

**WATER QUALITY STANDARDS REVIEW  
STREAM REDESIGNATION EVALUATION REPORT**

**BROOKE EVANS CREEK  
MONTGOMERY COUNTY**

**Segment: Basin**

**Stream Code: 01638**

**Drainage List: F**

WATER QUALITY ASSESSMENT SECTION (GLW)  
DIVISION OF WATER QUALITY STANDARDS  
BUREAU OF WATER STANDARDS AND FACILITY REGULATION  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
OCTOBER 2006

## **INTRODUCTION**

The Department conducted an evaluation of Brooke Evans Creek in response to a petition from Mr. Larry Piasecki that requests this basin be redesignated to Exceptional Value waters (EV). The Environmental Quality Board accepted this petition for further study on February 19, 2002. Brooke Evans Creek is currently designated Warm Water Fishes (WWF). This evaluation is based on a field survey conducted February 12, 2002.

## **GENERAL WATERSHED DESCRIPTION**

Brooke Evans Creek, a freestone stream, is a tributary to the Schuylkill River in the Delaware River watershed. The candidate basin is located in Limerick Township, Montgomery County. It has a drainage area of 1.5 square miles and contains 2.7 stream miles. The surrounding area is characterized by relatively flat topography with some gently rolling hills of low relief.

The current land use in the watershed consists mostly of single-family residential and open fields. Land use is a mixture of residential (40%), old fields (30%), industrial (15%), cropland (5%), pasture (5%), and commercial (5%). There are no major population centers in this basin.

## **WATER QUALITY AND USES**

### **Surface Water**

No long-term water quality chemistry data were available to allow a direct comparison to water quality criteria. Instead, biological data was collected to evaluate water quality conditions in Brooke Evans Creek, since the indigenous aquatic community is a better indicator of long-term water quality conditions. There is one NPDES permit for a sewage treatment plant that has not been constructed. There are no permitted surface water withdrawals in the candidate basin.

### **Aquatic Biota**

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of both water quality and ecological significance. Department staff collected habitat and benthic macroinvertebrate data at two locations on Brooke Evans Creek (1BEC and 2BEC), and from one station on Rock Run (EV reference, 1RR) on February 12, 2002 (Figure 1, Table 1).

**Habitat.** Instream habitat was assessed at each station on Brooke Evans Creek and Rock Run. Total habitat scores (Table 2) at stations 1BEC (173) and 2BEC (153) were suboptimal, compared to an optimal score at 1RR (205). Low scoring parameters indicated intense vegetative disruptive pressure, severely eroded banks, and a lack of epifaunal substrate and

adequate riparian buffering at station 2BEC; and intense vegetative disruptive pressure and a lack of adequate riparian buffer at station 1BEC.

**Benthos.** Benthic macroinvertebrate samples were collected at all three stations (Table 3) using the Department's Antidegradation sampling protocol (PA-DEP RBP) adapted from EPA's 1989 and 1999 Rapid Bioassessment Protocol manuals (Plafkin, et al 1989, Barbour, et al 1999). While taxa sensitive to water quality degradation were present at both 1 and 2BEC, the relatively high abundances of tolerant taxa at these stations compared to the reference station reflect the cumulative impacts of human activity in the basin. The presence of a species of special concern, *Stygobromus pizzini*, an amphipod crustacean was noted by the petitioner. The Pennsylvania Natural Heritage Program (PHNP) tracks species of special concern by using element rankings established by The Nature Conservancy (1996) to indicate a species risk of extinction both globally and within the state. Little is known about the global status of *S. pizzini*, but it is not considered threatened or endangered in the state (PHNP, 2004). No *S. pizzini* were found during the Department's February 2002 survey. An inquiry with the Pennsylvania Fish and Boat Commission indicated that no fisheries data was available.

