

UNNAMED TRIBUTARY TO SIXPENNY CREEK

BERKS COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 64027
Drainage List F

WATER QUALITY MONITORING SECTION
WATER QUALITY DIVISION
BUREAU OF CLEAN WATER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Unnamed Tributary (UNT) to Sixpenny Creek in response to request from The Nature Conservancy and based on the results of routine DEP monitoring efforts that suggested the existing use may be different than the current designated use. The UNT to Sixpenny Creek basin is currently designated High Quality Waters – Cold Water Fishes, Migratory Fishes (HQ-CWF, MF)

The stream redesignation process begins with an evaluation of the “existing uses” and the “designated uses” of a stream. “Existing uses” are water uses actually attained in the waterbody. Existing uses are protected through permit or approval actions taken by the DEP. “Designated uses” are water uses identified in regulations that protect a waterbody. Candidates for stream redesignation may be identified by the DEP based on routine waterbody investigations or based on requests initiated by other agencies or from the general public through a rulemaking petition to the Environmental Quality Board (EQB).

GENERAL WATERSHED DESCRIPTION

UNT to Sixpenny Creek is a small, shallow and cold first-order tributary to Sixpenny Creek located in Union Township, Berks County. UNT to Sixpenny Creek drains 1.03 square miles with a total of 6.91 stream miles (Table 1, Figure 1). The stream originates within and approximately 80% of it lies within French Creek State Park. UNT to Sixpenny Creek is located on the Elverson 7.5-minute series USGS quadrangle map. Land cover is 100% forested (Dewitz 2019). There are no NPDES permits within the watershed.

Table 1. Station Locations – UNT to Sixpenny Creek and Pine Creek Reference (REF).

STATION	DESCRIPTION
UNTSC	UNT to Sixpenny Creek, 500 meters upstream of the confluence with Sixpenny Creek Union Township, Berks County Lat: 40.239866 Long: -75.777984
PC (REF)	Pine Creek, 250 downstream of Long Lane Pike Township, Berks County Lat: 40.4232399 Long: -75.704330

WATER QUALITY

Physicochemical

Physicochemical data was collected from one location (UNTSC) on UNT to Sixpenny Creek and from the Pine Creek reference station (PC) on December 7, 2017. Results were generally comparable between the two stations. The majority of metals and nutrient parameters were below reporting limits. Alkalinity, hardness, pH, specific conductance and total dissolved solids (TDS) were slightly higher but comparable at the Pine Creek reference station (Table 2).

