

**“SMITHTOWN” CREEK**

**BUCKS COUNTY**

**Stream Redesignation Evaluation Report  
Water Quality Standards Review**

**Segment: Basin**

**Drainage List: E**

**Stream Code: 03211**

**Division of Water Quality Assessment and Standards  
Bureau of Water Supply and Wastewater Management  
Department of Environmental Protection**

**February 1997  
(Revised February 2000)  
(Revised January 2002)**

**“Smithtown” Creek (03211)**  
**Bucks County**  
**Drainage List E**

**GENERAL WATERSHED DESCRIPTION**

Unnamed tributary 03211, or “Smithtown” Creek as it is locally known, is located in southeastern Pennsylvania and is tributary to the Delaware River at river mile 159.9 (Figure 1). The basin encompasses a total of 1.38 square miles in Tincum Township, Bucks County. The waters of the “Smithtown” Creek basin traverse a total of 2.75 stream miles. An estimated  $Q_{7-10}$  of 0.01 cubic feet per second for “Smithtown” Creek at the mouth was based on the gage on Tohickon Creek near Pipersville (Lat. 40°26’00” Long. 75°07’00”).

The “Smithtown” Creek basin is currently designated Trout Stocking (TSF). “Smithtown” Creek was evaluated for designation as Exceptional Value Waters (EV) in response to a rulemaking petition from the Smithtown Creek Watershed Association. One component of the evaluation was a field survey conducted by central office staff on January 7, 1997.

The majority of the basin is wooded, but low-density residential usage is present along the mainstem and along portions of the tributaries. Township roads are located adjacent to the stream for the entire length of the mainstem, as well as along two of the three tributaries in the basin. A very small portion (less than 0.003%) of the “Smithtown” Creek watershed is located in the Delaware Canal State Park.

The “Smithtown” Creek watershed is located in the Gettysburg-Newark Lowland Section of the Piedmont physiographic province. The basin lies in the Triassic Lowland sub-ecoregion (64a) of the Northern Piedmont ecoregion (64). Basin elevations range from 100 feet to 450 feet. Topography and surface features are portrayed on the Lumberville 7.5 minute series USGS quadrangle.

Tincum Township regulates land uses with zoning ordinances. Zoning requirements vary with district and minimum lot sizes range from one to ten acres depending on proposed use. Currently a two-acre lot size is required for a house that is located in an area zoned residential/agricultural that is the zoning for the basin under study. According to the 1990 census, 4,167 people reside in the township; approximately 123 people are located in the “Smithtown” Creek watershed.

According to the U.S. Department of the Interior National Wetland Inventory quadrangle, four manmade ponds are present in the basin. Additionally, one small section of temporary, palustrine, broad-leaved deciduous forested wetland is present in the basin.

**WATER QUALITY AND USES**

**Surface Water**

Surface water quality data were collected at two stations in the “Smithtown” Creek basin through one-time grab samples (Figure 1, Tables 1 & 2). No long-term water quality data were available to allow a direct comparison to water quality criteria. The indigenous aquatic community is a better indicator of long-term conditions and is used as an indicator of ecological significance. Bacteriological sampling revealed relatively low fecal coliform levels of 20 colonies per 100 ml at both stations. No NPDES discharges or municipal water supply withdrawals are present in the basin.

The primary potential nonpoint pollution source is township roads that could contribute salt, gravel and petroleum products into the stream. To a lesser extent, residential lawns and septic systems could contribute nutrients and herbicides to the stream. From the water chemistry sampling results, these activities do not appear to be having a large impact on overall water quality.

### **Aquatic Biota**

An evaluation of the physical habitat at Station 2SC revealed sub-optimal conditions for benthic macroinvertebrates and fish (Table 3). The candidate stream lacked necessary instream cover for fish and benthic macroinvertebrates. This very small stream was barely a trickle until the confluence of all the unnamed tributaries at RMI 0.79. It then flowed down a bedrock swale that lacked significant amounts of cobble or gravel. The stream scored poorly on the width of its riparian vegetative zone due to township roads bordering the channel for its entire length, and the clearing of riparian vegetation at the lower end of the basin for Route 32, the Pennsylvania canal, and residences. Other low scoring parameters included channel flow status, condition of banks, grazing or other disruptive pressure, and velocity/depth regimes. These conditions did not compare favorably to either reference station. The Pine Creek ambient reference watershed in Berks County earned an optimal habitat score, while the South Branch French Creek reference station earned a sub-optimal habitat score with embeddedness, instream cover, and epifaunal substrate being the lowest scoring parameters.

