

# MAPLE CREEK



## Maple Creek (MAC-26)

Location:

River mile: 26

Watershed: 39043

U.S.G.S. quad: Owatonna; 44093-A2

Township: T107N R20W S1

Lat./Long: 44°01' / 93°11'

Other info.:

Type: Small Stream 3 miles from mouth

Stream Order: 2

Drainage area: 37

Riparian: Forest

Instream: Cobble and gravel in riffle; sand and silt in slow current

Gradient: 13.35 ft/mi



# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/16/95 River Mile 26 Watershed Number \_\_\_\_\_  
 Location MAC-26 U.S.G.S. quad Owatonna  
 Township T107N R20W Section 2 Lat./Long. 44°06'93" 11°30"

**71**

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 type="checkbox"/> Gravel (5)	_____	_____	Check all that apply: <input 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 checked="" 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 _____						

**11**

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 type="checkbox"/> Moderate (5)
<input checked="" type="checkbox"/> Shallows (in slow water) (1)	<input checked="" type="checkbox"/> Sparse (3)
<input checked="" type="checkbox"/> Logs or woody debris (1)	<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 _____	

**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 checked="" 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 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 <u>Sand bar</u>				

**12**

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"/>	<input checked="" type="checkbox"/> Forest, swamp (3)	<input type="checkbox"/> None (5)	
<input type="checkbox"/> Wide 50-100m (4)	<input type="checkbox"/> Fenced pasture (2)	<input type="checkbox"/>	<input type="checkbox"/> Shrub (4)	<input checked="" type="checkbox"/> Little (4)	
<input checked="" type="checkbox"/> Moderate 10-50m (3)	<input type="checkbox"/> Old field (3)	<input type="checkbox"/>	<input type="checkbox"/> Residential, Park (2)	<input type="checkbox"/> Moderate (3)	
<input type="checkbox"/> Narrow 5-10m (2)	<input type="checkbox"/> Rowcrop (1)	<input type="checkbox"/>	<input type="checkbox"/> Urban	<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 type="checkbox"/> Pool width > riffle width (2)
<input type="checkbox"/> 0.7-1m (2)	<input checked="" 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 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			

**10**

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) 13.4

**8**

Gradient

## 7. DRAINAGE AREA

(square mile) 37

**10**

Drainage Area

# QUALITATIVE HABITAT EVALUATION INDEX (QHEI) SCORING FORM

Date 6/15/96 River Mile 26 Watershed Number \_\_\_\_\_  
 Location MAC-26 U.S.G.S. quad Owatonna  
 Township T107N R20W Section 2 Lat./Long. 44°05.40N 93°11.34W

71

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 type="checkbox"/> Gravel (5)	_____	_____	Check all that apply: <input 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 checked="" 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 _____						

11

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 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 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 checked="" 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 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 \_\_\_\_\_

12

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 type="checkbox"/> Residential, Park (2)
		<input type="checkbox"/> Urban

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 checked="" 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 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 type="checkbox"/> Eddies (1)	
		<input type="checkbox"/> Interstitial (-1)	

10

Pool/  
Riffle

Riffle/Run Depth (Check 1)	Riffle/Run Substrate (Check 1)	Riffle/Run Substrate Quality (Check 1)
<input checked="" type="checkbox"/> Generally <10cm (1)	<input checked="" type="checkbox"/> Stable (cobble, boulder) (1)	<input type="checkbox"/> Embedded (0)
<input 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) 13.4

8

Gradient

## 7. DRAINAGE AREA

(square mile) 37

10

Drainage Area

SITE **MAC-26** Location MAPLE CREEK AT CTY 35 NW OF OWATONNA

	1994	1995	1996
SUBSTRATE	10	11	11
INSTREAM COVER	10	10	10
CHANNEL MORPHOLOGY	12	12	12
RIPARIAN	9	10	10
CHANNEL QUALITY	10	10	10

GRADIENT 8  
DRAINAGE 10

QHEI 1994 **69**

QHEI 1995 **71**

QHEI 1996 **71**

EXTENT OF CHANGE IN LOCATION  
No change in location.

RAPID HABITAT BIOASSESSMENT 1995 **192**

- FISH COVER 16
- MACRO COVER 19
- EMBEDDEDNESS 18
- VELOCITY\DEPTH 19
- CHANNEL 20
- SEDIMENT 10
- RIFFLES 13
- CHANNEL FLOW 18
- BANK EROSION 13
- VEGETATION 13
- GRAZING 19
- RIPARIAN 14

