

LOGAN SPRING RUN
HUNTINGDON AND BLAIR COUNTIES

WATER QUALITY STANDARDS REVIEW
STREAM EVALUATION REPORT

Segment: Basin
Stream Code: 15823
Drainage List: N

WATER QUALITY MONITORING SECTION
WATER QUALITY DIVISION
BUREAU OF CLEAN WATER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Logan Spring Run basin in response to a National Pollutant Discharge Elimination System (NPDES) permit renewal for the Narehood Quarry located at the confluence of Logan Spring Run and the Little Juniata River. The Logan Spring Run basin is currently designated Warm Water Fishes, Migratory Fishes (WWF, MF).

The stream redesignation process begins with an evaluation of the “existing uses” and the “designated uses” of a stream. “Existing uses” are water uses actually attained in the waterbody. Existing uses are protected through permit or approval actions taken by the DEP. “Designated uses” are water uses identified in regulations that protect a waterbody. Candidates for stream redesignation may be identified by the DEP based on routine waterbody investigations or based on requests initiated by other agencies or from the general public through a rulemaking petition to the Environmental Quality Board (EQB).

GENERAL WATERSHED DESCRIPTION

Logan Spring Run is a “true” limestone tributary to the Little Juniata River. The majority of the Logan Spring Run basin is located in Warriors Mark Township, Huntingdon County. A small portion of the basin, the farthest downstream reach, is located in Snyder Township, Blair County. The basin has a drainage area of approximately 7.7 square miles and consists of 13.5 stream miles. The surrounding area is fertile limestone valley surrounded by steep ridges characteristic of Central Pennsylvania’s Ridge and Valley Province. The current land cover within the basin consists of forested (57%), agricultural (37%), water/wetlands (4%), urban/developed areas (1%), and barren areas (1%) (Dewitz 2019). The Narehood Quarry has two NPDES permits, including an industrial stormwater discharge and an industrial mining discharge. These are the only NPDES permits in the basin.

WATER QUALITY

Physicochemical

Physicochemical data has been collected throughout the lower portion of the basin by the DEP’s Bureau of District Mining Operations staff for over two decades to characterize background instream conditions as part of the NPDES permit renewal process and for compliance monitoring for the Narehood Quarry. Additional physicochemical data has been collected by Bureau of Clean Water staff as part of routine Aquatic Life Use surveys and as part of the protected use evaluation. Physicochemical data collected 2014 through 2018, along with samples from 2005 and 2008 are included in this report.

Physicochemical data was collected from two locations on Logan Spring Run mainstem as well as from approximately six large alkaline limestone springs throughout the lower portion of the basin. Locations on Logan Spring Run are located upstream of the permitted quarry (2LSR) and just downstream of the quarry near the confluence with the Little Juniata River (9LSR) (Table 1, Figure 1). The six limestone spring locations are all located upstream of the quarry. Most of the physicochemical data includes a limited number of analytical tests (total alkalinity, total acidity, pH, specific conductance, total suspended solids, and total iron), but some also include additional tests for select metals and ions (Appendix A).

