

**INDIAN SPRING RUN  
CHESTER AND LANCASTER COUNTIES**

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

**SEGMENT BASIN**

**DRAINAGE LIST: 0**

**STREAM CODE: 07538**

**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**

**APRIL 2004**

## **GENERAL WATERSHED DESCRIPTION**

Indian Spring Run flows through Chester and Lancaster Counties and is a tributary to Pequea Creek in the Susquehanna River watershed (Figure 1). This basin covers an area of 11.6 square miles and contains 11.1 stream miles. It is located in West Caln, Sadsbury and West Sadsbury Townships, Chester County and Salisbury Township, Lancaster County. The Indian Spring Run basin currently has the protected water use designation of Cold Water Fishes (CWF). As a result of a request from staff in the Department's Southeast Regional Office, this basin was evaluated for redesignation as Exceptional Value Waters (EV). This report is based on a field survey conducted in February of 2001.

Land use in this basin changes dramatically from upstream to downstream. Above the SR 10 Bridge the basin is mostly forested with some low-density residential areas along the roads. Below the bridge, the land use shifts to intensive agriculture with a mixture of cropland and pasture.

## **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 collected at 4 stations in the Indian Spring Run basin during the February 2001 survey (Tables 1 & 2). These samples 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. A permit was issued to Earth Rite Inc. for an on-lot septic system in the basin of Unnamed Tributary 07539.

### **Aquatic Biota:**

Habitat assessments and biological samplings were conducted at 4 locations during the February 2001 survey. The physical habitat assessments revealed that conditions at Station 1ISR and Reference Station R1 scored in the Optimal range for benthic macroinvertebrates and fish (Table 3). Stations 2ISR and 3UNT scored at the high end of the Suboptimal range while Station 4ISR was at the low end of this same range. Overall, habitat scores for the Indian Spring Run stations, ranged from 146 to 201. The lower scoring parameters were primarily represented by poor riparian vegetation and disruptive bank pressure, especially at Station 4ISR, which is located in the intensive agricultural land use portion of the basin.

Benthic macroinvertebrate samples were collected at 4 stations (Table 4) using the Department's antidegradation protocol (adapted from the EPA's 1989 Rapid Bioassessment Protocols manual). Taxonomic diversity was good at the three upper stations with a mean of 36.3 total taxa per station. Individuals from several genera that are sensitive to water quality degradation were

common at these stations (e.g. *Epeorus*, *Paracapnia*, and *Neophylax*). At Station 4ISR there were only 25 total taxa and individuals from sensitive taxa were rare.

The Pennsylvania Fish and Boat Commission (PFBC) conducted a survey of Indian Spring Run's fish community in April 1995 (Table 5). They found a healthy native brook trout population at the two upper stations on Indian Spring Run (1ISR and 2ISR) and the station on UNT 07540 (3UNT). These trout populations are significant for a stream in Chester County, which has very few streams with naturally reproducing wild trout. The PFBC speculated that if sampling had occurred in the late summer or fall, a Class B brook trout population would most likely have been present in UNT 07540. In addition to brook trout, other cold-water species such as black-nose dace and creek chubs were also common at these stations. No trout were collected at Station 4ISR.

### **BIOLOGICAL USE QUALIFICATIONS**

The biological use qualifying criteria applied to Indian Spring Run 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 subsample was randomly selected from the total samples and enumerated (Table 6). Selected benthic macroinvertebrate community metrics were generated from these subsamples. Candidate station metrics were compared to those of a reference station on Rock Run (Table 7). Rock Run (01591) was used as the reference stream because it has a protected use designation of EV, is a tributary to French Creek (01548) located in Chester County, and has a comparable drainage area to Indian Spring Run. 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, Stations 1ISR and 2ISR had a biological condition score 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)). Also Station 3UNT had a biological condition score between 83 and 92% of the reference station score, which qualifies for a High Quality (HQ) designation. The remaining station (4ISR) had a score less than 83% of the reference station score, which does not meet the threshold required for designation as HQ waters (§93.4b(a)(2)(i)(A)).

