Pennsylvania Department of Environmental Protection

Southcentral Regional Office
CLEAN WATER PROGRAM

NPDES PERMIT FACT SHEET INDIVIDUAL SEWAGE

Application Type	**Renewal**	Application No.	**PA0080608**
Facility Type	**Non-Municipal**	APS ID	**274881**
Major / Minor	**Minor**	Authorization ID	**1484205**

Applicant and Facility Information

Applicant Name	**Fellowship of Bible Churches**	Facility Name	**Camp Tohiglo**
Applicant Address	10670 Fort Loudon Road	Facility Address	10670 Fort Loudon Road
	Mercersburg, PA 17236-9505		Mercersburg, PA 17236-9505
Applicant Contact	Jeffery Noll	Facility Contact	Matthew Sourbier
Applicant Phone	(717) 261-7781	Facility Phone	(717) 261-7781
Client ID	43654	Site ID	452738
Ch 94 Load Status	Not Overloaded	Municipality	Montgomery Township
Connection Status	No Limitations	County	Franklin
Date Application Received	April 29, 2024	EPA Waived?	Yes
Date Application Accepted	May 10, 2024	If No, Reason	
Purpose of Application	NPDES Renewal.		

Summary of Review

Fellowship of Bible Churches. has applied to the Pennsylvania Department of Environmental Protection (DEP) for reissuance of its NPDES permit. The permit was last reissued on April 17, 2019 and became effective on May 1, 2019. The permit expired on April 30, 2024.

Based on the review outlined in this fact sheet, it is recommended that the permit be drafted.

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		Jinsu Kim / Environmental Engineering Specialist	November 4, 2024
X		Maria D. Bebenek for Daniel W. Martin, P.E. / Environmental Engineer Manager	November 8, 2204
X		Maria D. Bebenek Maria D. Bebenek, P.E. / Program Manager	November 8, 2024

Discharge, Receiving Waters and Water Supply Information			
Outfall No.	001	Design Flow (MGD)	.012
Latitude	39º 46' 36.81"	Longitude	-77º 53' 3.35"
Quad Name	Mercersburg	Quad Code	2022
Wastewater Description:	Sewage Effluent		
Receiving Waters	Licking Creek (TSF, MF)	Stream Code	59425
NHD Com ID	49472370	RMI	3.81
Drainage Area	28.4 sq.mi.	Yield (cfs/mi^2)	0.111
Q_{7-10} Flow (cfs)	3.15	Q_{7-10} Basis	USGS gage no. 01614500
Elevation (ft)	507	Slope (ft/ft)	
Watershed No.	13-C	Chapter 93 Class.	TSF, MF
Existing Use		Existing Use Qualifier	
Exceptions to Use		Exceptions to Criteria	
Assessment Status	Impaired		
Cause(s) of Impairment	Nutrients, Siltation		
Source(s) of Impairment	Grazing Related Agric, Grazing Related Agric		
TMDL Status		Name	
Nearest Downstream Public Water Supply Intake	PA-MD Border		
PWS Waters	Conococheague Creek	Flow at Intake (cfs)	
PWS RMI	0.0	Distance from Outfall (mi)	10

Drainage Area
The discharge is to Licking Creek at RMI 3.81. A drainage area upstream of the point of discharge is estimated to be 28.4 sq.mi., according to USGS StreamStats available at https://streamstats.usgs.gov/ss/.

Streamflow
Using USGS gage station no. 01614500 on Conococheague Creek near Fairview, MD, streamflows have been calculated as follows:

$$\text{Low Flow Yield} = Q7\text{-}10_{gage} / \text{Drainage Area}_{gage} = 55.0 \text{ cfs} / 494 \text{ sq.mi} = 0.111 \text{ cfs/sq.mi.}$$
$$Q7\text{-}10_{site} = \text{Low Flow Yield} * \text{Drainage Area}_{site} = 0.113 \text{ cfs/sq.mi} * 28.4 \text{ cfs} = 3.15 \text{ cfs}$$
$$Q1\text{-}10/Q7\text{-}10 = 48.1 \text{ cfs} / 55 \text{ cfs} = 0.87:1$$
$$Q30\text{-}10/Q7\text{-}10 = 65.3 \text{ cfs} / 55 \text{ cfs} = 1.18:1$$

Licking Creek
Under 25 Pa Code §93.9z, Licking Creek is designated as Trout Stocking fishes and supports Migratory fishes. DEP's 2024 integrated water quality report indicates that Licking Creek is impaired for nutrients and siltation as a result of agricultural activities. There is currently no Total Maximum Daily Load (TMDL) available for review.

Public Water Supply Intake
The nearest water supply intake is PA-MD state border near Hagerstown, MD located less than 10 miles downstream of Conococheague Creek. Based on the nature of the discharge (i.e., no public water supply contaminants are of concern) and the distance from the public water supply, the discharge is not expected to affect downstream public water supply standards.

