

# STRAIGHT RIVER NEAR OWATONNA



Straight River near Steele County Hwy. 31 (SRH-28)

Location:

River mile: 38

Watershed: 39055

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

Township: T106N R21W S12

Lat./Long: 44°01' / 93°17'

Other info.:

Type: Large Stream at midreach 4 miles south of Owatonna

Stream Order: 3

Drainage area: 140

Riparian: Forest on flood plain with row crops

Instream: Sand with cobble in strong current; silt and mud in slow current

Gradient: 5.11 ft/mi



# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/16/95 River Mile 58 Watershed Number \_\_\_\_\_  
 Location SRH-28 U.S.G.S. quad Saco  
 Township T106N R21W Section 12 Lat./Long. 44°00'30"/93°17'30"

58.5

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 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)	_____	_____	

8

Substrate

Comments Inside bank substrate composed of sand and silt forming bars.

## 2. INSTREAM COVER

Type (Check ALL that apply)	Amount (Check ONLY one)
<input 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)	

7

Cover

Comments \_\_\_\_\_

## 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 type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input type="checkbox"/> Low (2)	<input checked="" type="checkbox"/> Fair (2)	<input type="checkbox"/> Recovering (2)	<input checked="" 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 checked="" type="checkbox"/> Forest, swamp (3)	<input type="checkbox"/> Shrub (4)	<input type="checkbox"/> None (5)	<input type="checkbox"/> Little (4)
<input type="checkbox"/> Wide 50-100m (4)	<input type="checkbox"/> Fenced pasture (2)	<input type="checkbox"/> Residential, Park (2)	<input type="checkbox"/> Urban	<input checked="" type="checkbox"/> Moderate (3)	<input type="checkbox"/> Heavy (2)
<input checked="" type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input type="checkbox"/> Conservation tillage (2)		<input type="checkbox"/> Severe (1)	
<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)					

8.5

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 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 checked="" 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 checked="" type="checkbox"/> No Pool			

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) 5.11

6

Gradient

7. DRAINAGE AREA (square mile) 140

12

Drainage Area

# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/14/96 River Mile 58 Watershed Number \_\_\_\_\_  
 Location SRH-28 U.S.G.S. quad Saco  
 Township T106N R21W Section 12 Lat./Long. 44°00'30"/93°17'30"

59.5

Total QHEI

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

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<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 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 type="checkbox"/> Undercut banks (1)	<input type="checkbox"/> Extensive (7)
<input checked="" type="checkbox"/> Overhanging vegetation (1)	<input checked="" type="checkbox"/> Moderate (5)
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<input 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 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 type="checkbox"/> Good (3)	<input type="checkbox"/> Recovered (3)	<input type="checkbox"/> Moderate (2)	<input type="checkbox"/> Islands
<input type="checkbox"/> Low (2)	<input checked="" type="checkbox"/> Fair (2)	<input type="checkbox"/> Recovering (2)	<input checked="" 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 _____				

11

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 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 checked="" type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input type="checkbox"/> Residential, Park (2)
<input type="checkbox"/> Narrow 5-10m (2)	<input 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 _____		

8.5

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 type="checkbox"/> > 1m (3)	<input type="checkbox"/> Extensive (3)	<input type="checkbox"/> Torrential (-1)	<input 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 checked="" 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 type="checkbox"/> Stable (cobble, boulder) (1)	<input checked="" type="checkbox"/> Embedded (0)	<div style="border: 2px solid black; padding: 5px; text-align: center; font-size: 24pt; font-weight: bold;">6</div> Pool/ Riffle
<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) 5.1

6

Gradient

**7. DRAINAGE AREA** (square mile) 140

12

Drainage Area

SITE **SRH-28** Location STRAIGHT RIVER AT COUNTY 31 SW OF OWATONNA

	1994	1995	1996
SUBSTRATE	8	8	8
INSTREAM COVER	7	7	8
CHANNEL MORPHOLOGY	12	11	11
RIPARIAN	8	8.5	8.5
CHANNEL QUALITY	6	6	6

GRADIENT 6  
DRAINAGE 12

QHEI 1994 **59** QHEI 1995 **58.5** QHEI 1996 **59.5**

EXTENT OF CHANGE IN LOCATION  
No change in location.

