

**UNNAMED TRIBUTARY CHESTER CREEK  
DELAWARE COUNTY**

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

**SEGMENT: BASIN  
DRAINAGE LIST: G  
STREAM CODE: 00595**

**WATER QUALITY MONITORING AND ASSESSMENT SECTION (DSB)  
DIVISION OF WATER QUALITY ASSESSMENT AND STANDARDS  
BUREAU OF WATER SUPPLY AND WASTEWATER MANAGEMENT  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**JUNE 2000  
REVISED JULY 2001**



## **GENERAL WATERSHED DESCRIPTION**

Unnamed Tributary Chester Creek (00595) is located in Thornbury Township, Delaware County. This basin has a drainage area of 1.2 square miles and contains 2.5 stream miles. The candidate stream is currently designated Trout Stocking (TSF). In response to a petition submitted by Frank Akutowicz, this watershed was evaluated for a possible redesignation to Exceptional Value Waters (EV). This evaluation is based on field surveys conducted in July 1998 and April 1999.

This watershed contains no major population centers. The large majority is owned by the Glen Mills School and is mostly undeveloped land. The school is currently building a golf course that will occupy a large portion of the watershed. A low-density residential subdivision is located on the western edge of the basin and a small area of agriculture occupies the southern edge. The National Wetlands Inventory maps indicate the presence of small areas of emergent marsh and forested and shrub swamp adjacent to the streams in this basin. Based on these maps, wetlands constitute less than 5% of the total watershed area.

## **WATER QUALITY AND USES**

### **Surface Water**

No long term water quality data were available to allow a direct comparison to water quality criteria. Grab samples were taken at three stations (Table 2). Water quality was generally good at all stations. Nitrates were highest at Station 1UCC probably due to a limited amount of agriculture in the upper part of the basin. The instantaneous nature of grab samples precludes comparison to applicable water quality criteria. The indigenous aquatic community is a better indicator of long term conditions and is used as a measure of both water quality and ecological significance.

There are no permitted surface water withdrawals or NPDES discharges in the candidate watershed.

### **Aquatic Biota**

The total habitat score for aquatic biota at Station 3UCC was in the Suboptimal range (Table 3). Instream habitat has been degraded by erosion and the riparian zone has been impacted by the construction of the golf course. Benthic macroinvertebrate samples were collected at Station 3UCC during the April 1999 survey. The results of these sampling efforts are presented in Table 4. Benthic macroinvertebrates were collected using sampling techniques adapted from the EPA Rapid Bioassessment Protocols. Taxonomic diversity was reasonably good but the number of intolerant taxa is indicative of the negative effects of human activity.

A total of 6 fish species were collected at Station 3UCC (Table 5). The fish community is a mixture of both warm water and cold water species. American eel, a migratory fish species, was also present. Communications from the Pennsylvania Fish and Boat

Commission (PFBC) confirm that eels are present throughout the entire basin of Chester Creek. Streams within the candidate basin support all designated uses.

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

There are no known portions of the Unnamed Tributary Chester Creek basin that exhibit the characteristics of outstanding national, state, regional, or local resource waters under the Department's regulatory criteria.

### **ECOLOGICAL OR RECREATIONAL SIGNIFICANCE**

Selected benthic macroinvertebrate community metrics were compared to a reference station with a comparable drainage area (Table 7). Birch Run (01563), a tributary to French Creek (see Table 1), was used as the reference stream. This stream is currently designated EV in Chapter 93 and has a drainage area of 6.5 square miles. Both candidate and reference basins are located in the Piedmont Uplands (64c) subcoregion. All sampling was conducted on the same day to minimize the effects of seasonal variation. This comparison was done using the following metrics which were selected as being indicative of community health: taxa richness; modified EPT index (total number of intolerant Ephemeroptera, Plecoptera, and Trichoptera taxa); modified Hilsenhoff Biotic Index; percent dominant taxon; and percent modified mayflies.

Based on these five metrics, Station 3UCC had a biological condition score that was 60% of the reference station. The candidate basin does not meet the 83% comparison standard required for redesignation to High Quality (HQ).

