

**UNNAMED TRIBUTARY TO LACKAWANNA RIVER  
(CLARKS CREEK)  
WAYNE COUNTY**

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

**SEGMENT: BASIN**

**STREAM CODE: 28600**

**DRAINAGE LIST: J**

**WATER QUALITY MONITORING SECTION (DSB)  
DIVISION OF WATER QUALITY STANDARDS  
BUREAU OF WATER STANDARDS AND FACILITY REGULATION  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**June 2007**

## **INTRODUCTION**

Clarks Creek is listed in Chapter 93 of the Pennsylvania Code as an unnamed tributary (UNT) to the Lackawanna River with a designated use of Cold Water Fishes (CWF). As a result of a petition submitted to the Environmental Quality Board by Mr. Glen Abello on May 29, 2001, this basin was evaluated for redesignation as High Quality-Cold Water Fishes (HQ-CWF). This report is based on a field survey conducted by the Department in April of 2002.

## **GENERAL WATERSHED DESCRIPTION**

Clarks Creek (28600) is a tributary to the Lackawanna River in the Susquehanna River watershed (Figure 1). This basin covers an area of 3.37 square miles and contains 4.59 stream miles. It is located in Clinton Township, Wayne County. Land use in this basin is mostly forested slopes with some low-density residential land use along the paved roads and the borough of Browndale in the lower portion of the watershed. This basin ranges in elevation from 2240 feet in the northeast corner to 1420 feet at the mouth. Clarks Creek is a freestone stream with a high to moderate gradient throughout its length.

## **WATER QUALITY AND USES**

### **Surface Water:**

No long-term water quality data were available to allow a direct comparison to water quality criteria. A grab sample was collected at Station 3CC near the mouth of Clarks Creek during the April 2002 survey (Tables 1 & 2). This sample indicated that water quality was generally good. Since 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 ecological significance.

There are no surface water withdrawals for public water supply or NPDES permitted surface water discharges in the candidate basin.

### **Aquatic Biota:**

Habitat assessments and biological samplings were conducted at 4 stations (3 candidate and 1 reference) during the April 2002 survey. The physical habitat assessments revealed that conditions at Station 1CC, 2CC, 3CC and Reference Station R1 scored in the Optimal range for benthic macroinvertebrates and fish (Table 3). Overall, habitat scores for the Clarks Creek stations ranged from 188 to 198.

Benthic macroinvertebrate samples were collected using the Department's Antidegradation protocol (adapted from Plafkin's 1989 and Barbour's 1999 Rapid Bioassessment Protocols manuals). Taxonomic diversity was high at all stations with individuals from several genera that are sensitive to water quality degradation occurring commonly at these stations (e.g. *Epeorus*, *Leuctra*, and *Amphinemura*).

The Pennsylvania Fish and Boat Commission surveyed the candidate stream in August 1997. They found 7 fish species in the sampled reach located approximately 560 meters upstream from the mouth (Table 4). They found naturally reproducing brook and brown trout and based on a 23.8 kg/ha wild trout biomass recommended a Class B management classification for Clarks

Creek. The vast majority of these trout were native brook trout making this stream one of the few remaining native trout resources in the heavily urbanized Lackawanna Valley.

### **BIOLOGICAL USE QUALIFICATIONS**

The biological use qualifying criteria applied to Clarks Creek was the integrated benthic macroinvertebrate score test described at § 93.4b(a)(2)(i)(A) and § 93.4b(b)(1)(v). This score is calculated from the macroinvertebrate samples referenced above. Following the Department's Antidegradation protocol, a 200 +/- 20% count subsample was randomly selected from the total sample and enumerated (Table 6). Selected benthic macroinvertebrate community metrics were generated from these subsamples. Candidate station metrics were compared to Dimmick Meadow Brook (05244) a reference stream with a comparable drainage area (Table 7). This reference stream has a protected use designation of EV and is a tributary to Sawkill Creek (05241) located in Pike County. All sampling was conducted within a two-day period 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, Stations 1CC, 2CC, and 3CC had a biological condition scores greater than 92% of the reference station score, which qualifies for an EV designation under the Department's regulatory criterion (§ 93.4b(b)(1)(v)).

### **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 April 27, 2002 (32 Pa.B 2162). A similar notice was also published in the Scranton Times on April 26, 2002. In addition, Clinton Township along with the Wayne County Planning Commission, were all notified of the evaluation in a letter dated March 12, 2002. No data on water chemistry, instream habitat, or the aquatic community were received in response to these notifications.