Benthic macroinvertebrates were collected from one station near the mouth (SC2) using a modification of EPA's Rapid Bioassessment Protocol III for use in streams and rivers. This sample was collected from the best available riffle habitat within the sampled reach. Taxa richness of the candidate was only 14 genera (Table 4). The total number of EPT (Ephemeroptera/Plecoptera/Tricoptera) taxa was 7 genera in the total sample. Because the candidate is designated Trout Stocking (TSF) and there were no Exceptional Value Waters in this ecoregion that were previously designated TSF at the time of the initial survey, the candidate was compared to two reference stations. Pine Creek, a cold water EV stream in Berks County and South Branch French Creek, a High Quality - Trout Stocking stream in Chester County were sampled. Since the initial field survey was conducted, the South Branch French Creek has been redesignated EV. The Pine Creek reference sample contained 37 total genera, 23 of which were EPT genera. The South Branch French Creek sample contained 26 genera, 11 of which were EPT taxa.

Fish sampling was also conducted at Station SC2 using a Coffelt backpack electrofisher. Only one species, blacknose dace (*Rhinichthys atratulus*), was collected. The basin is not stocked by the Pennsylvania Fish and Boat Commission, and no portion is designated a Wilderness Trout Stream or Class A Wild Trout Water.

### NATIONAL, STATE, REGIONAL, OR LOCAL SIGNIFICANCE

No portion of the "Smithtown" Creek basin possesses attributes that qualify as an outstanding national, state, regional, or local resource under the Department's antidegradation regulation.

### ECOLOGICAL OR RECREATIONAL SIGNIFICANCE

One benthic macroinvertebrate sample from the "Smithtown" Creek watershed was compared to two reference stations of similar drainage area using a modification of EPA's Rapid Bioassessment Protocol III (RBP) (Table 5). The selected reference streams, Pine Creek and South Branch French Creek, are located in the same ecoregion as the candidate and were sampled at the same time as the candidate. The best available habitat was sampled in all cases. The metrics used for comparison included taxa richness, modified EPT,

percent dominant taxon, percent modified mayflies, and modified Hilsenhoff Biotic Index. The scoring criteria used to evaluate candidates require that the overall score for a candidate station be greater than or equal to 92% of the reference station's score to qualify for an Exceptional Value Waters (EV) designation, and 83-91% of the reference station's score to qualify for a High Quality (HQ) designation. The station sampled in the "Smithtown" Creek watershed (2SC) did not earn an overall score that qualified for HQ or EV designation (Table 5). It earned only 20% of the Pine Creek reference watershed's overall score (Station R1PC), and 53% of the South Branch French Creek reference watershed's score (Station R2SBFC). Modified EPT numbers for the candidate were approximately one-half of the scores of the reference watersheds. The candidate earned 45% of Station R1PC and 71% of Station R2SBFC's score for the modified EPT index metric. The percent contribution from the dominant taxon in the candidate's sample was 56%. "Smithtown" Creek's dominant taxon was the blackfly *Prosimulium*. The Pine Creek reference station's dominant taxa were the pollution sensitive mayfly *Epeorus* and the stonefly *Prostoia*. South Branch French Creek's dominant taxon was the winter stonefly *Taeniopteryx*. Only 19% of the reference sample was composed of the dominant taxon in Pine Creek and 25% in South Branch French Creek. The "Smithtown" Creek sample contained 6% mayflies compared to 54% mayflies in the R1PC sample and 5% in the R2SBFC sample. The candidate station compared favorably with the reference watersheds for only the Modified Hilsenhoff Index parameter; for this metric "Smithtown" Creek earned the maximum points possible.

#### PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The Department provided public notice of this redesignation evaluation to and requested any technical data from the general public through publication in the Pennsylvania Bulletin on December 25, 1999 (29 Pa.B 6524). A similar notice was also published in the Quakertown Free Press on December 29, 1999. In addition, Tincum Township was notified of the evaluation in a letter dated December 23, 1999. The Bucks County Planning Commission was also notified at the same time. No data on water chemistry, instream habitat, or the aquatic community were received in response to these notices.

The Department sent copies of the draft stream evaluation report to the Smithtown Creek Watershed Association, Tincum Township and the Bucks County Planning Commission on May 19, 2000 requesting any comments by June 23, 2000. Comments were received from the watershed association and Tincum Township. In addition, letters supporting the petition were received from the Tincum Township Environmental Advisory Committee and the Bridgeton-Nockamixon-Tincum Groundwater Management Committee.

The Smithtown Creek Watershed Association questioned the Department's findings and directed us to the report by Princeton Hydro that was submitted with the Tincum Township response. Comments in that report questioned the Department's use of methods that have been modified from the EPA Rapid Bioassessment Protocols (RBP) and the reference stations used for comparison to Smithtown Creek. In addition, the report contained the results of stream sampling and comparisons to reference stations that conflict with the Department's findings. Princeton Hydro collected its benthic macroinvertebrate samples using a Surber sampler, a quantitative sampling device. It is unclear if they followed the methods outlined in the EPA RBP document to determine if the metrics and scoring criteria are valid for use with data collected using this device. Because of this concern, the Department is unable to accept these comparisons. As a result, the Department's recommendation is unchanged.

The Department responded to these comments in August 2000. That response included discussion of the Department's evaluation of biological metrics for use in Pennsylvania as well as the use of a D-frame net for sample collection. It also indicated that the Department believed the reference stations used in the evaluation

of Smithtown Creek were acceptable. The Department asked if Princeton Hydro had evaluated the metrics they used in their assessment to determine if they were appropriate for use with the sampling method employed. No response was received to this question.

In February 2001, Tinicum Township again provided comments on the Smithtown Creek evaluation in response to notification to the petitioner that the rulemaking package containing the stream would be considered as proposed rulemaking at the March 2001 Environmental Quality board meeting. Comments from Princeton Hydro attached to the township's letter were similar to those presented previously. The petitioner provided similar comments in an April 2001 letter. The Department responded to the petitioner, with a copy to Tinicum Township, in May 2001. In that response, the Department reiterated its belief in the assessment methods and reference stations used in evaluating Smithtown Creek. The Department again questioned the suitability of the metrics used by Princeton Hydro.