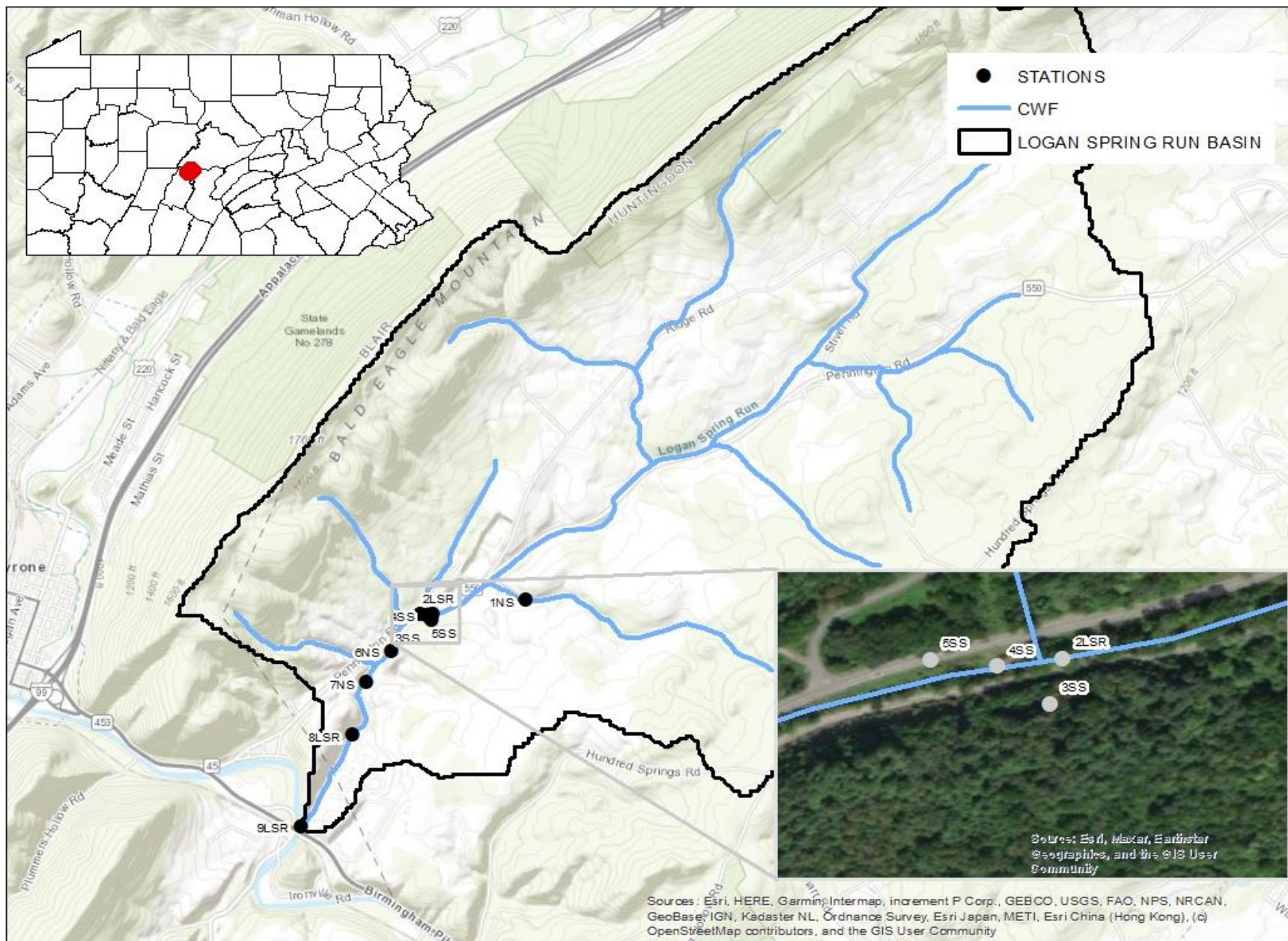


Figure 1. Logan Spring Run Basin Station Locations and Redesignation Recommendation.

Table 1. Station Locations – Logan Spring Run Basin.

STATION	DESCRIPTION
1NS	“North Spring” – Limestone Spring 1, right descending of unnamed tributary (UNT) 15827 and 350 meters upstream of the confluence with Logan Spring Run Water Chemistry August 2005 Lat: 40.676 Long: -78.199
2LSR	Logan Spring Run, 100 meters upstream of Stover Lane and Pennington Road intersection and 20 meters upstream of “Stover Springs” (4SS). DEP Survey February 2018 Water Chemistry February 2018 Lat: 40.675 Long: -78.207
3SS	“Stover Springs” – Limestone Spring 1, left descending of Logan Spring Run, in the vicinity of 2LSR. Water Chemistry August 2005 Lat: 40.674 Long: -78.206
4SS	“Stover Springs” – Limestone Spring A, right descending of Logan Spring Run and 20 meters downstream of 2LSR. Water Chemistry 2014 - 2017 Lat: 40.675 Long: -78.206
5SS	“Stover Springs” – Limestone Spring 3, right descending of Logan Spring Run, in the vicinity of 2LSR. Water Chemistry 2014 - 2017 Lat: 40.675 Long: -78.207
6NS	“North Spring” – Limestone Spring 3, left descending of Logan Spring Run, 350 meters upstream of 7NS and approx. 420 meters downstream of 2LSR and “Stover Springs”. Water Chemistry 2014 - 2015 Lat: 40.673 Long: -78.209
7NS	“North Spring” – Limestone Spring 2, left descending of Logan Spring Run, upstream of Narehood Quarry and 350 meters downstream of 6NS Water Chemistry June 2014 Lat: 40.671 Long: -78.211
8LSR	Logan Spring Run, upstream portion of the Narehood Quarry permit area. PFBC Fish Surveys August 1993, August 2004 and July 2016 Lat: 40.675 Long: -78.217
9LSR	Logan Spring Run, 40 meters upstream of the confluence with the Little Juniata River PFBC Fish Survey July 1993 SSWAP Survey May 2000 DEP Survey February 2018 Water Chemistry February 2018 Lat: 40.662 Long: -78.216

Samples collected on August 31, 2005 from upstream of the quarry operation (2LSR; Table A1) and on March 11, 2015 downstream of the quarry operation (9LSR; Table A7) were collected during elevated stream flow. Additional samples were collected on February 6, 2018 at base flow conditions from upstream and downstream of the quarry operation (2LSR and 9LSR; Table A7).

Physicochemical results from the Logan Spring Run basin are indicative of a “true” limestone stream. Alkalinity results range from 156.6 to 266 mg/L except for the sample collected (104 mg/L) during a high flow event on March 11, 2015. Instream nitrogen concentrations that range from 4.23 to 6.83 mg/L and the reduced alkalinity documented from the 2015 sample may indicate nonpoint source or other impacts. Total acidity results are all significantly less than zero and range from -301.4 to -135.2 mg/L. Results from samples collected on February 6, 2018 during base flow conditions indicate similar water quality conditions upstream and downstream of the quarry operation (Appendix A).

