

**FRENCH CREEK AND BEAVER RUN
CHESTER COUNTY**

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

**Segment: Basin, from Beaver Run
to the T522 Bridge (Kennedy Covered Bridge)
Stream Code: 01548
Drainage List: F**

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

MAY 2010

INTRODUCTION

The Department conducted an evaluation of Beaver Run and the lower French Creek basin (from the confluence with Beaver Run, to the junction of West Vincent, East Vincent, and East Pikeland Township borders) in response to a petition submitted by the Green Valleys Association. The petition, which was accepted by the Environmental Quality Board (EQB) on February 17, 2004, requests this basin be redesignated to Exceptional Value Waters (EV). The study area includes the Beaver Run basin and French Creek basin from the confluence with Beaver Run to the Township 522 bridge in East Vincent Township, excluding the Birch Run tributary, which is currently designated Exceptional Value, Migratory Fishes (EV, MF). Beaver Run and the portion of French Creek petitioned for study are currently designated High Quality-Trout Stocking, Migratory Fishes (HQ-TSF, MF) and one unnamed tributary in East Pikeland Township is designated TSF, MF. The upper French Creek basin, source to the confluence with Beaver Run is currently designated EV, MF. One component of the evaluation contained in this report is based on field surveys conducted April 27-30, 2004.

GENERAL WATERSHED DESCRIPTION

French Creek and Beaver Run are freestone streams that are tributaries to the Schuylkill River in the Delaware River watershed. The candidate basin is located in East Nantmeal, South Coventry, East Vincent, West Vincent, and East Pikeland Townships; Chester County (Figure 1). The portion of the French Creek basin petitioned for study has a drainage area of 17.0 square miles and the mainstem consists of 22.3 stream miles. The Beaver Run basin has a drainage area of 5.0 square miles and 9.4 stream miles. The surrounding area is characterized by relatively flat topography with some gently rolling hills of low relief.

The current land use in the watershed consists mostly of single-family residential and open fields. Land use is a mixture of residential (50%), old fields (20%), forest (15%), cropland (5%), pasture (5%), and commercial (5%). One major population center, the Borough of Phoenixville, lies within the southern end of this basin.

WATER QUALITY AND USES

Surface Water

Long-term chemistry data were available from the Department's Water Quality Network Station (WQN 156, Figure 1), located 1.5 miles upstream of the petitioned area, to allow a direct comparison to water quality criteria (Table 2). The period of record for this WQN station was from January 2000 until it was discontinued after December 2004. Based on the concentrations of hardness, alkalinity, calcium and magnesium, French Creek displays soft-to-moderate hardness with moderate buffering capacity. Field alkalinity measurements collected from most stations in the petitioned area (Table 2A) supports these buffering capacity findings. Most metals concentrations were routinely well below numeric criteria values with many measurements being below laboratory detection limits. Similarly, total concentrations of

sulfates, chlorides, and phosphorus and nitrogen-based parameters also were well below criteria values or detection limits. These water parameter data indicates that French Creek has experienced negligible water quality degradation, if any. Additional data submitted by the Delaware Riverkeeper Network also demonstrated excellent water quality at the end of the petitioned reach near Phoenixville. Data submitted included nitrate and ortho-phosphate data with nitrate concentrations below numeric criteria and ortho-phosphate levels always at or below laboratory detection limits. There are seven NPDES permits (5 for treated waste water, and 2 for treated industrial water) and four biosolids applications in the study area of the French Creek basin. One of these NPDES permits was issued for a sewage treatment plant that has yet to be constructed as of this report date. There are no surface water withdrawals in the petitioned area.

Aquatic Biota

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of both water quality and ecological significance. Department staff collected habitat and benthic macroinvertebrate data at eight locations in the petitioned area on April 27, 2004, and from one station each on Rock Run (small tributary EV reference; Chester County) and Kettle Creek (mainstem EV reference; Clinton County) on April 29 and 30, 2004, respectively (Figure 1, Table 1).

Habitat. Instream habitat was assessed at each station on French Creek, Kettle Creek, and Rock Run. Total habitat scores (Table 3) ranged from the suboptimal (4UNT) to the optimal (5FC and 8FC) compared to optimal scores found at reference stations 1 KC (198) and 1RR (195). The lower scoring parameters found at the stations with suboptimal habitat indicated moderate vegetative disruptive pressure, moderately eroded banks, and a lack of adequate riparian buffering.

