pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Northcentral Regional Office
CLEAN WATER PROGRAM

Application Type	**Renewal**	Application No.	**PA0115231**
Facility Type	**Municipal**	APS ID	**1074116**
Major / Minor	**Minor**	Authorization ID	**1414890**

NPDES PERMIT FACT SHEET
INDIVIDUAL SEWAGE

Applicant and Facility Information

Applicant Name	**Woodland Bigler Area Authority**	Facility Name	**Woodland Bigler Area Authority Wastewater Treatment Facility**
Applicant Address	PO Box 27	Facility Address	2912 Hogback Hill
	Woodland, PA 16881-0027		Mineral Springs, PA 16878
Applicant Contact	Samuel Lansberry	Facility Contact	Dave Stodart
Applicant Phone	(814) 857-2966	Facility Phone	(814) 577-5603
Client ID	77876	Site ID	245832
Ch 94 Load Status	Not Overloaded	Municipality	Bradford Township
Connection Status	No Limitations	County	Clearfield
Date Application Received	October 19, 2022	EPA Waived?	Yes
Date Application Accepted	November 1, 2022	If No, Reason	
Purpose of Application	Renewal of an existing NPDES permit for the discharge of treated sewage.		

Public Participation

DEP will publish notice of the receipt of the NPDES permit application and a tentative decision to issue the individual NPDES permit in the *Pennsylvania Bulletin* in accordance with 25 Pa. Code § 92a.82. Upon publication in the *Pennsylvania Bulletin*, DEP will accept written comments from interested persons for a 30-day period (which may be extended for one additional 15-day period at DEP's discretion), which will be considered in making a final decision on the application. Any person may request or petition for a public hearing with respect to the application. A public hearing may be held if DEP determines that there is significant public interest in holding a hearing. If a hearing is held, notice of the hearing will be published in the *Pennsylvania Bulletin* at least 30 days prior to the hearing and in at least one newspaper of general circulation within the geographical area of the discharge.

Approve	Deny	Signatures	Date
X		Derek S. Garner / Project Manager	December 21, 2023
X		Nicholas W. Hartranft, P.E. / Environmental Engineer Manager	December 26, 2023

Discharge, Receiving Waters and Water Supply Information

Outfall No.	001	Design Flow (MGD)	0.225
Latitude	40º 59' 47.67"	Longitude	-78º 21' 43.59"
Quad Name	Wallaceton	Quad Code	1119
Wastewater Description:	Sewage Effluent		

Receiving Waters	Roaring Run	Stream Code	26108
NHD Com ID	61830631	RMI	3.19
Drainage Area	8.85	Yield (cfs/mi^2)	0.114
Q_{7-10} Flow (cfs)	1.02	Q_{7-10} Basis	Streamgage No. 01541500
Elevation (ft)	1371	Slope (ft/ft)	n/a
Watershed No.	8-C	Chapter 93 Class.	CWF, MF
Existing Use	n/a	Existing Use Qualifier	n/a
Exceptions to Use	n/a	Exceptions to Criteria	n/a
Assessment Status	Impaired		
Cause(s) of Impairment	Metals, pH		
Source(s) of Impairment	Acid Mine Drainage		
TMDL Status	Final	Name	Clearfield Creek Watershed TMDL

Nearest Downstream Public Water Supply Intake	Shawville Power LLC		
PWS Waters	West Branch Susquehanna River	Flow at Intake (cfs)	117
PWS RMI	125.82	Distance from Outfall (mi)	49.48

Treatment Facility Summary

The Woodland Bigler Area Authority ("WBAA") Wastewater Treatment Facility ("WWTF") consists of three lagoons. Lagoons 1 and 2 are operated in parallel and subdivided into Units 1A/1B and 2A/2B. After passing through 1B and 2B the wastewater is conveyed to Lagoon 3. After Lagoon 3 the wastewater enters the facility's chlorine contact tank where disinfection is provided by gas chlorine. Effluent is dechlorinated using sodium sulfite prior to discharge. The treated wastewater is discharged via Outfall 001 to Roaring Run.

The operation of the WBAA WWTF is covered under WQM Permit Nos. 1792402 and 1708401

WQM No. 1792042 – This permit was issued January 12, 1993 and authorized the construction and operation of the original lagoon system with a design flow of 0.225 MGD and design loading of 452 lbs. BOD/day.

WQM No. 1708401 – This permit was issued April 1, 2008 and approves the installation and operation of 5 LG Sound "LG Sonic XXL" sonic wave transducers located in the treatment lagoons to limit algal growth. The application cited a smaller design loading than original permit (above) of 376 lbs. BOD/day. The permit was amended on March 30, 2009 to approve the installation and operation of a solar powered lagoon circulator in lagoons 1A and 2A to further reduce algal growth. The permit was amended again on May 20, 2020 to approve use of a tablet erosion dechlorinator.

Compliance History

The facility was most recently inspected by DEP on February 2, 2022. The inspection report indicates all necessary treatment units were online and no impact was noted at Outfall 001.

The following violations have occurred during the existing permit's term:

Noncompliance Date	Parameter	Sample Value	Violation Condition	Permit Value	Units	SBC
6/21/2019	Total Suspended Solids	72	>	65	mg/L	Weekly Average
6/22/2020	Total Suspended Solids	51	>	45	mg/L	Average Monthly
6/22/2020	Total Suspended Solids	75	>	65	mg/L	Weekly Average
6/22/2021	Fecal Coliform	1986.3	>	1000	No./100 ml	IMAX
6/22/2021	Total Suspended Solids	54	>	45	mg/L	Average Monthly
6/22/2021	Total Suspended Solids	71	>	65	mg/L	Weekly Average
9/23/2021	Fecal Coliform	1732.9	>	1000	No./100 ml	IMAX
1/20/2022	Fecal Coliform	> 2419.6	>	10000	No./100 ml	IMAX
1/20/2022	Fecal Coliform	> 5	>	2000	No./100 ml	Geometric Mean
3/24/2022	Fecal Coliform	> 2419.6	>	10000	No./100 ml	IMAX
3/24/2022	Fecal Coliform	> 9	>	2000	No./100 ml	Geometric Mean
7/24/2022	Fecal Coliform	> 2419.6	>	1000	No./100 ml	IMAX
7/24/2022	Fecal Coliform	> 7	>	200	No./100 ml	Geometric Mean
8/20/2023	Fecal Coliform	2419.6	>	1000	No./100 ml	IMAX

* Total Suspended Solids ("TSS") violations are generally attributed to algae blooms in the lagoons.
* Fecal coliform violations are generally attributed to heavy rainfalls and/or snow melt causing the chlorine dose to become inefficient. The July 2022 exceedances are attributed to a sample error.

The Operations Section is aware of the chronic exceedances identified above and has been in contact with the permittee.

There are no open violations associated with the permittee.

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** 0.225
Latitude 40º 59' 51.00" **Longitude** -78º 21' 44.60"
Wastewater Description: Sewage Effluent

Technology-Based Limitations ("TBELs")

The following technology-based limitations apply, subject to water quality analysis and best professional judgment ("BPJ") where applicable:

Pollutant	Limit (mg/l)	SBC	Federal Regulation	State Regulation
$CBOD_5$	25	Average Monthly	133.102(a)(4)(i)	92a.47(a)(1)
	40	Average Weekly	133.102(a)(4)(ii)	92a.47(a)(2)
Total Suspended Solids	45	Average Monthly	133.105(b)(1)	-
	65	Average Weekly	133.105(b)(2)	-
pH	6.0 – 9.0 S.U.	Min – Max	133.102(c)	95.2(1)
Fecal Coliform (5/1 – 9/30)	200 / 100 ml	Geo Mean	-	92a.47(a)(4)
Fecal Coliform (5/1 – 9/30)	1,000 / 100 ml	IMAX	-	92a.47(a)(4)
Fecal Coliform (10/1 – 4/30)	2,000 / 100 ml	Geo Mean	-	92a.47(a)(5)
Fecal Coliform (10/1 – 4/30)	10,000 / 100 ml	IMAX	-	92a.47(a)(5)
Total Residual Chlorine	0.5	Average Monthly	-	92a.48(b)(2)

Generally, secondary treatment standards for TSS of 30 mg/l average monthly and 45 mg/l average weekly are applied to POTWs (§§ 133.102(b)(1) and (2), 92a.47(a)(1) and (2)). However, § 133.105 establishes treatment equivalent to secondary treatment for waste stabilization ponds, such as the WBAA WWTF. These equivalent standards have been applied to the permit dating back to 2002. eDMR data indicates that the facility still has trouble maintaining 100% compliance with these relaxed TSS limits. Accordingly, DEP recommends that the existing equivalent secondary treatment standards for TSS remain in the permit.