Biological

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. Pennsylvania Fish and Boat Commission (PFBC) staff collected fisheries data from two locations (8LSR and 9LSR) in 1993 and again at a single location (8LSR) in 2001 and 2016 (Figure 1, Table 1). Macroinvertebrate surveys were conducted at two locations on February 6, 2018.

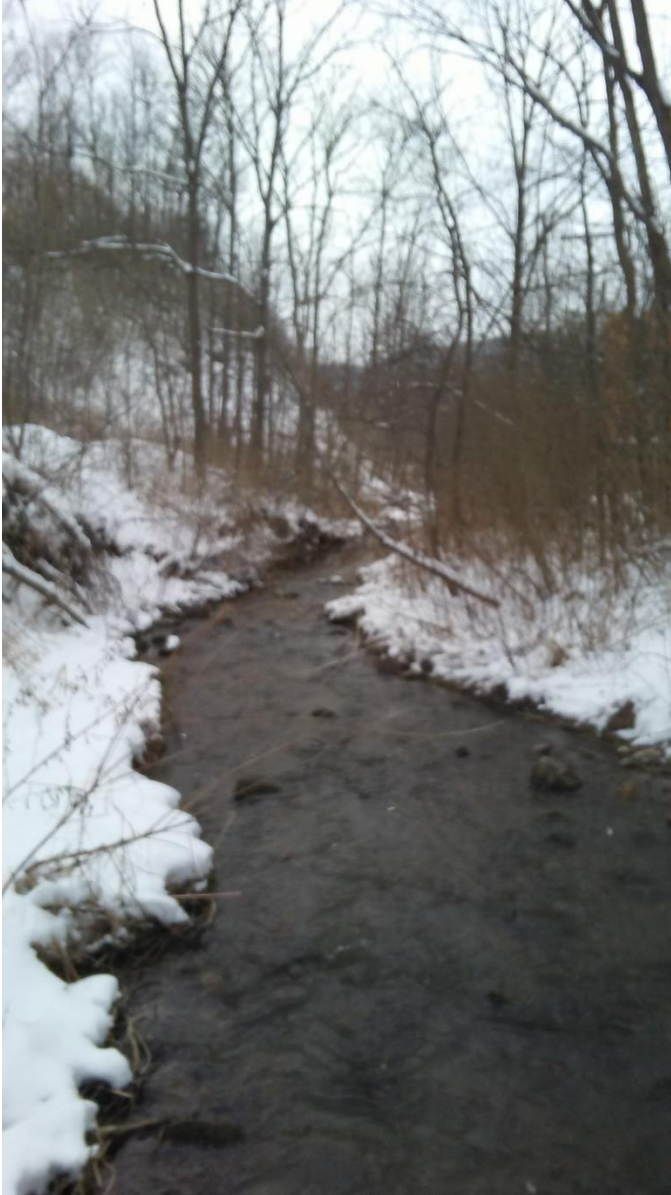


Figure 2. Logan Spring Run – Station 2LSR, Looking Downstream.



Figure 3. Logan Spring Run – Station 9LSR, Looking Downstream.

Benthos

A macroinvertebrate survey was completed on February 6, 2018 using DEP's *Wadeable Limestone Stream Macroinvertebrate Data Collection Protocol* (Williams 2017b). Samples were collected from upstream and downstream (2LSR and 9LSR) of the quarry operation. The macroinvertebrate community at both stations are indicative of a true limestone stream. The Index of Biotic Integrity (IBI)

assessment threshold for limestone streams is 60. IBI scores for the 2018 samples were 71.5 (2LSR) and 80.0 (9LSR) (Williams 2017a). Both samples are above the assessment threshold. Five macroinvertebrate taxa including, *Lirceus*, *Gammarus*, *Ephemerella*, *Optioservus*, and Chironomidae account for approximately 80% of the total organisms collected from DEP limestone method development samples (Botts 2009). Comparatively *Gammarus*, *Ephemerella*, and Chironomidae comprise 86% of the 2LSR sample and 79% of the 9LSR sample. *Gammarus* was the dominant taxon comprising over half of the subsample from each station. Taxa richness was higher at 9LSR (15) than at 2LSR (10), and diversity metrics were also higher at 9LSR (Tables 2 and 3).

Table 2. Benthic Macroinvertebrate Data.

TAXA	STATIONS ¹	
	2LSR	9LSR
Ephemeroptera		
Baetidae <i>Baetis</i>	2	14
Ephemerellidae <i>Ephemerella</i>	61	63
Leptophlebiidae <i>Paraleptophlebia</i>	2	-
Plecoptera		
Nemouridae <i>Amphinemura</i>	-	2
Trichoptera		
Uenoidae <i>Neophylax</i>	3	1
Diptera		
Chironomidae	-	27
Simuliidae <i>Prosimulium</i>	5	1
<i>Simulium</i>	5	5
Tipulidae <i>Antocha</i>	-	1
<i>Tipula</i>	-	1
Coleoptera		
Elmidae <i>Optioservus</i>	43	5
<i>Oulimnius</i>	1	-
Non-Insect Taxa		
Cambaridae <i>Cambarus</i>	-	1
Gammaridea <i>Gammarus</i>	172	181
Oligochaeta	1	5
Planariidae	-	5
Stygobromus	-	1
Taxa Richness	10	15

¹ Refer to Table 1 for station locations

"-" indicate taxa was not identified at a particular station

Table 3. Benthic Macroinvertebrate Metrics.