### **PUBLIC RESPONSE AND PARTICIPATION SUMMARY**

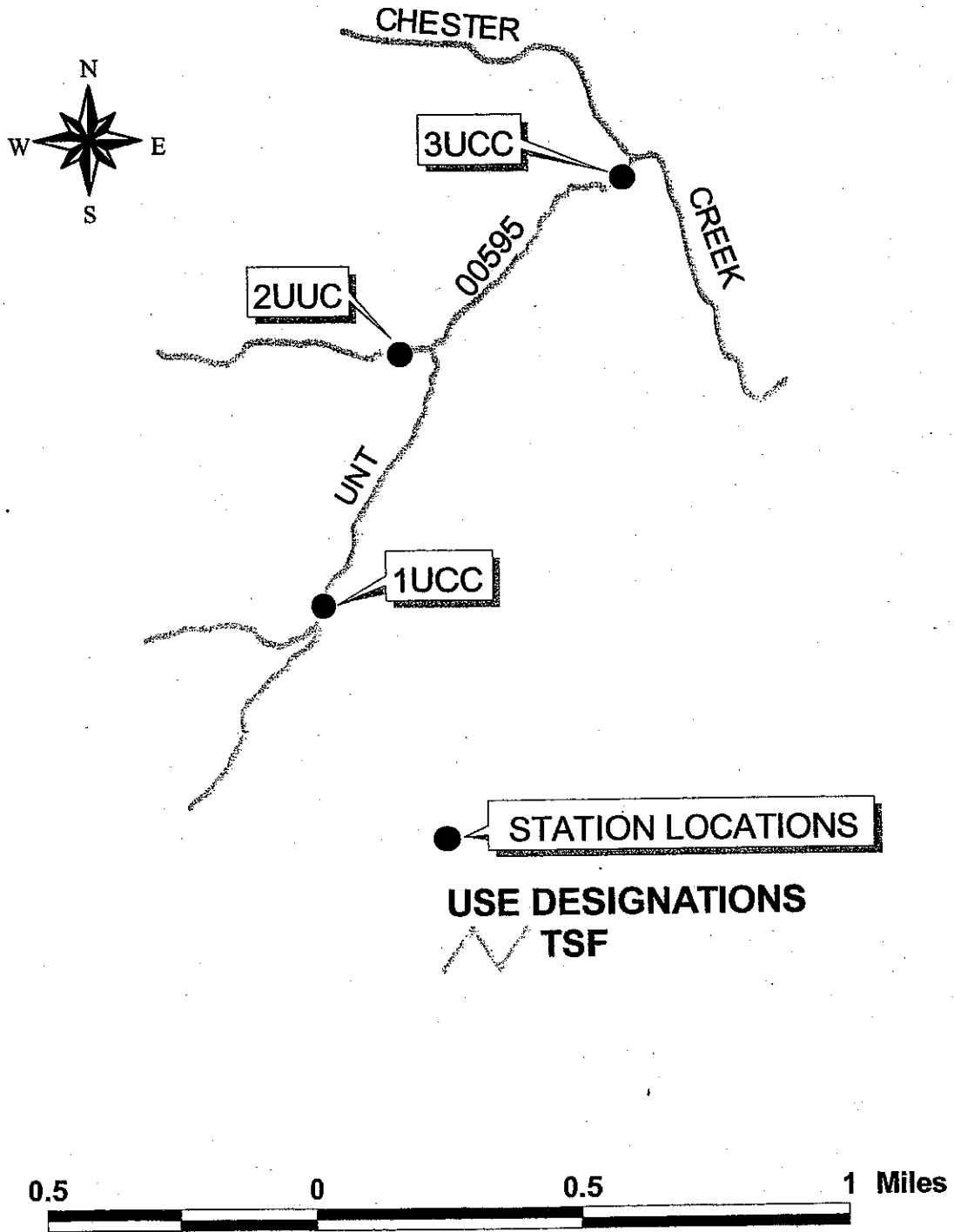
The Department provided public notice of this redesignation evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on December 25, 1999 (29 Pa.B 6524). A similar notice was also published in the Daily Local News, West Chester on December 27, 1999. In addition, Thornbury Township was notified of the evaluation in a letter dated December 23, 1999. The Delaware County Planning Department 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 this draft report along with a cover letter dated May 17, 2001 requesting comments within a 30-day period, to Frank Akutowicz, the Delaware County Planning Department, and Thornbury Township. No comments were received in response to this request.