Water Quality-Based Limitations ("WQBELs")

Roaring Run is significantly impaired for pH and metals resulting from abandoned mine drainage ("AMD") caused by historic mining operations throughout the Clearfield Creek Watershed. 25 PA § 95.5(a)(1) states that only secondary treatment standards need applied when the impairment is so significant that the applicable water quality criterion is not being met and the designated water use is not being achieved to the extent that aquatic communities are essentially excluded. Consequently, WQBELs have never been applied to this permit.

To confirm that this exclusion is still applicable, DEP conducted a stream assessment at the site of Outfall 001 on November 20, 2023. The assessment (attached) concludes that:

"…the presence of long-lived taxa in adequate numbers indicate that suitable in-situ conditions are maintained sufficiently throughout the year for an aquatic community. Additionally, although still indicative of impacts from legacy AMD, water quality is improving."

Based on the conclusion that Roaring Run can support an aquatic community at the site of Outfall 001 and that water quality is improving, DEP believes that § 95.5(a)(1) is no longer applicable and that an analysis of water-quality based limitations is warranted for the WBAA WWTF.

WQM 7.0 v1.1

The water quality model WQM 7.0 v1.1 is used to determine the WQBELs for $CBOD_5$, ammonia-N, and dissolved oxygen based on a multiple-discharge analysis, if applicable. The model assumes complete and instantaneous mixing with the

receiving surface water. The reach chosen to model the in-stream characteristics is appropriate as a recovery in dissolved oxygen levels is demonstrated. The modeling output is as follows:

Parameter	Discharge Conc. (mg/L)	Effluent Limitations		
		30 Day Average (mg/L)	Maximum (mg/L)	Minimum (mg/L)
$CBOD_5$	25	25	--	--
NH3-N	27.78	9.83	19.66	--
Dissolved Oxygen	3.4	--	--	3.4

The discharge concentration for CBOD5 is the existing technology-based concentration limitation. The discharge concentrations for ammonia-n and dissolved oxygen are the maximum and minimum concentrations, respectively, taken from the effluent testing submitted with the application. Based on the model output, WQBELs are recommended for ammonia-n. WQM 7.0 v1.1 input/output data is attached.

Toxics Management Spreadsheet ("TMS")

Unlike WQM 7.0 v1.1, TMS is a single discharge model that does not assume instantaneous mixing with the receiving surface water upon discharge, but instead, assigns a partial mixing factor based upon surface water and discharge characteristics.

Maximum concentrations taken from the effluent testing submitted with the application were entered into TMS to determine if the pollutant requires reporting or effluent limits. Based on the available data, the following requirements are proposed:

Pollutants	Mass Limits		Concentration Limits				Governing WQBEL	WQBEL Basis
	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units		
Total Copper (1)	Report	Report	Report	Report	Report	mg/l	0.074	CFC
Free Zinc (1)	Report	Report	Report	Report	Report	mg/l	0.47	AFC

(1) Discharge concentration > 10% WQBEL (no RP)

TMS input/output data is attached.

Total Residual Chlorine ("TRC") Calculation Spreadsheet

Existing TRC technology-based effluent limitations were evaluated in the TRC_CALC spreadsheet. The spreadsheet recommends WQBELs of 0.43 mg/l average monthly and an instantaneous maximum of 1.43 mg/l.

The TRC_CALC spreadsheet is attached.

TMDL Considerations

Roaring Run is part of the Clearfield Creek Watershed which has an EPA-approved TMDL; Clearfield Creek Watershed TMDL, January 19, 2007. The TMDL was developed to address pollution from abandoned mine drainage causing high metals (Al, Fe, Mn) and low pH. As part of the renewal application, WBBA provided one grab sample each of Al, Fe, and Mn. Historic sample results indicate the metals are present in the effluent well below Chapter 93 criteria. Since the discharge is not contributing to the impairment of the Clearfield Creek Watershed it does not require limits or monitoring requirements for the AMD-related metals. pH is controlled through treatment standards at 25 PA § 95.2(1) and 40 CFR § 133.102(c) (identified in TBEL section above).

Best Professional Judgment ("BPJ") Limitations

DEP recommends that existing influent monitoring for BOD and TSS remains in the permit to continue to characterize the wastewater.

DEP recommends daily dissolved oxygen reporting requirements should be included in the permit now that § 95.5 is no longer applicable. Daily dissolved oxygen monitoring will help to further characterize the effluent.

Quarterly E. Coli reporting requirements have been proposed per the 2017 Triennial Review of Water Quality Standards, published in the PA Bulletin on July 11, 2020.

Chesapeake Bay

The WWBA WWTF is identified as a Phase 4 facility (average annual design flow ≥ 0.2 MGD and < 0.4 MGD) in Phase 3 of Pennsylvania's Watershed Implementation Plan ("WIP"). The WIP states that renewed permits for Phase 4 facilities that do not increase design flow will contain monitoring and reporting for total nitrogen ("TN") and total phosphorus ("TP") throughout the permit term at a frequency no less than monthly. Accordingly, DEP recommends that the existing monthly sampling requirements for TN and TP remain in the permit.

Anti-Backsliding

No limits were relaxed because of this review. Anti-backsliding regulations are not applicable.

Existing Effluent Limitations and Monitoring Requirements

The existing effluent limitations and monitoring requirements are as follows:

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	46	75	XXX	25.0	40.0	50	1/week	8-Hr Composite
BOD5 Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Total Suspended Solids	80	120	XXX	45.0	65.0	90	1/week	8-Hr Composite
TSS Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
Total Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite
Total Phosphorus	Report	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite

Compliance Sampling Location: Outfall 001

Proposed Effluent Limitations and Monitoring Requirements

The limitations and monitoring requirements specified below are proposed for the draft permit, and reflect the most stringent limitations amongst technology, water quality and BPJ. Instantaneous Maximum (IMAX) limits are determined using multipliers of 2 (conventional pollutants) or 2.5 (toxic pollutants). Sample frequencies and types are derived from the "NPDES Permit Writer's Manual" (386-0400-001), SOPs and/or BPJ.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day)		Concentrations (mg/L)				Minimum Measurement Frequency	Required Sample Type
	Average Monthly	Weekly Average	Minimum	Average Monthly	Weekly Average	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	Continuous	Metered
pH (S.U.)	XXX	XXX	6.0 Inst Min	XXX	XXX	9.0	1/day	Grab
Dissolved Oxygen	XXX	XXX	Report Inst Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.43	XXX	1.43	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	46	75	XXX	25.0	40.0	50	1/week	8-Hr Comp.
Biochemical Oxygen Demand (BOD5) Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Total Suspended Solids Raw Sewage Influent	Report	XXX	XXX	Report	XXX	XXX	1/week	8-Hr Composite
Total Suspended Solids	80	120	XXX	45.0	65.0	90	1/week	8-Hr Composite
Fecal Coliform (No./100 ml) Oct 1 - Apr 30	XXX	XXX	XXX	2000 Geo Mean	XXX	10000	2/month	Grab
Fecal Coliform (No./100 ml) May 1 - Sep 30	XXX	XXX	XXX	200 Geo Mean	XXX	1000	2/month	Grab
E. Coli (No./100 ml)	XXX	XXX	XXX	XXX	XXX	Report	1/quarter	Grab
Total Nitrogen	Report	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite
Ammonia-Nitrogen	18.44	27.66	XXX	9.83	14.74	19.66	1/week	8-Hr Composite
Total Phosphorus	Report	XXX	XXX	Report	XXX	XXX	1/month	8-Hr Composite
Copper, Total	XXX	Report Daily Max	XXX	XXX	Report Daily Max	XXX	1/month	8-Hr Composite
Zinc, Total	XXX	Report Daily Max	XXX	XXX	Report Daily Max	XXX	1/month	8-Hr Composite

Compliance Sampling Location: Outfall 001

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

MEMO

TO: Derek Garner
Project Manager
Bureau of Clean Water / Northcentral Region

Through: Anne Hughes *Anne Hughes* 12/15/2023
Environmental Group Manager
Bureau of Clean Water / Northcentral Region

FROM: Rebecca Dunlap *Rebecca Dunlap* 12/14/2023
Aquatic Biologist Supervisor
Bureau of Clean Water / Northcentral Region

DATE: December 14, 2023

SUBJECT Roaring Run
Stream File: 26108
HUC: 02050201 (Clearfield)
Bradford Township, Clearfield County
25 PA Code § 95.5 Determination Study

This memo is in response to a request from Project Manager, Derek Garner, to determine whether Roaring Run (PA Stream Code #26108) supports an aquatic community in accordance with 25 PA Code § 95.5 regarding abandoned coal mine discharges and sewage treatment. The Woodland-Bigler Area Authority currently has a wastewater treatment facility (WWTF) that discharges into Roaring Run under NPDES Permit No. PA0115231.

