

**MILL CREEK
BERKS COUNTY**

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

**SEGMENT: BASIN
STREAM CODE: 01714
DRAINAGE LIST: F**

**WATER QUALITY MONITORING SECTION (MJL, DSB)
DIVISION OF WATER QUALITY STANDARDS
BUREAU OF CLEAN WATER
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

February 2016

INTRODUCTION

The Department conducted an evaluation of Mill Creek basin, in response to a petition from the Delaware Riverkeeper Network that was accepted for study by the Environmental Quality Board (EQB) on May 18, 2011. The petition requests the Mill Creek basin be redesignated to Exceptional Value Waters (EV). The Mill Creek basin is currently designated Warm Water Fishes, Migratory Fishes (WWF, MF).

The USGS officially named Mill Creek in 2009. Prior to Mill Creek receiving an official name, stream codes were assigned to this basin and were recorded in the Pennsylvania Gazetteer of Streams. The named mainstem is made up of three separate stream segment codes, which is extraordinary. Generally the named mainstem has only one stream code. The upstream portion of the named mainstem includes all of stream code 01716. The middle of the named mainstem of Mill Creek is that portion of stream segment code 01715 that lies between the downstream terminus of stream code 01716 and its confluence with stream segment code 01714. The downstream portion of Mill Creek is that portion of stream segment code 01714 that lies between its confluence with stream code 01715 and the downstream terminus of stream segment code 01714.

GENERAL WATERSHED DESCRIPTION

Mill Creek is a tributary to the Schuylkill River in the Delaware River watershed (Figure 1). This basin covers an area of 4.9 square miles and contains 7.7 stream miles. It is located in Union Township, Berks County along with a portion of the headwaters in North Coventry Township, Chester County. Land use in this basin is approximately 73% mixed hardwood forest. The remaining portion of the basin is a mixture of low-density residential, agriculture, commercial, and a golf course. The headwaters of Mill Creek are located in French Creek State Park. This is a freestone stream with a moderate gradient throughout its length.

WATER QUALITY AND USES

Surface Water

Biological data was collected to evaluate water quality conditions in the petitioned basin, since the indigenous aquatic community is a better indicator of long-term water quality conditions. There have been no NPDES permits issued and no surface water withdrawals within the petitioned basin.

There is the potential for nonpoint source discharges from on-lot septic systems along with runoff from agriculture, residential lawns, and the golf course. There is also the potential for storm water discharge to the stream in the area immediately upstream of the mouth.

Water Chemistry

The petitioner submitted nitrate-nitrogen data collected at five stations throughout the petitioned basin on May 21, 2009. The data indicates non-detection results for three of the five stations, and nitrate results of 2.0 mg/l and 1.0 mg/l at the two stations on UNT

01714. The petitioner also submitted physical water data that was collected from nine sites throughout the petitioned basin on May 30, 2012. Results show elevated water temperature on UNT 01714 upstream of the confluence with UNT 01715 and lower conductivity on reaches of UNTs 01715 and 01716 than on UNT 01714.

Aquatic Biota

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. Department staff collected habitat and benthic macroinvertebrate data at four locations within the petitioned basin. Initially a single station was collected in April 2009. Three additional stations were collected in April 2011 subsequent to the submission of the petition. Reference samples were also collected from a reference station in April 2009 and again in April 2011. The Pennsylvania Fish and Boat Commission conducted a relative abundance fish survey on July 13, 1994 at one location on UNT 01715.

Habitat. Instream habitat was assessed at each station within the petitioned basin and twice at the reference station. The physical habitat assessments revealed that conditions at stations 1MC, 2MC, and 4MC in addition to the reference station scored within the optimal range (Table 2) and ranged from 201 to 206. The fourth candidate station (3UNT) had a score of 174 which falls into the suboptimal range. This was largely due to suboptimal riparian conditions and increased sedimentation.