Benthos. Benthic macroinvertebrate samples were collected at all eight stations (Table 4) 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). With the exception of a low of 10 taxa at 7UNT, taxonomic diversity was very good overall, ranging from 16 to a high of 29 at the other stations. Taxa sensitive to water quality degradation were well represented at all stations except for 4UNT and 7UNT where they were nearly absent. This lack of sensitive taxa and relatively high abundances of tolerant taxa at stations 4UNT and 7UNT compared to reference station conditions, reflect the cumulative impacts of human activity to these two streams. The stations at Beaver Run (1BR) and the French Creek mainstem (5FC and 8FC) had very good-to-excellent taxa richness and were dominated by taxa sensitive to pollution, indicating minimal impacts from human activity.

Fish. Fishery data were made available from the U.S. Geological Survey (USGS) from the Delaware River National Water Quality Assessment (NAWQA) program. The French Creek fish populations were sampled at the USGS gauging station on July 20, 1999 (Figure 1; USGS, 1999). Nineteen species of fish (891 individuals) were captured in 3 hours and 24 minutes of sampling a 300m section of French Creek (Table 5). The French Creek mainstem has a diverse fish community and the species collected are commonly found in warm water habitats

and included several pollution sensitive taxa. The fish data reveal a balanced fish community indicative of a healthy warm water fishery.

BIOLOGICAL USE QUALIFICATIONS

The qualifying criteria applied to French Creek was the DEP integrated benthic macroinvertebrate scoring test described at § 93.4b(a)(2)(i)(A) and § 93.4b(b)(1)(v). Selected benthic macroinvertebrate community metrics from the French Creek petition area (Table 6) were compared to those from Exceptional Value (EV) reference streams with comparable drainage areas. Stations 5FC and 8FC were compared to a reference station on Kettle Creek (1KC) in Clinton County and stations 1BR, and 2-7UNT were compared to a station on Rock Run (1RR), a tributary to French Creek. Rock Run and Kettle Creek were used as references because both are freestone streams, have similar drainage areas to the candidate basins (Rock Run = 3.3 Beaver Run = 5.0; French Creek = 63.1 Kettle Creek = 86.5 square miles). In addition, both Kettle Creek and Rock Run have served as EV reference streams in several other Departmental surveys. Sampling from all stations was completed within a 3-day time frame (April 28-30, 2004) to minimize seasonal variation. The comparisons were done using metrics 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 1BR, 5FC and 8FC in the candidate streams had Biological Condition Scores (BCS) that were 100% of the reference station (Table 6), which exceeds the 92% comparison standard required to qualify as Exceptional Value Waters (§ 93.4b(b)(1)(v)). The remaining five stations (unnamed tributaries to French Creek) in the candidate basin had Biological Condition Scores that ranged from 20% to 82.5% of the reference station (Table 5). As a result, these candidate stations do not meet the 92% EV criterion found at (§ 93.4b(b)(1)(v)). None of the other antidegradation requirements listed in § 93.4b, pertaining to qualifying as High Quality or Exceptional Value waters, apply to these stations.

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The Department provided public notice of this redesignation evaluation and requested technical data from the general public through publication in the Pennsylvania Bulletin on March 13, 2004 (34 Pa.B 1520). A similar notice was also published in The Mercury newspaper (Pottstown, PA) on March 12, 2004. In addition, East Nantmeal, East Pikeland, East Vincent, South Coventry, and West Vincent Townships and the Chester County Planning Commission were notified of the redesignation evaluation in a letter dated February 24, 2004. Water quality and benthic macroinvertebrate data were received from the Delaware Riverkeeper Network as a result of these requests. In addition, the petitioner provided data from Stroud Water Research Center, The Academy of Natural Sciences Patrick Center for Environmental Research and US Geological Survey. The data provided by the petitioner was used as documentation and support for acceptance of the French Creek and Beaver Run petition for redesignation. The data submitted by the Delaware Riverkeeper Network was used

as supporting documentation of the excellent water quality of the mainstem of French Creek in conjunction with the findings of the Department's survey on April 27-30, 2004.