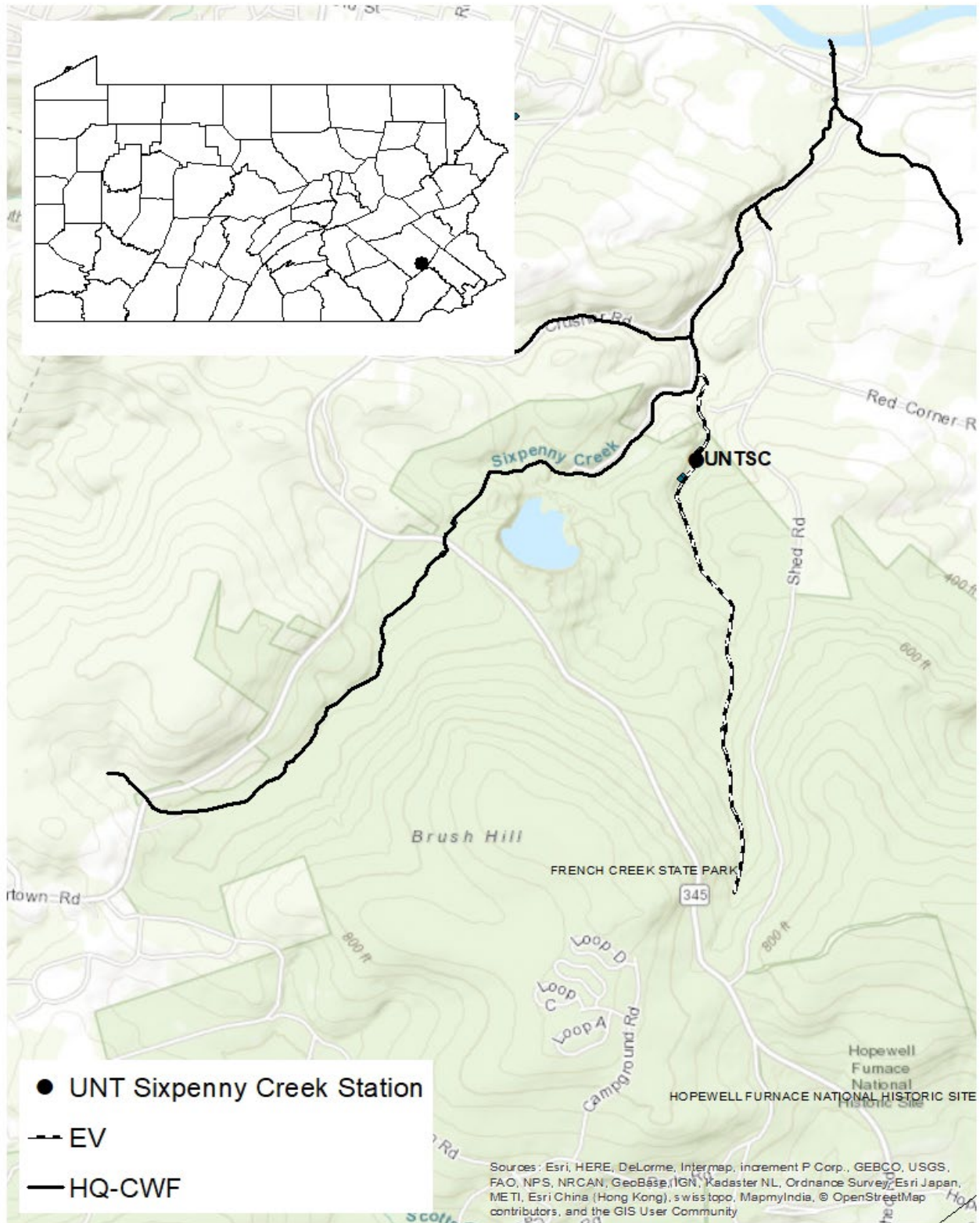


Figure 1. UNT to Sixpenny Creek Basin Redesignation Recommendations.

Table 2. Discrete Physicochemical Data – UNT to Sixpenny Creek and Pine Creek REF.

	PARAMETER	UNITS	STATIONS ¹	
			UNTSC	PC
METALS AND IONS	ALUMINUM D	µg/L	<10	<10
	ALUMINUM T	µg/L	22.2	14.9
	BARIUM T	µg/L	26	21
	BORON T	µg/L	<200	<200
	BROMIDE	µg/L	<25.0	<25.0
	CADMIUM D	µg/L	<.20	<.20
	CALCIUM T	mg/L	6.629	10.692
	CHLORIDE	mg/L	11	16.6
	COPPER D	µg/L	<4	<4
	COPPER T	µg/L	<4	<4
	IRON D	µg/L	<20	30
	IRON T	µg/L	34	53
	LEAD D	µg/L	<1.0	<1.0
	LEAD T	µg/L	<1.0	<1.0
	LITHIUM D	µg/L	<25	<25
	LITHIUM T	µg/L	<25	<25
	MAGNESIUM T	mg/L	2.925	4.686
	MANGANESE D	µg/L	<10	<10
	MANGANESE T	µg/L	<10.00	<10.00
	NICKEL D	µg/L	<50	<50
	NICKEL T	µg/L	<50	<50
	POTASSIUM T	mg/L	<1.00	1.142
	SELENIUM T	µg/L	<7	<7
	SODIUM T	mg/L	5.892	8.855
	STRONTIUM T	µg/L	24	98
	SULFATE	mg/L	7.16	10.6
	ZINC D	µg/L	<10.0	<10.0
	ZINC T	µg/L	<10.0	<10.0
NUTRIENTS	AMMONIA D	mg/L	<.02	<.02
	AMMONIA T	mg/L	<.02	<.02
	NITRATE & NITRITE D	mg/L	<0.05	0.87
	NITRATE & NITRITE T	mg/L	<0.05	0.92
	NITROGEN T	mg/L	<0.25	1.02
	ORTHO PHOSPHORUS D	mg/L	0.012	0.014
	ORTHO PHOSPHORUS T	mg/L	0.011	0.015
	PHOSPHORUS D	mg/L	<0.01	0.01
	PHOSPHORUS T	mg/L	0.011	0.01
PHYSICAL/OTHER	ALKALINITY	mg/L	17	31
	DISSOLVED OXYGEN	mg/L	12.22	12.74
	HARDNESS	mg/L	29	46
	pH	SU	7.3	7.49
	SPECIFIC CONDUCTANCE	µS/cm°	91.3	147.1
	TDS	mg/L	76	104
	TEMPERATURE	°C	5.7	5.0
	TOTAL SUSPENDED SOLIDS	mg/L	<5	<5
	TOTAL ORGANIC CARBON	mg/L	1.43	1.6

¹ Refer to Table 1 and/or Figure 1 for station locations

<” indicate concentrations below the reporting limit.