RAPID HABITAT BIOASSESSMENT 1995

**120**

FISH COVER 9  
MACRO COVER 8  
EMBEDDEDNESS 8  
VELOCITY\DEPTH 7  
CHANNEL 15  
SEDIMENT 6  
RIFFLES 6  
CHANNEL FLOW 11  
BANK EROSION 6  
VEGETATION 6  
GRAZING 20  
RIPARIAN 18

## STRAIGHT RIVER (SRH-28)

ATt Steele County Highway 31

Riparian: Forest, row crops

Instream: cobble, sand, silt, and mud

### Macroinvertebrate Metrics

<u>Metric</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>Average</u>	<u>Overall Impact</u>
QHEI	59	58.5	59.5	59	
ICI	26	26	35	29	Slight
Richness	10	15.5	17.5	14.3	Moderate
Diversity	1.8	2.4	2.7	2.3	Slight
Equitability	0.48	0.52	0.49	0.50	Moderate
Scraper/Filterer Ratio	0.30	0.24	1.43		
Tolerance Range	2-6	2-8	1-8	2-8	

### Macroinvertebrate Taxa and Numbers of Individuals

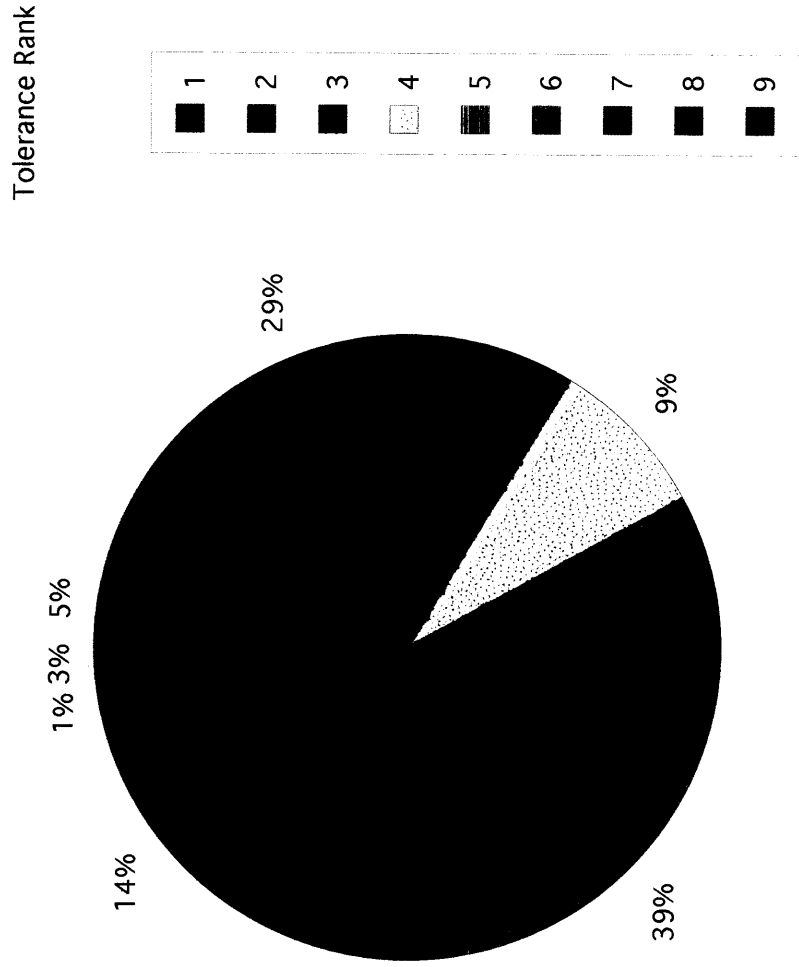
[#] = Tolerance Values (Source is Illinois Environmental Protection Agency)

	<u>June 94</u>	<u>July 94</u>	<u>June 95</u>	<u>July 95</u>	<u>June 96</u>	<u>July 96</u>
<b>Leeches</b>						
Placobdella [8]	-	-	-	-	1	-
<b>Amphipods</b>						
Gammarus [3]	-	-	-	-	1	-
<b>Gastropoda</b>						
Ferrissa [7]	-	-	-	-	1	-
<b>Stoneflies</b>						
Perlesta [3]	21	-	145	-	73	17
Pteronarcys [2]	5	13	12	6	6	37
Acroneuria [1]	-	-	-	-	3	-
<b>Beetles</b>						
Dubiraphia [5]	-	-	1	-	-	-
Stenelmis [7]	-	-	2	-	8	-
Macronychus [2]	-	-	4	2	2	5
<b>Mayflies</b>						
Baetis [4]	-	-	2	-	16	-
Heptagenia [3]	71	21	70	5	27	70
Stenonema [4]	-	4	17	16	79	23
Isonychia [3]	4	2	10	1	-	41
Pseudocloeon [4]	-	-	5	-	-	1
Caenis [6]	-	-	-	1	3	1
Tricorythodes [5]	-	-	-	-	-	1
Ephoron [2]	-	-	-	2	-	-
Leucrocuta [?]	-	-	-	-	-	1
<b>Caddisflies</b>						
Cheumatopsyche [6]	40	2	22	9	5	30
Hydropsyche [5]	184	81	154	141	49	202
Pycnopsyche [3]	-	-	-	-	-	2
<b>True Flies</b>						
Simuliidae [4-6]	-	-	1	1	-	-
Atherix [4]	-	-	-	9	-	1
<b>Midges</b>						
Brillia [?]	-	-	12	-	2	-
Cricotopus [8]	-	-	52	-	1	5
Polypedilum [6]	-	-	103	-	-	-
Rheotanytarsus [6]	-	-	12	2	1	1
Thienemannimyia [6]	-	-	44	1	-	-
Rheocricotopus [6]	-	-	-	-	-	2
Larsia [6]	-	-	-	-	-	1

