM COVER

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

6

Cover

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

Sinuosity	Development	Channelization	Stability	Other
<input type="checkbox"/> High (4) <input type="checkbox"/> Moderate (3) <input checked="" type="checkbox"/> Low (2) <input type="checkbox"/> None (1)	<input type="checkbox"/> Excellent (4) <input checked="" type="checkbox"/> Good (3) <input type="checkbox"/> Fair (2) <input type="checkbox"/> Poor (1)	<input type="checkbox"/> None (4) <input checked="" type="checkbox"/> Recovered (3) <input 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 _____				

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"/> Wide 50-100m (4) <input type="checkbox"/> Moderate 10-50m (3) <input checked="" 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 checked="" 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 type="checkbox"/> Little (4) <input checked="" type="checkbox"/> Moderate (3) <input type="checkbox"/> Heavy (2) <input type="checkbox"/> Severe (1)
Comments _____		

7

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"/> 0.7-1m (2) <input type="checkbox"/> 0.4-0.7m (1) <input type="checkbox"/> < 0.4m (0) <input checked="" 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 checked="" 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 type="checkbox"/> Generally >10cm Max <50 (2) <input checked="" 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)

6.56

6

Gradient

7. DRAINAGE AREA (square mile)

450

14

Drainage Area

QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/14/96 River Mile 10 Watershed Number _____
 Location SRF-30 U.S.G.S. quad Medford East
 Township T109N R19W Section 16 Lat./Long. 44 14'37"N 93 14'27"W

61

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 checked="" type="checkbox"/> <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)
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<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 _____						

10

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 checked="" 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 checked="" type="checkbox"/> Logs or woody debris (1) <input type="checkbox"/> Aquatic macrophytes (1)	<input type="checkbox"/> Extensive (7) <input type="checkbox"/> Moderate (5) <input checked="" type="checkbox"/> Sparse (3) <input type="checkbox"/> Nearly absent (1)
Comments _____	

6

Cover

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

Sinuosity	Development	Channelization	Stability	Other
<input type="checkbox"/> High (4) <input type="checkbox"/> Moderate (3) <input checked="" type="checkbox"/> Low (2) <input type="checkbox"/> None (1)	<input type="checkbox"/> Excellent (4) <input type="checkbox"/> Good (3) <input checked="" type="checkbox"/> Fair (2) <input type="checkbox"/> Poor (1)	<input checked="" type="checkbox"/> None (4) <input type="checkbox"/> Recovered (3) <input 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 _____				

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																																		
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7

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)
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Comments _____			

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

6.6

6

Gradient

7. DRAINAGE AREA (square mile)

450

14

Drainage Area

SITE **SRF-30** Location STRAIGHT RIVER 3 MILES SOUTH OF FARIBAULT AT JUNCTION OF CTY 19 & 21

	1994	1995	1996
SUBSTRATE	10	10	10
INSTREAM COVER	6	6	6
CHANNEL MORPHOLOGY	12	10	10
RIPARIAN	8.5	7	7
CHANNEL QUALITY	9	8	8

GRADIENT 6
DRAINAGE 14

QHEI 1994 **65.5** QHEI 1995 **61** QHEI 1996 **61**

EXTENT OF CHANGE IN LOCATION
Site comparison is with Medford as this is a new site downstream from Medford and Rush Creeks.

RAPID HABITAT BIOASSESSMENT 1995

154

- FISH COVER 11
- MACRO COVER 12
- EMBEDDEDNESS 14
- VELOCITY\DEPTH 11
- CHANNEL 15
- SEDIMENT 12
- RIFFLES 10
- CHANNEL FLOW 17
- BANK EROSION 11
- VEGETATION 11
- GRAZING 18
- RIPARIAN 12

STRAIGHT RIVER (SRF-30)

At Rice County Highway 19

Riparian: Wooded, row crops

Instream: Rip rap, boulders, gravel, sand, and silt

Macroinvertebrate Metrics		1994	1995	1996	Average	Overall Impact
Metric	Site added in 1995					
QHEI			61	61	61	
ICI			31	36	33.5	Slight
Richness			14	21.5	17.8	Moderate
Diversity			2.2	2.7	2.45	Slight
Equitability			0.45	0.42	0.435	Moderate
Scraper/Filterer Ratio			0.39	0.47		
Tolerance Range			2-8	1-8	2-8	