METRIC	STATIONS ¹	
	2LSR	9LSR
Total Richness	10	15
EPT Richness	4	4
Beck's Index (Version 4)	8	10
Hilsenhoff Biotic Index	3.39	3.85
% Tolerant Individuals (PTV 7-10)	0.3	3.2
Shannon Diversity	1.21	1.40
IBI for Limestone Streams	71.5	80.0

¹ Refer to Table 1 for station locations

Fishes

Fish were collected using backpack electrofishing gear and populations were estimated during 1993 PFBC surveys using a two-pass Zippin Removal Method. Approximately 75 meters were sampled on July 15, 1993 just downstream of the quarry (9LSR), and 248 meters were sampled on August 31, 1993 within the quarry permit area (8LSR). A total of 20 brown trout (*Salmo trutta*) and a single brook trout (*Salvelinus fontinalis*) ranging 50-350 mm, along with mottled sculpin (*Cottus bairdii*) and Eastern blacknose dace (*Rhinichthys atratulus*) were collected during the July 15th survey. A total of 108 brown trout ranging 75-474 mm, along with rainbow trout (*Oncorhynchus mykiss*), and mottled sculpin were collected during the August 31st survey. A biomass of 191.68 kg/ha of brown trout was calculated (Appendix B – *Aquatic Biological Investigation Logan Spring Run*; PFBC, 1993).

Additional PFBC surveys were completed using backpack electrofishing gear on August 10, 2004 and again on July 14, 2016 within the quarry permit area (8LSR). Blacknose dace, brook trout, brown trout, mottled sculpin and rainbow trout were collected in 2004 (PFBC 2004). Creek chub (*Semotilus atromaculatus*) and slimy sculpin (*Cottus cognatus*) were collected in 2016 but no trout were collected (PFBC 2016).

Physical

Instream habitat was assessed at each station where benthic macroinvertebrates were sampled during the 2018 survey (Table 4). The habitat evaluation consists of rating twelve parameters to derive a station habitat score. The total habitat scores were suboptimal (172) at 2LSR, upstream of the permitted quarry area and optimal (194) at 9LSR, downstream of the quarry. Suboptimal scores at 2LSR were influenced by low scores for instream cover, embeddedness, sediment deposition, and riparian zone width.

Table 4. Habitat Evaluation Data.

PARAMETER	STATIONS ¹	
	2LSR	9LSR
1. INSTREAM COVER	12	17
2. EPIFAUNAL SUBSTRATE	16	19
3. EMBEDDEDNESS	11	16
4. VELOCITY/DEPTH	16	16
5. CHANNEL ALTERATIONS	13	13
6. SEDIMENT DEPOSITION	9	14
7. RIFFLE FREQUENCY	16	19
8. CHANNEL FLOW STATUS	20	20
9. BANK CONDITION	15	16
10. BANK VEGPROTECTION	18	16
11. GRAZING/DISRUPT PRESS	19	20
12. RIPARIAN VEG. ZONE WIDTH	7	8
Total Score	172	194
Rating ²	SUB	OPT

¹ Refer to Table 1 for station locations

² OPT=Optimal (≥192); SUB=Suboptimal (132-191)

AQUATIC LIFE USE EVALUATION

The Aquatic Life Use of Logan Spring Run was evaluated according to definitions described at 25 Pa. Code § 93.3, Table 1 – *Protected Water Uses*. Table 1 defines the Cold Water Fishes (CWF) protected use as;

Maintenance or propagation, or both, of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat.

PFBC surveys conducted in 1993 and 2004 have documented the maintenance and propagation of Salmonidae and other fish species indigenous to cold water habitat. While the 2016 survey did not document Salmonidae, it did document sculpin (Cottidae), which are also indigenous to cold water habitat (Eaton & Scheller 1996, Lyons et al. 2009, Zorn et al. 2002). Regardless of the 2016 survey results, the 1993 and 2004 surveys have demonstrated an existing use of CWF. Subsequent evaluations do not supersede prior demonstrations of meeting the CWF Aquatic Life Use, and any additional biological measures of water quality would be used to measure changes in water quality from the benchmark biological characterization. The benchmark for water quality is that use attained in the waterbody on or after November 28, 1975, whether or not it is included in the water quality standards (25 Pa. Code § 93.1).