Benthos. Benthic macroinvertebrate samples were collected at all stations (Table 3) using the Department's PA-DEP RBP benthic sampling methodology, which is a modification of EPA's Rapid Bioassessment Protocols (RPBs; Plafkin, et al 1989; Barbour, et al 1999). Taxonomic diversity was high at all stations with individuals from taxa that are sensitive to water quality degradation (e.g. *Ephemerella*, *Drunella*, *Amphinemura*, and *Diplectrona*) outnumbering individuals from more tolerant taxa.

Fish. A 300-meter relative abundance, single pass fish survey was performed at one station on UNT 01715 downstream of UNT 01716. Twelve fish species were collected that included eight brown trout ranging from 175 mm to 324 mm and two brook trout 124 mm and 200 mm in total length. There were no young-of-year trout collected. This is not a trout stocked water (Wnuk, et al 1994).

BIOLOGICAL USE QUALIFICATIONS

The biological use qualifying criteria applied to the petitioned basin were the DEP integrated benthic macroinvertebrate scoring tests described at 25 Pa. Code § 93.4b(a)(2)(i)(A) and § 93.4b(b)(1)(v). Selected benthic macroinvertebrate community metrics from all candidate stations were compared to UNT 64027 Sixpenny Creek, a stream with a similar drainage area located in a watershed adjacent to Mill Creek. This reference stream has an existing use of EV. The samples from station 2MC and R1 were collected on April 30, 2009 and samples 1MC, 3UNT, 4MC, and R2 were collected on April 27 2011. 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, Stations 1MC, 2MC, and 4MC had biological condition scores that ranged from 93-100% of the reference station score (Table 4). As a result these stations exceeded the threshold of 92% required to qualify for an EV designation under the Department's regulatory criterion (§93.4b(b)(1)(v)). The remaining station (3UNT) had a score of 73% which falls below the threshold of 83% required for a High Quality (HQ) designation.

ADDITIONAL EXCEPTIONAL VALUE WATERS QUALIFYING CRITERIA

Based on petitioner information suggesting that additional EV regulatory criteria may apply, the Department evaluated additional antidegradation criteria listed in § 93.4b(b). These additional criteria include:

- A. The water is an outstanding National, State, regional or local resource water [§ 93.4b(b)(1)(iii) – see Appendix A¹];
- B. The water is a surface water of exceptional recreational significance [§ 93.4b(b)(1)(iv) – see Appendix A²];
- C. The water is a surface water of exceptional ecological significance [§ 93.4b(b)(2) – see Appendix A³].

A. Waters qualifying as EV as outstanding National, State, regional or local resource waters under § 93.4b(b)(1)(iii):

This “outstanding resource waters” EV qualifier may not be considered for portions of UNT 01714 upstream of UNT 01715 since the petitioned basin does not meet the prerequisite HQ designation. This qualifier establishes requirements for National, State, regional and local resource waters.

B. Waters qualifying as EV as a Surface Water of Exceptional Recreational Significance under § 93.4b(b)(1)(iv):

This “surface water of exceptional recreational significance” EV qualifier may not be considered for portions of UNT 01714 upstream of UNT 01715 since the petitioned basin does not meet the prerequisite HQ designation.

C. Waters Qualifying as EV as Surface Waters of Exceptional Ecological Significance under § 93.4b (b)(2):

The Department reviewed information gathered for the Pennsylvania Natural Heritage Program and reported in Berks Count Natural Heritage Inventory Update (Western Pennsylvania Conservancy, 2014). The information did not identify any surface waters

with statewide or local ecological significance. No areas were identified that tie the petitioned surface waters to rare or endemic ecological community types.

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The Department provided public notice of this redesignation evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on May 12, 2012 (42 Pa.B. 2539). A similar notice was also sent to Union Township, Berks County and North Coventry Township, Chester County along with the Berks County Conservation District on March 27, 2012 to notify them of this evaluation. Water quality data, a copy of the 1994 Pennsylvania Fish and Boat Commission Report, information pertaining to the Pennsylvania Fish and Boat Commission 'Natural Trout Reproduction Data Layer', and information pertaining to local angler observations were received from the Delaware River Keeper Network. The data submitted by the petitioner was used as supporting documentation of the water quality of the Mill Creek basin in conjunction with the findings of the Department's survey. The Department also received two responses in the form of emails of support from local citizens.