Introduction

The Woodland-Bigler Area Authority WWTF is located at 2912 Hogback Hill in Clearfield County near Mineral Springs, Pennsylvania. The drainage area of Roaring Run upstream of the WWTF is 8.8 square miles. Land use is 68% forest and 7% urban (StreamStats, 2019). Roaring Run is classified as cold-water fishes (CWF) under Chapter 93 and is listed as being impaired for Acid Mine Drainage (AMD) with a cause of metals and pH. Roaring Run was listed as impaired in 1999 (990819-1110-LMS) and is included in a TMDL developed for the Clearfield Creek Watershed (PA DEP, 2007). Historical data show that mining began in the Clearfield Creek Watershed in the early twentieth century. The TMDL notes that “a large portion of the watershed has been mined for coal, and some unreclaimed abandoned mine lands, as well as active mining operations, line the hillsides. Both strip and deep mining have been conducted in the watershed”. (PA DEP, 2007)

Methods

On November 20th, 2023, one stream reach (40.99686, -78.36081) was evaluated as part of this assessment. This site, located approximately 150 feet upstream of the Hogback Hill bridge, was selected because it was representative of the stream prior to the influence of the WWTF discharge and because water chemistry data exists from a sample collected at this location in 2010 (collector ID & sequence # 0901-42). Field measurements of temperature, dissolved oxygen, pH, and specific conductance were collected with a calibrated YSI ProDSS meter per Hoger, 2020. A standardized, non-truncated D-framed net with 500µm mesh was used to collect macroinvertebrates according to the Department's Qualitative Benthic Macroinvertebrate Data Collection Protocol (Lookenbill, 2017), found in the Water Quality Monitoring Protocols for Streams and Rivers (Lookenbill & Whiteash, 2021). A total of six kicks were performed in the study reach to ensure all best available riffle/run habitats were sampled. The macroinvertebrate sample composite was sorted in the laboratory on November 20th, 2023 per the Department's Macroinvertebrate Laboratory Subsampling and Identification Protocol (Brickner, 2020).

Results and Discussion

The sample reach was predominantly riffle/run habitat with numerous boulders. The legacy impacts of acid mine drainage were evidenced by the iron precipitate coating the substrate (Photo 1). The riparian zone was impacted by Casher Road on the right descending bank and private residences on the left descending bank. In-situ water chemistry field parameters of the reach are provided in Table 1.

Table 1. *In-Situ field chemistry measurements recorded for Roaring Run upstream of the Woodland-Bigler Area Authority WWTF discharge in Bradford Township, Clearfield County.*

11/20/2023	Roaring Run above WWTF
Temp. (°C)	2.8
DO (%)	92.9
DO (mg/L)	12.57
SPC (uS/cm)	714
pH (SU)	4.12

A total of 20 individuals representing four different taxa were documented as part of the qualitative sub-sampling. According to the NC Division of Water Quality's Methodology for Identification of Intermittent and Perennial Streams and their Origins (NC-DWQ, 2010), three of those taxa (*Diplectrona*, *Nigronia*, *Antocha*) are considered long-lived.

Table 2. *Macroinvertebrate taxa list, abundance, Pollution Tolerance Value (PTV), Acid Tolerance Value (ATV), and life history.*

TAXA	STATION Roaring Run above WWTF			
	Observed	Pollution Tolerance Value* (PTV)	Acid Tolerance Value** (ATV)	Long-Lived Taxa
Trichoptera (Caddisflies)	-	-	-	-
Hydropsychidae *Diplectrona*	8	0	5	Yes
Megaloptera (Dobson/Alderflies)	-	-	-	-
Corydalidae *Nigronia*	4	2	3	Yes
Diptera (True Flies)	-	-	-	-
Chironomidae	7	6	4	-
Tipulidae *Antocha*	1	3	2	Yes
Taxa Richness	**4**			**3**
Total Organisms	**20**			

*PTV values from PA DEP, 2023; ** Acid Tolerance Values from Shank, 2023

Water chemistry data results collected from Roaring Run during this investigation (collector ID & sequence #: 0224-048) were compared to data collected in 2010 (collector ID & sequence # 0901-42). This comparison indicates an overall improvement over the past 13 years with an increase in pH and decreases in the concentration of metals (Al, Fe, Mn, Zn) (Table 2).

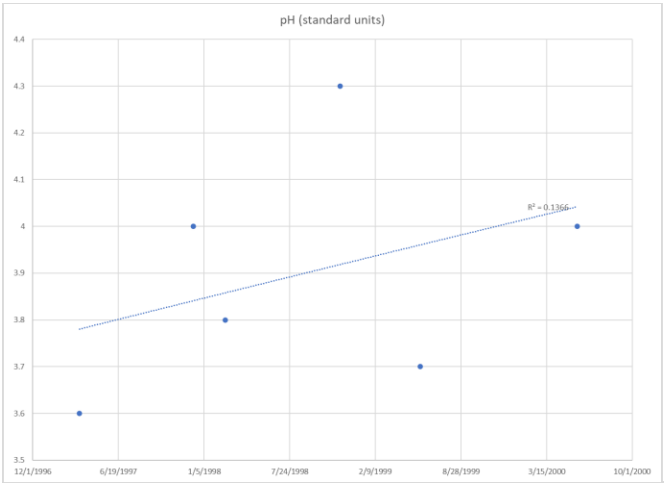
Table 2. Comparison of w*ater chemistry parameters associated with AMD from 2010 and 2023.*

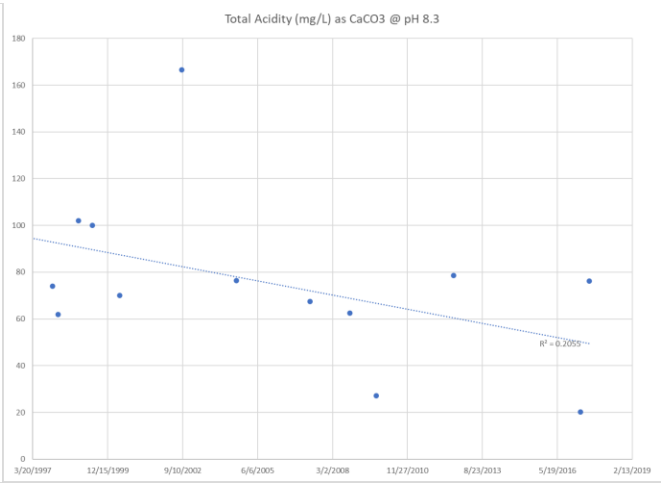
PARAMETER	7/14/2010	11/20/2023	CHANGE
ALUMINUM, TOTAL (ug/L)	2926	1310	Decrease
IRON, TOTAL (ug/L)	1531	1380	Decrease
MANGANESE, TOTAL ((ug/L)	8366	4470	Decrease
pH, Lab (standard units)	3.8	4.3	Increase
SPECIFIC CONDUCTIVITY (umhos/cm)	961	695	Decrease
ZINC, TOTAL (ug/L)	272	93.5	Decrease

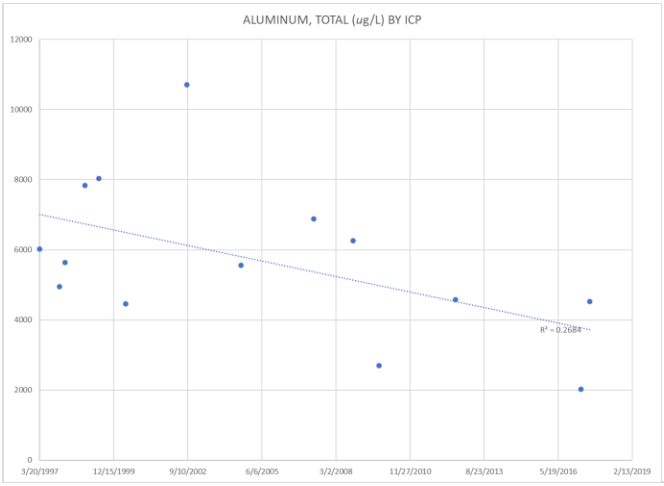
Since it is difficult to ascertain an overall trend based only on two data points, additional water chemistry results were queried from the Department's Sample Information System (SIS) database for the first upstream site where a historical dataset exists (approximately 1.7 miles upstream of the WWTF). 20 years of water chemistry data exist from collections at this location from 1997 to 2017. Results of pH, acidity, Al, Fe, and Mn and their data trendlines corroborate that the water quality of Roaring Run has historically been improving upstream of the WWTF: pH is increasing and acidity, Al, Fe, and Mn are decreasing (Figures 1 - 5). Personal communication with the Department's Bureau of Abandoned Mine Drainage (BAMR) revealed that there are no AMD remediation projects in the watershed where either the Department or a Non-Government Agency have been involved (Smoyer, 2023) indicating that the improvements are likely owed to