The petitioner and local municipality and planning commission representatives were notified by a postcard mailing that the report was available on the Department's web page for review with a 30-day comment period, which closed on April 16, 2010. In response, DEP received comments from the petitioner, Green Valleys Association, the Delaware Riverkeeper, and the Valley Forge Chapter of Trout Unlimited. These commentors are in support of the EV redesignation recommendations below but noted that tributaries to the French Creek mainstem were not included in the EV redesignation recommendations and raised concerns that their exclusion would expose them to potential degradation. In addition, DEP received an inquiry from the Honorable Curt Schroder, State Representative for the 155th Legislative District that raised these same concerns. While it is preferred to have included the unnamed tributaries as part of the EV recommendation, DEP's evaluation of these streams indicated they did not meet the biological qualifying EV criterion and therefore could not be included in the EV recommendation. It is further noted that since these tributaries are currently HQ, an EV mainstem designation adds an even higher level of protective review because if any wastewater discharges are proposed for these unnamed tributaries, they would not only need to meet more stringent HQ-based permit limits but must also then need to meet the more protective EV requirements at the point of confluence with the French Creek mainstem.

RECOMMENDATION

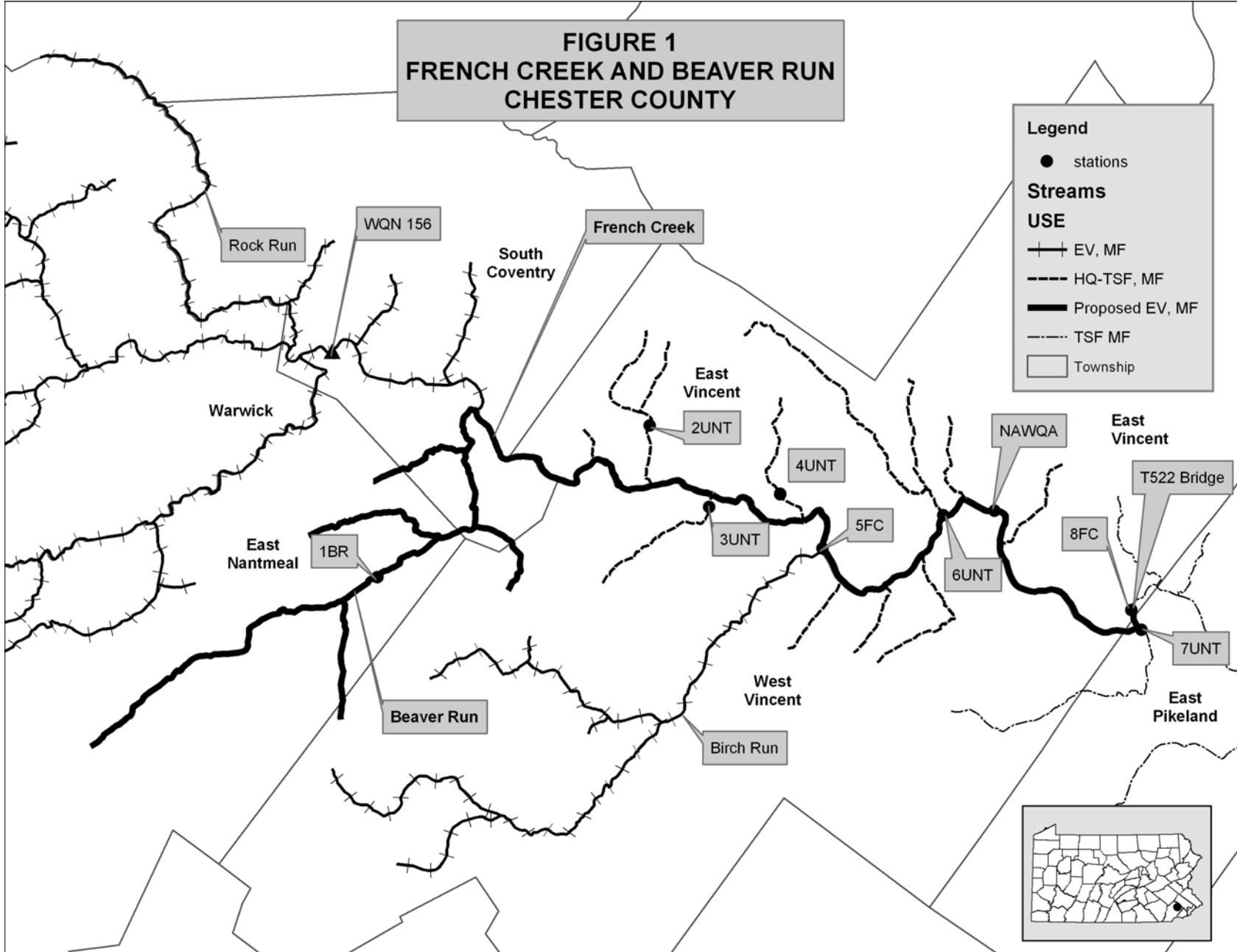
Based on the applicable regulatory definitions and requirements of § 93.4b, the Department recommends that the Beaver Run basin and the French Creek mainstem from Beaver Run to the T522 bridge (Kennedy Covered Bridge) be redesignated Exceptional Value, Migratory Fishes (EV, MF) and the unnamed tributary basins to this reach of the mainstem from Beaver Run to East Pikeland Township retain their current HQ-TSF, MF designation and the unnamed tributary in East Pikeland Township retain its current TSF, MF.