Biological

Benthic macroinvertebrate samples were collected using the DEP benthic macroinvertebrate data collection protocols, which is a modification of EPA's Rapid Bioassessment Protocols (Barbour et al. 1999, Plafkin et al. 1989, Shull 2017; Table 4). DEP staff collected benthic macroinvertebrate data at both the UNT to Sixpenny Creek station and Pine Creek reference station. The dominant taxon for both samples was the pollution sensitive *Ephemerella* mayfly. Overall taxa richness was high with 30 and 29 taxa for UNT to Sixpenny and Pine Creek respectively. Both samples were dominated by pollution sensitive Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (EPT) taxa.

Table 4. Benthic Macroinvertebrate Data.

TAXA		STATIONS ¹	
		UNTSC	PC
Ephemeroptera			
Ameletidae	<i>Ameletus</i>	3	-
Baetidae	<i>Acentrella</i>	-	1
	<i>Baetis</i>	1	1
Ephemerellidae	<i>Drunella</i>	9	19
	<i>Ephemerella</i>	70	57
Heptageniidae	<i>Cinygmula</i>	14	3
	<i>Epeorus</i>	11	4
	<i>Leucrocuta</i>	1	-
	<i>Rhithrogena</i>	-	10
	<i>Stenacron</i>	1	-
	<i>Stenonema</i>	3	-
Leptophlebiidae	<i>Paraleptophlebia</i>	5	2
Plecoptera			
Chloroperlidae	<i>Alloperla</i>	-	2
	<i>Sweltsa</i>	4	-
Leuctridae	<i>Leuctra</i>	3	1
Nemouridae	<i>Amphinemura</i>	3	2
Perlidae	<i>Acroneuria</i>	3	2
	<i>Perlesta</i>	-	10
Perlodidae	<i>Malirekus</i>	1	-
	<i>Isoperla</i>	20	8
Peltoperlidae	<i>Peltoperla</i>	-	9
	<i>Tallaperla</i>	9	-
Pteronarcyidae	<i>Pteronarcys</i>	17	2
Trichoptera			
Glossosomatidae	<i>Agapetus</i>	-	10
Hydropsychidae	<i>Diplectrona</i>	13	1
Philopotamidae	<i>Dolophilodes</i>	11	38
Polycentropodidae	<i>Polycentropus</i>	1	-
Rhyacophilidae	<i>Rhyacophila</i>	5	6
Odonata			
Gomphidae	<i>Lanthus</i>	4	-
Megaloptera			
Corydalidae	<i>Nigronia</i>	1	3
Coleoptera			
Psephenidae	<i>Psephenus</i>	-	2
	<i>Ectopria</i>	-	1
Elmidae	<i>Oulimnius</i>	3	5
	<i>Promoresia</i>	-	1
Diptera			
Blepharicaridae	<i>Blepharicera</i>	-	1
Tipulidae	<i>Tipula</i>	2	-
	<i>Dicranota</i>	3	1
	<i>Hexatoma</i>	2	3
Chironomidae		16	10
Non-Insect Taxa			
Oligochaeta		1	-
Taxa Richness		30	29
Total Organisms		239	215

¹ Refer to Figure 1 and/or Table 1 for station locations

"-" indicate taxa was not identified at a particular station

Physical

Instream habitat was assessed at the UNT to Sixpenny Creek station and Pine Creek Exceptional Value Waters (EV) reference station. The total habitat score for the UNT to Sixpenny Creek basin station was 202, reflecting optimal habitat conditions (Table 5).