Final Draft Notice, Comments and Response. Once the final draft report was completed, it was made available to the petitioner, all municipalities, County Planning Commissions, County Conservation Districts and other State Agencies on September 4, 2015 with an initial public comment period ending 45-days later. Three stakeholders offered comments, one in support and two in opposition. In addition the Delaware Riverkeeper requested an extension of the original 30-day public comment period. In response the Department provided an additional 30-day comment period extension. The Delaware Riverkeeper provided additional comments in support of the EV recommendation and in opposition of the recommendation of segment 01714 upstream of 01715 to remain unchanged.

RECOMMENDATIONS

Based on applicable regulatory definitions and requirements of § 93.4b, the Department recommends that the protected use designation of the Mill Creek basin (01714, 01715, and 01716), excluding the portion of segment 01714 upstream of the confluence with 01715, be changed from the current WWF, MF designation to EV, MF based on § 93.4b(b)(1)(v). The designation of segment 01714 upstream of 01715 should remain unchanged. This designation affects 5.6 stream miles.

APPENDIX A

¹Definition at § 93.1: *Outstanding National, State, regional or local resource water*—A surface water for which a National or State government Agency has adopted water quality protective measures in a resource management plan, or regional or local governments have adopted coordinated water quality protective measures⁴ along a watershed corridor.

²Definition at § 93.1: *Surface water of exceptional recreational significance*—A surface water which provides a water-based, water quality-dependent recreational opportunity (such as fishing for a species with limited distribution) because there are only a limited number of naturally occurring areas and waterbodies across the State where the activity is available or feasible.

³ Definition at § 93.1: *Surface water of exceptional ecological significance*—A surface water which is important, unique or sensitive ecologically, but whose water quality as measured by traditional parameters (for example, chemical, physical or biological) may not be particularly high, or whose character cannot be adequately described by these parameters. These waters include:

- (i) Thermal springs.
- (ii) Wetlands which are exceptional value wetlands under § 105.17(1) (relating to wetlands).

⁴ Definition at § 93.1: *Coordinated water quality protective measures*—

(i) Legally binding sound land use water quality protective measures coupled with an interest in real estate which expressly provide long-term water quality protection of a watershed corridor.

(ii) Sound land use water quality protective measure include: surface or ground water protection zones, enhanced stormwater management measures, wetland protection zones or other measures which provide extraordinary water quality protection.