CLASS A WILD TROUT – HIGH QUALITY QUALIFICATION

The DEP is required by regulation, 25 Pa. Code § 93.4b(a)(2)(ii) to consider streams for High Quality Waters (HQ) designation when the PFBC provides information that indicates a stream is a Class A Wild Trout stream based on wild trout biomass and the PFBC, after public notice and comment, classifies the stream as a Class A Wild Trout Water. A PFBC survey conducted in 1993 (Appendix B) documented a biomass of brown trout (191.68 kg/ha) that exceeds the PFBC Class A Wild Trout Stream criteria listed in Table 5. The PFBC classification process includes a public notice, review of comments, and approval by their Commissioners. Logan Spring Run has not been officially classified as a Class A Wild

Trout Stream by PFBC, and therefore does not meet the qualifications listed in 25 Pa. Code § 93.4b(b)(a)(2)(ii).

Table 5. PFBC Trout Biomass Estimates Classes and Criteria.

CLASS	CRITERIA
A (Brook Trout)	a. Total wild brook trout biomass of at least 30 kg/ha (26.7 lbs./acre) b. Total biomass of wild brook trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre) c. Wild brook trout biomass must comprise at least 75% of the total wild trout biomass
A (Brown Trout)	a. Total wild brown trout biomass of at least 40 kg/ha (35.6 lbs. acre) b. Total biomass of wild brown trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre). c. Wild brown trout biomass must comprise at least 75% of the total wild trout biomass
A (Mixed Brown and Brook)	a. Combined wild brook and wild brown trout biomass of at least 40 kg/ha (35.6 lbs. acre) b. Total biomass of wild brook trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre). c. Total biomass of wild brown trout less than 15 centimeters (cm) or 5.9 inches in total length of at least 0.1 kg/ha (0.089 lbs./acre). d. Wild brook trout biomass comprises less than 75% of total trout biomass e. Wild brown trout biomass comprises less than 75% of total trout biomass
A (Rainbow Trout)	Total biomass of wild rainbow trout less than 15 cm (5.9 inches) in total length of at least 2.0 kg/ha (1.78 lbs./acre).

PUBLIC NOTICE AND REQUEST FOR TECHNICAL DATA

Evaluation Notice

The DEP provided public notice of this redesignation evaluation and requested any technical data from the general public on the DEP website and through publication in the *Pennsylvania Bulletin* on June 9, 2018 (48 Pa.B. 3491). Blair County Conservation District, Blair County Board of Commissioners, Huntingdon County Conservation District, Huntingdon County Board of Commissioners, Snyder Township, and Warriors Mark Township were notified of the redesignation evaluation in a letter dated June 12, 2018. No data on water chemistry, instream habitat, or the aquatic community were received in response to these notices.

Final Draft Notice, Comments and Response

Once the final draft report was completed it was made available to affected municipalities, County Planning Commissions, County Conservation Districts, the DCNR and the PFBC in a letter dated November 16, 2019 with a public comment period ending 30-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website and in the *Pennsylvania Bulletin* on November 16, 2019 (49 Pa.B. 6919). No comments were received in response to the draft report notification

RECOMMENDATION

Based on applicable regulatory definitions in 25 Pa. Code § 93.3, the DEP recommends that the Logan Spring Run basin be redesignated from Warm Water Fishes, Migratory Fishes (WWF, MF) to Cold Water Fishes, Migratory Fishes (CWF, MF) based on documented maintenance and propagation of Salmonidae and other fish species indigenous to cold water habitat.

This recommendation adds approximately 13.5 total stream miles of CWF waters to Chapter 93.

LITERATURE CITED

- Botts, W. F. 2009. Wadable limestone stream macroinvertebrate assessment method. Chapter 2, pages 225-35. *In* Shull, D. R., and M. Pulket. (editors). Assessment methodology for rivers and streams. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania.
- Dewitz, J., 2019, National Land Cover Database (NLCD) 2016 Products (ver. 2.0, July 2020): U.S. Geological Survey data release, <https://doi.org/10.5066/P96HHBIE>.
- Eaton, J. G. and Scheller, R. M. 1996. Effects of climate warming on fish thermal habitat in streams of the United States. *Limnology and Oceanography*, 41(5):.1109-1115.
- Lyons, J., Zorn, T., Stewart, J. Seelbach, P., Wehrly, K., Wang, L. 2009. Defining and characterizing coolwater streams and their fish assemblages in Michigan and Wisconsin, USA. *North American Journal of Fisheries Management* 29:1130-1151.
- Pennsylvania Fish and Boat Commission (PFBC). 2004. Logan Spring Run fisheries management data. Unpublished raw data. Pennsylvania Fish and Boat Commission. Bellefonte, Pennsylvania.
- PFBC. 2016. Logan Spring Run fisheries management data. Unpublished raw data. Pennsylvania Fish and Boat Commission. Bellefonte, Pennsylvania.
- Shull, D. R. and M. J. Lookenbill. 2018. Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection. Harrisburg, Pennsylvania.
- Williams, A. (editor). 2017a. Wadeable limestone stream macroinvertebrate assessment method. Chapter 2.2, pages 25–35 *in* D. R. Shull, and R. Whiteash (editors). Assessment methodology for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.
- Williams, A. (editor). 2017b. Wadeable limestone stream macroinvertebrate data collection protocol. Chapter 3.2, pages 9–13 *in* M. J. Lookenbill, and R. Whiteash (editors). Water quality monitoring protocols for streams and rivers. Pennsylvania Department of Environmental Protection, Harrisburg, Pennsylvania.
- Zorn, T., Seelbach, P., Whiley, M. 2002. Distributions of stream fishes and their relationship to stream size and hydrology in Michigan's Lower Peninsula. *Transactions of the American Fisheries Society* 131:70-82.