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

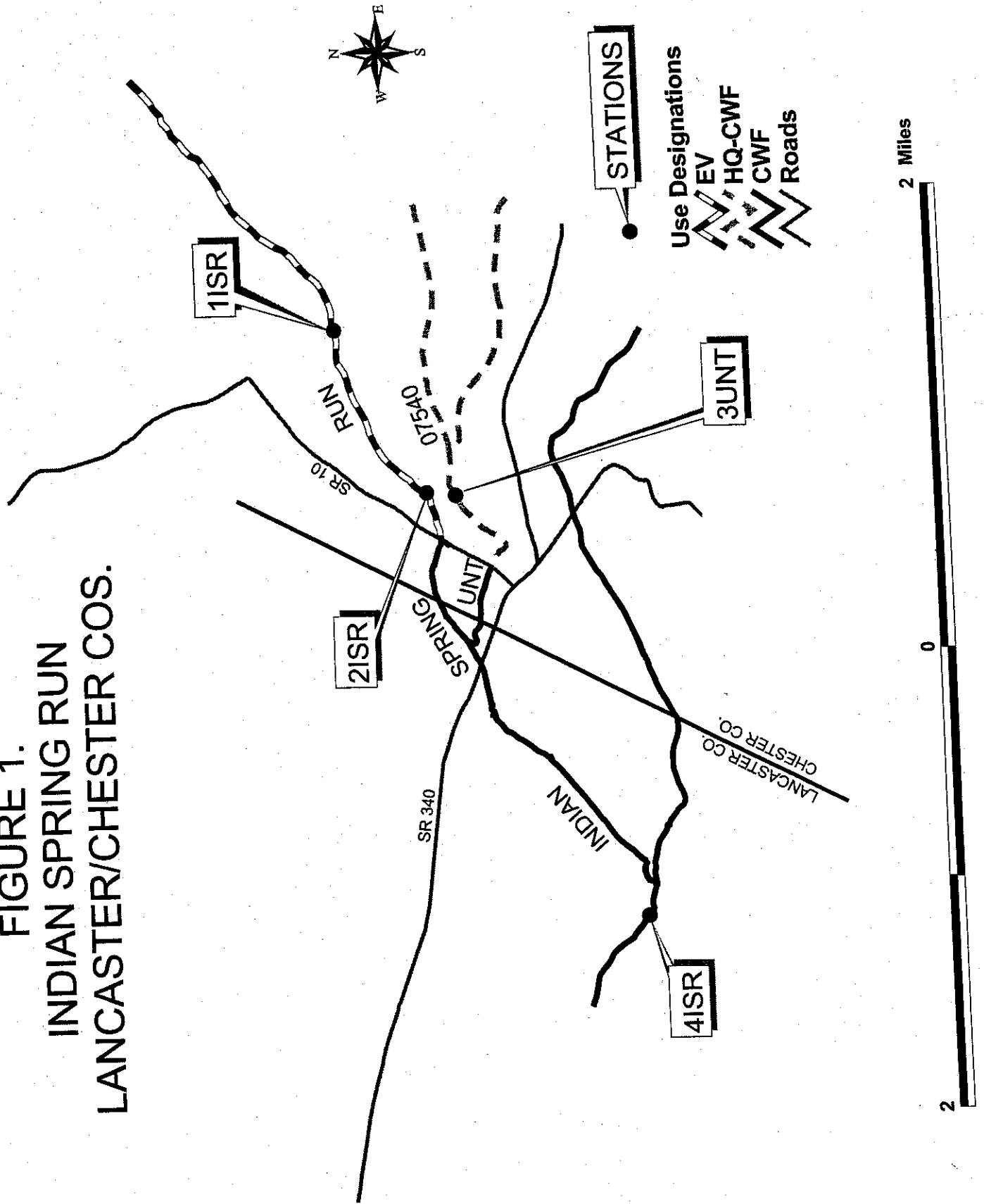
The Department provided public notice of this redesignation evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on April 14, 2001 (31 Pa.B 2074). A similar notice was also published in the Ephrata Review on March

28, 2001. In addition, West Caln and Salisbury Townships along with the Chester and Lancaster County Planning Commissions, were all notified of the evaluation in a letter dated March 21, 2001. No data on water chemistry, instream habitat, or the aquatic community were received in response to these notifications.