## **BIOLOGICAL USE QUALIFICATIONS**

The qualifying criterion applied to Brooke Evans Creek was the DEP integrated benthic macroinvertebrate scoring test described at §93.4(b)(2)(i)(A) and §93.4(b)(1)(v). Selected benthic macroinvertebrate community metrics from Brooke Evans Creek (Table 4) were compared to those from a reference stream with a comparable drainage area. Stations 1BEC and 2BEC were compared to a reference station on Rock Run (1RR), a tributary to French Creek, which is currently designated Exceptional Value (EV). Rock Run was used as a reference because both are freestone streams, have similar drainage area (3.3 and 1.5 square miles, respectively), are in close proximity (8 miles) to each other, and are found in similar geologic settings. In addition, Rock Run has served as an EV reference stream in several other Departmental surveys. Sampling of all stations was conducted on the same day to minimize seasonal variation. The comparisons were done using the following metrics that were selected as being indicative of community health: taxa richness; modified EPT index; modified Hilsenhoff Biotic Index; percent dominant taxon; and percent modified mayflies.

Based on these five metrics, neither station (1BEC or 2BEC) in the candidate basin had Biological Condition Scores (BCS) greater than 75% of the reference station (Table 4). As a result, the candidate basin does not meet the 83% comparison standard required to qualify as High Quality Waters (§93.4(b)(2)(i)(A)); a pre-requisite for redesignation to EV waters. None of the other antidegradation requirements listed in §93.4b, pertaining to qualifying as High Quality or Exceptional Value waters, apply to this basin.

## **PUBLIC RESPONSE AND PARTICIPATION SUMMARY**

The Department provided public notice of this redesignation evaluation and requested technical data from the general public through publication in the Pennsylvania Bulletin on April 27, 2002 (32 Pa.B 2162). A similar notice was also published in The Mercury newspaper (Pottstown, PA) on April 26, 2002. In addition, Limerick Township and the Montgomery County

Planning Commission were notified of the redesignation evaluation in a letter dated March 12, 2002. No data were received as a result of these requests.