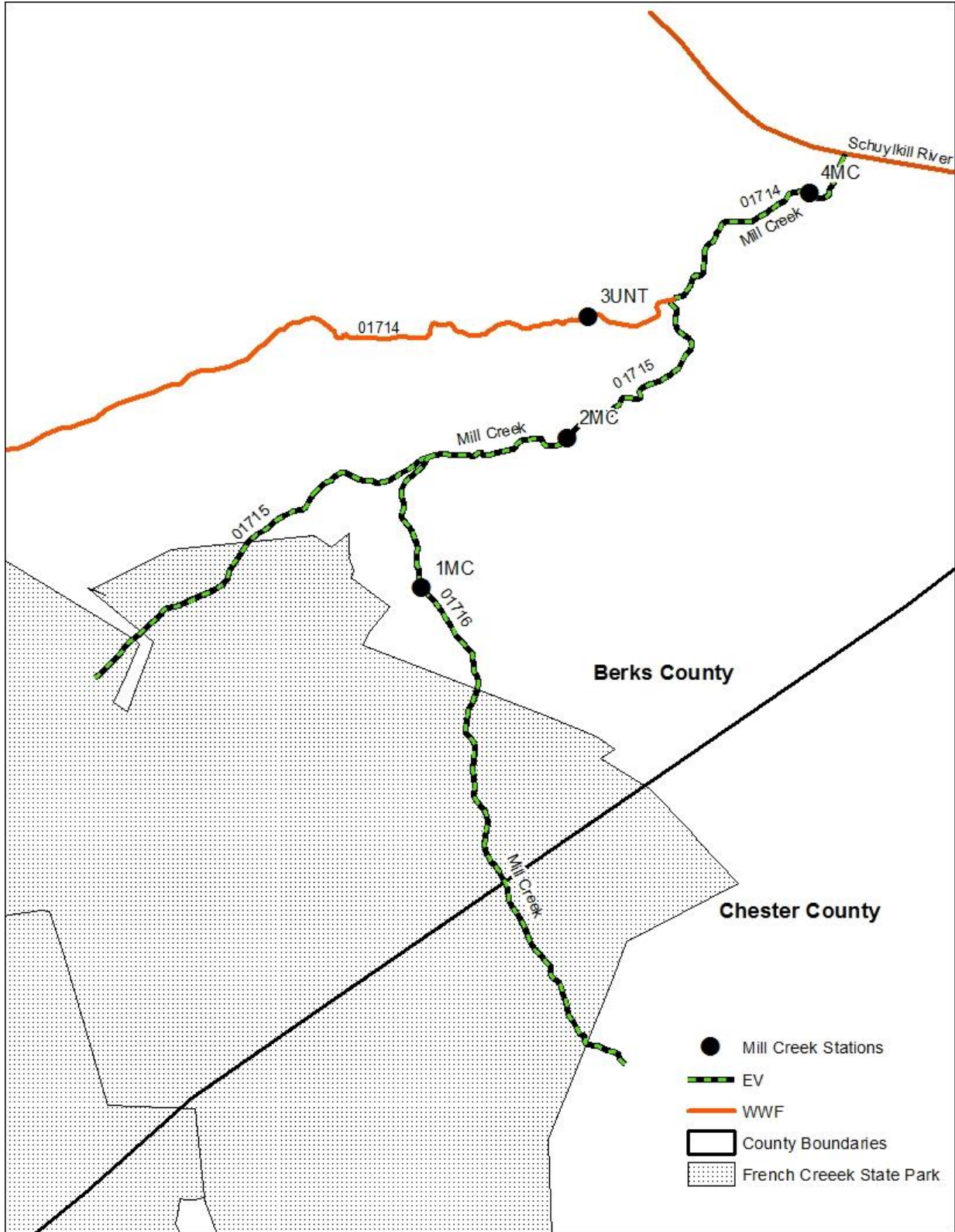
(iii) Real estate interests include:

- (A) Fee interests.
- (B) Conservation easements.
- (C) Government owned riparian parks or natural areas
- (D) Other interests in land which enhance water quality in a watershed corridor area.

REFERENCES

- 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
- 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
- Western Pennsylvania Conservancy. 2014. Berks Count Natural Heritage Inventory Update 2014. Pennsylvania Natural Heritage Program.
- Wnuk, Edan, and Gottesfeld. 1994. PA Fish and Boat Commission Comments and Recommendations; Water: UNT to Schuylkill River (603D) River Mile 57.97. Pennsylvania Fish and Boat Commission

**FIGURE 1
STATION LOCATIONS
MILL CREEK
BERKS COUNTY**



**TABLE 1
STATION LOCATIONS
MILL CREEK
BERKS COUNTY**

STATION	LOCATION
1MC	Mill Creek (01716) approximately 200 meters upstream from the T355 crossing. Union Township, Berks County Lat: 40.2312 Long: -75.7439
2MC	Mill Creek (01715) approximately 5 meters upstream from the T357 crossing. Union Township, Berks County Lat: 40.2372 Long: -75.7360
3UNT	UNT Mill Creek (01714) approximately 20 meters downstream from the T357 crossing. Union Township, Berks County Lat: 40.2421 Long: -75.7347
4MC	Mill Creek (01714) approximately 180 meters upstream from the mouth. Union Township, Berks County Lat: 40.2469 Long: -75.7227
R1¹	UNT Sixpenny Creek approximately 50 meters upstream from the old railroad trestle. Union Township, Berks County Lat: 40.2402 Long: -75.7778
R2²	UNT Sixpenny Creek approximately 50 meters upstream from the old railroad trestle. Union Township, Berks County Lat: 40.2402 Long: -75.7778