### **RECOMMENDATIONS**

Based on applicable regulatory criteria, the Department recommends that the use designation of the Indian Spring Run basin from the source to the SR 10 Bridge be changed from CWF to EV based on biological condition scores greater than 92% of the reference station score and UNT 07540 basin from the source to the SR 10 Bridge be changed from CWF to HQ-CWF based on a biological condition score between 83-92% of the reference station score. The Indian Spring Run basin and the basin of UNT 07540 downstream of the SR 10 Bridge should retain its current CWF use designation. These EV and HQ-CWF recommendations affect 4.9 stream miles.

FIGURE 1.  
INDIAN SPRING RUN  
LANCASTER/CHESTER COS.



**TABLE 7**  
**RBP METRIC COMPARISON**  
**INDIAN SPRING RUN, CHESTER COUNTY**  
**FEBRUARY 8, 2001**

METRIC	STATIONS				
	1ISR	2ISR	3UNT	4ISR	R1
1. TAXA RICHNESS	24	28	21	10	24
Cand/Ref (%)	100	117	88	42	
Biol. Cond. Score	8	8	8	0	8
2. MOD. EPT INDEX	12	14	10	0	14
Cand/Ref (%)	86	100	71	0	
Biol. Cond. Score	8	8	5	0	8
3. MOD. HBI	3.02	3.01	3.52	5.59	2.72
Cand-Ref	0.30	0.29	0.80	2.87	
Biol. Cond. Score	8	8	6	0	8
4. % DOMINANT TAXA	17	17	19	35	34
Cand-Ref	-17	-17	-15	1	
Biol. Cond. Score	8	8	8	8	8
5. % MOD. MAYFLIES	13	14	4	0	16
Ref-Cand	3	2	12	16	
Biol. Cond. Score	8	8	7	6	8
TOTAL BIOLOGICAL CONDITION SCORE	40	40	34	14	40
% COMPARABILITY TO REFERENCE	100	100	85	35	

<sup>1</sup> - Stations 1ISR, 2ISR, 3UNT, and 4ISR compared to R1

**TABLE 1**  
**STATION LOCATIONS**  
**INDIAN SPRING RUN**  
**CHESTER AND LANCASTER COUNTIES**

<u>STATION</u>	<u>LOCATION</u>
1ISR	Indian Spring Run (07538); approximately 0.18 miles upstream from the upper T435 Bridge. West Caln Township, Chester County. Lat: 40 01 25 Long: 75 30 19 RM: 3.58
2ISR	Indian Spring Run; approximately 30 meters upstream of the lower T435 crossing. West Caln Township, Chester County. Lat: 40 01 03 Long: 75 29 04 RM: 2.72
3UNT	Unnamed Tributary to Indian Spring Run (07540); approximately 20 meters downstream of the T447 crossing. West Caln Township, Chester County. Lat: 40 00 15 Long: 75 29 34 RM: 0.81
4ISR	Indian Spring Run; approximately 20 meters downstream of the T903 Bridge. Salisbury Township, Lancaster County. Lat: 39 59 55 Long: 75 27 41 RM: 0.47
R1	Rock Run (01591); approximately 30 meters upstream of the crossing of old SR0023 South Coventry Township, Chester County. Lat: 40 10 27 Long: 75 41 47 RM: 0.24

**TABLE 2**  
**WATER CHEMISTRY<sup>1</sup>**  
**INDIAN SPRING RUN**  
**CHESTER AND LANCASTER COUNTIES**  
**FEBRUARY 8, 2001**

