

# **DWARFS KILL**

**PIKE COUNTY**

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

**Segment: Basin  
Stream Code: 05221  
Drainage List C**

**WATER QUALITY MONITORING SECTION (MAB)  
DIVISION OF WATER QUALITY STANDARDS  
BUREAU OF CLEAN WATER  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**February 2016**

## **INTRODUCTION**

The Department of Environmental Protection (Department) conducted an evaluation of the Dwarfs Kill basin for redesignation in response to a petition submitted to the Environmental Quality Board (EQB) by the Dwarfs Kill Watershed Association dated May 21, 2009. The EQB accepted the petition for further study on July 21, 2009 and a notice of a stream redesignation evaluation was published in the Pa Bulletin on May 22, 2010. The petition requests the Dwarfs Kill basin, from its source to its mouth, be redesignated to Exceptional Value (EV). The Dwarfs Kill basin is currently designated High Quality – Cold Water Fishes, Migratory Fishes (HQ-CWF, MF). One component of this evaluation is based on an aquatic life use survey of the Dwarfs Kill basin on April 13, 2010.

## **GENERAL WATERSHED DESCRIPTION**

Dwarfs Kill is a small, shallow and cold first-order tributary to Raymondskill Creek at river mile 5.14 located in Dingman Township, Pike County. The petitioned basin drains 8.02 square miles and 15.0 stream miles (Figure 1). The upper portion of the basin is a series of ponds, lakes and wetlands and in most accessible areas has no defined stream channel. The lower portion of the basin increases in gradient and can best be described as riffle–run with interspersed sections of low gradient waters. Dwarfs Kill is located on the Edgemere 7.5-minute series USGS quadrangle maps. Land use consists of 14% low density residential and 72.4% forested.

## **WATER QUALITY AND USES**

### **Surface Water**

No long-term water quality data were available from the Dwarfs Kill basin that would allow a direct comparison to water quality criteria. The Department did collect chemical and biological data from the Dwarfs Kill study area during site visits in April 13, 2010. There are no NPDES permitted discharges in the Dwarfs Kill basin.

### **Water Chemistry**

A single water chemistry grab sample from one location was collected (3DK), the farthest downstream location within the petitioned basin. Field chemistry data was collected from three sampling locations. Field chemistry was collected using an YSI 556 handheld water quality meter. No recent precipitation events had occurred to influence base flow. Due to the instantaneous nature of water chemistry grab samples, the indigenous aquatic community is a better indicator of long-term water quality conditions.

## Aquatic Biota

The indigenous aquatic community is an excellent indicator of long-term water quality conditions and is used as a measure of both water quality and ecological significance. Department staff collected habitat and benthic macroinvertebrate data at three Dwarfs Kill locations and one on the EV reference station Sawkill Creek (SKC) on April 14, 2010 (Table 1, Figure 1).

**Habitat.** Instream habitat was assessed at each station within the petitioned basin and at the Sawkill Creek reference station. The habitat evaluation consists of rating twelve habitat parameters to derive an overall station habitat score. The habitat scores for the three Dwarfs Kill stations ranged from 216 (1UNTDK) to 226 (3DK), reflecting optimal habitat conditions (Table 3).

**Benthos.** Benthic samples were collected from three stations in the Dwarf Kill basin and one from Sawkill Creek on April 14, 2010 (Table 4). All of the benthic macroinvertebrate samples collected followed the Department's antidegradation sampling methodology, which is a modification of EPA's Rapid Bioassessment Protocols (Plafkin, et al. 1989; Barbour et al. 1999). Taxonomic diversity was good at 3DK and the reference SKC. Taxonomic diversity was reduced at the upper two stations, 1UNTDK and 2DK. Station 1UNTDK was dominated by *Amphinemura* and *Simulium*, together comprising 55% of the sample. Station 2DK was dominated by *Ephemerella* and *Prosimulium*, together comprising 64% of the sample.