¹ Reference Station Collected on April 30, 2009

² Reference Station Collected on April 27, 2011

**TABLE 2
HABITAT ASSESSMENT RESULTS
MILL CREEK
BERKS COUNTY**

PARAMETER	Scoring Range	STATION ¹					
		1MC	2MC	3UNT	4MC	R1 ²	R2 ³
1. instream cover	0-20	18	17	15	17	17	17
2. epifaunal substrate	0-20	19	18	17	18	18	19
3. embeddedness	0-20	16	16	12	16	17	17
4. velocity/depth	0-20	13	17	16	17	15	14
5. channel alterations	0-20	15	16	13	16	18	18
6. sediment deposition	0-20	18	18	16	17	19	19
7. riffle frequency	0-20	19	19	17	17	19	19
8. channel flow status	0-20	18	18	18	19	15	18
9. bank condition	0-20	17	14	14	15	18	17
10. bank vegetative protection	0-20	18	15	16	14	19	18
11. grazing/disruptive pressures	0-20	17	17	9	17	20	19
12. riparian vegetation zone width	0-20	18	17	11	18	20	20
Total Score	0-240	206	202	174	201	215	215
Rating⁴		OPT	OPT	SUB	OPT	OPT	OPT

¹ Refer to Figure 1 and Table 1 for station locations

² Reference Station Collected on April 30, 2009 – Refer to Table 1 for location

³ Reference Station Collected on April 27, 2011 – Refer to Table 1 for location

⁴ OPT=Optimal (≥192); SUB=Suboptimal (132-191)

TABLE 3
SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA
MILL CREEK
BERKS COUNTY

TAXA	STATIONS ¹					
	1MC	2MC	3UNT	4MC	R1 ²	R2 ³
Ephemeroptera (Mayflies)						
Ameletidae; <i>Ameletus</i>	1					
Baetidae; <i>Acentrella</i>		4	9	17		1
<i>Baetis</i>		2			4	4
<i>Dipheter</i>			5	1		
<i>Heterocloeon</i>	1	6	1	8		
Caenidae; <i>Caenis</i>				2		
Ephemerellidae; <i>Drunella</i>	5	19	1	11	4	
<i>Ephemerella</i>	45	36	67	71	42	43
<i>Eurylophella</i>	2					
<i>Serratella</i>		1		1		
Heptageniidae; <i>Cinygmula</i>	39	2			13	19
<i>Epeorus</i>	29	1		3	15	24
<i>Leucrocuta</i>	1					
<i>Maccaffertium</i>	3	5	1	2		
Isonychiidae; <i>Isonychia</i>				1		
Leptophlebiidae; <i>Habrophlebiodes</i>	3		1			
<i>Paraleptophlebia</i>	4	3				
Plecoptera (Stoneflies)						
Chloroperlidae; <i>Sweltsa</i>	4				1	1
Leuctridae; <i>Leuctra</i>	3	18			5	3
Nemouridae; <i>Amphinemura</i>	12	8	45	15	19	9
Peltoperlidae; <i>Tallaperla</i>					2	1
Perlidae; <i>Acroneuria</i>	4	1		1	9	9
<i>Perlesta</i>			4	2		
Perlodidae; <i>Isoperla</i>	4	1	13	1	5	1
<i>Remenus</i>					2	1
Pteronarcyidae; <i>Pteronarcys</i>	14				3	3
Tricoptera (Caddisflies)						
Glossosomatidae; <i>Agapetus</i>						3
Goeridae; <i>Goera</i>				1		
Hydropsychidae; <i>Ceratopsyche</i>		2		1		
<i>Cheumatopsyche</i>			1	2		
<i>Diplectrona</i>	10	1			14	14
Lepidostomatidae; <i>Lepidostoma</i>	2				3	2
Philopotamidae; <i>Chimarra</i>				1		
<i>Dolophilodes</i>	3			2	2	1
Polycentropodidae; <i>Polycentropus</i>		1			2	1
Rhyacophilidae; <i>Rhyacophila</i>		4		3	1	1
Uenoidae; <i>Neophylax</i>	1					