## **RECOMMENDATION**

Based on applicable regulatory criteria the Department recommends that the Unnamed Tributary Chester Creek basin (00595) retain the current Trout Stocking (TSF) use designation with the addition of Migratory Fishes (MF) based on the presence of American eel. This recommendation affects approximately 2.5 stream miles. This designation provides less protection than the EV designation requested by the petitioner. The Department also recommends adding MF to the entire Chester Creek basin.

# FIGURE 1. UNNAMED TRIBUTARY CHESTER CREEK DELAWARE COUNTY



**TABLE 1**  
**STATION LOCATIONS**  
**UNNAMED TRIBUTARY CHESTER CREEK**  
**DELAWARE COUNTY**

<b>STATION</b>	<b>LOCATION</b>
<b>1UCC</b>	Unnamed tributary Chester Creek (00595) approximately 40 meters downstream of the lower crossing of SR4016. Thornbury Township, Delaware County Lat: 39 54 54 Long: 75 30 24 RMI: 1.0
<b>2UUC</b>	Unnamed tributary to 00595 approximately 150 meters upstream of the mouth. Thornbury Township, Delaware County Lat: 39 55 19 Long: 75 30 14 RMI: 0.1
<b>3UCC</b>	Unnamed tributary Chester Creek (00595) approximately 60 meters upstream of the mouth. Thornbury Township, Delaware County Lat: 39 55 36 Long: 75 29 43 RMI: 0.1
<b>R1</b>	Birch Run approximately 20 meters upstream of the mouth. West Vincent Township, Chester County Lat: 40 08 51 Long: 75 37 17 RMI: 0.1

**TABLE 2**  
**WATER CHEMISTRY<sup>1</sup>**  
**UNNAMED TRIBUTARY CHESTER CREEK**  
**DELAWARE COUNTY**  
**JULY 14, 1998**

STATION	1UCC	2UUC	3UCC
<b>Field Parameters</b>			
Temp (°C)	19.5	19.0	21.7
pH	7.3	7.3	6.7
Cond (µmhos)	204	137	200
Diss. O <sub>2</sub>	NO DATA		
<b>Laboratory Parameters</b>			
pH	6.7	6.8	6.8
Alkalinity	28	30	36
Acidity	0	0	0
Hardness	66	38	73
T Diss. Sol.	164	116	184
Susp.Sol.	20	16	2
NH <sub>3</sub> -N	<.02	<.02	<.02
NO <sub>2</sub> -N	<.01	<.01	<.01
NO <sub>3</sub> -N	5.07	1.87	2.86
Total P	0.02	0.02	0.02
Ca	15.6	8.7	17.2
Mg	6.91	5.03	7.17
Cl	15	11	19
SO <sub>4</sub>	16	11	15
As*	< 4.0	< 4.0	< 4.0
As Diss	< 4.0	< 4.0	< 4.0
Cd*	< 0.2	< 0.2	< 0.2
Cd Diss	< 0.2	< 0.2	< 0.2
hex Cr*	<10	<10	<10
Cr*	<50	<50	<50
Cu*	< 4.0	< 4.0	< 4.0
Cu Diss	< 4.0	< 4.0	< 4.0
Fe*	221	414	301
Pb*	< 1.0	< 1.0	< 1.0
Pb Diss	< 1.0	< 1.0	< 1.0
Mn*	20	18	59
Ni*	< 4.0	< 4.0	< 4.0
Ni Diss	< 4.0	< 4.0	< 4.0
Zn*	< 5.0	< 5.0	< 5.0
Zn Diss	< 5.0	< 5.0	< 5.0
Al*	77.4	53.3	53.3
fecal coliforms			320