## MAPLE CREEK (MAC-26)

At Steele County Highway 35

Riparian: Forest and encroaching residential

Instream: 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	69	71	71	70.3	
ICI	34	27	29	30	Slight
Richness	17.5	10.5	18	15.3	Moderate
Diversity	2.6	2.4	3.0	2.7	Slight
Equitability	0.48	0.73	0.64	0.62	Non Impacted
Scraper/Filterer Ratio	0.97	2.09	3.62		
Tolerance Range	3-8	3-7	1-9	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>
<b>Amphipods</b>						
Hyalella [5]	-	1	-	-	-	-
<b>Gastropoda</b>						
Physa [9]	-	-	-	-	1	-
<b>Stoneflies</b>						
Perlesta [3]	3	-	12	3	7	-
<b>Beetles</b>						
Dubiraphia [5]	-	-	-	-	6	-
Optioservus [4]	14	-	3	3	-	1
Stenelmis [7]	9	3	-	1	3	5
<b>Mayflies</b>						
Baetis [4]	31	-	-	-	4	-
Heptagenia [3]	18	3	8	-	-	3
Stenacron [4]	21	127	-	62	52	27
Stenonema [4]	-	-	17	-	2	3
Leucrocuta [?]	-	-	-	-	-	1
Pseudocloeon [4]	-	-	-	-	4	-
Caenis [6]	-	1	-	-	-	-
Tricorythodes [5]	-	-	-	1	-	-
Paraleptophlebia [2]	-	-	-	-	1	-
Macdunnoa [?]	-	-	-	-	3	-
<b>Caddisflies</b>						
Cheumatopsyche [6]	98	32	-	7	-	-
Hydropsyche [5]	87	6	6	-	-	-
Pycnopsyche [3]	-	-	-	-	5	2
Polycentropus [3]	-	1	-	5	-	1
Nyctophylax [1]	-	-	-	-	-	1
Cyrnellus [5]	-	-	-	-	1	-
<b>True Flies</b>						
Simuliidae [4-6]	-	-	-	-	1	-
Antocha [5]	-	-	-	-	-	1
Atherix [4]	1	-	-	3	-	-