STATION	1ISR	2ISR	3UNT	4ISR
<b>Field Parameters</b>				
Temp (°C)	3.8	3.9	4.8	35
pH	6.5	6.7	7.1	7.5
Cond (µmhos)	68	126	126	189
Diss. O <sub>2</sub>	13.8	14.1	12.6	14.0
<b>Laboratory Parameters</b>				
pH	6.3	6.7	6.8	7.5
Alkalinity	7	11	19	40
Acidity	0	0	0	0
Hardness	18.3	37.3	37.5	66.5
T Diss. Sol.	2	62	< 2	86
Susp. Sol.	< 2	< 2	< 2	< 2
NH <sub>3</sub> -N	0.17	0.23	0.04	0.31
NO <sub>2</sub> -N	<.01	<.01	<.01	0.01
NO <sub>3</sub> -N	1.77	4.46	2.75	3.96
Total P	<0.01	<0.01	0.02	0.04
Ca	2.9	6.4	7.6	13.5
Mg	2.7	5.2	4.5	7.9
Cl	9	15	16	22
SO <sub>4</sub>	<20	<20	<20	<20
As*	< 4.0	< 4.0	< 4.0	< 4.0
As Diss	< 4.0	< 4.0	< 4.0	< 4.0
Cd*	< 0.2	< 0.2	< 0.2	< 0.2
Cd Diss	< 0.2	< 0.2	< 0.2	< 0.2
hex Cr*	<10	<10	<10	<10
Cr*	<50	<50	<50	<50
Cu*	< 4.0	< 4.0	< 4.0	< 4.0
Cu Diss	< 4.0	< 4.0	< 4.0	< 4.0
Fe*	74	112	138	288
Pb*	< 1.0	< 1.0	< 1.0	< 1.0
Pb Diss	< 1.0	< 1.0	< 1.0	< 1.0
Mn*	15	21	39	18
Ni*	< 4.0	< 4.0	< 4.0	< 4.0
Ni Diss	< 4.0	< 4.0	< 4.0	< 4.0
Zn*	< 5.0	< 5.0	< 5.0	< 5.0
Zn Diss	< 5.0	< 5.0	< 5.0	< 5.0
Al*	72	51	64	139
fecal coliforms	40	80	60	170

<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**  
**INDIAN SPRING RUN**  
**CHESTER AND LANCASTER COUNTIES**  
**FEBRUARY 8, 2001**

HABITAT PARAMETER	STATIONS <sup>1</sup>				
	1ISR	2ISR	3UNT	4ISR	R1
1. instream cover	16	17	14	10	17
2. epifaunal substrate	18	17	17	12	18
3. embeddedness	16	12	14	11	17
4. velocity/depth	14	14	17	16	16
5. channel alterations	18	16	16	17	17
6. sediment deposition	17	15	16	13	17
7. riffle frequency	17	16	15	12	18
8. channel flow status	18	18	17	18	19
9. bank condition	16	16	16	12	14
10. bank vegetation protection	17	16	17	13	15
11. grazing/disruptive pressures	18	15	13	8	16
12. riparian vegetation zone width	16	12	9	4	10
Total Score	201	184	181	146	194
Rating <sup>2</sup>	OPT	SUB	SUB	SUB	OPT

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

<sup>2</sup> OPT = Optimal; SUB = Suboptimal

**TABLE 4**  
**BENTHIC MACROINVERTEBRATE TAXA LIST**  
**INDIAN SPRING RUN, CHESTER COUNTY**  
**FEBRUARY 8, 2001**

TAXA	STATION				
	1ISR	2ISR	3UNT	4ISR	R1
<b>Ephemeroptera (mayflies)</b>					
Ameletidae; <i>Ameletus</i>					R
Baetidae; <i>Acentrella</i>					P
<i>Baetis</i>	A	P	A		
Ephemerellidae; <i>Ephemerella</i>	A	A	C		C
<i>Eurylophella</i>		P		R	R
Heptageniidae; <i>Epeorus</i>	A	C	R		C
<i>Stenacron</i>					P
<i>Stenonema</i>	A	P	P	P	A
Isonychiidae; <i>Isonychia</i>					P
Leptophlebiidae sp.		R			
<i>Paraleptophlebia</i>	C				P
<i>Habrophlebiodes</i>	A				
<b>Plecoptera (stoneflies)</b>					
Capniidae; <i>Allocapnia</i>			P	R	P
<i>Paracapnia</i>	VA	P			R
Chloroperlidae; <i>Sweltsa</i>			P		R
Leuctridae; <i>Leuctra</i>	C	P			
Nemouridae; <i>Prostoia</i>	P	VA	A	P	VA
Peltoperlidae; <i>Tallaperla</i>	A	P			R
Perlidae; <i>Acroneuria</i>		R			P
<i>Agneta</i>	C	A	A		
<i>Paragneta</i>					P
Perlodidae; <i>Diploperla</i>	R				
<i>Isoperla</i>	A	P			
Taeniopterygidae; <i>Taeniopteryx</i>				R	C
<i>Strophopteryx</i>	C	C	C		A
<b>Trichoptera (caddisflies)</b>					
Brachycentridae; <i>Micrasema</i>					R
Glossosomatidae; <i>Agapetus</i>	R	A			
<i>Glossosoma</i>					R
Hydropsychidae; <i>Cheumatopsyche</i>	P	A		A	A
<i>Diplectrona</i>	VA	C	P		A
<i>Hydropsyche</i>		A	C	VA	A
Hydroptilidae; <i>Palaeagapetus</i>	R				
Limnephilidae; <i>Goera</i>		R	R		
<i>Pycnopsyche</i>	P	P			
Odontoceridae; <i>Psilotreta</i>	P				
Philopotamidae; <i>Chimarra</i>					A
<i>Dolophilodes</i>	A	P	P		P
Polycentropodidae; <i>Polycentropus</i>	P		P		
Psychomiidae; <i>Psychomyia</i>					R
Rhyacophilidae; <i>Rhyacophila</i>	A	P	C		P
Uenoidae; <i>Neophylax</i>	C	C			P