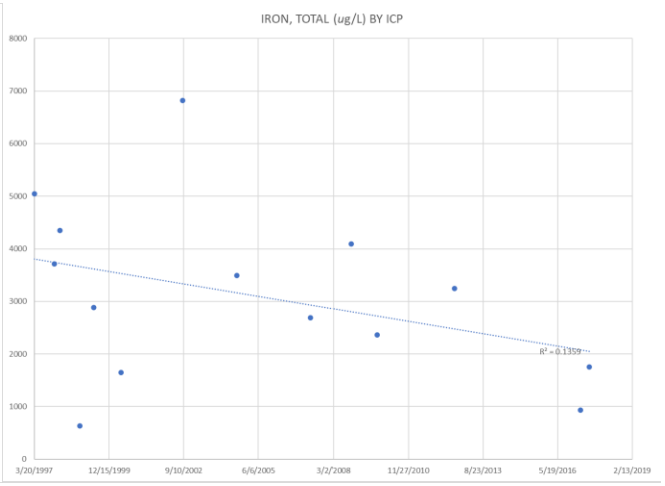
the cessation of mining operations, improved mining practices, and/or natural attenuation within the watershed.

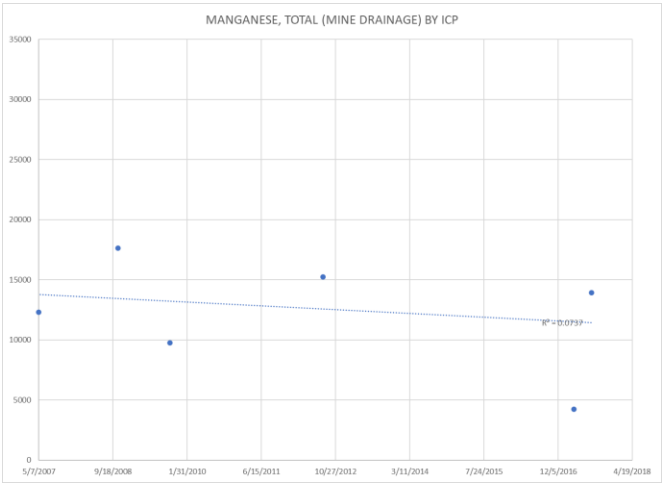
Figures 1 - 5. *pH (Standard Units), Total Acidity (mg/L) Total Aluminum (ug/L), Total Iron (ug/L) and Total Manganese (ug/L) in Roaring Run below Rosebud Mine Company – approximately 1.7 miles upstream of Woodland-Bigler Area Authority WWTF.*











In summary, the presence of long-lived taxa in adequate numbers indicate that suitable in-situ conditions are maintained sufficiently throughout the year for an aquatic community. Additionally, although still indicative of impacts from legacy AMD, water quality is improving. As such, it is recommended that the current discharge not be exempt from stricter limits under 25 PA Code § 95.5.

References

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The Pennsylvania Code. 1985. Chapter 95. Wastewater Treatment Requirements. Chapter 95.5. Treatment Requirements for Discharges to Waters Affected by Abandoned Mine Drainage. Commonwealth of Pennsylvania.

CC: Stream File – Roaring Run (26108)
NPDES Permit # PA0115231
Erika Arnold – CO, Environmental Group Manager

Figure 1. A map of Roaring Run (CWF) where an aquatic survey was conducted for §95.5 in relation to the Woodland-Bigler Area Authority

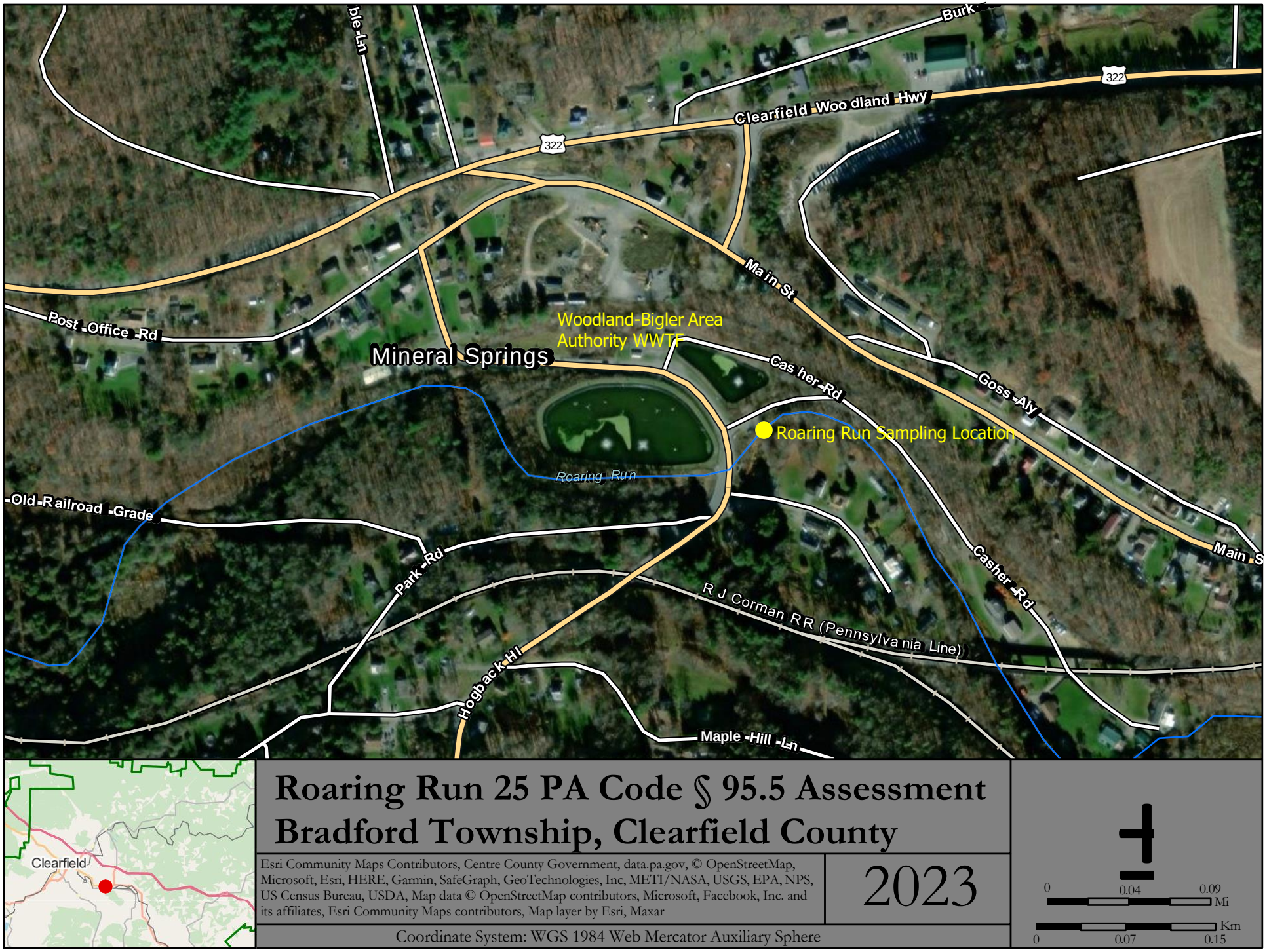
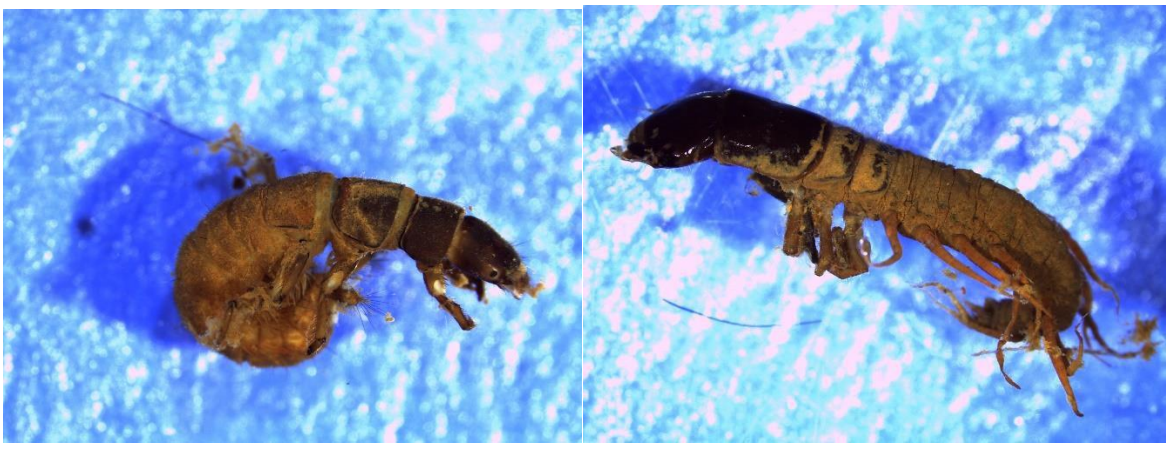