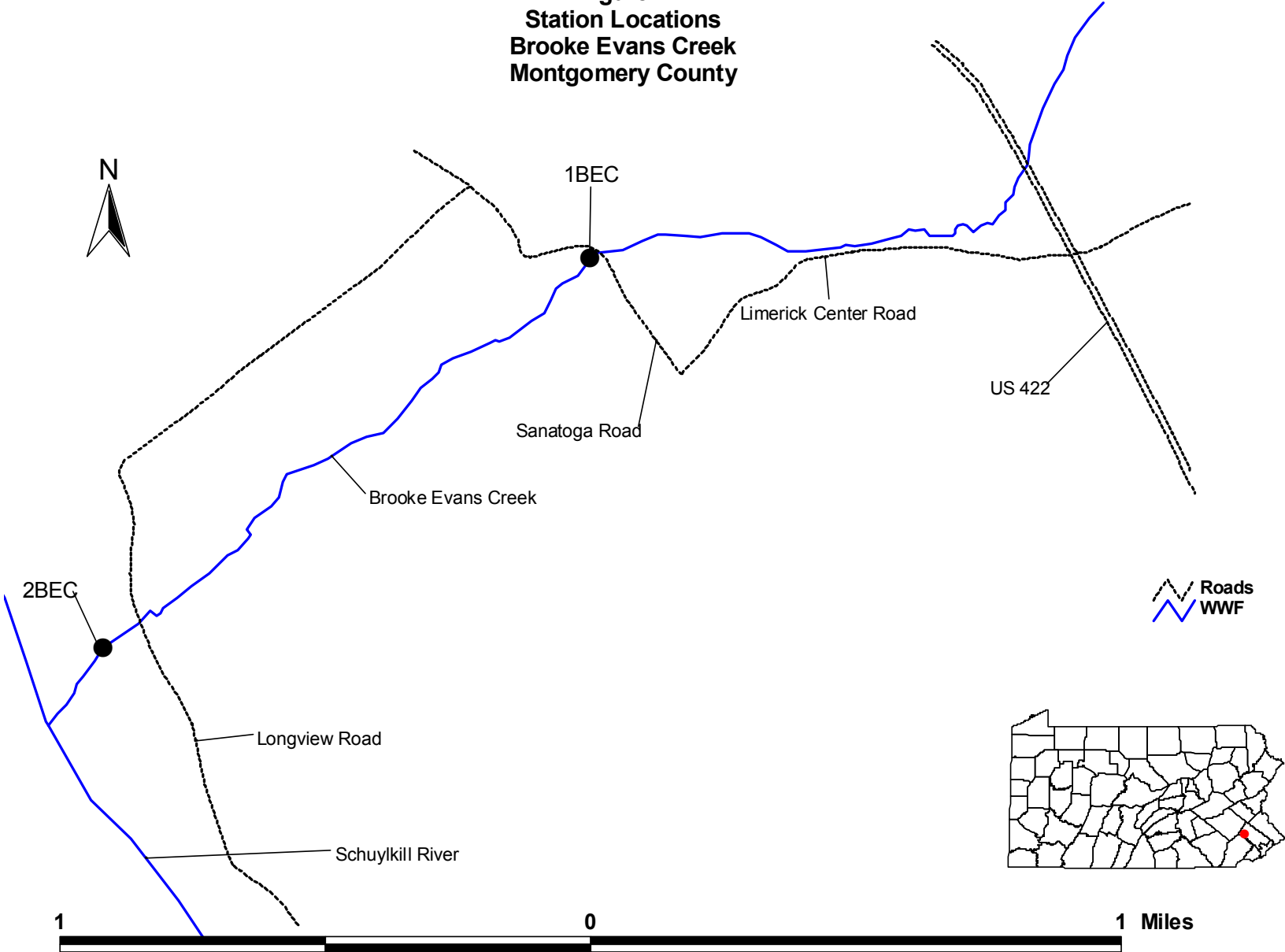
## RECOMMENDATION

Based on applicable regulatory definitions and requirements of § 93.4b, the Department recommends that Brooke Evans Creek basin from its source to its mouth retain its current warm water fishes (WWF) designation. A total of 2.7 stream miles will retain their current designation. This recommendation does not reflect the EV designation sought in the petition.

## REFERENCES

- Plafkin, JL, MT Barbour, KD Porter, SK Gross, & RM Hughes. 1989. Rapid Bioassessment Protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. United States Environmental Protection Agency. EPA/444/4-89-001.
- Barbour, Michael T., Jeroen Gerritsen, Blaine D. Snyder, James B Stribling. 1999. Rapid Bioassessment Protocols For Us in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. United States Environment Protection Agency. EPA 841-B-99-002
- Department of Conservation and Natural Resources, 2004. Pennsylvania Natural Heritage Program. Internet Document.
- The Nature Conservancy, 1996. Global and State Rank Definitions. Internal Agency Document.

**Figure 1**  
**Station Locations**  
**Brooke Evans Creek**  
**Montgomery County**



**TABLE 1  
STATION LOCATIONS  
BROOKE EVANS CREEK  
MONTGOMERY COUNTY**

<b>STATION</b>	<b>LOCATION</b>
<b>1BEC</b>	Brooke Evans Creek (01638) approximately 15 meters downstream of Sanatoga Road (SR 4025). Limerick Township, Montgomery County Lat: 40° 13' 35"      Long: 75° 34' 04"      RMI: 1.4
<b>2BEC</b>	Brooke Evans Creek (01638) approximately 125 meters downstream of Longview Road (T-200). Limerick Township, Montgomery County Lat: 40° 12' 58"      Long: 75° 35' 07"      RMI: 0.2
<b>1RR</b>	Rock Run (01591) approximately 50 meters upstream of confluence with French Creek (01548) at Warwick County Park. South Coventry Township, Chester County Lat: 40° 10' 19"      Long: 75° 41' 45"      RMI: 0.1

**TABLE 2  
HABITAT ASSESSMENT RESULTS  
BROOKE EVANS CREEK  
MONTGOMERY COUNTY  
FEBRUARY 12, 2002**

PARAMETER	STATION <sup>1</sup>		REFERENCE
	1BEC	2BEC	1RR <sup>2</sup>
Instream cover	12	11	18
Epifaunal substrate	15	10	15
Embeddedness	16	16	18
Velocity/depth regimes	15	14	17
Channel alteration	14	15	16
Sediment deposition	16	14	17
Frequency of riffles	17	14	17
Channel flow status	17	16	19
Condition of banks	17	10	15
Bank vegetative protection	16	10	16
Disruptive pressure	12	12	18
Riparian zone width	6	11	19
<b>Total Score</b>	<b>173</b>	<b>153</b>	<b>205</b>
<b>Rating<sup>3</sup></b>	<b>SUB</b>	<b>SUB</b>	<b>OPT</b>