APPENDIX A – PHYSICOCHEMICAL DATA

Table A1. Logan Spring Run Basin Physicochemical Data – August 31, 2005

PARAMETER	UNITS	STATIONS ¹		
		1NS	2LSR	3SS
ALKALINITY T	mg/L	253	175.2	245.4
ACIDITY T	mg/L	-211.6	-143	-201.4
pH	SU	7.78	8	7.5
SPECIFIC COND	µS/CM ^C	537	398	531
TSS	mg/L	2	52	10
ALUMINUM T	µg/L	<200	854	<200
CALCIUM T	mg/L	63.8	52.6	62.7
IRON T	µg/L	<20	2000	<20
MAGNESIUM T	mg/L	32.9	19.8	29.4
MANGANESE T	µg/L	<10	48	<10
POTASSIUM T	mg/L	1.28	4.81	1.67
SODIUM T	mg/L	3.09	4.79	3.84
CHLORIDE T	mg/L	11.3	9	10.2
SULFATE T	mg/L	<20	23.2	27.5
ZINC T	µg/L	19	16	15
NITRATE NITROGEN T	mg/L	6.83	-	6.44
NITRATE T	mg/L	-	4.23	-

¹ Refer to Table 1 for station locations

" < " indicate concentrations below the reporting limit.

" - " indicate parameter was not tested

Table A2. Logan Spring Run Basin Physicochemical Data – June 18, 2014

PARAMETER	UNITS	STATIONS ¹					
		2LSR	4SS	5SS	6NS	7NS	9LSR
ALKALINITY	mg/L	165.2	220.8	150.8	214.6	266	169.6
ACIDITY T	mg/L	-159.2	-197.8	-135.2	-191.4	-243	-163.6
pH	SU	8.3	8	7.8	8	8	8.3
SPECIFIC COND	µS/CM ^C	409	548	418	486	592	528
TSS	mg/L	16	<5	<5	<5	10	8
IRON T	µg /L	303	43	77	<20	<45	174

¹ Refer to Table 1 for station locations

" < " indicate concentrations below the reporting limit.

Table A3. Logan Spring Run Basin Physicochemical Data – June 10, 2015

PARAMETER	UNITS	STATIONS ¹				
		2LSR	4SS	5SS	6NS	9LSR
ALKALINITY	mg/L	156.6	242.6	235.6	213.4	216.6
ACIDITY T	mg/L	-142.4	-209	-190.8	-184.2	-185.4
pH	SU	8.5	7.8	7.8	8	8.5
SPECIFIC COND	µS/CM ^C	366	574	555	491	517
TSS	mg/L	< 5	8	6	10	8
IRON T	µg /L	106	22	<20	<20	55

¹ Refer to Table 1 for station locations

“<” indicate concentrations below the reporting limit.

Table A4. Logan Spring Run Basin Physicochemical Data – October 27, 2015

PARAMETER	UNITS	STATIONS ¹			
		2LSR	4SS	5SS	9LSR
ALKALINITY	mg/L	244.6	245	245.4	246
ACIDITY T	mg/L	-209	-200.8	-200.6	-145.8
pH	SU	8.5	7.8	7.8	8.5
SPECIFIC COND	µS/CM ^C	566	586	585	568
TSS	mg/L	< 5	<5	<5	<5
IRON T	µg /L	<20	<20	<20	38

¹ Refer to Table 1 for station locations

“<” indicate concentrations below the reporting limit.

Table A5. Logan Spring Run Basin Physicochemical Data – May 19, 2016

PARAMETER	UNITS	STATIONS ¹			
		2LSR	4SS	5SS	9LSR
ALKALINITY	mg/L	156.6	243.2	137.8	170
ACIDITY T	mg/L	-142.4	-224.4	-136.4	-167.8
pH	SU	8.5	7.7	7.7	8.5
SPECIFIC COND	µS/CM ^C	366	554	368	414
TSS	mg/L	< 5	14	6	< 5
IRON T	µg /L	151	<20	31	83

¹ Refer to Table 1 for station locations

“<” indicate concentrations below the reporting limit.

Table A6. Logan Spring Run Basin Physicochemical Data – May 17, 2017

PARAMETER	UNITS	STATIONS ¹			
		2LSR	4SS	5SS	9LSR
ALKALINITY	mg/L	193.4	241.6	169.8	194
ACIDITY T	mg/L	-181.4	-235.4	-159.4	-178.2
pH	SU	8.4	7.7	7.6	8.4
SPECIFIC COND	µS/CM ^C	440	555	426	480
TSS	mg/L	8	14	12	6
IRON T	µg /L	187	309	176	378

¹ Refer to Table 1 for station locations

“<” indicate concentrations below the reporting limit.