The Clarks Creek report and original recommendations (June 2007) to redesignate the stream as Exceptional Value (EV) were made available for public review and comment on DEP's web page. The local stakeholders, which included the petitioner, Clinton Township, the Wayne County Planning Commission, and the Wayne Conservation District, were notified of the web report availability by postal mail. No comments were received in response to this web posting.

### **RECOMMENDATIONS**

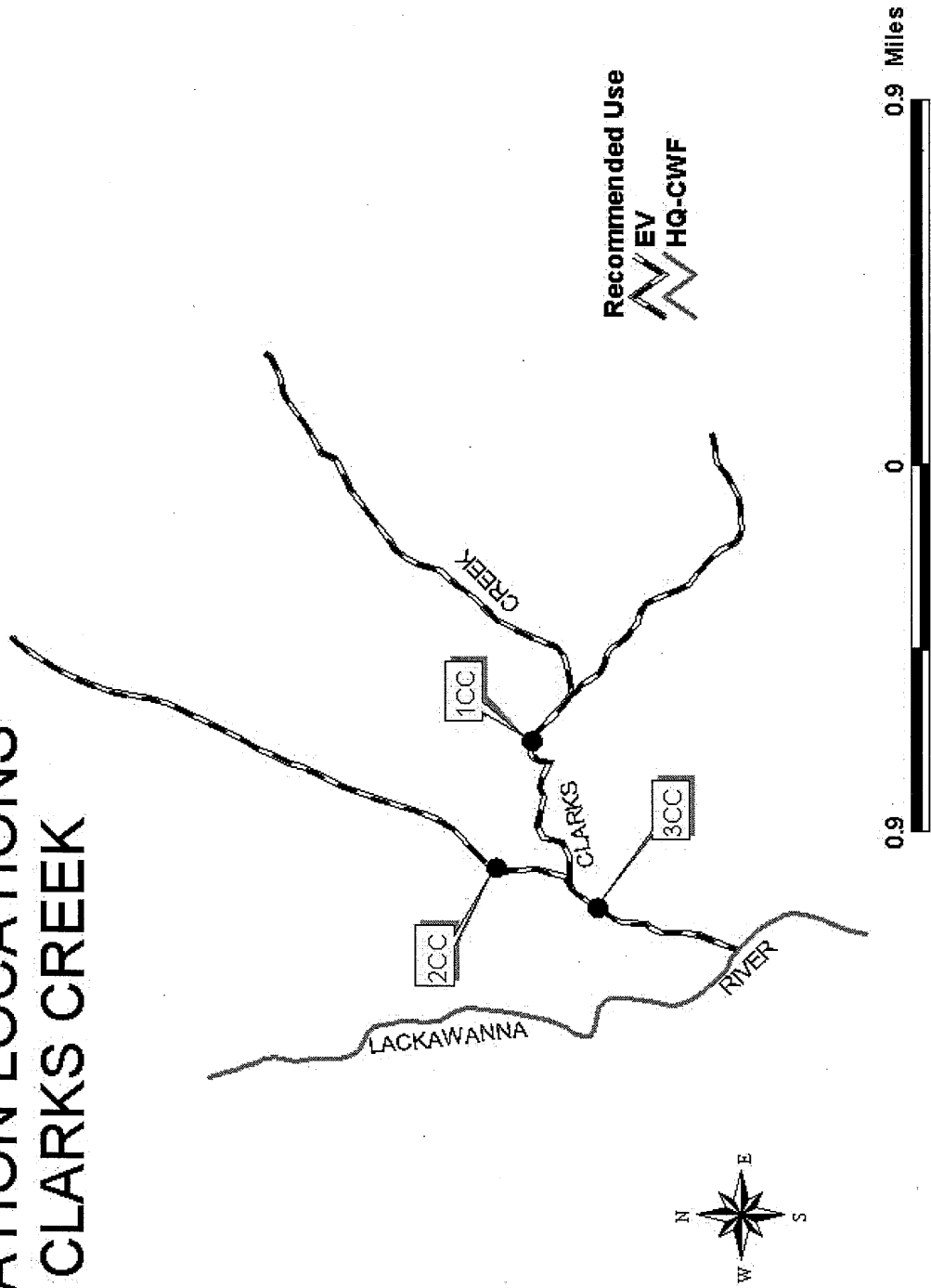
Based on applicable regulatory definitions and requirements of § 93.4b, the Department recommends that the protected use designation of the UNT 28600 of the Lackawanna River (known locally as Clarks Creek) basin be changed from CWF to EV based on biological condition scores greater than 92% of the reference station score (§ 93.4b(b)(1)(v)). This recommendation affects 4.59 stream miles.