Photo 1. Roaring Run above the Woodland-Bigler Area Authority WWT.

Photo 2. *Diplectrona* (Trichoptera, Hydropsychidae) & *Nigronia* (Megaloptera, Corydalidae) from the benthic macroinvertebrate sample collected from Roaring Run above the Woodland-Bigler Area Authority WWT.



USGS
science for a changing world

Prepared in cooperation with the Pennsylvania Department of Environmental Protection

Selected Streamflow Statistics for Streamgage Locations in and near Pennsylvania

Open-File Report 2011-1070

U.S. Department of the Interior
U.S. Geological Survey

Table 1. List of U.S. Geological Survey streamgage locations in and near Pennsylvania with updated streamflow statistics.—Continued

[Latitude and Longitude in decimal degrees; mi^2, square miles]

Streamgage number	Streamgage name	Latitude	Longitude	Drainage area (mi^2)	Regulated[1]
01541303	West Branch Susquehanna River at Hyde, Pa.	41.005	-78.457	474	Y
01541308	Bradley Run near Ashville, Pa.	40.509	-78.584	6.77	N
01541500	Clearfield Creek at Dimeling, Pa.	40.972	-78.406	371	Y
01542000	Moshannon Creek at Osceola Mills, Pa.	40.850	-78.268	68.8	N
01542500	WB Susquehanna River at Karthaus, Pa.	41.118	-78.109	1,462	Y
01542810	Waldy Run near Emporium, Pa.	41.579	-78.293	5.24	N
01543000	Driftwood Branch Sinnemahoning Creek at Sterling Run, Pa.	41.413	-78.197	272	N
01543500	Sinnemahoning Creek at Sinnemahoning, Pa.	41.317	-78.103	685	N
01544000	First Fork Sinnemahoning Creek near Sinnemahoning, Pa.	41.402	-78.024	245	Y
01544500	Kettle Creek at Cross Fork, Pa.	41.476	-77.826	136	N
01545000	Kettle Creek near Westport, Pa.	41.320	-77.874	233	Y
01545500	West Branch Susquehanna River at Renovo, Pa.	41.325	-77.751	2,975	Y
01545600	Young Womans Creek near Renovo, Pa.	41.390	-77.691	46.2	N
01546000	North Bald Eagle Creek at Milesburg, Pa.	40.942	-77.794	119	N
01546400	Spring Creek at Houserville, Pa.	40.834	-77.828	58.5	N
01546500	Spring Creek near Axemann, Pa.	40.890	-77.794	87.2	N
01547100	Spring Creek at Milesburg, Pa.	40.932	-77.786	142	N
01547200	Bald Eagle Creek below Spring Creek at Milesburg, Pa.	40.943	-77.786	265	N
01547500	Bald Eagle Creek at Blanchard, Pa.	41.052	-77.604	339	Y
01547700	Marsh Creek at Blanchard, Pa.	41.060	-77.606	44.1	N
01547800	South Fork Beech Creek near Snow Shoe, Pa.	41.024	-77.904	12.2	N
01547950	Beech Creek at Monument, Pa.	41.112	-77.702	152	N
01548005	Bald Eagle Creek near Beech Creek Station, Pa.	41.081	-77.549	562	Y
01548500	Pine Creek at Cedar Run, Pa.	41.522	-77.447	604	N
01549000	Pine Creek near Waterville, Pa.	41.313	-77.379	750	N
01549500	Blockhouse Creek near English Center, Pa.	41.474	-77.231	37.7	N
01549700	Pine Creek below Little Pine Creek near Waterville, Pa.	41.274	-77.324	944	Y
01550000	Lycoming Creek near Trout Run, Pa.	41.418	-77.033	173	N
01551500	WB Susquehanna River at Williamsport, Pa.	41.236	-76.997	5,682	Y
01552000	Loyalsock Creek at Loyalsockville, Pa.	41.325	-76.912	435	N
01552500	Muncy Creek near Sonestown, Pa.	41.357	-76.535	23.8	N
01553130	Sand Spring Run near White Deer, Pa.	41.059	-77.077	4.93	N
01553500	West Branch Susquehanna River at Lewisburg, Pa.	40.968	-76.876	6,847	Y
01553700	Chillisquaque Creek at Washingtonville, Pa.	41.062	-76.680	51.3	N
01554000	Susquehanna River at Sunbury, Pa.	40.835	-76.827	18,300	Y
01554500	Shamokin Creek near Shamokin, Pa.	40.810	-76.584	54.2	N
01555000	Penns Creek at Penns Creek, Pa.	40.867	-77.048	301	N
01555500	East Mahantango Creek near Dalmatia, Pa.	40.611	-76.912	162	N
01556000	Frankstown Branch Juniata River at Williamsburg, Pa.	40.463	-78.200	291	N
01557500	Bald Eagle Creek at Tyrone, Pa.	40.684	-78.234	44.1	N
01558000	Little Juniata River at Spruce Creek, Pa.	40.613	-78.141	220	N
01559000	Juniata River at Huntingdon, Pa.	40.485	-78.019	816	LF
01559500	Standing Stone Creek near Huntingdon, Pa.	40.524	-77.971	128	N
01559700	Sulphur Springs Creek near Manns Choice, Pa.	39.978	-78.619	5.28	N
01560000	Dunning Creek at Belden, Pa.	40.072	-78.493	172	N