Table A7. Logan Spring Run Basin Physicochemical Data – February 6, 2018 and March 11, 2015

PARAMETER		UNITS	STATIONS ¹		
			2LSR ²	9LSR ³	9LSR ²
METALS AND IONS	ALUMINUM D	µg/L	<10	-	<10
	ALUMINUM T	µg/L	49	5557	36
	BARIUM T	µg/L	52	96	44
	BORON T	µg/L	<200	<19.105	<200
	BROMIDE	µg/L	<25	<8.041	<25
	CADMIUM D	µg/L	<0.2	-	<0.2
	CALCIUM T	mg/L	56.011	75.46	59.022
	CHLORIDE T	mg/L	10.69	16.141	11.16
	COPPER D	µg/L	<4	-	<4
	COPPER T	µg/L	<4	17.9	<4
	IRON D	µg/L	<20	-	<20
	IRON T	µg/L	98	8713	59
	LEAD D	µg/L	<1	-	<1
	LEAD T	µg/L	<1	15.2	<1
	LITHIUM D	µg/L	<25	-	<25
	LITHIUM T	µg/L	<25	-	<25
	MAGNESIUM T	mg/L	21.022	29.43	22.594
	MANGANESE D	µg/L	<10	-	<10
	MANGANESE T	µg/L	<10	363	<10
	NICKEL D	µg/L	<50	-	<50
	NICKEL T	µg/L	<50	14	<50
	POTASSIUM T	mg/L	1.895	-	1.984
	SELENIUM T	µg/L	<7	0.77	<7
	SODIUM T	mg/L	5.68	7.548	5.546
	STRONTIUM T	µg/L	291	187	237
	SULFATE T	mg/L	18.18	21.621	22.54
	ZINC D	µg/L	14	-	12
	ZINC T	µg/L	12	82	13
NUTRIENTS	AMMONIA D	mg/L	<0.02	0.183	<0.02
	AMMONIA T	mg/L	<0.02	0.177	<0.02
	NITRATE & NITRITE D	mg/L	5.8	2.948	5.3
	NITRATE & NITRITE T	mg/L	5.79	2.913	5.54
	NITROGEN T	mg/L	5.77	4.662	5.4
	ORTHO PHOS D	mg/L	0.019	0.105	0.016
	ORTHO PHOS T	mg/L	0.018	0.1	0.017
	PHOSPHORUS D	mg/L	0.015	0.117	0.016
	PHOSPHORUS T	mg/L	0.021	0.471	0.016

Table A7 (cont.). Logan Spring Run Basin Physicochemical Data – February 6, 2018 and March 11, 2015

	PARAMETER	UNITS	STATIONS ¹		
			2LSR ²	9LSR ³	9LSR ²
PHYSICAL/OTHER	ALKALINITY T	mg/L	199	104	199.4
	HARDNESS T	mg/L	227	310	241
	OSMOTIC PRESSURE	mOsm	-	150	-
	pH	SU	8.3	7.76	8.2
	SPECIFIC COND	µs/cm ^c	455	306	464
	SSC COURSE FRACTION	PPM	-	160.8	-
	SSC FINE FRACTION	PPM	-	319.2	-
	SSC T	PPM	-	480	-
	TDS	mg/L	300	220	296
	TOC	mg/L	0.62	8.296	0.67
	TSS	mg/L	<5	420	<5

¹ Refer to Table 1 for station locations

² February 6, 2018

³ March 11, 2015

"<" indicate concentrations below the reporting limit.

"-" indicate parameter was not tested

APPENDIX B – PFBC AQUATIC BIOLOGICAL INVESTIGATION LOGAN SPRING RUN

**AQUATIC BIOLOGICAL INVESTIGATION
LOGAN SPRING RUN
HUNTINGDON AND BLAIR COUNTIES**

OCTOBER 12, 1993

PREPARED BY:

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AQUATIC BIOLOGICAL INVESTIGATION LOGAN SPRING RUN, HUNTINGDON AND BLAIR COUNTIES

Introduction

Logan Spring Run was surveyed on 15 July and 31 August 1993 in response to proposed and permitted encroachments at the New Enterprise Stone and Lime Company Mine Site, Permit Number 4275SM14. The purpose of the study was to collect baseline data on Logan Spring Run to determine the stream's biological sensitivity. Two stations were sampled on Logan Spring Run for this study. The initial sampling (15 July 1993) was conducted to determine if wild trout were present downstream of the active quarry, while the 31 August 1993 survey was conducted within the active quarry permit area to estimate populations of wild trout.

Description of Study Area

Logan Spring Run has a total length of approximately 7.3 km and confluences with the Little Juniata River near the town of Tyrone. The primary drainage area can be seen on the 7.5 minute USGS Tyrone Quadrangle (Figure 1).