This recommendation adds approximately 16.3 stream miles of EV, MF waters to Chapter 93. A total of 14.7 stream miles will retain their current HQ-TSF, MF designation. With the exception of Beaver Run and the main stem of French Creek, this recommendation does not reflect the EV designation sought in the petition.

REFERENCES

- Barbour, Michael T., Jeroen Gerritsen, Blaine D. Snyder, James B 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
- Fischer, Jeffrey M. 1999. National Water-Quality Assessment Program: Delaware River Basin. United States Geological Survey. FS-056-99.
- Jackson, John. 2001. Aquatic Macroinvertebrate Communities at 19 Sites in the Schuylkill River Basin, 1996-2000. Stroud Water Research Center.
- 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.
- Reif, Drew. 2002. Assessment of Stream Quality using Biological Indices at selected sites in the Schuylkill River Basin, Chester County, Pennsylvania, 1981-97. United States Geological Survey. FS-114-02.
- Zerbe, Faith. 2004. French Creek Water Chemistry Data in Support of Petition. Delaware Riverkeeper Network. Filed in French Creek and Beaver Run Petition file.

**FIGURE 1
FRENCH CREEK AND BEAVER RUN
CHESTER COUNTY**



**TABLE 1
STATION LOCATIONS
FRENCH CREEK
CHESTER COUNTY**

STATION	LOCATION
1BR	Beaver Run (01573) approximately 15 meters downstream of Fairview Road (SR4031). East Nantmeal Township, Chester County Lat: 40° 08' 47" Long: 75° 41' 07" RMI: 1.98
2UNT	Unnamed Tributary to French Creek (01570) approximately 5 meters downstream of Pughtown Road (SR1028). East Vincent Township, Chester County Lat: 40° 09' 44" Long: 75° 38' 44" RMI: 0.50
3UNT	Unnamed Tributary to French Creek (01569) approximately 100 meters upstream of mouth adjacent to Sawmill Road (T490). West Vincent Township, Chester County Lat: 40° 09' 11" Long: 75° 38' 14" RMI: 0.11
4UNT	Unnamed Tributary to French Creek (01568) approximately 10 meters upstream of Pughtown Road (SR1028). East Vincent Township, Chester County Lat: 40° 09' 14" Long: 75° 37' 36" RMI: 0.30
5FC	French Creek (01548) approximately 20 meters upstream of Sheeder Road (SR1033). East and West Vincent Townships, Chester County Lat: 40° 08' 54" Long: 75° 37' 16" RMI: 9.03
6UNT	Unnamed Tributary to French Creek (01558) approximately 5 meters upstream of confluence with French Creek. East Vincent Township, Chester County Lat: 40° 09' 05" Long: 75° 36' 12" RMI: 0.01
7UNT	Unnamed Tributary to French Creek (01555) approximately 10 meters upstream of confluence with French Creek adjacent to Mill Lane (T536). East Pikeland Township, Chester County Lat: 40° 08' 18" Long: 75° 34' 31" RMI: 0.04
8FC	French Creek (01548) approximately 70 meters upstream of Kennedy Covered Bridge and Seven Stars Road (T522). East and West Vincent Townships, Chester County Lat: 40° 08' 25" Long: 75° 34' 38" RMI: 5.25

