

CLYDE RUN
ELK COUNTY

WATER QUALITY STANDARDS REVIEW
STREAM REDESIGNATION EVALUATION REPORT

Segment: Basin
Stream Code: 50034
Drainage List: R

WATER QUALITY MONITORING SECTION (MJL)
WATER QUALITY DIVISION
BUREAU OF CLEAN WATER
DEPARTMENT OF ENVIRONMENTAL PROTECTION

2021

INTRODUCTION

The Department of Environmental Protection (DEP) conducted an evaluation of the Clyde Run basin as part of ongoing statewide monitoring efforts. Clyde Run is currently designated Cold Water Fishes (CWF). Components of this evaluation include a benthic macroinvertebrate survey conducted in April 2007 and water chemistry collected in August 2018.

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. When existing uses are determined, the stream is protected for those uses 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 state Environmental Quality Board.

GENERAL WATERSHED DESCRIPTION

Clyde Run is a freestone tributary to the Clarion River located in Millstone Township, Elk County. It has a drainage area of 0.48 square miles and consists of 1.1 stream miles. The surrounding area is relatively mountainous with moderate relief. The current land use consists of forested land (83%), agriculture/open area (15%), and urban/developed (2%). The basin is within Allegheny National Forest and approximately half the basin is in Federal ownership.

WATER QUALITY AND USES

Surface Water

Habitat and biological data were collected to evaluate water quality conditions in the Clyde Run basin since the indigenous aquatic community is a better indicator of long-term water quality conditions. Water chemistry data were collected subsequent to the draft report becoming available for public comment in August 2018. There are no National Pollutant Discharge Elimination Systems (NPDES) permits or surface water intakes but there are two active conventional gas wells within the basin.

Aquatic Biota

DEP staff collected habitat and benthic macroinvertebrate data at one station on Clyde Run and one on the Exceptional Value (EV) reference station, Korb Run (Figure 1, Table 1).