<sup>1</sup> Refer to Figure 1 and Table 1 for the station locations

<sup>2</sup> Rock Run, Chester County

<sup>3</sup> OPT=Optimal; SUB=Suboptimal



**TABLE 3**  
**SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA**  
**BROOKE EVANS CREEK, MONTGOMERY COUNTY**  
**FEBRUARY 12, 2002**

TAXA	STATION <sup>1</sup>		REFERENCE
	1BEC	2BEC	1RR <sup>2</sup>
<b>Ephemeroptera (mayflies)</b>			
Ameletidae; <i>Ameletus</i>	7		3
Baetidae	1	1	
<i>Baetis</i>			2
<i>Labioaetis</i>	1		
Caenidae; <i>Caenis</i>	1	1	
Ephemerellidae			1
<i>Ephemerella</i>	1		47
<i>Eurylophella</i>	2	6	2
<i>Dannella</i>			1
<i>Serratella</i>			15
Heptageniidae; <i>Epeorus</i>			8
<i>Stenacron</i>	1		
<i>Stenonema</i>			6
Isonychiidae; <i>Isonychia</i>			6
<b>Plecoptera (stoneflies)</b>			
Capniidae; <i>Allocapnia</i>	3		
Chloroperlidae			1
Nemouridae	18	10	
<i>Amphinemura</i>	1		4
<i>Prostoia</i>	84	33	66
Perlodidae	10		
<i>Isoperla</i>	33	17	1
Taeniopterygidae; <i>Taenionema</i>			2
<i>Taeniopteryx</i>			1
<b>Trichoptera (caddisflies)</b>			
Hydropsychidae; <i>Cheumatopsyche</i>	14		10
<i>Hydropsyche</i>		3	4
Hydroptilidae; <i>Leucotrichia</i>			1
Philopotamidae; <i>Chimarra</i>	4	25	1
Rhyacophilidae; <i>Rhyacophila</i>			3
Uenoidae; <i>Neophylax</i>	1		1
<b>Other Insect Taxa</b>			
DIPTERA (true flies)			
Chironomidae	40	100	21
Simuliidae; <i>Prosimulium</i>	13	10	8
Tipulidae; <i>Dicranota</i>	2		
<i>Tipula</i>	1		1
ODONATA (dragon-, damselflies)			
Gomphidae; <i>Stylogomphus</i>			1

TAXA	STATION <sup>1</sup>		REFERENCE
	1BEC	2BEC	1RR <sup>2</sup>
COLEOPTERA (aquatic beetles)			
Elmidae; <i>Macronychus</i>		1	
<i>Optioservus</i>		2	
Psephenidae; <i>Psephenus</i>	1		
<b>Non-Insect Taxa</b>			
Turbellaria (flat worms)			
Planariidae	1	6	
Oligochaeta			8
Sphaeriidae	1		
Amphipoda			
Gammaridae; <i>Gammarus</i>	1		
Isopoda			
Asellidae; <i>Caecidotea</i>	1		
<b>Number of taxa in total sample</b>	<b>25</b>	<b>13</b>	<b>27</b>

<sup>1</sup> Refer to Figure 1 and Table 1 for the station locations

<sup>2</sup> Rock Run, Chester County

**TABLE 4  
RBP METRIC COMPARISON  
BROOKE EVANS CREEK  
MONTGOMERY COUNTY**

METRIC	STATION		REFERENCE
	1BEC	2BEC	1RR <sup>1</sup>
1. TAXA RICHNESS	24	14	29
Cand/Ref (%)	82.8	48.3	
Biol. Cond. Score	8	0	
2. MOD. EPT INDEX	12	6	18
Cand/Ref (%)	66.7	33.3	
Biol. Cond. Score	4	0	
3. MOD. HBI	3.1	4.44	2.74
Cand-Ref	0.36	1.7	
Biol. Cond. Score	8	0	
4. % DOMINANT TAXA	46.3	34.5	29.1
Cand-Ref	17.23	5.43	
Biol. Cond. Score	8	4	
5. % MOD. MAYFLIES	5	2.8	39.2
Cand-Ref	34.2	36.4	
Biol. Cond. Score	2	1	
<b>TOTAL BIOLOGICAL CONDITION SCORE</b>	<b>30</b>	<b>5</b>	<b>40</b>
<b>% COMPARABILITY TO REFERENCE</b>	<b>75</b>	<b>12.5</b>	

<sup>1</sup> Rock Run, Chester County