MAPLE CREEK (MAC-26) page 2

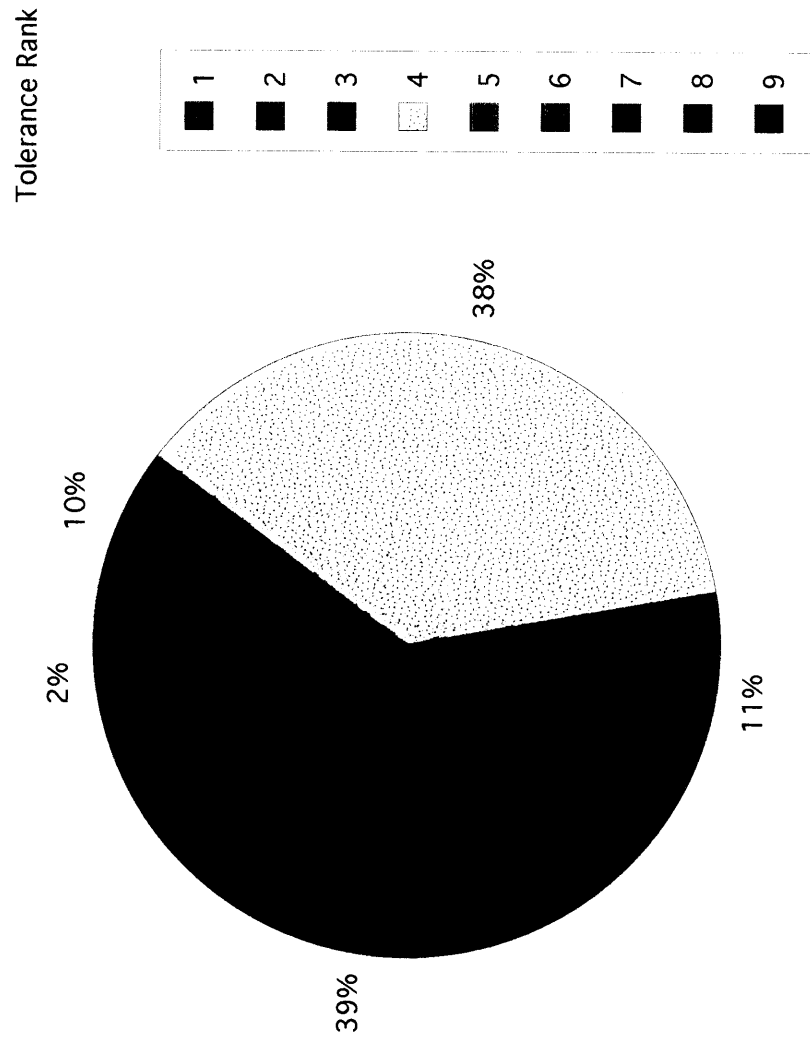
**Midges**

Brillia [?]	1	-	11	-	2	-
Cricotopus [8]	-	-	-	-	2	-
Microtendipes [6]	2	37	49	6	8	30
Polypedilum [6]	4	3	-	4	1	3
Eukiefferiella [4]	-	1	-	-	-	-
Rheotanytarsus [6]	-	2	-	-	2	-
Parametriocnemus[4]	-	-	-	-	8	-
Thienemannimyia[6]	1	19	8	5	4	33
Thienemaniella [2]	-	-	-	-	2	-
Tanytarsus [7]	-	-	-	1	-	-
Paratendipes [3]	2	-	-	-	-	3
Nylotanypus [?]	4	-	-	-	-	-
Endochironomus [6]	2	4	-	-	-	-
Stenochironomus [3]	2	3	-	1	-	19
Cryptochironomus[8]	1	-	-	-	-	-
Parachironomus[8]	-	-	-	-	1	-
Paratanytarsus [?]	-	1	-	-	-	-

### Maple Creek near Owatonna (MAC-26)

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
MAC 1994	0	0	30	164	94	205	12	1	0	506	0%	0%	6%	32%	19%	41%	2%	0%	
MAC 1995	0	0	25	88	7	79	2	0	0	201	0%	0%	12%	44%	3%	39%	1%	0%	
MAC 1996	1	3	40	102	7	82	8	3	1	247	0%	1%	16%	41%	3%	33%	3%	0%	
MAC TOTAL	1	3	95	354	108	366	22	4	1	954	0%	0%	10%	37%	11%	38%	2%	0%	

Percent Macroinvertebrates by Tolerance Rank



## MAPLE CREEK NORTHEAST OF OWATONNA [MAC]

DATE	JULY 1994	JULY 1995	JUNE 1996	JULY 1996
<b>SURFACE WATER</b>				
NITRATE NITROGEN	----	----	7.11	1.29
AMMONIA NITROGEN	----	----	0.031	0.022
KJELDAHL NITROGEN	----	----	7.5	1.95
ORTHOPHOSPHATE	----	----	0.029	0.097
TOTAL PHOSPHORUS	----	----	0.035	0.18
<b>PORE WATER</b>				
NITRATE NITROGEN	----	----	6.72	1.09
AMMONIA NITROGEN	----	----	0.163	0.131
KJELDAHL NITROGEN	----	----	6.89	1.93
ORTHOPHOSPHATE	----	----	0.008	0.052
TOTAL PHOSPHORUS	----	----	0.022	0.09
<b>STREAM LOAD</b>				
TURBIDITY	----	----	11	15
TOTAL SUSPENDED SOLIDS	----	----	40.8	32.71
TOTAL VOLATILE SOLIDS	----	----	15.13	6.01
CONDUCTIVITY	0.667	----	0.649	0.695
<b>OTHER</b>				
pH	8.4	----	8.1	8.3
ALKALINITY	----	----	320	280
TEMPERATURE	20.6	----	22.5	----

# MAPLE CREEK NORTHEAST OF OWATONNA

Maple creek is a 2nd order stream that drains 37 square miles and enters into the Straight River in Owatonna. The stream has a gradient of 13.4 feet/mile in the sample area and is shallow with a mixture of riffles, runs, and pools. The substrate is composed of cobble and gravel in the riffle and sand and silt where the current slows. The QHEI score is 71 which ranks it highest among the Straight River tributaries and about equal to Pine, Heath, and Wolf Creeks. The flow is less than that of any of the other tributaries that were monitored in the Cannon River Basin. During dry weather this stream has very little flow and may even stop altogether during an extended drought.

The total number of insects collected at this site was not very great, however there were 10 different species of mayflies, 6 species of caddisflies, and 17 species of midges collected at the site. The predominant species collected were the mayflies, especially the Stenacron. In 1994 when water levels were much higher, significantly higher numbers of caddisflies were collected than in subsequent years. The midge population remained consistently high during all three years of the study. The ICI and Diversity Indices ranked in the slight impact range while Richness was in the moderate range and the Equitability Index was in the non impacted range. In 1994 the scraper/filterer ratio was about even, however in 1995 and 96 the scrapers dominated the sample. The tolerance range averaged between 3 and 7 with 39% in rank 6, 11% in rank 5, 38% in rank 4, and 10% in rank 3.

Very little chemistry was obtained from this site in 1994 and 95. In 1996 the nutrient tests revealed that the phosphorus levels were very low in June and increased in July to around .1 mg/l as the flow decreased to a trickle. On the other hand, the nitrogen levels went from around 7 mg/l to about 2 mg/l as the flow decreased. Stream load was in the median range for all tributaries monitored and showed no significant information.

This quiet little stream is going to receive more pressure from human impact as the residential area northeast of Owatonna continues to expand in the years to come. Efforts should be taken to ensure that development does not impact the quality of the riparian zone and water of this quiet little stream. Storm and melt water flowing into newly installed storm sewers could adversely affect the nature of this watershed.