## 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, MT, J. Gerritsen, BT Snyder, and JB Stribling. 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.

FIGURE 1.  
STATION LOCATIONS  
CLARKS CREEK



**TABLE 1**  
**STATION LOCATIONS**  
**CLARKS CREEK**  
**WAYNE COUNTY**

<u>STATION</u>	<u>LOCATION</u>
1CC	Clarks Creek (28600); approximately 50 meters upstream of the T538 crossing. Clinton Township, Wayne County. Lat: 41 39 01 Long: 75 26 54 RM:
2CC	Unnamed Tributary to Clarks Creek (28600); approximately 30 meters upstream of the T538 crossing. Clinton Township, Wayne County. Lat: 41 39 06 Long: 75 26 55 RM:
3CC	Clarks Creek; approximately 650 meters upstream of the mouth. Clinton Township, Wayne County. Lat: 41 38 54 Long: 75 27 22 RM: 0.81
R1	Dimmick Meadow Brook (05244) approximately 30 meters upstream of the T428 crossing. Milford Township, Pike County. Lat: 41 20 51 Long: 74 50 14 RM: 0.52

**TABLE 2**  
**WATER CHEMISTRY<sup>1</sup>**  
**CLARKS CREEK**  
**WAYNE COUNTY**  
**APRIL 24, 2002**

STATION	3CC
<b>Field Parameters</b>	
Temp (°C)	7.8
Cond (µmhos)	44
pH	6.7
<b>Laboratory Parameters</b>	
pH	6.4
Alkalinity	5
Acidity	1.4
Hardness	12
T Diss. Sol.	66
Susp.Sol.	<2
NH <sub>3</sub> -N	<0.02
NO <sub>2</sub> -N	<0.01
NO <sub>3</sub> -N	0.17
Total P	<0.01
Ca	3.3
Mg	0.89
Cl	2
SO <sub>4</sub>	<20
As*	< 4.0
As Diss	< 4.0
Cd*	< 0.2
Cd Diss	< 0.2
hex Cr*	<10
Cr*	<50
Cu*	< 4.0
Cu Diss	< 4.0
Fe*	29
Pb*	< 1.0
Pb Diss	< 1.0
Mn*	13
Ni*	< 4.0
Ni Diss	< 4.0
Zn*	<5.0
Zn Diss	<5.0
Al*	66
fecal coliforms	<20

<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**  
**CLARKS CREEK**  
**WAYNE COUNTY**  
**APRIL 24, 2002**

HABITAT PARAMETER	STATIONS <sup>1</sup>			
	1CC	2CC	3CC	R1
1. instream cover	19	19	18	18
2. epifaunal substrate	18	18	19	17
3. embeddedness	18	18	16	18
4. velocity/depth	15	12	13	15
5. channel alterations	16	14	12	18
6. sediment deposition	18	19	18	19
7. riffle frequency	18	18	19	18
8. channel flow status	12	15	16	16
9. bank condition	14	16	17	17
10. bank vegetation protection	16	17	17	18
11. grazing/disruptive pressures	18	18	14	20
12. riparian vegetation zone width	16	12	9	20
Total Score	198	196	188	214
Rating <sup>2</sup>	OPT	OPT	OPT	OPT

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

<sup>2</sup> OPT = Optimal



**TABLE 4**  
**FISHES**  
**CLARKS CREEK**  
**WAYNE COUNTY**

SPECIES	STATION <sup>1</sup>
Brown trout, <i>Salmo trutta</i>	X
Brook trout, <i>Salvelinus fontinalis</i>	X
Blacknose dace, <i>Rhinichthys atratulus</i>	X
Longnose dace, <i>Rhinichthys cataractae</i>	X
Creek chub, <i>Semotilus atromaculatus</i>	X
White sucker, <i>Catostomus commersoni</i>	X
Sunfish, <i>Lepomis sp.</i>	X

1 - Data from PA Fish and Boat Commission survey (8/14/97)