TAXA	STATION				
	1ISR	2ISR	3UNT	4ISR	R1
<b>Diptera (true flies)</b>					
Empididae; <i>Hemerodromia</i>				R	
Simuliidae; <i>Prosimulium</i>	A	C	C		A
<i>Simulium</i>				VA	
Tabanidae; <i>Chrysops</i>		R			
<i>Tabanus</i>			R		
Tipulidae; <i>Antocha</i>	P	R	R	A	
<i>Dicranota</i>	A	C	P	R	R
<i>Hexatoma</i>	C	C	P		
<i>Limnophila</i>	P	R			
<i>Tipula</i>		C	P	R	P
Chironomidae	VA	A	A	VA	C
<b>Megaloptera (dobson-, fishflies)</b>					
Corydalidae; <i>Nigronia</i>	C	P			
Sialidae; <i>Sialis</i>	P	P	R		
<b>Odonata (dragon-, damselflies)</b>					
Gomphidae; <i>Lanthus</i>	C				P
<i>Ophiogomphus</i>					
<i>Stylogomphus</i>		R			P
<b>Coleoptera (aquatic beetles)</b>					
Dryopidae; <i>Helichus</i>	P	R			R
Elmidae; <i>Dubiraphia</i>				R	
<i>Optioservus</i>	C	A	A	C	P
<i>Oulimnius</i>	A	A	A	R	P
<i>Promoresia</i>	P	P			R
<i>Stenelmis</i>		P	P	A	P
Hydrophilidae			R		
Psephenidae; <i>Psephenus</i>		R		R	P
<i>Ectopria</i>	P				P
Ptilodactylidae; <i>Anchytarsus</i>	R		R		
<b>Non-Insect Taxa</b>					
Turbellaria (flat worms)					
<i>Dugesia</i>				P	
Oligochaeta				R	P
Hirundinea (leeches)				R	
Isopoda (aquatic sowbugs)					
Asellidae; <i>Caecidotea</i>				R	
Decapoda (crayfish)					
Cambaridae sp.	R	R			
<i>Orconectes</i>				R	
Gastropoda (univalves, snails)					
Ancylidae; <i>Ferrissia</i>				R	
Physidae				R	
Pelecypoda (bivalve clams)					
Sphaeriidae					P
Total Number of Taxa	40	41	28	25	43

**TABLE 5**  
**FISHES<sup>1</sup>**  
**INDIAN SPRING RUN**  
**CHESTER AND LANCASTER COUNTIES**

SPECIES NAME	STATION			
	1ISR	2ISR	3UNT	4ISR
Brook trout, <i>Salvelinus fontinalis</i>	P	P	P	
Blacknose dace, <i>Rhinichthys atratulus</i>	A	A	A	X
Longnose dace, <i>Rhinichthys cataractae</i>		R		X
Rosyside dace, <i>Clinostomus funduloides</i>		P		
Creek chub, <i>Semotilus atromaculatus</i>	C	C	C	X
White sucker, <i>Catostomus commersoni</i>	P	C	C	X
Redbreast sunfish, <i>Lepomis auritus</i>	P			
Pumpkinseed, <i>Lepomis gibbosus</i>	R			
Banded killifish, <i>Fundulus diaphanus</i>				X
Tessellated darter, <i>Etheostoma olmstedi</i>	R			X
Total Number of Species	7	6	4	6