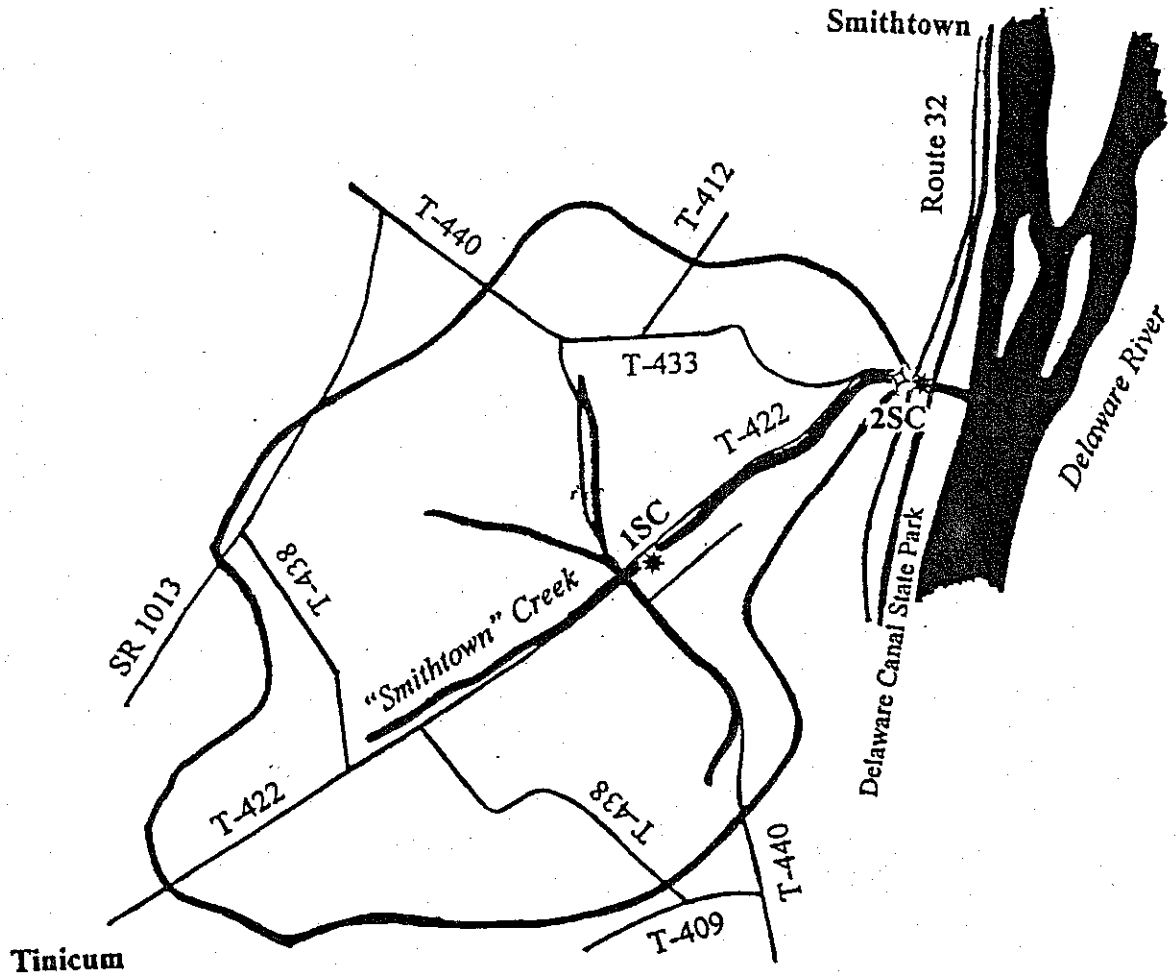
The petitioner and the township provided the same comments during the public comment period on the Little Bush Kill proposed rulemaking package. The Department's responses, which are similar to those above, can be found in the comment/response document included with the Little Bush Kill final rulemaking package.

Princeton Hydro collected its benthic macroinvertebrate samples using a Surber sampler, a quantitative sampling device. It is unclear if they followed the methods outlined in the EPA RBP document to determine if the metrics and scoring criteria are valid for use with data collected using this device. The Department has not received documentation that this evaluation was done. Because of this concern, the Department is unable to accept these comparisons. As a result, the Department's recommendation is unchanged.

## RECOMMENDATIONS

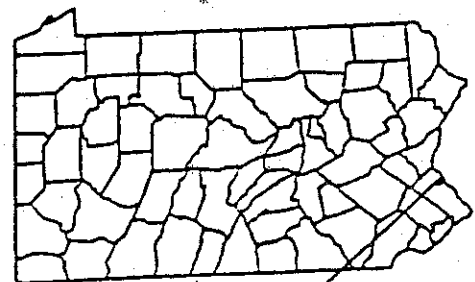
Based on applicable regulatory criteria, the Department recommends that the "Smithtown" Creek basin retain its current Trout Stocking (TSF) designation. A total of 2.75 stream miles will retain their current designation. This recommendation does not reflect the EV designation sought in the petition.

Figure 1  
 "Smithtown" Creek (03211)  
 Tincicum Township, Bucks County



Legend

- \* - denotes water and/or benthos sampling station
- ◇ - denotes electrofishing station