**TABLE 2
WATER CHEMISTRY
FRENCH CREEK
WQN 156
CHESTER COUNTY**

WQN 156 ¹	
Period of Record Jan 2000 to Dec 2004	
Laboratory Parameters	
Parameter	Range ²
Field	
Temperature °C	0.02 – 23.2
Dissolved Oxygen	8.4 – 16.2
Laboratory	
pH	5.9 – 8.2
Alkalinity as CaCO ₃	2.0 – 56.0
Chloride	<0.5 – 18.9
Fluoride	<0.2
Hardness	0.0 – 73.3
T. Diss. Sol.	<2 – 600
Susp. Sol.	<2 – 36
NH ₃ -N	<0.02 – 0.11
NO ₂ -N	<0.04
NO ₃ -N	<0.04 – 2.05
Total N	0.56 – 2.31
Total P	<0.01 – 0.076
Sulfate	<1 – 24.4
Ca	<0.03 – 20.6
Mg	<0.01 – 6.34
SO ₄	4.7 – 8.8
Ba (total) *	<2 – 39.4
As (dissolved) *	<4
Cd (dissolved) *	<0.2
Cu (total/dissolved) *	<4.0 – 6.8 / <4.0
Fe (total/dissolved) *	<20 – 2010 / <20 – 308
Pb (total/dissolved) *	<1.0 – 3.0 / <1.0 – 3.0
Mn (total/dissolved) *	<2 – 103 / <2 – 33
Ni (total/dissolved) *	<4 / <4
Zn (total/dissolved) *	<5 – 15.4 / <5 – 12
Al (total/dissolved) *	<10-984 / <10 – 41.2

¹ Refer to Figure 1 and Table 1 for station locations

² Except for pH & conductance and indicated otherwise, all values are total concentrations in mg/l

* Concentrations in µg/l

TABLE 2A
FIELD WATER CHEMISTRY
FRENCH CREEK AND BEAVER RUN
CHESTER COUNTY
April 27-30, 2004

	STATIONS ¹								REFERENCE STATIONS	
	1BR	2UNT	3UNT	4UNT	5FC	6UNT	7UNT	8FC	1KC ³	1RR ⁴
Field Parameters										
Temp (°C)	15.2	11.03	12.33	13.55	11.43	13.74	16.97	11.22	10.94	13.94
pH	7.05	7.2	7.17	7.05	7.26	7.59	7.77	7.42	7.3	6.69
Cond (µS/cm)	156	222	128	172	154	161	254	182	47	79
Dissolved Oxygen	8.9	10.02	9.85	9.42	10.6	9.83	9.4	10.06	11.43	8.75
Total Alkalinity	40	50	30	30	NA	50	90	40	10	20

¹ Refer to Figure 1 and Table 1 for station locations

² Kettle Creek, Clinton County, April 30, 2004

³ Rock Run, Chester County, April 29, 2004

NA = Not Available

TABLE 3
HABITAT ASSESSMENT RESULTS
FRENCH CREEK AND BEAVER RUN
CHESTER COUNTY
April 27-30, 2004

PARAMETER	STATION ¹									
	1BR	2UNT	3UNT	4UNT	5FC	6UNT	7UNT	8FC	1KC ³	1RR ⁴
1. instream cover	15	16	15	13	16	15	16	15	16	16
2. epifaunal substrate	16	16	16	16	16	15	16	18	19	16
3. embeddedness	15	13	15	14	12	15	15	13	17	15
4. velocity/depth regimes	16	10	10	10	15	10	15	16	15	17
5. channel alteration	17	17	12	18	18	16	16	19	19	16
6. sediment deposition	16	14	14	16	16	16	15	18	19	15
7. frequency of riffles	17	17	19	15	16	18	17	16	20	17
8. channel flow status	18	20	20	19	20	20	18	20	20	19
9. condition of banks	14	11	13	16	15	15	16	15	16	15
10. bank vegetative protection	15	14	14	16	16	16	16	16	16	16
11. disruptive pressure	11	18	17	11	16	12	16	13	10	16
12. riparian zone width	11	18	18	0	16	11	15	13	11	17
Total Score	181	184	183	164	192	179	191	192	198	195
Rating ²	SUB	SUB	SUB	SUB	OPT	SUB	SUB	OPT	OPT	OPT

¹ Refer to Figure 1 and Table 1 for station locations

² OPT=Optimal (>192); SUB=Suboptimal (132-180)

³ Kettle Creek, Clinton County, April 30, 2004

⁴ Rock Run, Chester County, April 29, 2004

TABLE 4
SEMI-QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA
FRENCH CREEK AND BEAVER RUN, CHESTER COUNTY
APRIL 27-30, 2004