## BIOLOGICAL USE QUALIFICATIONS

The biological use qualifying criteria applied to the Dwarfs Kill was the DEP integrated benthic macroinvertebrate scoring test described in 25 Pa. Code §93.4b(b)(1)(v). Selected benthic macroinvertebrate community metrics from the petitioned basins (Table 5) were compared to those from reference streams with a comparable drainage area. All stations were compared with a reference station collected on Sawkill Creek in Pike County (Table 5). Stations on Sawkill Creek have served as EV references in several other Departmental surveys. The comparisons were done using the following metrics that were selected as being indicative of community health: taxa richness; modified EPT index; modified Hilsenhoff Biotix Index; percent dominant taxa; and percent modified mayflies.

Based on these five metrics, candidate stations had Biological Condition Scores (BCS) that ranged from 33% (1UNTDK) to 88% (3DK) of the reference BCS (Table 5). As a result, these candidate stations do not meet the 92% comparison standard required to qualify as Exceptional Value Waters (§93.4b(b)(1)(v)).

## ADDITIONAL EXCEPTIONAL VALUE WATERS QUALIFYING CRITERIA

Based on petitioner information suggesting that certain 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 A<sup>1</sup>];
- B. The water is a surface water of exceptional recreational significance [§ 93.4b(b)(1)(iv) – see Appendix A<sup>2</sup>].
- C. The water is a surface water of exceptional ecological significance [§ 93.4b(b)(2) – see Appendix A<sup>3</sup>].

**A. Waters qualifying as EV as outstanding National, State, regional or local resource waters under 25 Pa. Code § 93.4b(b)(1)(iii):**

This “outstanding resource waters” EV qualifier may be considered for the Dwarfs Kill basin from its source to mouth since it already has the prerequisite HQ designation. The definition of “Outstanding National, State, regional or local resource waters” in § 93.1 requires adoption of “water quality protective measures”. “Coordinated water quality protective measures”, also defined at § 93.1, are required for regional or local governments. (See Appendix A for definitions).

**Outstanding National or State Resource Waters**

To qualify for outstanding National or State resource waters, a government agency must adopt water quality protection measures for such waters. No waters that meet this criterion have been identified in the petition.

**Outstanding Regional or Local Resource Waters**

The Department evaluated local ordinances described below, as “coordinated water quality protective measures” adopted by local governments along the Dwarfs Kill watershed corridor. Dingman Township has adopted water quality protective measures through ordinances that aim to conserve natural features, including land or water resource areas (e.g. wetlands, floodplain, vernal pools, springs, and steep slopes). The purpose of the regulations is to ensure that land uses minimize disturbances to natural features and that reasonable measures are taken to mitigate any adverse impacts from such uses.

Although the protective measures provided by these townships could enhance water quality protection, the regulations require that such measures be “coupled with” an interest in real estate, as described at § 93.1. Definitions - “*Coordinated water quality protective measures*”. Such requisite real estate interests have not been identified within the Dwarfs Kill Basin.

**Real Estate Interests**

Real estate interests identified by the Delaware Highlands Conservancy include a conservation easement to maintain existing water quality of portions of Dwarfs Kill and its tributaries. Although this

preserved and eased property represents legally binding sound land use water quality protective measures, no regional or local government has adopted these water quality protective measures or is a beneficiary of this easement. Therefore, the easement may not be taken into consideration under the regulations.

**B. Waters Qualifying as EV as Surface Water of Exceptional Recreational Significance under 25 Pa. Code § 93.4b(b)(1)(iv):**

This “surface water of exceptional recreational significance” EV qualifier defined in § 93.1 is applicable to surface waters that provide a “water-based, water quality-dependent recreational opportunity because there are only a limited number of naturally occurring areas and waterbodies across the State where the activity is available or feasible.”

This exceptional recreational waters qualifier has been reviewed for Dwarfs Kills recreational attributes as described below:

1. Anecdotal information was provided stating the excellent trout fishing opportunities available in the Dwarfs Kill basin. These opportunities exist throughout the state and cannot be described as a limited opportunity activity.
2. Various lake communities and camps provide water based activities. These opportunities exist throughout the state and cannot be described as a limited opportunity activity.