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



**TABLE 3  
HABITAT ASSESSMENT SUMMARY  
UNNAMED TRIBUTARY CHESTER CREEK  
DELAWARE COUNTY  
APRIL 21, 1999**

HABITAT PARAMETER	STATIONS <sup>1</sup>	
	3UCC	R1
1. instream cover	15	16
2. epifaunal substrate	15	17
3. embeddedness	12	15
4. velocity/depth	15	14
5. channel alterations	15	17
6. sediment deposition	11	17
7. riffle frequency	13	18
8. channel flow status	17	18
9. bank condition	16	12
10. bank vegetation protection	15	14
11. grazing/disruptive pressures	18	11
12. riparian vegetation zone width	8	9
Total Score	170	178
Rating	SUB	SUB

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

**TABLE 4**  
**Benthic Macroinvertebrate Results**  
**UNT Chester Creek, Delaware County**  
**April 21, 1999**

TAXA	STATION	
	3UCC	R1
<b>Ephemeroptera (mayflies)</b>		
Baetidae; <i>Acentrella</i>		R
<i>Baetis</i>	P	
Ephemerellidae; <i>Ephemerella</i>	VA	VA
<i>Eurylophella</i>	P	
<i>Drunella</i>		VA
<i>Serratella</i>		P
Heptageniidae; <i>Epeorus</i>	P	C
<i>Stenonema</i>	A	C
Leptophlebiidae; <i>Habrophlebiodes</i>	P	
Ameletidae; <i>Ameletus</i>	P	
<b>Plecoptera (stoneflies)</b>		
Leuctridae; <i>Leuctra</i>		R
Nemouridae; <i>Amphinemoura</i>	C	P
Pertidae; <i>Acroneuria</i>	C	A
<i>Paragnetina</i>		P
<i>Eccopectera</i>	P	
<i>Perlesta</i>		R
<b>Tricoptera (caddisflies)</b>		
Brachycentridae; <i>Micrasema</i>		P
Glossosomatidae; <i>Agapetus</i>	R	P
<i>Glossosoma</i>		P
Hydroptilidae; <i>Leucotrichia</i>		R
Hydropsychidae; <i>Cheumatopsyche</i>	C	
<i>Diplectronea</i>	C	
<i>Hydropsyche</i>	A	A
Lepidostomatidae; <i>Lepidostoma</i>		P
Limnophilidae; <i>Pycnopsyche</i>	R	
Philopotamidae; <i>Chimarra</i>	R	P
Psychomyiidae; <i>Psychomyia</i>		P
Rhyacophilidae; <i>Rhyacophila</i>	P	R
Uenoidae; <i>Neophylax</i>	R	
<b>Diptera (true flies)</b>		
Blephariceridae; <i>Blepharicera</i>		A

TAXA	STATION	
	3UCC	R1
Empididae; <i>Clinocera</i>	P	P
Simuliidae; <i>Simulium</i>	P	P
<i>Prosimulium</i>	P	
Tabanidae; <i>Chrysops</i>	R	
Tipulidae; <i>Antocha</i>		C
<i>Tipula</i>	C	
Chironomidae	VA	A
<b>Megaloptera</b>		
Corydalidae; <i>Nigronia</i>	P	R
Sialidae; <i>Sialis</i>		R
<b>Odonata (dragon-, damselflies)</b>		
Calopterigidae; <i>Calopteryx</i>	R	
Gomphidae		P
<i>Stylogomphus</i>	P	
<b>Lepidoptera (moths)</b>		
Pyralidae; <i>Petrophila</i>		P
<b>Coleoptera (aquatic beetles)</b>		
Dryopidae; <i>Helichus</i>	P	
Elmidae; <i>Optioservus</i>	C	P
<i>Oulimnius</i>	P	
<i>Promoresia</i>		P
<i>Stenelmis</i>	R	R
Psephenidae; <i>Psephenus</i>	P	C
Ptilodactylidae; <i>Anchytarsus</i>	P	
<b>Non-Insect Taxa</b>		
Turbellaria (flat worms)		
<i>Cura</i>	R	
Oligochaeta		
Lumbricidae	C	P
Gastropoda (univalves, snails)		
Ancylidae; <i>Ferrissia</i>		P
Number of taxa in total sample	35	35