TAXA	STATION ¹									
	1BR	2UNT	3UNT	4UNT	5FC	6UNT	7UNT	8FC	1KC ²	1RR ³
Ephemeroptera (mayflies)										
Baetidae; <i>Acentrella</i>	2				2				20	
<i>Acerpenna</i>									6	
<i>Baetis</i>	1	1	27		1		3	1		
Caenidae; <i>Caenis</i>						2				
Ephemerellidae; <i>Drunella</i>	2				47	2		54	54	
<i>Ephemerella</i>	146	1	34		50	1		42	45	
<i>Eurylophella</i>				2		1		3		
<i>Serratella</i>					12	1				
Heptageniidae; <i>Cinygmula</i>			15							
<i>Epeorus</i>			18						3	
<i>Stenacron</i>	1									
<i>Stenonema</i>	14	1			4			9	8	
Isonychiidae; <i>Isonychia</i>	2		2		6			2	5	
Leptophlebiidae; <i>Paraleptophlebia</i>										
Plecoptera (stoneflies)										
Chloroperlidae; <i>Haploperla</i>	3				1					
Leuctridae; <i>Leuctra</i>	2		4					1		
Nemouridae; <i>Amphinemura</i>	4	1	42	7	1	4				
Peltoperlidae; <i>Tallaperla</i>			1							
Perlidae; <i>Acroneuria</i>	1		3		4	2		2	9	
<i>Eccoptura</i>		4								
<i>Paragnetina</i>									2	
<i>Perlesta</i>					9			7		
Perlodidae; <i>Isoperla</i>		12	1	7	1	2		1		
<i>Remenus</i>			1							
Pteronarcyidae; <i>Pteronarcys</i>			1						1	
Trichoptera (caddisflies)										

TAXA	STATION ¹									
	1BR	2UNT	3UNT	4UNT	5FC	6UNT	7UNT	8FC	1KC ²	1RR ³
Brachycentridae; <i>Micrasema</i>					2			2		
Glossosomatidae; <i>Agapetus</i>					6	1		8		
<i>Glossosoma</i>	1									
Hydropsychidae; <i>Cheumatopsyche</i>	12	40			9	2	2	13	6	
<i>Diplectrona</i>	2		10							
<i>Hydropsyche</i>	17	12	3		15	4	2	5	9	
Limnephilidae; <i>Pycnopsyche</i>			1							
Philopotamidae; <i>Chimarra</i>		3						2		
Polycentropodidae;	1									
<i>Polycentropus</i>		1	1							
Rhyacophilidae; <i>Rhyacophila</i>	5		2							
Uenoidae; <i>Neophylax</i>	1	2	11						3	
Other Insect Taxa										
DIPTERA (true flies)										
Blephariceridae; <i>Blepharicera</i>			2							
Ceratopogonidae; <i>Atrichopogon</i>				1						
Chironomidae	3	55	4	60	4	169	59	2	32	
Dixidae; <i>Dixa</i>			1							
Empididae; <i>Chelifera</i>	1					2				
<i>Clinocera</i>	2	2	2						1	
<i>Hemerodromia</i>	1	1		2	3	1	1			
Simuliidae; <i>Prosimulium</i>	1	1				2				
<i>Simulium</i>	1	4	1		23	5		17	4	
Tipulidae; <i>Antocha</i>	12	10				8	1	2		
<i>Hexatoma</i>			2							
<i>Tipula</i>			1			1				
MEGALOPTERA (hellgrammites, dobson flies)										
Corydalidae; <i>Corydalus</i>								1		
<i>Nigronia</i>		5								
ODONATA (dragon-, damselflies)										
Cordulegastridae, <i>Cordulegaster</i>			1		1					
Gomphidae; <i>Lanthus</i>									4	
<i>Stylogomphus</i>		1			1					

TAXA	STATION ¹									
	1BR	2UNT	3UNT	4UNT	5FC	6UNT	7UNT	8FC	1KC ²	1RR ³
COLEOPTERA (aquatic beetles)										
Dytiscidae				2						
Elmidae; <i>Dubiraphia</i>		4		10	2					
<i>Optioservus</i>	3	16			6	4	24	8	4	
<i>Oulimnius</i>	1		4		1					
<i>Promoresia</i>								1		
<i>Stenelmis</i>	1	19		3	3	18	96	20	2	
Psephenidae; <i>Psephenus</i>	1	2			2	6	13	3	8	
LEPIDOPTERA										
Pyralidae; <i>Petrophila</i>					1					
Non-Insect Taxa										
OLIGOCHETA		2		2	2	2				
GASTROPODA										
Physidae				8						
Planorbidae				27						
Sphaeriidae				42						
AMPHIPODA										
Talitridae; <i>Hyalella</i>				1						
DECOPODA										
Cambaridae									1	
ISOPODA										
Asellidae; <i>Caecidotea</i>				34						
<i>Lirceus</i>							2			
OSTROCODA				2						
Number of taxa in total sample	29	24	27	16	28	22	10	23	21	