**C. Waters Qualifying as EV as Surface Waters of Exceptional Ecological Significance under 25 Pa. Code § 93.4b (b)(2):**

Information gathered for the Pennsylvania Natural Heritage Program and reported in County Natural Areas Inventories for Pike County did identify Dark Run Wetland as an area of local significance within the Dwarfs Kill basin, but no statewide or local ecological community types were identified that would satisfy the “exceptional ecological significance” requirement of this EV criterion.

**PUBLIC RESPONSE AND PARTICIPATION SUMMARY**

The Department provided public notice of this designation evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on May 22, 2010 (40 Pa.B. 2716). In addition, Dingman Township was notified of the redesignation evaluation in a letter dated October 9, 2009. No other data were received resulting from the public notice.

**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 December 15, 2015 with an initial public comment period ending 30-days later. In response to this notice the Delaware Riverkeeper provided additional information that pertains to the petitioned basin. The Delaware Riverkeeper also requested that the

Department review additional EV waters qualifying criteria and an extension of the original 30-day public comment period. In response the Department reviewed the additional information submitted. The Department also reviewed additional EV waters qualifying criteria, updated the original draft report and provided an additional 30-day comment period extension.

## **RECOMMENDATION**

Based on applicable regulatory definitions and requirements of 25 Pa. Code § 93.4b, the Department recommends that the Dwarfs Kill basin, from its source to mouth, maintain its current designated use in Chapter 93 as High Quality – Coldwater Fishes, Migratory Fishes (HQ-CWF, MF).

## APPENDIX A

<sup>1</sup>Definition 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 measures<sup>3</sup> along a watershed corridor.

<sup>2</sup> Definition 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.

<sup>3</sup> 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).

<sup>4</sup> 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

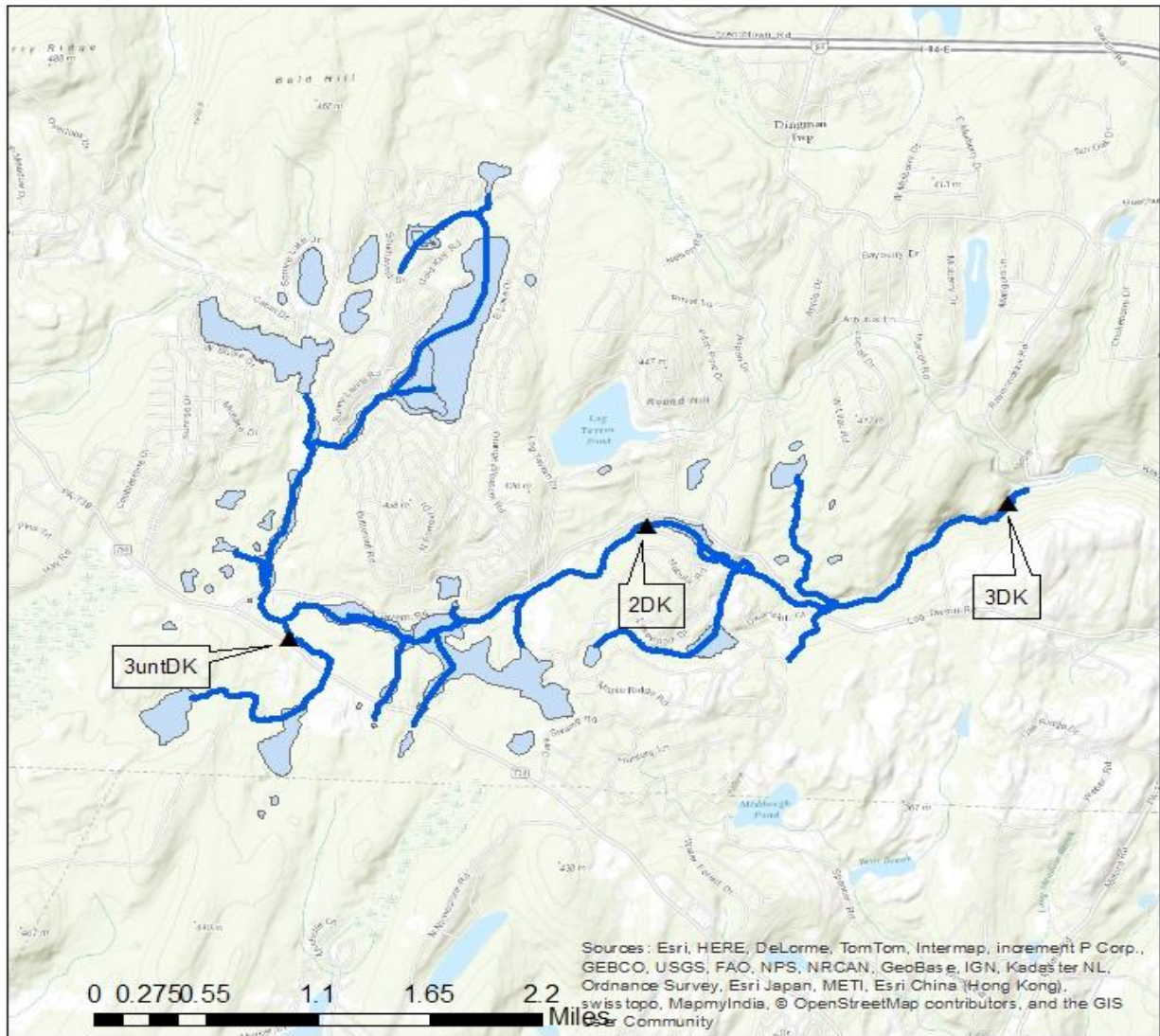
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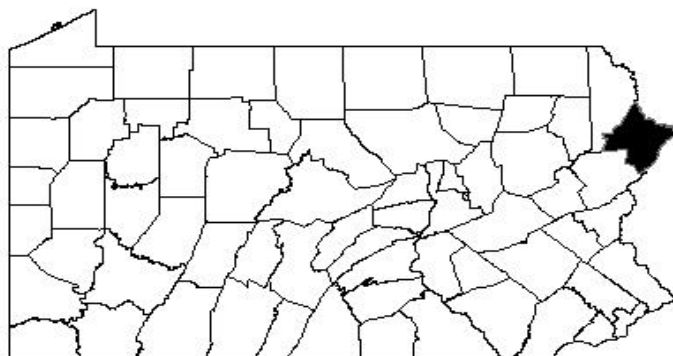