**TABLE 5**  
**SEMI QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA**  
**CLARKS CREEK**  
**APRIL 24, 2002**

TAXA	STATION			
	1CC	2CC	3CC	R1
<b>Ephemeroptera (mayflies)</b>				
Ameletidae; <i>Ameletus</i>				1
Baetidae; <i>Acentrella</i>		1		
<i>Baetis</i>				2
Ephemerellidae; <i>Ephemerella</i>	1		5	63
<i>Eurylophella</i>				2
Heptageniidae; <i>Cinygmula</i>				2
<i>Epeorus</i>	56	53	47	17
<i>Leucrocuta</i>	1	3	1	4
<i>Stenonema</i>	13	19	22	2
<i>Stenacron</i>	6	2	4	
Leptophlebiidae; <i>Habrophlebiodes</i>				3
<b>Plecoptera (stoneflies)</b>				
Chloroperlidae; <i>Sweltsa</i>	8	9	13	1
Leuctridae; <i>Leuctra</i>	18	18	12	5
Nemouridae; <i>Amphinemura</i>	22	13	11	14
<i>Ostrocerca</i>		1		
Peltoperlidae; <i>Tallaperla</i>				1
Perlidae; <i>Acroneuria</i>		1	1	4
Perlodidae; <i>Isoperla</i>	1			7
<i>Malirekus</i>	1			
Pteronarcyidae; <i>Pteronarcys</i>				3
<b>Tricoptera (caddisflies)</b>				
Glossosomatidae; <i>Glossosoma</i>			1	
Goeridae; <i>Goera</i>		1		
Hydropsychidae; <i>Cheumatopsyche</i>		1		
<i>Diplectrona</i>	7	7	8	8
<i>Hydropsyche</i>	8	7	8	2
Lepidostomatidae; <i>Lepidostoma</i>	2	2	1	
Leptoceridae; <i>Mystacides</i>				1
Philopotamidae; <i>Dolophilodes</i>	1		4	
<i>Wormaldia</i>		2		
Polycentropidae; <i>Polycentropus</i>		1		2
Rhyacophilidae; <i>Rhyacophila</i>	1	6	4	4
Uenoidae; <i>Neophylax</i>	2	7	2	2
<b>Diptera (true flies)</b>				
Empididae; <i>Chelifera</i>	3			
Simuliidae; <i>Prosimulium</i>	10	11	2	4
Tipulidae; <i>Antocha</i>	2			1
<i>Dicranota</i>		2	3	2
<i>Hexatoma</i>	9	8	9	1
<i>Tipula</i>		2		1
Ceratopogonidae; <i>Probezzia</i>				1
Chironomidae	18	22	37	32

Table 5 continued

TAXA	STATION			
	1CC	2CC	3CC	R1
<b>Megaloptera (dobson-, fishflies)</b>				
<i>Corydalidae; Nigronia</i>			2	2
<b>Odonata (dragon-, damselflies)</b>				
<i>Aeshnidae; Boyeria</i>				1
<i>Gomphidae; Lanthus</i>	2	4	1	
<b>Coleoptera (aquatic beetles)</b>				
<i>Elmidae; Optioservus</i>		1	1	
<i>Oulimnius</i>	13	15	14	
<i>Promoresia</i>			1	11
<i>Stenelmis</i>				1
<i>Psephenidae; Ectopria</i>			1	
<i>Psephenus</i>				9
<b>Non-Insect Taxa</b>				
<i>Cambaridae</i>	1		2	
<i>Oligochaeta</i>				1
Total number in subsample	206	219	217	217

**TABLE 6**  
**RBP METRIC COMPARISON**  
**CLARKS CREEK, WAYNE COUNTY**

METRIC	STATIONS			
	1CC	2CC	3CC	R1
1. TAXA RICHNESS	24	27	27	32
Cand/Ref (%)	75	84	84	
Biol. Cond. Score	6	8	8	8
2. MOD. EPT INDEX	15	15	15	18
Cand/Ref (%)	83	83	83	
Biol. Cond. Score	8	8	8	8
3. MOD. HBI	2.11	2.16	2.42	2.32
Cand-Ref	-0.21	-0.16	0.10	
Biol. Cond. Score	8	8	8	8
4. % DOMINANT TAXA	27	24	22	29
Cand-Ref	-2	-5	-7	
Biol. Cond. Score	8	8	8	8
5. % MOD. MAYFLIES	37	35	36	42
Ref-Cand	5	7	6	
Biol. Cond. Score	8	8	8	8
TOTAL BIOLOGICAL CONDITION SCORE	38	40	40	40
% COMPARABILITY	95	100	100	