Watershed Location

SCALE 1:24000

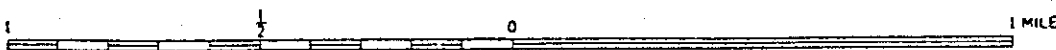


Table 1

STATION LOCATIONS

“Smithtown” Creek (03211), Bucks County

Station	Station Description	Stream Code	Drainage Area	RMI Location	Latitude	Longitude
1SC	“Smithtown” Creek below Unnamed Tributaries - The creek was sampled approximately 4170 feet above the mouth. The station was located off T-422 in Tincicum Township, Bucks County.	03211	1.13	0.79	40°27'28”	75°05'02”
2SC	“Smithtown” Creek near Mouth - The station was accessed from Route 32 in Tincicum Township, Bucks County. The samples were collected 500 feet above the mouth.	03211	1.38	0.10	40°27'46”	75°04'23”
R1PC	Pine Creek Headwaters - The station on this ambient reference stream was accessed from SR 1026 in Pike Township, Berks County. This cold water Exceptional Value (EV) stream was sampled 20 feet above the road crossing.	01701	3.57	3.65	40°25'44”	75°41'48”
R2SBFC	South Branch French Creek - The stream was sampled 100 yards downstream of the Route 345 and 401 intersection in Warwick Township, Chester County. The stream was designated High Quality- Trout Stocking (HQ-TSF) at the time of the field survey. It is now designated EV	01580	5.0	6.50	40°08'53”	75°47'43”

**Table 2**  
**Water Chemistry**  
**"Smithtown" Creek (03211)**  
**Bucks County**  
**January 7, 1996**

Field Parameters <sup>1</sup>	Stations	
	1SC	2SC
Temperature (C)	2.8	4.4
Conductivity (umhos)	140.9	140.6
Dissolved O <sub>2</sub>	11.7	11.3
Stream Flow (cfs)	-	0.56
<b>Laboratory Parameters</b>		
pH	6.6	6.8
Alkalinity	36.0	40.0
Acidity	0.0	0.0
Hardness	40.0	40.0
Total Dis. Solids	192.0	146.0
Suspended Solids	<2.0	<2.0
NH <sub>3</sub> -N	<0.02	<0.02
NO <sub>2</sub> -N	<.01	<.01
NO <sub>3</sub> -N	0.63	0.57
Total P	0.02	0.02
Ca	11.60	13.50
Mg	4.64	5.58
Cl	7.00	6.00
SO <sub>4</sub>	17.0	14.0
As - Dissolved*	<4.0	<4.0
As - Total*	<4.0	<4.0
Cd - Dissolved*	<0.2	<0.2
Cd - Total*	<0.2	<0.2
hex Cr*	<10.0	<10.0
Cr - Total*	<50.0	<50.0
Cu - Dissolved*	<4.0	<4.0
Cu - Total*	<4.0	<4.0
Fe*	94.0	30.0
Pb - Dissolved*	<1.0	<1.0
Pb - Total*	<1.0	<1.0
Mn*	<10.0	<10.0
Ni - Dissolved*	<4.0	<4.0
Ni - Total*	<4.0	<4.0
Zn - Dissolved*	<5.0	<5.0
Zn - Total*	<5.0	<5.0
Al*	26.4	24.5
Fecal Colif. Col/100 ml	20	20

<sup>1</sup> Except for pH, conductance, and those indicated otherwise, all values are total concentrations in mg/l  
\* Total concentrations in ug/l



**Table 3**

**HABITAT ASSESSMENT SUMMARY**

**“Smithtown” Creek (03211), Bucks County**

**January 7, 1997**

Habitat Parameter	Station <sup>1</sup>		
	2SC	RIPC	R2SBFC
Instream Cover (fish)	13	13	11
Epifaunal Substrate	14	13	11
Embeddedness	11	11	9
Velocity/Depth Regimes	10	17	17
Channel Alterations	13	15	15
Sediment Deposits	11	13	12
Frequency of Riffles	16	19	12
Channel Flow Status	7	20	19
Condition of Banks	8	17	16
Bank Vegetation Protection	14	19	16
Vegetation Disruptive Pressure	6	19	16
Riparian Vegetative Zone Width	5	18	14
Total Score	128	194	168
Rating <sup>2</sup>	SUB	OPT	SUB

<sup>1</sup> Refer to Figure 1 for station locations.

<sup>2</sup> OPTimal, SUB-optimal, MARginal, and POOR habitat ratings are based on the Riffle/Run prevalence Habitat Assessment Field Data Sheet.