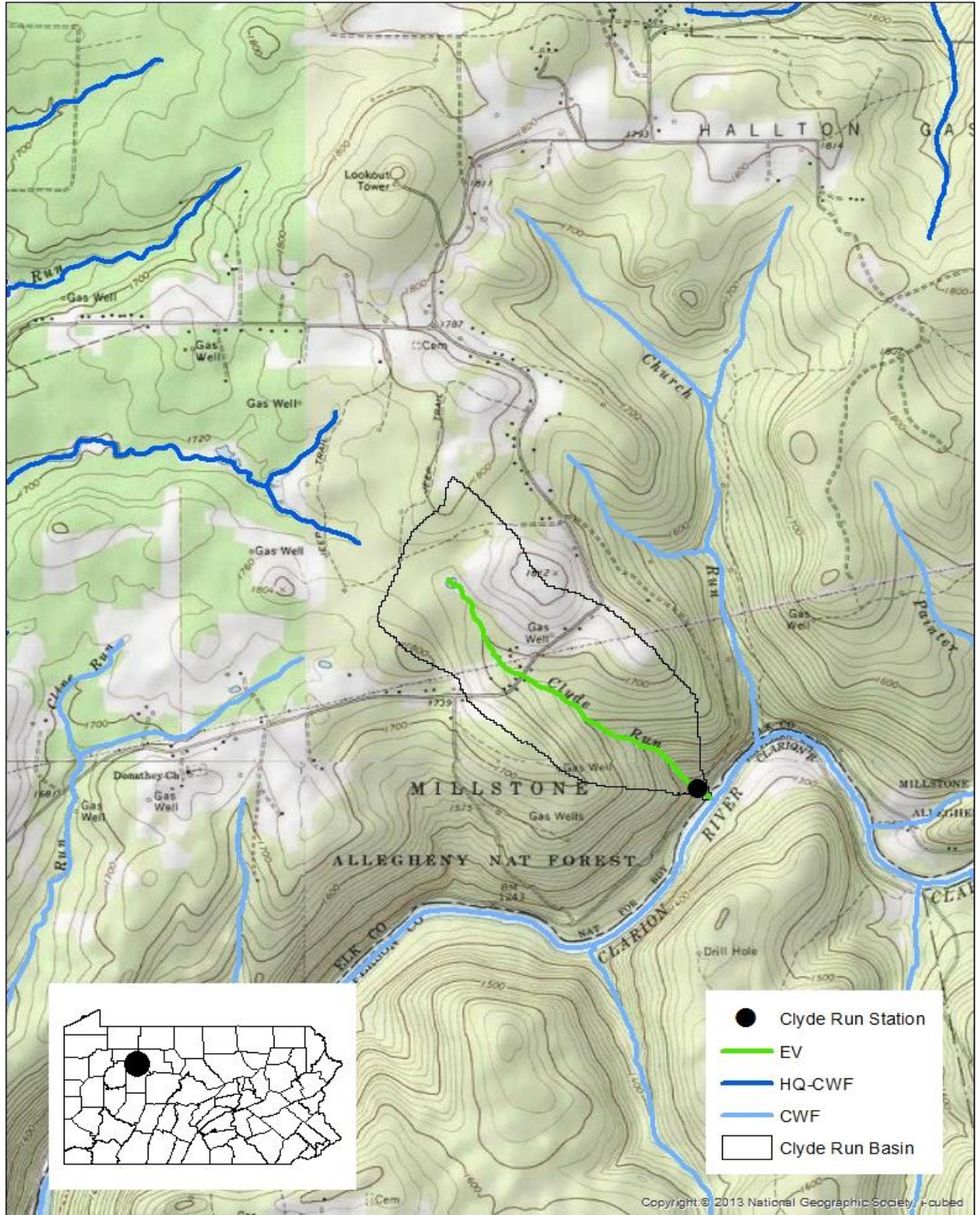


Figure 1. Clyde Run station location – Elk County

Table 1. Clyde Run and Korb Run station locations

STATION	LOCATION
CR	Clyde Run (50034) just upstream of confluence with Clarion River. Millstone Township, Elk County Lat: 41.3737 Long: -78.9770
KR	Korb Run (54831) just upstream of confluence with Hemlock Creek. President Township, Venango County Lat: 41.4271 Long: -79.4976

Habitat. Instream habitat conditions were evaluated at both the candidate station and the reference station. Total habitat scores were well within the optimal scoring range (192-240) at both stations. Clyde Run had a total score of 199 and the Korb Run reference station scored 207 (Table 2).

Table 2. Habitat assessment results

PARAMETER	STATION	REF
	CR ¹	KR ²
1. instream cover	16	17
2. epifaunal substrate	13	18
3. embeddedness	17	11
4. velocity/depth	15	19
5. channel alterations	20	20
6. sediment deposition	19	11
7. riffle frequency	11	19
8. channel flow status	11	17
9. bank condition	20	15
10. bank vegetative protection	18	20
11. grazing/disruptive pressures	19	20
12. riparian vegetation zone width	20	20
Total Score	199	207
Rating³	OPT	OPT

¹ Refer to Figure 1 and Table 1 for station location

² Reference Station – Refer to Table 1 for location

³ OPT=Optimal (≥192); SUB=Suboptimal (132-191)

Benthos. Benthic macroinvertebrate samples were collected from Clyde Run on April 25, 2007 and from Korb Run on April 30, 2007 using the DEP’s Rapid Bioassessment Protocols (RBP) benthic macroinvertebrate sampling technique, which is a modification of the US Environmental Protection Agency’s (EPA) RBPs (Plafkin et al. 1989, Barbour et al. 1999). Taxonomic diversity was similar at the candidate and the reference station. Both stations were dominated by intolerant individuals, with nearly half of the individuals from the Plecoptera (stonefly) family. Taxa richness at both stations was 27 (Table 3).