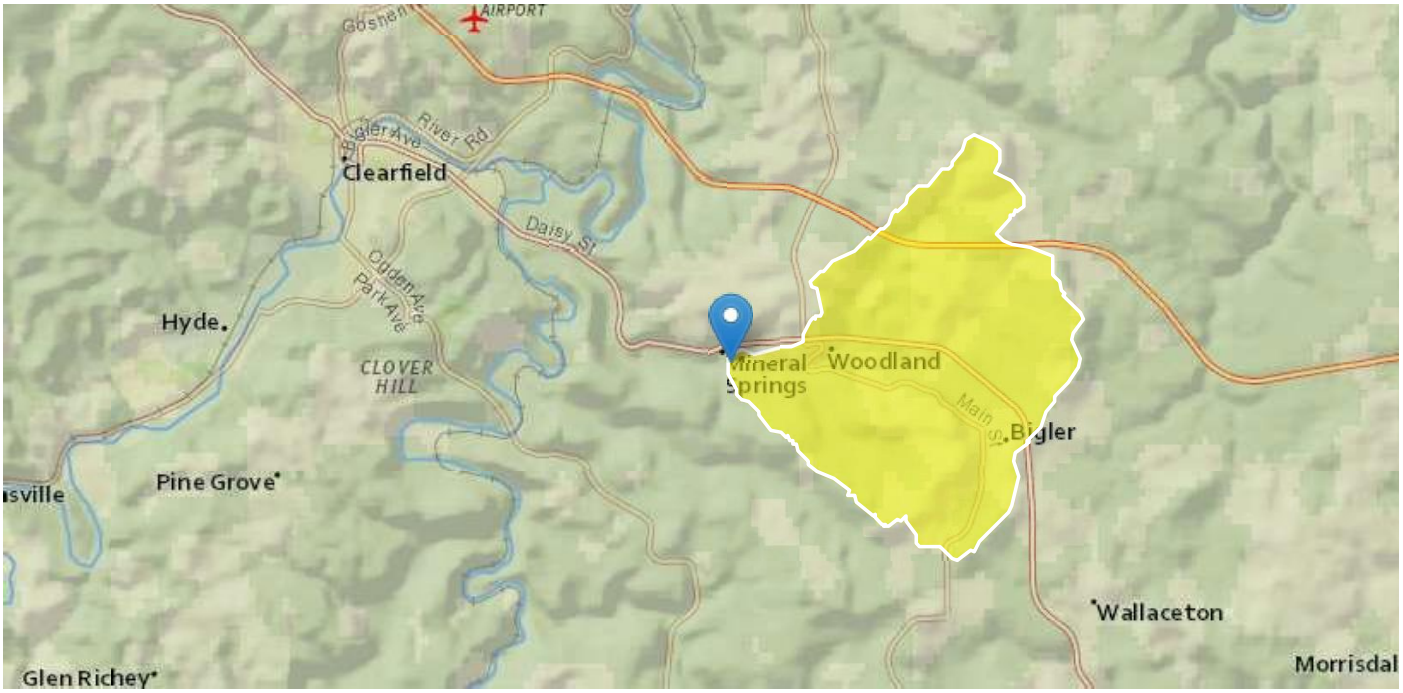
DFLOW Results

All available data from Apr 1, 1991 through Mar 31, 2021 are included in analysis.

Gage	Period	Days in Record	Zero/Missing	1B3	Percentile	Excur per 3 yr	1Q10	Percentile	Excur per 3 yr	1Qy Type	xQy	Percentile	Harmonic	Percentile
01541500 - Clearfield Creek at Dimeling, PA	1990/04/01 - 2021/04/01	11,323	0/0	41.9	0.12%	0.97	40.6	0.10%	0.48	1Q3	39	0.05%	2.18E+02	32.62%
Gage	**Period**	**Days in Record**	**Zero/Missing**	**1B3**	**Percentile**	**Excur per 3 yr**	**7Q10**	**Percentile**	**Excur per 3 yr**	**7Qy Type**	**xQy**	**Percentile**	**Harmonic**	**Percentile**
01541500 - Clearfield Creek at Dimeling, PA	1990/04/01 - 2021/04/01	11,323	0/0	41.9	0.12%	0.97	42.8	0.17%	0.97	7Q11	27.2	0.00%	2.18E+02	32.62%
Gage	**Period**	**Days in Record**	**Zero/Missing**	**1B3**	**Percentile**	**Excur per 3 yr**	**30Q10**	**Percentile**	**Excur per 3 yr**	**30Qy Type**	**xQy**	**Percentile**	**Harmonic**	**Percentile**
01541500 - Clearfield Creek at Dimeling, PA	1990/04/01 - 2021/04/01	11,323	0/0	41.9	0.12%	0.97	53.4	1.38%	4.26	30Q11	35.8	0.02%	2.18E+02	32.62%

Woodland-Bigler Area Authority WWTF

Region ID: PA
Workspace ID: PA20231219140110440000
Clicked Point (Latitude, Longitude): 40.99656, -78.36224
Time: 2023-12-19 09:01:30 -0500



Drainage area at Outfall 001

D Collapse All

) Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	6.2619	degrees
BSLOPDRAW	Unadjusted basin slope, in degrees	6.4741	degrees
BSLPDRPA20	Unadjusted basin slope, in degrees, from PA v1	7.0567	degrees
CARBON	Percentage of area of carbonate rock	0	percent
CENTROXA83	X coordinate of the centroid, in NAD_1983_Albers, meters	-27135.9947	meters
CENTROYA83	Basin centroid horizontal (y) location in NAD 1983 Albers	221752.0429	meters
DRN	Drainage quality index from STATSGO	3.8	dimensionless
DRNAREA	Area that drains to a point on a stream	8.81	square miles

Parameter Code	Parameter Description	Value	Unit
ELEV	Mean Basin Elevation	1691	feet
ELEVMAX	Maximum basin elevation	2055	feet
FOREST	Percentage of area covered by forest	68.4219	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	0	percent
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	1.9166	percent
LC01DEV	Percentage of land-use from NLCD 2001 classes 21-24	13.2265	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	14.0811	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	2.3823	percent
LONG_OUT	Longitude of Basin Outlet	-78.362195	degrees
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	56.9	degrees F
OUTLETXA83	X coordinate of the outlet, in NAO_1983_Albers,meters	-30470.2237	meters
OUTLETYA83	Y coordinate of the outlet, in NAD_1983_Albers, meters	221736.5551	meters
PRECIP	Mean Annual Precipitation	41	inches
ROCKDEP	Depth to rock	4.2	feet
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.38	percent
STRDEN	Stream Density -- total length of streams divided by drainage area	1.33	miles per square mile
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	11.7	miles
URBAN	Percentage of basin with urban development	6.8738	percent

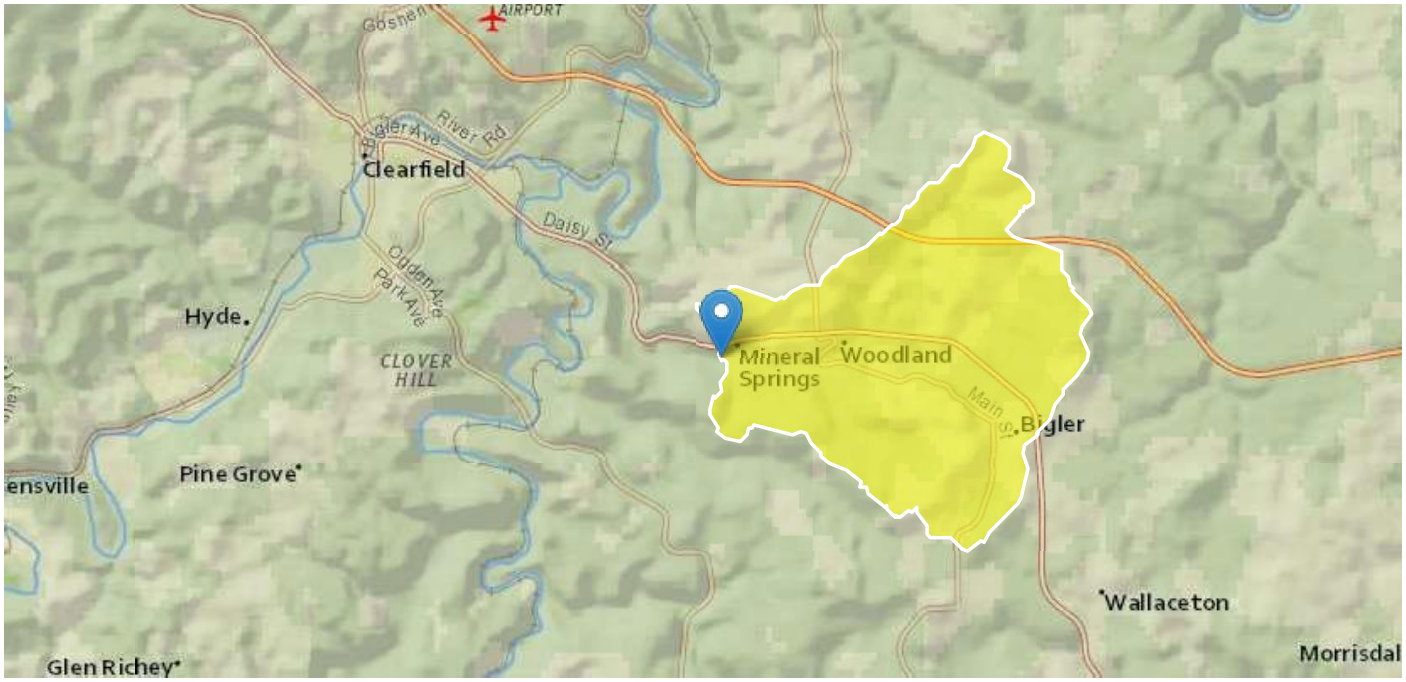
Application Version: 4.19.2

StreamStats Services Version: 1.2.22

NSS Services Version: 2.3.2

Woodland-Bigler Area Authority WWTF

Region ID: PA
Workspace ID: PA20231219140708734000
Clicked Point (Latitude, Longitude): 40.99629, -78.36677
Time: 2023-12-19 09:07:29 -0500