## Straight River at Steele County 31 (SRH-28)

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
SRH 1994	0	18	120	4	266	42	0	0	0	450	0%	4%	27%	1%	59%	9%	0%	0%	
SRH 1995	0	26	231	49	296	196	2	52	0	852	0%	3%	27%	6%	35%	23%	0%	6%	
SRH 1996	3	50	230	120	252	44	9	7	0	715	0%	7%	32%	17%	35%	6%	1%	0%	
SRH TOTAL	3	94	581	173	814	282	11	59	0	2017	0%	5%	29%	9%	40%	14%	1%	3%	

**Percent Macroinvertebrates by Tolerance Rank**



## STRAIGHT RIVER AT COUNTY HIGHWAY #31 [SRH]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
<b>SURFACE WATER</b>				
NITRATE NITROGEN	3.23	2.29	6.21	1.19
AMMONIA NITROGEN	0.033	0.026	0.051	LB
KJELDAHL NITROGEN	3.79	2.89	6.6	1.61
ORTHOPHOSPHATE	0.009	0.025	0.038	0.016
TOTAL PHOSPHORUS	0.024	0.049	0.138	0.061
<b>PORE WATER</b>				
NITRATE NITROGEN	0.312	2.3	5.68	1.07
AMMONIA NITROGEN	1.4	0.105	0.034	0.117
KJELDAHL NITROGEN	5.73	3.08	6.12	1.8
ORTHOPHOSPHATE	0.075	0.057	0.057	0.055
TOTAL PHOSPHORUS	0.157	0.064	0.064	0.039
<b>STREAM LOAD</b>				
TURBIDITY	----	----	18	20
TOTAL SUSPENDED SOLIDS	----	----	31.8	26.22
TOTAL VOLATILE SOLIDS	----	----	10.62	5.98
CONDUCTIVITY	0.67	0.669	0.692	0.668
<b>OTHER</b>				
pH	8.4	8.6	8.1	8.4
ALKALINITY	----	----	320	300
TEMPERATURE	18.3	26.4	21.1	----

## STRAIGHT RIVER AT STEELE COUNTY 31

The location of this site is at river mile 38 of the Straight River. The Straight River is a 3rd order stream draining about 140 square miles at this location. It has a gradient of 5.1 feet/mile and in the main current there is some cobble mixed with the sandy bottom however, in the quiet water silt and mud form bars along the banks making access to the stream very difficult as you sink into the sediment. The QHEI score for this site is 59 with channel quality and substrate metrics keeping the score down. The QHEI score is the lowest of all main stem sites in the study. The flow at this site is about the same as the flow in the Little Cannon River.

The predominant species at this site were caddisflies, mayflies, and stoneflies. In June of 1995 a very large number of midges were collected, however the number of midges found during the other sample periods was quite low. The ICI and Diversity Indices ranked slight in impact while Richness and Equitability ranked moderate. Filterers outnumbered scrapers in 1994 and 95. In 1996 scrapers slightly outnumbered filterers. The tolerance range was from 2 - 8 with 14% in rank 6, 39% in rank 5, 9% in rank 4, and 29% in rank 3. Stoneflies were found in large numbers (17% of all insects collected) at this site with 256 *Perlesta*, 79 *Pteronarcys*, and 3 *Acroneuria* found over the course of the study.

Nitrogen levels in surface and pore water were less than 7 mg/l during the 4 sample periods over the 3 years. Phosphorus levels were low as well with only the June of 1996 surface water and July of 1994 pore water being above .1 gm/l. In 1996 TSS and TVS were low, however water levels were low and there were no major storm events in the 1996 sample period. The substrate seems to indicate that this stream carries a very high sediment load when water levels are high.

The upper reaches of the Straight River tend to be very flashy as was observed after several storm events in 1994 and 1995. Following the storm events water levels rose very rapidly and the water had a brown color indicating the heavy sediment load. Erosion control measures need to be taken in the headwaters of the Straight River in order to decrease the sediment load.