Table 3. Semi-quantitative benthic macroinvertebrate data

TAXA		STATION	REF
		CR ¹	KR ²
MAYFLIES			
Ameletidae	<i>Ameletus</i>	7	
Baetidae	<i>Baetis</i>		3
Heptageniidae	<i>Epeorus</i>	5	22
	<i>Heptagenia</i>	1	
	<i>Maccaffertium</i>		1
	<i>Cinygmula</i>	1	
	<i>Drunella</i>		4
Ephemereidae	<i>Ephemerella</i>		18
Leptophlebiidae	<i>Habrophlebiodes</i>	2	
	<i>Paraleptophlebia</i>	39	
STONFLIES			
Peltoperlidae	<i>Peltoperla</i>		5
	<i>Tallaperla</i>	4	
Nemouridae	<i>Amphinemura</i>	49	74
Leuctridae	<i>Leuctra</i>	49	17
Perlodidae	<i>Malirekus</i>	1	
	<i>Yugus</i>	3	
	<i>Isoperla</i>	3	1
	<i>Alloperla</i>		4
	<i>Haploperla</i>	1	2
	<i>Sweltsa</i>	2	
CADDISFLIES			
Philopotamidae	<i>Dolophilodes</i>		4
	<i>Wormaldia</i>	8	
Psychomyiidae	<i>Lype</i>	1	
Polycentropidae	<i>Polycentropus</i>	1	2
Limnephilidae	<i>Diplectrona</i>	4	4
Hydropsychidae	<i>Hydropsyche</i>		1
Rhyacophilidae	<i>Rhyacophila</i>	2	8
Lepidostomatidae	<i>Lepidostoma</i>	1	
Uenoidae	<i>Neophylax</i>		2
TRUE FLIES			
Ceratopogonidae	<i>Probezzia</i>	1	4
Empididae	<i>Chelifera</i>		3
Tipulidae	<i>Antocha</i>		1
	<i>Dicranota</i>	1	3
	<i>Hexatoma</i>	1	
	<i>Molophilus</i>	1	
	Simuliidae	<i>Prosimulium</i>	1
Chironomidae		36	11
MISC. INSECT TAXA			
Psephenidae	<i>Ectopria</i>	1	1
Elmidae	<i>Dubiraphia</i>		2
	<i>Oulimnius</i>		36
Gomphidae	<i>Lanthus</i>		1
	<i>Richness</i>	27	27
	<i>Total</i>	226	240

Table 4. Water chemistry data

PARAMETER	UNITS	STATION	REF
		CR ¹	KR ²
ALUMINUM D	µg/L	13.3	20.8
ALUMINUM T	µg/L	78.6	51.8
BARIUM T	µg/L	68	25
BORON T	µg/L	<200	<200
BROMIDE T	µg/L	<25	<25
CADMIUM D	µg/L	<0.2	<0.2
CALCIUM T	mg/L	6.44	2.97
CHLORIDE T	mg/L	3.24	1.35
COPPER D	µg/L	<4	<4
COPPER, T	µg/L	<4	<4
IRON D	µg/L	60	31
IRON T	µg/L	207	104
LEAD D	µg/L	<1	<1
LEAD T	µg/L	<1	<1
LITHIUM D	µg/L	<25	<25
LITHIUM T	µg/L	<25	<25
MAGNESIUM T	mg/L	1.79	1.74
MANGANESE D	µg/L	<10	16
MANGANESE T	µg/L	38	19
NICKEL D	µg/L	<50	<50
NICKEL T	µg/L	<50	<50
POTASSIUM T	mg/L	1.09	1.17
SELENIUM T	µg/L	<7	<7
SODIUM T	mg/L	4.64	2.48
STRONTIUM T	µg/L	52	17
SULFATE T	mg/L	5.77	8.66
ZINC D	µg/L	<10	<10
ZINC T	µg/L	<10	<10
AMMONIA D	mg/L	<0.02	<0.02
AMMONIA T	mg/L	<0.02	<0.02
NITRATE & NITRITE D	mg/L	0.23	0.46
NITRATE & NITRITE T	mg/L	0.25	0.44
NITROGEN T	mg/L	0.25	0.43
ORTHO PHOS D	mg/L	<0.01	<0.01
ORTHO PHOS T	mg/L	<0.01	<0.01
PHOSPHORUS D	mg/L	<0.01	<0.01
PHOSPHORUS T	mg/L	<0.01	<0.01
ALKALINITY T	mg/L	25	7.4
DO	mg/L	9.53	9.22
HARDNESS T	mg/L	23	15
pH	SU	7.22	6.26
SP COND	µS/cm ^C	72.7	44.6
TDS	mg/L	58	40
TEMPERATURE	°C	15.9	16
TOC	mg/L	0.87	0.97
TSS	mg/L	<5	136