Drainage area downstream of Outfall 001

D Collapse All

) Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLOPD	Mean basin slope measured in degrees	6.2532	degrees
BSLOPDRAW	Unadjusted basin slope, in degrees	6.4653	degrees
BSLPDRPA20	Unadjusted basin slope, in degrees, from PA v1	7.077	degrees
CARBON	Percentage of area of carbonate rock	0	percent
CENTROXA83	X coordinate of the centroid, in NAO_1983_Albers, meters	-27471.0107	meters
CENTROYA83	Basin centroid horizontal (y) location in NAD 1983 Albers	221762.6425	meters
DRN	Drainage quality index from STATSGO	3.8	dimensionless
DRNAREA	Area that drains to a point on a stream	9.89	square miles
ELEV	Mean Basin Elevation	1684	feet

Parameter Code	Parameter Description	Value	Unit
ELEVMAX	Maximum basin elevation	2055	feet
FOREST	Percentage of area covered by forest	67.6493	percent
GLACIATED	Percentage of basin area that was historically covered by glaciers	0	percent
IMPNLCD01	Percentage of impervious area determined from NLCD 2001 impervious dataset	2.0752	percent
LC01DEV	Percentage of land-use from NLCD 2001 classes 21-24	13.8599	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	15.851	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	3.5085	percent
LONG_OUT	Longitude of Basin Outlet	-78.366774	degrees
MAXTEMP	Mean annual maximum air temperature over basin area from PRISM 1971-2000 800-m grid	56.9	degrees F
OUTLETXA83	X coordinate of the outlet, in NAO_1983_Albers,meters	-30855.5511	meters
OUTLETYA83	Y coordinate of the outlet, in NAD_1983_Albers, meters	221708.3902	meters
PRECIP	Mean Annual Precipitation	41	inches
ROCKDEP	Depth to rock	4.2	feet
STORAGE	Percentage of area of storage (lakes ponds reservoirs wetlands)	0.35	percent
STRDEN	Stream Density -- total length of streams divided by drainage area	1.21	miles per square mile
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	11.98	miles
URBAN	Percentage of basin with urban development	7.2793	percent

Application Version: 4.19.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.3.2

Low-Flow (Q_{7-10}) Calculation

Facility: **Woodland-Bigler Area Authority WWTF**
NPDES Permit No. **PA0115231**

Gage Information

Drainage Area: **371** mi^2
Q_{7-10}: **42.8** cfs
LFY: **0.115** cfsm

Outfall Information

Drainage Area: **8.81** mi^2
Q_{7-10}: **1.02** cfs

Downstream Locations

RMI: **2.9**
Drainage Area: **9.89** mi^2
Q_{7-10}: **1.141** cfs

RMI:
Drainage Area: mi^2
Q_{7-10}: cfs

RMI:
Drainage Area: mi^2
Q_{7-10}: c s

RMI:
Drainage Area: mi^2
Q_{7-10}: cfs

RMI:
Drainage Area: mi^2
Q_{7-10}: c s

RMI:
Drainage Area: mi^2
Q_{7-10}: cfs

RMI:
Drainage Area: mi^2
Q_{7-10}: c s

RMI:
Drainage Area: mi^2
Q_{7-10}: cfs

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
26108	ROARING RUN	**3.190**	1371.00	8.85	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.115	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	4.30	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
WBAA WWTF	PA0115231	0.2250	0.2250	0.2250	0.000	25.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.40	8.24	0.00	0.00
NH3-N	27.78	0.00	0.00	0.70

Input Data WQM 7.0

Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
26108	ROARING RUN	**2.900**	1351.00	9.89	0.00000	0.00	☑

Stream Data

Design Cond.	LFY (cfsm)	Trib Flow (cfs)	Stream Flow (cfs)	Rch Trav Time (days)	Rch Velocity (fps)	WD Ratio	Rch Width (ft)	Rch Depth (ft)	Tributary Temp (ºC)	Tributary pH	Stream Temp (ºC)	Stream pH
Q7-10	0.115	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	4.30	0.00	0.00
Q1-10		0.00	0.00	0.000	0.000							
Q30-10		0.00	0.00	0.000	0.000							

Discharge Data

Name	Permit Number	Existing Disc Flow (mgd)	Permitted Disc Flow (mgd)	Design Disc Flow (mgd)	Reserve Factor	Disc Temp (ºC)	Disc pH
		0.0000	0.0000	0.0000	0.000	0.00	7.00

Parameter Data

Parameter Name	Disc Conc (mg/L)	Trib Conc (mg/L)	Stream Conc (mg/L)	Fate Coef (1/days)
CBOD5	25.00	2.00	0.00	1.50
Dissolved Oxygen	3.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

WQM 7.0 Hydrodynamic Outputs

SWP Basin	Stream Code	Stream Name
08C	26108	ROARING RUN

RMI	Stream Flow (cfs)	PWS With (cfs)	Net Stream Flow (cfs)	Disc Analysis Flow (cfs)	Reach Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Reach Trav Time (days)	Analysis Temp (ºC)	Analysis pH
Q7-10 Flow												
3.190	1.02	0.00	1.02	.3481	0.01306	.538	15.13	28.1	0.17	0.106	21.27	4.43
Q1-10 Flow												
3.190	0.97	0.00	0.97	.3481	0.01306	NA	NA	NA	0.16	0.108	21.32	4.43
Q30-10 Flow												
3.190	1.27	0.00	1.27	.3481	0.01306	NA	NA	NA	0.18	0.096	21.07	4.40

WQM 7.0 Modeling Specifications

Parameters	Both	Use Inputted Q1-10 and Q30-10 Flows	☑
WLA Method	EMPR	Use Inputted W/D Ratio	☐
Q1-10/Q7-10 Ratio	0.95	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.25	Temperature Adjust Kr	☑
D.O. Saturation	90.00%	Use Balanced Technology	☑
D.O. Goal	5		

WQM 7.0 Wasteload Allocations

SWP Basin	Stream Code	Stream Name
08C	26108	ROARING RUN

NH3-N Acute Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
3.190	WBAA WWTF	24.26	55.56	24.26	55.56	0	0

NH3-N Chronic Allocations

RMI	Discharge Name	Baseline Criterion (mg/L)	Baseline WLA (mg/L)	Multiple Criterion (mg/L)	Multiple WLA (mg/L)	Critical Reach	Percent Reduction
3.190	WBAA WWTF	2.11	9.83	2.11	9.83	0	0

Dissolved Oxygen Allocations

RMI	Discharge Name	CBOD5		NH3-N		Dissolved Oxygen		Critical Reach	Percent Reduction
		Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)	Baseline (mg/L)	Multiple (mg/L)		
3.19	WBAA WWTF	25	25	9.83	9.83	3.4	3.4	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
08C	26108	ROARING RUN

RMI	Total Discharge Flow (mgd)	Analysis Temperature (ºC)	Analysis pH
3.190	0.225	21.274	4.427
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
15.129	0.538	28.103	0.168
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
7.86	1.196	2.50	0.772
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
7.009	21.451	Tsivoglou	5
Reach Travel Time (days)			
0.106			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.011	7.76	2.48	7.18
0.021	7.65	2.46	7.32
0.032	7.55	2.44	7.43
0.042	7.45	2.42	7.52
0.053	7.35	2.40	7.60
0.063	7.25	2.38	7.66
0.074	7.16	2.37	7.71
0.085	7.06	2.35	7.75
0.095	6.97	2.33	7.79
0.106	6.88	2.31	7.82

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
08C	26108	ROARING RUN

RMI	Name	Permit Number	Disc Flow (mgd)	Parameter	Effl. Limit 30-day Ave. (mg/L)	Effl. Limit Maximum (mg/L)	Effl. Limit Minimum (mg/L)
3.190	WBAA WWTF	PA0115231	0.225	CBOD5	25		
				NH3-N	9.83	19.66	
				Dissolved Oxygen			3.4

Discharge Information

Instructions | Discharge | Stream

Facility: **Woodland-Bigler Area Authority WWTF** NPDES Permit No.: **PA0115231** Outfall No.: **001**

Evaluation Type: **Custom / Additives** Wastewater Description: **Sewage**

Discharge Characteristics								
Design Flow (MGD)*	Hardness (mg/l)*	pH (SU)*	Partial Mix Factors (PMFs)				Complete Mix Times (min)	
			AFC	CFC	THH	CRL	Q_{7-10}	Q_h
0.225	100	7						