¹ Refer to Figure 1 for station location

² Kettle Creek, Clinton County, April 30, 2004

³ Rock Run, Chester County, April 29, 2004

**TABLE 5
FISHES
FRENCH CREEK
CHESTER COUNTY
USGS NAWQA
JULY 20, 1999**

SPECIES NAME	STATION ¹
	NAWQA
Satinfin shiner, <i>Cyprinella analostana</i>	14
Cutlips minnow, <i>Exoglossum maxillingua</i>	171
Common shiner, <i>Luxilus cornutus</i>	28
Spottail shiner, <i>Notropis hudsonius</i>	17
Swallowtail shiner, <i>N. procne</i>	1
Blacknose dace, <i>Rhinichthys atratulus</i>	54
Longnose dace, <i>R. cataractae</i>	46
Fallfish, <i>Semotilus corporalis</i>	119
White sucker, <i>Catostomus commersoni</i>	140
Yellow bullhead, <i>Ameiurus natalis</i>	1
Margined madtom, <i>Noturus insignis</i>	28
American eel, <i>Anguilla rostrata</i>	4
Rock bass, <i>Ambloplites rupestris</i>	85
Redbreast sunfish, <i>Lepomis auritus</i>	3
Green sunfish, <i>Lepomis cyanellus</i>	16
Pumpkinseed, <i>L. gibbosus</i>	1
Largemouth bass, <i>Micropterus dolomieu</i>	86
Tessellated darter, <i>Etheostoma olmstedi</i>	44
Shield darter, <i>Percina peltata</i>	33
TOTAL INDIVIDUALS	891
TOTAL TAXA	19

¹Refer to Figure 1 for station location

**TABLE 6
RBP METRIC COMPARISON
FRENCH CREEK AND BEAVER RUN
CHESTER COUNTY
APRIL 27, 2004**

METRIC	STATION									
	1BR	2UNT	3UNT	4UNT	5FC	6UNT	7UNT	8FC	1KC ¹	1RR ²
1. TAXA RICHNESS	29	24	27	16	28	22	10	23	21	28
Cand/Ref (%)	103.57	82.76	96.43	57.14	133.33	78.57	35.71	109.52		
Biol. Cond. Score	8	8	8	0	8	7	0	8	8	8
2. MOD. EPT INDEX	14	7	15	3	13	8	0	12	10	17
Cand/Ref (%)	82.35	50.0	88.24	17.65	130.0	47.06	0	120.0		
Biol. Cond. Score	8	1	8	0	8	0	0	8	8	8
3. MOD. HBI	2.1	4.99	2.47	6.25	2.81	5.48	5.16	2.7	2.87	1.64
Cand-Ref	0.46	2.89	0.83	4.61	-0.06	3.84	3.52	-0.17		
Biol. Cond. Score	8	0	6	0	8	0	0	8	8	8
4. % DOMINANT TAXA	59.3	27.5	21.5	28.6	22.8	70.4	47.3	26.2	23.8	56.2
Cand-Ref	3.1	-31.8	-34.7	-27.6	-1	14.2	-8.9	2.4		
Biol. Cond. Score	8	8	8	8	8	5	8	8	8	8
5. % MOD. MAYFLIES	67.9	1	35.4	0.95	55.3	2.08	0	53.4	59.5	73.1
Cand-Ref	5.2	72.1	37.7	72.15	4.2	71.02	73.1	6.1		
Biol. Cond. Score	8	0	0	0	8	0	0	8	8	8
TOTAL BIOLOGICAL CONDITION SCORE	40	17	30	8	40	12	8	40	40	40
% COMPARABILITY TO REFERENCE	100.0	42.5	75.0	20.0	100.0	30.0	20.0	100.0		

¹ Kettle Creek, Clinton County, April 30, 2004

² Rock Run, Chester County, April 29, 2004