Table 4

**Benthic Macroinvertebrate Taxa List**  
**"Smithtown" Creek, Bucks County**  
**January 7, 1997**

Taxa	Stations <sup>2</sup>		
	2SC	RIPC	R2SBFC
<b>Ephemeroptera (mayflies)</b>			
Baetidae; <i>Baetis</i>	P	C	-
Ephemerellidae; <i>Ephemerella</i>	-	VA	-
Heptageniidae; <i>Epeorus</i>	C	VA	-
<i>Rhithrogena</i>	-	C	-
<i>Stenonema</i>	-	P	C
Leptophlebiidae; <i>Paraleptophlebia</i>	-	A	-
Oligoneuriidae; <i>Isonychia</i>	-	P	-
Siphonuridae; <i>Ameletus</i>	P	P	-
<b>Plecoptera (stoneflies)</b>			
Capniidae; <i>Allocapnia</i>	-	R	-
Chloroperlidae; <i>Sweltsa</i>	A	R	-
Nemouridae; <i>Prostoia</i>	A	VA	-
Peltoperlidae; <i>Tallaperla</i>	-	R	-
Perlidae; <i>Acroneuria</i>	-	R	C
Perlodidae; <i>Isoperla</i>	P	-	-
Pteronarcyidae; <i>Pteronarcys</i>	-	R	-
Taeniopterygidae; <i>Taeniopteryx</i>	R	P	A
<i>Strophopteryx</i>	-	R	-
<b>Tricoptera (caddisflies)</b>			
Brachycentridae; <i>Micrasema</i>	-	-	C
Hydropsychidae; <i>Diplectrona</i>	-	P	-
<i>Cheumatopsyche</i>	-	-	A
<i>Hydropsyche</i>	-	P	A
Limnephilidae; <i>Goera</i>	-	R	P
<i>Apatania</i>	-	P	-
Philopotamidae; <i>Dolophilodes</i>	-	R	-
<i>Chimarra</i>	-	-	P
Polycentropodidae; <i>Polycentropus</i>	-	-	P
Rhyacophilidae; <i>Rhyacophila</i>	-	A	P
Uenoidae; <i>Neophylax</i>	-	C	P
<b>Diptera (true flies)</b>			
Athericidae; <i>Atherix</i>	-	R	P
Ceratopogonidae; <i>Bezzia</i>	-	R	-
Simuliidae; <i>Prosimulium</i>	VA	A	-
<i>Simulium</i>	-	-	P
Tipulidae; <i>Hexatoma</i>	P	C	-
<i>Antocha</i>	-	R	R
<i>Tipula</i>	R	-	P
Chironomidae	A	A	C

Table 4 - Continued

Benthic Macroinvertebrate Taxa List  
 "Smithtown" Creek, Bucks County  
 January 7, 1997

Taxa	Stations <sup>2</sup>		
	2SC	RIPC	R2SBFC
<b>Other Insect Taxa</b>			
<b>Megaloptera</b> (dobson-, alder-, fishflies)			
Corydalidae; <i>Nigronia</i>	-	R	-
<b>Odonata</b> (Dragon-, damselflies)			
Gomphidae; <i>Lanthus</i>	-	R	-
<b>Coleoptera</b> (aquatic beetles)			
Elmidae; <i>Dubiraphia</i>	-	-	R
<i>Optioservus</i>	-	P	A
<i>Oulimnius</i>	-	P	-
<i>Promoresia</i>	-	R	-
<i>Stenelmis</i>	R	-	P
Psephenidae; <i>Psephenus</i>	R	P	P
<i>Ectopria</i>	-	R	P
Ptilodactylidae; <i>Anchytarsus</i>	-	-	R
<b>Non-Insect Taxa</b>			
Oligochaeta Lumbricidae	C	-	A
Ancylidae; <i>Laevapex</i>	-	P	-
Sphaeriidae	-	-	R
Cambaridae; <i>Orconectes</i>	-	-	P
Hydracarina	-	-	R
<b>Total Number Taxa</b>	14	37	26

Table 5

Semi-Quantitative Benthic  
Macroinvertebrate Data and RBP Metric  
Comparisons<sup>1</sup>  
"Smithtown" Creek, Bucks County  
January 7, 1997