				0 if left blank		0.5 if left blank		0 if left blank			1 if left blank	
Discharge Pollutant	Units	Max Discharge Conc		Trib Conc	Stream Conc	Daily CV	Hourly CV	Stream CV	Fate Coeff	FOS	Criteria Mod	Chem Transl
Total Dissolved Solids (PWS)	mg/L		323									
Chloride (PWS)	mg/L		57.1									
Bromide	mg/L	<	2									
Sulfate (PWS)	mg/L		58.9									
Total Copper	mg/L		0.0117		0.0016							
Total Lead	mg/L	<	0.008									
Total Zinc	mg/L		0.0591		0.0935							

Stream / Surface Water Information

Woodland-Bigler Area Authority WWTF, NPDES Permit No. PA0115231, Outfall 001

Instructions | Discharge | *Stream*

Receiving Surface Water Name: **Roaring Run**

No. Reaches to Model: **1**

- (●) Statewide Criteria
- ( ) Great Lakes Criteria
- ( ) ORSANCO Criteria

Location	Stream Code*	RMI*	Elevation (ft)*	DA (mi²)*	Slope (ft/ft)	PWS Withdrawal (MGD)	Apply Fish Criteria*
Point of Discharge	026108	3.19	1371	8.85			Yes
End of Reach 1	026108	2.9	1351	9.89			Yes

Q *7-10*

Location	RMI	LFY (cfs/mi²)*	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness*	pH*	Hardness	pH
Point of Discharge	3.19	0.115										293	4.3		
End of Reach 1	2.9	0.115										293	4.3		

Q *h*

Location	RMI	LFY (cfs/mi²)	Flow (cfs)		W/D Ratio	Width (ft)	Depth (ft)	Velocity (fps)	Travel Time (days)	Tributary		Stream		Analysis	
			Stream	Tributary						Hardness	pH	Hardness	pH	Hardness	pH
Point of Discharge	3.19														
End of Reach 1	2.9														

Model Results

Woodland-Bigler Area Authority WWTF, NPDES Permit No. PA0115231, Outfall 001

Instructions | *Results* | RETURN TO INPUTS | SAVE AS PDF | PRINT | ◉ All | ○ Inputs | ○ Results | ○ Limits

☑ ***Hydrodynamics***

Q_{7-10}

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
3.19	1.02		1.02	0.348	0.013	0.538	15.129	28.103	0.168	0.106	3.859
2.9	1.14		1.13735								

Q_h

RMI	Stream Flow (cfs)	PWS Withdrawal (cfs)	Net Stream Flow (cfs)	Discharge Analysis Flow (cfs)	Slope (ft/ft)	Depth (ft)	Width (ft)	W/D Ratio	Velocity (fps)	Travel Time (days)	Complete Mix Time (min)
3.19	7.55		7.55	0.348	0.013	1.165	15.129	12.988	0.448	0.04	1.995
2.9	8.315		8.31								

☑ ***Wasteload Allocations***

☑ ***AFC*** CCT (min): 3.859 PMF: 1 Analysis Hardness (mg/l): 243.81 Analysis pH: 4.43

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	1.62	0		0	31.121	32.4	122	Chem Translator of 0.96 applied
Total Lead	0	0		0	167.861	254	996	Chem Translator of 0.661 applied
Total Zinc	93.5	0		0	249.351	255	727	Chem Translator of 0.978 applied

☑ ***CFC*** CCT (min): 3.859 PMF: 1 Analysis Hardness (mg/l): 243.81 Analysis pH: 4.43

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	

Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	1.62	0		0	19.180	20.0	73.7	Chem Translator of 0.96 applied
Total Lead	0	0		0	6.541	9.89	38.8	Chem Translator of 0.661 applied
Total Zinc	93.5	0		0	251.391	255	727	Chem Translator of 0.986 applied

☑ ***THH*** CCT (min): 3.859 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	500,000	500,000	N/A	
Chloride (PWS)	0	0		0	250,000	250,000	N/A	
Sulfate (PWS)	0	0		0	250,000	250,000	N/A	
Total Copper	1.62	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	93.5	0		0	N/A	N/A	N/A	

☑ ***CRL*** CCT (min): 1.995 PMF: 1 Analysis Hardness (mg/l): N/A Analysis pH: N/A

Pollutants	Stream Conc (µg/L)	Stream CV	Trib Conc (µg/L)	Fate Coef	WQC (µg/L)	WQ Obj (µg/L)	WLA (µg/L)	Comments
Total Dissolved Solids (PWS)	0	0		0	N/A	N/A	N/A	
Chloride (PWS)	0	0		0	N/A	N/A	N/A	
Sulfate (PWS)	0	0		0	N/A	N/A	N/A	
Total Copper	1.62	0		0	N/A	N/A	N/A	
Total Lead	0	0		0	N/A	N/A	N/A	
Total Zinc	93.5	0		0	N/A	N/A	N/A	

☑ ***Recommended WQBELs & Monitoring Requirements***

No. Samples/Month: 4

	Mass Limits		*Concentration Limits*						
Pollutants	AML (lbs/day)	MDL (lbs/day)	AML	MDL	IMAX	Units	Governing WQBEL	WQBEL Basis	Comments
Total Copper	Report	Report	Report	Report	Report	mg/L	0.074	CFC	Discharge Conc > 10% WQBEL (no RP)
Total Zinc	Report	Report	Report	Report	Report	mg/L	0.47	AFC	Discharge Conc > 10% WQBEL (no RP)

☑ ***Other Pollutants without Limits or Monitoring***

The following pollutants do not require effluent limits or monitoring based on water quality because reasonable potential to exceed water quality criteria was not determined and the discharge concentration was less than thresholds for monitoring, or the pollutant was not detected and a sufficiently sensitive analytical method was used (e.g., <= Target QL).

Pollutants	Governing WQBEL	Units	Comments
Total Dissolved Solids (PWS)	N/A	N/A	PWS Not Applicable
Chloride (PWS)	N/A	N/A	PWS Not Applicable

Bromide	N/A	N/A	No WQS
Sulfate (PWS)	N/A	N/A	PWS Not Applicable
Total Lead	38.8	µg/L	Discharge Conc ≤ 10% WQBEL

TRC EVALUATION

Input appropriate values in B4:B8 and E4:E7

1.02	= Q stream (cfs)	0.5	= CV Daily
0.225	= Q discharge (MGD)	0.5	= CV Hourly
30	= no. samples	1	= AFC_Partial Mix Factor
0.3	= Chlorine Demand of Stream	1	= CFC_Partial Mix Factor
0	= Chlorine Demand of Discharge	15	= AFC_Criteria Compliance Time (min)
0.5	= BAT/BPJ Value	720	= CFC_Criteria Compliance Time (min)
0	= % Factor of Safety (FOS)	0	=Decay Coefficient (K)

Source	Reference	AFC Calculations	Reference	CFC Calculations
TRC	1.3.2.iii	WLA afc = 0.954	1.3.2.iii	WLA cfc = 0.922
PENTOXSD TRG	5.1a	LTAMULT afc = 0.373	5.1c	LTAMULT cfc = 0.581
PENTOXSD TRG	5.1b	LTA_afc= 0.355	5.1d	LTA_cfc = 0.536

Source		Effluent Limit Calculations	
PENTOXSD TRG	5.1f	AML MULT = 1.231	
PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.437	AFC
		INST MAX LIMIT (mg/l) = 1.431	

WLA afc	(.019/e(-k*AFC_tc)) + [(AFC_Yc*Qs*.019/Qd*e(-k*AFC_tc))... ...+ Xd + (AFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT afc	EXP((0.5*LN(cvh^2+1))-2.326*LN(cvh^2+1)^0.5)
LTA_afc	wla_afc*LTAMULT_afc
WLA_cfc	(.011/e(-k*CFC_tc) + [(CFC_Yc*Qs*.011/Qd*e(-k*CFC_tc))... ...+ Xd + (CFC_Yc*Qs*Xs/Qd)]*(1-FOS/100)
LTAMULT_cfc	EXP((0.5*LN(cvd^2/no_samples+1))-2.326*LN(cvd^2/no_samples+1)^0.5)
LTA_cfc	wla_cfc*LTAMULT_cfc
AML MULT	EXP(2.326*LN((cvd^2/no_samples+1)^0.5)-0.5*LN(cvd^2/no_samples+1))
AVG MON LIMIT	MIN(BAT_BPJ,MIN(LTA_afc,LTA_cfc)*AML_MULT)
INST MAX LIMIT	1.5*((av_mon_limit/AML_MULT)/LTAMULT_afc)