Methods

The benthic macroinvertebrate community for the two sampling dates was characterized by one qualitative sample (kick-net), with this sampling being conducted in as many different stream habitats as possible. The samples were preserved in alcohol and transported to the laboratory where the invertebrates were sorted from debris and identified to the genus level of taxonomic classification, where possible.

Fish populations were sampled using a Coffelt BP-1C electrofisher. Approximately 75 meters were electrofished downstream of the permit area (Station 01A) during the 15 July 1993 survey for the purpose of evaluating the stream for wild trout populations. A 248 meter stream section was electrofished at Station 01 (Figure 1) on 31 August 1993 with this station being located within the permit boundary. The fish populations were estimated using a two-pass Zippin Removal Method for wild brown trout while all other species were noted.

Results and Discussion

The qualitative benthic macroinvertebrate sampling for both survey dates collected 15 taxa at Station 01A and 14 taxa at Station 01 (Table 1). The communities were dominated by Gammaridae and Hydropsychidae which reflects the limestone stream system sampled.

The initial 15 July 1993 qualitative sampling at Station 01A for fish species revealed a naturally reproducing population of brown trout and brook trout. Approximately 75 meters were electrofished with 20 brown trout and one brook trout being captured with these ranging from 50-350 mm (2-14 inches). In addition mottled sculpins and blacknose dace were identified. Table 2 contains the results of electrofishing at Station 01. A two-pass Zippin Population

Table 1. Results of qualitative benthic macroinvertebrate sampling on Logan Spring Run, Blair County, 15 July* and 31 August 1993**.

Taxa	Station 01A*	Station 01**
DIPTERA		
CHIRONOMIDAE	X	X
SIMULIIDAE		
PROSIMULIUM		X
SIMULIUM	X	X
TIPULIDAE		
ANTOCHA	X	X
MUSCIDAE	X	
TRICHOPTERA		
HYDROPSYCHIDAE		
HYDROPSYCHE	X	X
GLOSSOSOMATIDAE		
GLOSSOSOMA	X	
PLECOPTERA		
NEMOURIDAE		
AMPHINEMURA	X	
EPHEMEROPTERA		
BAETIDAE		
BAETIS	X	X
EPHEMERELLIDAE		
EPHEMERELLA	X	
COLEOPTERA		
ELMIDAE		
PROMORESIA		X
OPTIOSERVUS	X	X
STENELMIS		X
OTHER		
GAMMARIDAE	X	X
HIRUDINEA	X	X
GASTROPODA		X
BIVALVIA		X
PLANARIA		X
PLANORBIDAE	X	
AMPHIPODA	X	
LUMBRICINA	X	
TOTAL TAXA	15	14

Table 2. Results of electrofishing one station on Logan Spring Run,
Blair County, 31 August 1993, using a 2-Pass Zippin Removal
population estimate.

Species	Size Class (mm)	Total fish Pass 1-2	Population Estimate	
			Fish Per Hectare	Kg Per Hectare
Brown Trout (<i>Salmo trutta</i>)	0-49	—	—	—
	50-74	—	—	—
	75-99	10	100	1.00
	100-124	25	273	3.82
	125-149	3	30	0.68
	150-174	—	—	—
	175-199	9	90	8.54
	200-224	13	159	20.87
	225-249	14	139	21.88
	250-274	10	177	37.71
	275-299	10	120	32.89
	300-324	3	30	11.62
	325-349	6	59	23.66
	350-374	2	20	9.34
	375-399	1	10	4.43
	400-449	1	10	6.88
	450-474	1	10	8.36
Totals		108	1227	191.68

Station Length: 248 meters

Station Width: 4.1 meters

Other Species Collected

Rainbow Trout

Palomino Trout

Mottled Sculpin

Blacknose Dace

Estimate was calculated for this 248 meter stream section with an estimate of 1227 trout per hectare and a biomass of 191.68 kilograms per hectare (Kg/ha). The presence of sub-legal trout along with fish scale samples indicate natural reproduction. In addition to the wild brown trout captured, four other fish species were collected which include mottled sculpins, blacknose dace, and palomino and rainbow trout (both fish species of hatchery origin).

Summary

The Pennsylvania Fish and Boat Commission's (PFBC) criteria for Class A Brown Trout Waters is a brown trout biomass of 40 Kilograms per Hectare and the presence of natural reproduction. Logan Spring Run contains a brown trout population with a biomass estimate of 192 Kg/ha and the presence of natural reproduction which meets the criteria for a Class A water. This significant brown trout fishery illustrates the biological sensitivity of the watershed and requires the full protection available through existing law and regulation. Furthermore, since it is now documented that this Little Juniata tributary maintains excellent water quality sufficient to support a Class A wild trout fishery, it is recommended that Logan Spring Run be upgraded from its present 25 PA Code Chapter 93 designation of a Warm Water Fishery (WWF) to a High-Quality Coldwater Fishery (HQ-CWF). The information contained within this report shows the need to immediately protect the aquatic uses of the Logan Spring Run to the standards provided by the HQ-CWF regulatory designation. To do less could compromise the future integrity of this outstanding local/regional resource.