¹ Refer to Figure 1 and Table 1 for station location

² Reference Station – Refer to Table 1 for location

Table 5. RBP metric comparison

METRIC	STATION	REF
	CR ¹	KR ²
1. TAXA RICHNESS	27	27
Cand/Ref (%)	100	-
Biol. Cond. Score	8	8
2. MOD. EPT INDEX	18	14
Cand/Ref (%)	129	-
Biol. Cond. Score	8	8
3. MOD. HBI	2.06	2.67
Cand-Ref	-0.61	-
Biol. Cond. Score	8	8
4. % DOMINANT TAXA	21.7	30.8
Cand-Ref	-9.1	-
Biol. Cond. Score	8	8
5. % MOD. MAYFLIES	23.5	18.8
Ref-Cand	-4.7	-
Biol. Cond. Score	8	8
TOTAL BIOLOGICAL CONDITION SCORE	40	40
% COMPARABILITY TO REFERENCE	100	

¹ Refer to Figure 1 and Table 1 for station location

² Reference Station – Refer to Table 1 for location

Water Chemistry

DEP staff collected water chemistry data at one station on Clyde Run and one on the EV reference station, Korb Run on August 2, 2018. Metal and ion concentrations at both stations were low with Korb Run results slightly lower across parameters with the exception of dissolved aluminum, dissolved manganese and total sulfate. Nutrient concentrations were also low. Many of the parameters were below reporting limits. The Clyde Run sample also had slightly higher alkalinity, pH, and specific conductance (Table 4).

BIOLOGICAL USE QUALIFICATIONS

The qualifying criteria applied to Clyde Run were the DEP’s 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 Clyde Run station were compared to the Korb Run reference station. Korb Run was used as a reference because it has demonstrated an existing use of exceptional value based on biological measures and the macroinvertebrate community has demonstrated best attainable biological communities by scoring well above the top 25th percentile of Pennsylvania EV reference streams. In addition, it is a freestone stream with similar drainage area to Clyde Run. Sampling of candidate and reference stations was conducted within a temporally narrow window to minimize seasonal variation. The comparisons were done using the following metrics that were selected as being indicative of community health: taxa richness, modified Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) (EPT) index, modified Hilsenhoff Biotic Index (HBI), percent dominant taxon, and percent modified mayflies (Table 5).

Based on these five metrics, station CR had Biological Condition Scores (BCS) that was 100% of the Korb Run reference station, which exceeds the 92% EV qualifying criterion (§ 93.4b(b)(1)(v)) (Table 5).

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

The DEP provided public notice of this redesignation evaluation and requested technical data from the general public through publication in the Pennsylvania Bulletin on October 2, 2010 (40 Pa.B 5643). A similar notice was also published in The Daily Press newspaper (St. Marys, PA) on January 5, 2011. In addition, Millstone Township was notified of the redesignation evaluation in a letter dated November 5, 2010.

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, and the Allegheny National Forest in a letter dated July 14, 2018 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 July 14, 2018 (48 Pa.B 4174). One comment was received in support of the recommendation. All comments and data received throughout the public participation opportunities were considered in the evaluation and recommendations.

RECOMMENDATIONS

Based on applicable regulatory definitions and requirements of § 93.4b, the DEP recommends that Clyde Run basin from source to mouth be designated EV based on § 93.4b(b)(1)(v).

This recommendation adds approximately **1.1** stream miles of EV waters to Chapter 93.

REFERENCES

- Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid bioassessment protocols for use in streams and wadeable rivers: periphyton, benthic macroinvertebrates and fish, second edition. EPA 841-B-99-002. United States Environmental Protection Agency; Office of Water. Washington, D.C.
- Plafkin, J.L., Barbour, M.T., Porter, K.D, Gross, S.K., Hughes, R.M. 1989. Rapid Bioassessment Protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. United States Environmental Protection Agency. EPA/444/4-89-001.