Macroinvertebrate Taxa and Numbers of Individuals

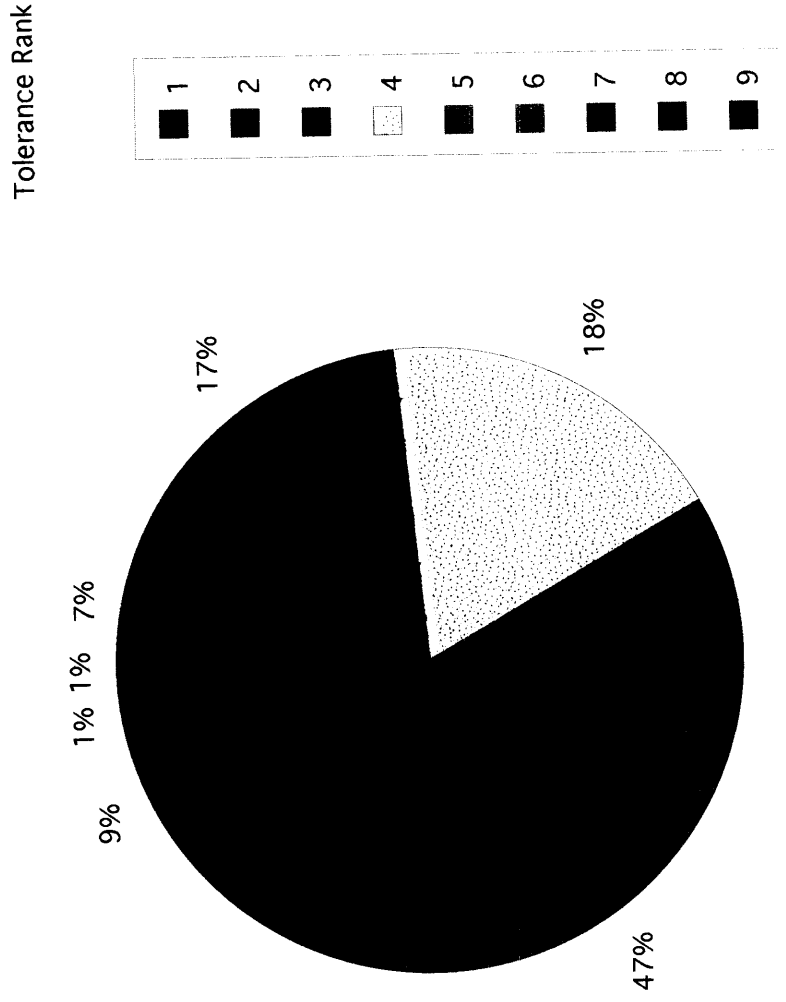
[#] = Tolerance Values (Source is Illinois Environmental Protection Agency)

	June 94	July 94	June 95	July 95	June 96	July 96
Stoneflies			25	20	182	-
Perlesta [3]			49	55	2	9
Pteronarcys [2]			-	-	1	1
Acroneuria [1]						
Beetles			-	-	2	2
Dubiraphia [5]			8	3	4	2
Stenelmis [7]			2	5	6	3
Macronychus [2]						
Mayflies			9	-	4	37
Baetis [4]			-	-	26	20
Heptagenia [3]			-	-	16	1
Stenacron [4]			-	-	75	41
Stenonema [4]			138	30	7	29
Isonychia [3]			28	-	2	1
Pseudocloeon [4]			-	-	-	1
Ephoron [2]			-	-	-	16
Tricorythodes [5]			1	1	5	
Caddisflies			28	22	-	78
Cheumatopsyche [6]			192	288	210	242
Hydropsyche [5]						
True Flies			5	1	-	3
Simuliidae [4-6]			-	-	-	1
Empididae [6]			3	7	-	-
Atherix [4]						
Midges			6	-	-	14
Cricotopus [8]			-	-	-	2
Microtendipes [6]			7	2	1	14
Polypedilum [6]			4	-	5	-
Eukiefferiella [4]			3	-	-	2
Rheotanytarsus [6]			-	-	-	2
Nanoclaudius [6]			-	-	-	9
Thienemannimyia [6]			-	-	3	2
Rheocricotopus [6]			-	-	-	2
Larsia [6]			-	-	-	-
Stenochironomus [3]			3	-	-	-