R=rare (<3 organisms); P=present (3-9 organisms); C=common (10-24 organisms); A=abundant (25-99 organisms); VA=very abundant (>99 organisms)

**TABLE 5**  
**FISHES**  
**UNNAMED TRIBUTARY CHESTER CREEK**  
**DELAWARE COUNTY**

SPECIES NAME <sup>1</sup>	STATION
	3UCC
American eel, <i>Anguilla rostrata</i>	X
Blacknose dace, <i>Rhinichthys atratulus</i>	X
Creek chub, <i>Semotilus atromaculatus</i>	X
White sucker, <i>Catostomus commersoni</i>	X
Largemouth bass, <i>Micropterus salmoides</i>	X
Tessellated darter, <i>Etheostoma olmstedii</i>	X

1 - Data collected by Department of Environmental Protection (July 1998)

**TABLE 6**  
**Semi-quantitative Benthic Macroinvertebrate Data**  
**UNT Chester Creek, Delaware County**  
**April 21, 1999**

TAXA	STATION	
	3UCC	R1
<b>Ephemeroptera (mayflies)</b>		
Baetidae; <i>Acentrella</i>		1
Ephemerellidae; <i>Ephemerella</i>	32	36
<i>Drunella</i>		40
<i>Serratella</i>		1
Heptageniidae; <i>Epeorus</i>	2	3
<i>Stenonema</i>	13	2
Ameletidae; <i>Ameletus</i>	1	
<b>Plecoptera (stoneflies)</b>		
Nemouridae; <i>Amphinemoura</i>	3	
Perlidae; <i>Acroneuria</i>	1	5
<i>Paragnetina</i>		1
<i>Perlesta</i>		1
<b>Tricoptera (caddisflies)</b>		
Glossosomatidae; <i>Agapetus</i>		2
Hydropsychidae; <i>Cheumatopsyche</i>	2	
<i>Diplectrona</i>	6	
<i>Hydropsyche</i>	6	6
Lepidostomatidae; <i>Lepidostoma</i>		2
Rhyacophilidae; <i>Rhyacophila</i>	1	1
<b>Diptera (true flies)</b>		
Blephariceridae; <i>Blepharicera</i>		5
Simuliidae; <i>Simulium</i>	1	2
<i>Prosimulium</i>	1	
Tabanidae; <i>Chrysops</i>	1	
Tipulidae; <i>Antocha</i>		2
<i>Tipula</i>	1	
Chironomidae	51	8
<b>Odonata (dragon-, damselflies)</b>		
Gomphidae; <i>Stylogomphus</i>	1	
<b>Coleoptera (aquatic beetles)</b>		
Dryopidae; <i>Helichus</i>	1	
Elmidae; <i>Optioservus</i>	8	2
<i>Oulimnius</i>	1	
<i>Stenelmis</i>		1
Psephenidae; <i>Psephenus</i>		4
Ptilodactylidae; <i>Anchytarsus</i>	1	
<b>Non-Insect Taxa</b>		
Oligochaeta		
Lumbricidae	2	1
Number of individuals in subsample	136	126

**TABLE 7**  
**RBP METRIC COMPARISON<sup>1</sup>**  
**UNT CHESTER CREEK, DELAWARE COUNTY**

METRIC	STATION <sup>2</sup>	
	3UCC	R1
1. TAXA RICHNESS	21	21
Cand/Ref (%)	100	***
Biol. Cond. Score	6	6
2. MOD. EPT INDEX	8	12
Cand/Ref (%)	67	***
Biol. Cond. Score	4	6
3. MOD. HBI	3.82	1.83
Cand-Ref	1.99	***
Biol. Cond. Score	0	6
4. % DOMINANT TAXA	38	32
Cand-Ref	6	***
Biol. Cond. Score	6	6
5. % MOD. MAYFLYS	35	66
Ref-Cand	31	***
Biol. Cond. Score	2	6
TOTAL BIOLOGICAL CONDITION SCORE	18	30
% COMPARABILITY TO REFERENCE	60	***

1 - Derived from the subsample detailed in Table 6

2 - Candidate station compared to R1 (Birch Run)