Taxa	Stations <sup>2</sup>		
	2SC	RIPC	R2SBFC
<b>Ephemeroptera (mayflies)</b>			
Baetidae; <i>Baetis</i>	2	1	-
Ephemerellidae; <i>Ephemerella</i>	-	18	-
Heptageniidae; <i>Epeorus</i>	5	21	-
<i>Rhithrogena</i>	-	3	-
<i>Stenonema</i>	-	3	6
Leptophlebiidae; <i>Paraleptophlebia</i>	-	11	-
Oligoneuriidae; <i>Isonychia</i>	-	1	-
Siphonuridae; <i>Ameletus</i>	1	2	-
<b>Plecoptera (stoneflies)</b>			
Chloroperlidae; <i>Sweltsa</i>	17	-	-
Nemouridae; <i>Prostoia</i>	9	21	-
Perlidae; <i>Acroneuria</i>	-	-	2
Perlodidae; <i>Isoperla</i>	1	-	-
Taeniopterygidae; <i>Taeniopteryx</i>	-	-	32
<b>Tricoptera (caddisflies)</b>			
Brachycentridae; <i>Micrasema</i>	-	-	4
Hydropsychidae; <i>Diplectrona</i>	-	1	-
<i>Cheumatopsyche</i>	-	-	14
<i>Hydropsyche</i>	-	2	10
Limnephilidae; <i>Goera</i>	-	-	2
Philopotamidae; <i>Dolophilodes</i>	-	1	-
Polycentropodidae; <i>Polycentropus</i>	-	-	3
Rhyacophilidae; <i>Rhyacophila</i>	-	7	2
Uenoidae; <i>Neophylax</i>	-	-	2
<b>Diptera (true flies)</b>			
Athericidae; <i>Atherix</i>	-	-	3
Simuliidae; <i>Prosimulium</i>	57	7	-
<i>Simulium</i>	-	-	2
Tipulidae; <i>Hexatoma</i>	2	2	-
<i>Tipula</i>	-	-	1
Chironomidae	5	4	14

Table 5 - Continued

Taxa	Stations <sup>2</sup>		
	2SC	R1PC	R2SBFC
Other Insect Taxa			
<b>Megaloptera</b> (dobson-, alder-, fishflies)			
Corydalidae; <i>Nigronia</i>	-	1	-
<b>Coleoptera</b> (aquatic beetles)			
Elmidae; <i>Dubiraphia</i>	-	-	1
<i>Optioservus</i>	-	-	13
<i>Stenelmis</i>	-	-	3
Psephenidae; <i>Psephenus</i>	-	1	2
Non-Insect Taxa			
Oligochaeta Lumbricidae	2	-	10
Ancylidae; <i>Laevapex</i>	-	3	-
Sphaeriidae	-	-	1
Cambaridae; <i>Orconectes</i>	-	-	1
<b>Total Number Individuals</b>	101	110	128
<b>Station Compared to:</b>	R1	R2	
<b>Taxa Richness</b>	10	10	19
candidate/reference	53%	48%	-
biological condition score	0	0	6
<b>Modified EPT Index</b>	5	5	11
candidate/reference	45%	71%	-
biological condition score	0	4	6
<b>Modified Hilsenhoff Index</b>	2.0	2.0	1.6
candidate - reference	0.4	-2.3	-
biological condition score	6	6	6
<b>% Dominant Taxon</b>	56	56	19
candidate - reference	37	31	-
biological condition score	0	0	6
<b>% Modified Mayfly</b>	6	6	54
reference - candidate	48	-1	-
biological condition score	0	6	6
<b>Total Biological Condition Score</b>	6	16	30
<b>% Comparability to Reference Station<sup>3</sup></b>	20%	53%	--
<b>Designation</b>	NC	NC	EV
			HQ-TSF

1Semi-quantitative based on randomly selected subsample (100+ individuals) from qualitative samplings.

2Refer to Figure 1 and Table 1 for station locations.

3Reference stations were selected based on documented ecological integrity, location in appropriate ecoregion, aquatic use and current EV or HQ designation.