BIOLOGICAL USE QUALIFICATIONS

The qualifying criterion applied to the UNT to Sixpenny Creek basin was the DEP integrated benthic macroinvertebrate scoring test described at 25 Pa. Code § 93.4b(b)(1)(v) (Table 6). Selected benthic macroinvertebrate community metrics from UNT to Sixpenny Creek basin were compared to an

available reference station with comparable drainage areas from Pine Creek located in Berks County. The Pine Creek basin was used as a reference because it has demonstrated an existing use of EV based on biological measures and the macroinvertebrate community has demonstrated best attainable biological communities by scoring well above the top 25th percentile of Pennsylvania EV reference streams. In addition, the Pine Creek basin has optimal habitat and similar gradient, drainage area, pH and alkalinity to the candidate stream stations (DEP 2003). Comparisons with the following metrics were used as an indicator of community health: taxa richness, modified Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (EPT) index, modified Hilsenhoff Biotic Index (HBI), percent dominant taxon, and percent modified mayflies (Table 6).

Based on these five metrics, the UNT to Sixpenny Creek candidate surface waters exceeded the EV qualifying criterion of 92% (§ 93.4b(b)(1)(v)).

Table 5. Habitat Evaluation Data.

PARAMETER	STATIONS ¹	
	UNTSC	PC
1. INSTREAM COVER	17	17
2. EPIFAUNAL SUBSTRATE	18	18
3. EMBEDDEDNESS	17	18
4. VELOCITY/DEPTH	15	17
5. CHANNEL ALTERATIONS	19	19
6. SEDIMENT DEPOSITION	16	18
7. RIFFLE FREQUENCY	16	18
8. CHANNEL FLOW STATUS	16	17
9. BANK CONDITION	16	17
10. BANK VEGETATIVE PROTECTION	15	18
11. GRAZING/DISRUPTIVE PRESSURES	18	19
12. RIPARIAN VEGETATION ZONE WIDTH	19	18
Total Score	202	214
Rating ²	OPT	OPT

¹ Refer to Figure 1 and/or Table 1 for station locations

² OPT=Optimal (≥192)

PUBLIC RESPONSE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided notice of this redesignation evaluation and requested any technical data from the general public through publication in the *Pennsylvania Bulletin* on March 2, 2016 (46 Pa.B. 1287). The Berks County Planning Commission, Berks County Conservation District and Union Township were notified of the evaluation in a letter dated May 27, 2016. In addition, a notification was posted on the DEP's website on June 15, 2016.

Table 6. Benthic Macroinvertebrate Metric Comparison.

METRIC	STATIONS ¹	
	UNTSC	PC
1 TAXA RICHNESS	30	29
Candidate/Reference (%)	114	
Biol. Cond. Score	8	8
2 MOD. EPT INDEX	20	19
Candidate/Reference (%)	111	
Biol. Cond. Score	8	8
3 MOD. HBI	1.43	1.36
Candidate-Reference	0.48	
Biol. Cond. Score	8	8
4 % DOMINANT TAXA	29.2	26.5
Candidate-Reference	2	
Biol. Cond. Score	8	8
5 % MOD. MAYFLIES	48.8	44.7
Reference-Candidate	-5	
Biol. Cond. Score	8	8
TOTAL BIOLOGICAL CONDITION SCORE	40	40
% COMPARABILITY TO REFERENCE	100	

¹ Refer to Figure 1 and/or Table 1 for station locations

Final Draft Notice, Comments and Response

Once the final draft report was completed it was made available to affected municipalities, County Planning Commissions, County Conservation Districts, Delaware RiverKeeper Network, Trout Unlimited, the Pennsylvania Game Commission, and the Department of Conservation and Natural Resources in a letter dated November 16, 2019 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on November 16, 2019 (49 Pa.B. 6919).

All comments received were in support of the redesignation recommendations in the draft report. Comments were received from the Pennsylvania Fish and Boat Commission. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

RECOMMENDATION

Based on applicable regulatory definitions and requirements of 25 Pa. Code § 93.4b(b)(1)(v) (the DEP's integrated benthic macroinvertebrate scoring test) the DEP recommends that the UNT 64027 to Sixpenny Creek basin be redesignated to EV, MF.

This recommendation adds approximately 6.91 stream miles with the designation of EV to Chapter 93.

LITERATURE CITED

- Barbour, M. T., Gerritsen, J., Snyder, B. D., Stribling, J. B. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. United States Environmental Protection Agency. EPA 841-B-99-002.
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- Dewitz, J., 2019, National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, <https://doi.org/10.5066/P96HHBIE>.
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- Shull, D. R. (editor). 2017. Wadeable riffle-run stream macroinvertebrate data collection protocol. Chapter 3.1, pages 2–8 in M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.