**FIGURE 1  
DWARFS KILL BASIN, PIKE COUNTY**



**Legend**

- Dwarfs Kill Petition Area
- Dwarfs Kill NHD Waterbodies



**TABLE 1**  
**STATION LOCATION**  
**DWARFS KILL, PIKE COUNTY**  
**SAWKILL CREEK, PIKE COUNTY (REFERENCE)**  
**April 13, 2010**

<u>STATION</u>	<u>LOCATION</u>	<u>COORDINATES</u>
<b>1UNTDK</b>	UNT to Dwarfs Kill,	41.295944, -74.957347
<b>2DK</b>	Dwarfs Kill, upstream of Crescent Lake	41.304022, -74.923178
<b>3DK</b>	Dwarfs Kill, upstream of confluence with Raymondskill Creek	41.304565, -74.888627
<b>SKC</b>	Sawkill Creek, upstream of interstate 84	41.341785, -74.826595

**TABLE 2**  
**WATER CHEMISTRY**  
**DWARFS KILL, PIKE COUNTY**  
**SAWKILL CREEK, PIKE COUNTY (REFERENCE)**  
**April 13, 2010**

<b>FIELD PARAMETER</b>	<b>1UNTDK</b>	<b>2DK</b>	<b>3DK</b>	<b>SKC</b>
ALKALINITY	2 MG/L	4 MG/L	6 MG/L	4 MG/L
SPECIFIC CONDUCTANCE(UMHOS)	17	149	131	85
DISSOLVED OXYGEN	9.27 MG/L	9.68 MG/L	10.86 MG/L	10.85 MG/L
<b>LAB PARAMETER</b>	<b>1UNTDK</b>	<b>2DK</b>	<b>3DK</b>	<b>SKC</b>
ACIDITY	-	-	4 MG/L	-
ALKALINITY	-	-	8.4 MG/L	-
ALUMINUM, TOTAL	-	-	32.6 UG/L	-
AMMONIA TOTAL AS NITROGEN	-	-	<.02 MG/L	-
ARSENIC, DISSOLVED	-	-	<3.0 UG/L	-
ARSENIC, TOTAL	-	-	<3.0 UG/L	-
CADMIUM, DISSOLVED	-	-	<.20 UG/K	-
CADMIUM, TOTAL	-	-	<0.2 UG/L	-
CALCIUM, TOTAL	-	-	5.287 MG/L	-
CHLORIDE, TOTAL	-	-	30 MG/L	-
CHROMIUM, TOTAL	-	-	<50 UG/L	-
COPPER, DISSOLVED	-	-	<4.0 UG/L	-
COPPER, TOTAL	-	-	<4.0 UG/L	-
IRON, TOTAL	-	-	86 UG/L	-
LEAD, DISSOLVED	-	-	<1.0 UG/L	-
LEAD, TOTAL	-	-	<1.0 UG/L	-
MAGNESIUM, TOTAL	-	-	1.791 MG/L	-
MANGANESE, TOTAL	-	-	19 UG/L	-
NICKEL, DISSOLVED	-	-	<4.0 UG/L	-
NICKEL, TOTAL	-	-	<4.0 UG/L	-
NITRATE AS NITROGEN	-	-	<.04 MG/L	-
NITRITE NITROGEN, TOTAL	-	-	<.01 MG/L	-
pH(Lab)	-	-	7.2	-
PHOSPHORUS, TOTAL AS P	-	-	0.015 MG/L	-
SULFATE TOTAL	-	-	<15.0 MG/L	-
TOTAL DISSOLVED @105 C	-	-	92 MG/L	-
TOTAL HARDNESS	-	-	21 MG/L	-
TOTAL SUSPENDED SOLIDS	-	-	<5 MG/L	-
ZINC TOTAL	-	-	<5.0 UG/L	-
ZINC, DISSOLVED	-	-	<5.0 UG/L	-
TOTAL COLIFORMS	-	-	60/100 ML	-
FECAL COLIFORMS	-	-	<10/100 ML	-

**TABLE 3  
HABITAT ASSESSMENT SUMMARY  
DWARFS KILL, PIKE COUNTY  
SAWKILL CREEK, PIKE COUNTY (REFERENCE)  
April 13, 2010**

<b>PARAMETER</b>	<b>Scoring Range</b>	<b>1UNTDK</b>	<b>2DK</b>	<b>3DK</b>	<b>SKC</b>
<b>1. instream cover</b>	0-20	17	18	18	18
<b>2. epifaunal substrate</b>	0-20	18	19	19	17
<b>3. embeddedness</b>	0-20	19	16	18	19
<b>4. velocity/depth</b>	0-20	14	17	15	19
<b>5. channel alterations</b>	0-20	19	20	20	20
<b>6. sediment deposition</b>	0-20	17	18	19	18
<b>7. riffle frequency</b>	0-20	19	18	18	18
<b>8. channel flow status</b>	0-20	20	20	20	20
<b>9. bank condition</b>	0-20	19	20	20	19
<b>10. bank vegetative protection</b>	0-20	19	19	19	20
<b>11. grazing/disruptive pressures</b>	0-20	17	20	20	20
<b>12. riparian vegetation zone width</b>	0-20	18	18	20	20
<b>Total Score</b>	0-240	216	223	226	228
<b>Rating<sup>1</sup></b>		OPT	OPT	OPT	OPT

<sup>1</sup> - OPT = Optimal (192 - 240)

**TABLE 4**  
**SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA**  
**DWARFS KILL, PIKE COUNTY**  
**SAWKILL CREEK, PIKE COUNTY (REFERENCE)**  
**April 13, 2010**