1 - Data collected by the Pennsylvania Fish and Boat Commission (Apr 1995)

A = Abundant (>100); C = Common (26-100); P = Present (3-25); R = Rare (<3)

X = present but no relative abundance determined

**TABLE 6**  
**SEMI QUANTITATIVE BENTHIC MACROINVERTEBRATE DATA**  
**INDIAN SPRING RUN**  
**FEBRUARY 8, 2001**

TAXA	STATION				
	1ISR	2ISR	3UNT	4ISR	R1
<b>Ephemeroptera (mayflies)</b>					
Baetidae; <i>Acentrella</i>					1
<i>Baetis</i>	4	2	9		
Ephemerellidae; <i>Ephemerella</i>	5	12	3		4
<i>Eurylophella</i>		1			
Heptageniidae; <i>Epeorus</i>	4	2	1		2
<i>Stenonema</i>	3				10
Leptophlebiidae sp.		1			
<i>Habrophlebiodes</i>	12				
<i>Paraleptophlebia</i>	3				1
<b>Plecoptera (stoneflies)</b>					
Capniidae; <i>Allocapnia</i>			2		1
<i>Paracapnia</i>	8	1			
Chloroperlidae; <i>Sweltsa</i>			1		
Leuctridae; <i>Leuctra</i>	1	1			
Nemouridae; <i>Prostoia</i>		20	21		37
Peltoperlidae; <i>Tallaperla</i>	9	3			
Perlidae; <i>Acroneuria</i>					2
<i>Agnetina</i>		8	8		
Perlodidae; <i>Isoperla</i>	4	1			
Taeniopterygidae; <i>Taeniopteryx</i>					1
<i>Strophopteryx</i>			2		2
<b>Tricoptera (caddisflies)</b>					
Glossosomatidae; <i>Agapetus</i>		3			
Hydropsychidae; <i>Cheumatopsyche</i>		4		16	9
<i>Diplectrona</i>	8	2	2		7
<i>Hydropsyche</i>		9	4	34	3
Philopotamidae; <i>Chimarra</i>					3
<i>Dolophilodes</i>	1	1	2		1
Rhyacophilidae; <i>Rhyacophila</i>	5		4		2
Uenoidae; <i>Neophylax</i>	2	3			
<b>Diptera (true flies)</b>					
Empididae; <i>Hemerodromia</i>				1	
Simuliidae; <i>Prosimulium</i>	7	3	5		11
<i>Simulium</i>				20	
Tabanidae; <i>Tabanus</i>			1		
Tipulidae; <i>Antocha</i>			1	4	
<i>Dicranota</i>	3	1	2		
<i>Hexatoma</i>	1	1	2		
<i>Limnophila</i>	1				
<i>Tipula</i>		4	2		1
Chironomidae	20	9	21	49	5

TAXA	STATION				
	1ISR	2ISR	3UNT	4ISR	R1
<b>Megaloptera (dobson-, fishflies)</b>					
Corydalidae; <i>Nigronia</i>	2				
Sialidae; <i>Sialis</i>	1				
<b>Odonata (dragon-, damselflies)</b>					
Gomphidae; <i>Lanthus</i>					1
<i>Stylogomphus</i>		1			
<b>Coleoptera (aquatic beetles)</b>					
Dryopidae; <i>Helichus</i>					1
Elmidae; <i>Optioservus</i>	1	14	8	6	
<i>Oulimnius</i>	8	5	7		1
<i>Promoresia</i>	1	1			
<i>Stenelmis</i>		1		6	
Psephenidae; <i>Psephenus</i>		1			1
<b>Non-Insect Taxa</b>					
Turbellaria (flat-worms)					
<i>Dugesia</i>				1	
Oligochaeta					1
Lumbricidae				1	

**TABLE 7**  
**RBP METRIC COMPARISON**  
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Cand-Ref	-17	-17	-15	1	
Biol. Cond. Score	8	8	8	8	8
5. % MOD. MAYFLIES	13	14	4	0	16
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<sup>1</sup> - Stations 1ISR, 2ISR, 3UNT, and 4ISR compared to R1