TABLE 3 (continued)
SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA
MILL CREEK
BERKS COUNTY

TAXA	STATIONS ¹					
	1MC	2MC	3UNT	4MC	R1 ²	R2 ³
Diptera (True Flies)						
Blephariceridae; <i>Blepharicera</i>		2			2	1
Ceratopogonidae; <i>Bezzia</i>			1			
Dixidae; <i>Dixa</i>						1
Empididae; <i>Clinocera</i>	1			1		
Simuliidae; <i>Prosimulium</i>	4	17		2		7
<i>Simulium</i>	2	42	8	28	14	34
Tabanidae; <i>Chrysops</i>		1				
Tipulidae; <i>Antocha</i>			1			
<i>Dicranota</i>					1	
<i>Hexatoma</i>	4				1	1
<i>Tipula</i>			1	1		
Chironomidae	15	32	17	46	29	6
Odonata (Dragon/ Damselflies)						
Gomphidae; <i>Lanthus</i>	1					1
<i>Stylogomphus</i>		2			1	
Coleoptera (Aquatic Beetles)						
Dryopidae; <i>Helichus</i>				1		
Elmidae; <i>Ancyronyx</i>				1		
<i>Optioservus</i>	2	2	1	1	2	3
<i>Oulimnius</i>	10	6		2	17	13
<i>Stenelmis</i>			36	5		
Psephenidae; <i>Ectopria</i>	1	1			3	
<i>Psephenus</i>	4			1	3	4
Non-Insect Taxa						
Turbellaria (Flatworms)						
<i>Cura</i>			5			
Nematoda (Roundworms)			1	1		
Oligochaeta	3	2	1	3	3	5
Isopoda (Aquatic Sowbugs)						
Asellidae; <i>Caecidotea</i>			2			
Pelecypoda (Bivalve Clams)						
Corbiculidae; <i>Corbicula</i>			1			
Richness	32	28	23	33	29	30
Total number of individuals	237	222	223	239	222	217

¹ Refer to Figure 1 and Table 1 for station locations

² Reference Station Collected on April 30, 2009 – Refer to Table 1 for location

³ Reference Station Collected on April 27, 2011 – Refer to Table 1 for location

**TABLE 4
RBP METRIC COMPARISON
MILL CREEK
BERKS COUNTY**

METRIC	STATIONS ¹					
	1MC	2MC	3UNT	4MC	R1 ²	R2 ³
1. TAXA RICHNESS	32	28	23	33	29	30
Cand/Ref (%)	107	97	77	110		
Biol. Cond. Score	8	8	6	8	8	8
2. MOD. EPT INDEX	20	15	8	16	16	16
Cand/Ref (%)	125	94	50	100		
Biol. Cond. Score	8	8	1	8	8	8
3. MOD. HBI	1.76	3.24	3.39	3.44	2.64	2.53
Cand-Ref	-0.77	0.60	0.86	0.91		
Biol. Cond. Score	8	8	6	5	8	8
4. % DOMINANT TAXA	19	19	30	30	19	20
Cand-Ref	-1	0	10	10		
Biol. Cond. Score	8	8	8	8	8	8
5. % MOD. MAYFLIES	55	35	35	48	33	40
Ref-Cand	-15	-2	5	-8		
Biol. Cond. Score	8	8	8	8	8	8
TOTAL BIOLOGICAL CONDITION SCORE	40	40	29	37	40	40
% COMPARABILITY TO REFERENCE	100	100	73	93		

¹ Refer to Figure 1 and Table 1 for station locations

² Reference Station Collected on April 30, 2009 – Refer to Table 1 for location

³ Reference Station Collected on April 27, 2011 – Refer to Table 1 for location