<b>ORDER</b>	<b>TAXA</b>	<b>3DK</b>	<b>2DK</b>	<b>1UNTDK</b>	<b>SKC</b>
<b>Ephemeroptera</b>	<i>Ameletus</i>	1			
	<i>Acerpenna</i>		6	2	
	<i>Baetis</i>	23			42
	<i>Dipheter</i>				2
	<i>Isonychia</i>	12	1		1
	<i>Epeorus</i>	18			28
	<i>Leucrocuta</i>				2
	<i>Maccaffertium</i>	3			
	<i>Drunella</i>				27
	<i>Ephemerella</i>	14	52		8
	<i>Eurylophella</i>	1		3	
	<i>Serratella</i>				7
	<i>Paraleptophlebia</i>	3			27
	<b>Odonata</b>	<i>Stylogomphus</i>			
<b>Plecoptera</b>	<i>Pteronarcys</i>	1	1		
	<i>Amphinemura</i>	10	2	56	1
	<i>Leuctra</i>	3	1	18	2
	<i>Agneta</i>				1
	<i>Paragnetina</i>	3			
	<i>Acroneuria</i>	2	1	1	2
	<i>Isoperla</i>	1	6	1	2
<b>Megaloptera</b>	<i>Sialis</i>	1			
	<i>Nigronia</i>	2			1
<b>Trichoptera</b>	<i>Chimarra</i>	6	1		1
	<i>Dolophilodes</i>	27	5	1	5
	<i>Diplectrona</i>	2	11	23	
	<i>Ceratopsyche</i>	29	4	2	6
	<i>Cheumatopsyche</i>	3			
	<i>Rhyacophila</i>		2	2	2
	<i>Palaeagapetus</i>			2	
	<i>Micrasema</i>				1
	<i>Lepidostoma</i>	2			
	<i>Neophylax</i>				1
<b>Coleoptera</b>	<i>Psilotreta</i>		1		
	<i>Psephenus</i>	1			2
	<i>Ectopria</i>		1		

**TABLE 4**  
**SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA**  
**DWARFS KILL, PIKE COUNTY**  
**SAWKILL CREEK, PIKE COUNTY (REFERENCE)**  
**April 13, 2010**

ORDER	TAXA	3DK	2DK	1UNTDK	SKC
	<i>Oulimnius</i>	3			3
	<i>Promoresia</i>	1	8	3	8
	<i>Stenelmis</i>		1		
	<i>Anchytarsus</i>			3	
<b>Diptera</b>	<i>Hemerodromia</i>	1			
	<i>Neoplasta</i>				1
	<i>Antocha</i>	5	1		
	<i>Dicranota</i>			6	
	<i>Hexatoma</i>				4
	<i>Prosimulium</i>	3	82	11	11
	<i>Simulium</i>		1	71	3
	<i>Stegopterna</i>		15		
	<i>Chironomidae</i>	13	5	20	9
<b>Veneroida</b>	<i>Sphaeriidae</i>			1	
<b>Decapoda</b>	<i>Cambarus</i>			1	
	Total # Organisms	194	208	227	211
	Total Taxa Richness	29	22	19	30

**TABLE 5**  
**RBP METRIC COMPARISON**  
**DWARFS KILL, PIKE COUNTY**  
**SAWKILL CREEK, PIKE COUNTY (REFERENCE)**  
**April 13, 2010**

METRIC	STATIONS			REFERENCE
	1UNTDK	2DK	3DK	SKC
<b>TAXA RICHNESS</b>	19	22	29	30
<b>Cand/Ref (%)</b>	63	73	97	
<b>Biol. Cond. Score</b>	2	5	8	8
<b>MOD. EPT INDEX</b>	9	12	17	17
<b>Cand/Ref (%)</b>	53	71	100	
<b>Biol. Cond. Score</b>	1	5	8	8
<b>MOD. HBI</b>	3.65	2.18	2.91	2.60
<b>Cand-Ref</b>	1.05	-0.42	0.31	
<b>Biol. Cond. Score</b>	3	8	8	8
<b>% DOMINANT TAXA</b>	31	39	15	20
<b>Cand-Ref</b>	11	19	-5	
<b>Biol. Cond. Score</b>	8	8	8	8
<b>% MOD. MAYFLIES</b>	1	25	27	56
<b>Ref-Cand</b>	55	31	29	
<b>Biol. Cond. Score</b>	0	3	3	8
<b>TOTAL BIOLOGICAL CONDITION SCORE</b>	14	29	35	40
<b>% COMPARABILITY TO REFERENCE</b>	35	73	88	