Straight River at Rice County 19 (SRF-30)

Site	NUMBER OF INSECTS BY TOLERANCE RATING									TOTAL	PERCENT IN TOLERANCE RANK								
	1	2	3	4	5	6	7	8	9		1	2	3	4	5	6	7	8	9
SRF 1995	0	111	76	191	482	68	11	6	0	945	0%	12%	8%	20%	51%	7%	1%	0%	
SRF 1996	2	21	264	182	477	119	6	14	0	1085	0%	2%	24%	17%	44%	11%	1%	0%	
SRF TOTAL	2	132	340	373	959	187	17	20	0	2030	0%	7%	17%	18%	47%	9%	1%	0%	

Percent Macroinvertebrates by Tolerance Rank



STRAIGHT RIVER AT RICE COUNTY #19 [SRF]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
SURFACE WATER				
NITRATE NITROGEN	----	2.49	5.00	2.60
AMMONIA NITROGEN	----	0.004	0.122	0.121
KJELDAHL NITROGEN	----	2.98	3.05	2.79
ORTHOPHOSPHATE	----	0.126	0.201	0.198
TOTAL PHOSPHORUS	----	0.153	0.262	0.258
PORE WATER				
NITRATE NITROGEN	----	2.52	----	----
AMMONIA NITROGEN	----	0.086	----	----
KJELDAHL NITROGEN	----	3.38	----	----
ORTHOPHOSPHATE	----	0.168	----	----
TOTAL PHOSPHORUS	----	0.174	----	----
STREAM LOAD				
TURBIDITY	----	----	19	13
TOTAL SUSPENDED SOLIDS	----	----	32.8	28.64
TOTAL VOLATILE SOLIDS	----	----	10.31	8.1
CONDUCTIVITY	----	0.697	0.709	0.68
OTHER				
pH	----	8.8	8.4	8.3
ALKALINITY	----	----	320	260
TEMPERATURE	----	28.5	24.8	22.8

STRAIGHT RIVER AT RICE COUNTY 19 SOUTH OF FARIBAULT

The Straight River is a 4th order stream draining 450 square miles at this mid reach location. The gradient at this site is 6.6 feet/mile and the substrate consists of rip rap boulders below the bridge with silt, sand, and gravel in the main channel. About 100 yards upstream of this site is a natural riffle with cobble and gravel substrate. It was very difficult to get to the site so it was decided to use the area below the bridge as the monitoring site. The QHEI score is relatively low at this site primarily because of low scores in instream cover, channel quality, and riparian zone metrics. The flow was not determined at this site however it has increased significantly since the Clinton Falls site because Crane, Mud, Medford, and Rush Creeks all empty into the Straight between here and Clinton Falls. From this site upstream to Medford the primary activity along the river is the mining of sand and gravel. It is not known what impact if any this has on the water quality. This site was added in 1995 because it was felt that a site upstream from Faribault would be desirable.

The dominant taxa at this location was mayflies and caddisflies. Stoneflies were also very abundant at this site which is somewhat surprising in that there is not a well defined riffle at the site. The ICI and Diversity Indices were in the slight impact range and the Richness and Equitability index were in the moderate range. Filtering organisms outnumber scrapers by more than a 2 to 1 margin. The tolerance range was from 2 - 8 with 9% in rank 6, 47% in rank 5, 18% in rank 4, 17% in rank 3 and 7% in rank 2. The macroinvertebrate community appears to have a good overall tolerance rank given what the substrate is like at this site. It would be interesting to conduct a survey of the macroinvertebrate community upstream in the riffle to see if the diversity and tolerance rank is even better.

Nutrient loading continues to be somewhat of a problem in the Straight River south of Faribault compared to sites sampled on the mainstem of the Lower Cannon. Nitrogen and phosphorus values were relatively higher here than most of the other sites tested, however the nitrogen levels (2.0-5.0 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 0.25 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. These values were consistent with all of the Straight River sites.

In general, high nutrient load and sediment load appear to be areas of concern for the mainstem of the Straight River. Any interventions that can be put in place to reduce the nutrient and sediment load should be investigated and employed.