Treatment Facility Summary				
Treatment Facility Name: Camp Tohiglo				
Waste Type	**Degree of Treatment**	**Process Type**	**Disinfection**	**Avg Annual Flow (MGD)**
Sewage	Secondary	Extended Aeration	Hypochlorite	0.012
Hydraulic Capacity (MGD)	**Organic Capacity (lbs/day)**	**Load Status**	**Biosolids Treatment**	**Biosolids Use/Disposal**
0.012	N/A	Not Overloaded	Aerobic Digestion	Other WWTP

The permittee currently owns and operates an on-site sanitary wastewater treatment facility serving a church camp (i.e., Camp Tohiglo) located in Montgomery Township, Franklin County. The facility utilizes an extended aeration activated sludge treatment process consisting of a comminutor, aeration tank, clarifier, chlorine contact tank with chlorinator, dechlorination/post aeration tank, and an outfall to Licking Creek. The facility has a design flow of 0.012 MGD. Tablets are currently used for chlorination and dechlorination.

A sludge holding tank is utilized for sludge handling process. Sludge is then hauled off site via a local hauler to another treatment facility for ultimate disposal/treatment.

Compliance History	
Summary of DMRs:	A summary of past 12-month DMR data is presented on the next page.
Summary of Inspections:	06/12/2023: DEP conducted a routine inspection and noted that the facility has failed to properly maintain and submit records. This violation was noted at the time of inspection.
Other Comments:	Since the last permit reissuance, the facility had two (2) violations in January 2020 and February 2020 regarding late DMR submission and effluent violation (CBOD), respectively. DEP's database shows there is one pending open violation associated with this facility. a draft permit cover letter will indicate that the permit may not be finalized until all open violations are resolved and closed out.

Effluent Data

DMR Data for Outfall 001 (from October 1, 2023 to September 30, 2024)

Parameter	SEP-24	AUG-24	JUL-24	JUN-24	MAY-24	APR-24	MAR-24	FEB-24	JAN-24	DEC-23	NOV-23	OCT-23
Flow (MGD) Average Monthly	0.00084	0.00156	0.00238	0.0018	0.0005	0.00081	0.00101	0.00107	0.00161	0.00116	0.00618	0.00059
Flow (MGD) Daily Maximum	0.0051	0.0042	0.00544	0.00571	0.00178	0.00582	0.0038	0.00292	0.00947	0.0089	0.00288	0.00216
pH (S.U.) Daily Minimum	7.0	7.1	6.8	6.7	7.7	7.7	7.7	7.5	7.5	7.8	7.9	7.9
pH (S.U.) Daily Maximum	7.5	7.8	7.9	7.9	7.9	8.0	8.0	8.0	8.1	8.0	8.2	8.1
DO (mg/L) Daily Minimum	9.2	7.4	6.7	7.0	8.7	8.6	10.6	11.2	11.0	11.3	10.2	9.0
TRC (mg/L) Average Monthly	< 0.02	0.04	0.06	0.07	< 0.1	< 0.02	< 0.02	< 0.02	< 0.03	< 0.02	< 0.03	< 0.02
TRC (mg/L) Instantaneous Maximum	0.08	0.69	1.10	0.45	0.03	0.21	0.09	0.08	0.17	0.1	0.1	0.04
CBOD5 (mg/L) Average Monthly	< 2.9	< 7.0	< 2.0	< 3.8	6.7	6.9	5.3	7.6	7.4	< 3.0	12.4	5.3
TSS (mg/L) Average Monthly	3.8	2.3	4.0	< 3.5	8.5	11.0	4.5	5.5	12.3	9.3	12.5	7.8
Fecal Coliform (No./100 ml) Geometric Mean	7	66	< 4	< 7	< 3	< 1	< 1	< 4	< 1	< 7	< 2.0	87
Fecal Coliform (No./100 ml) Instantaneous Maximum	14	74	17	56	10	< 1	< 1	18	< 1	48	6	208
Total Nitrogen (lbs/day) Annual Average										< 0.05		
Total Nitrogen (mg/L) Annual Average										< 17.5		
Ammonia (mg/L) Average Monthly	0.917	< 0.5	< 0.559	< 0.5	< 0.547	< 0.5	< 0.571	< 0.5	< 0.5	< 0.5	< 1.59	< 0.5
Total Phosphorus (lbs/day) Annual Average										0.01		
Total Phosphorus (mg/L) Annual Average										3.81		

Existing Effluent Limitations and Monitoring Requirements

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
Dissolved Oxygen	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
Total Residual Chlorine (TRC)	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
Carbonaceous Biochemical Oxygen Demand (CBOD5)	XXX	XXX	XXX	25.0	XXX	50	2/month	Grab
Total Suspended Solids	XXX	XXX	XXX	30.0	XXX	60	2/month	Grab
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 Annl Avg	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	Calculation
Ammonia-Nitrogen	XXX	XXX	XXX	Report	XXX	XXX	2/month	Grab
Total Phosphorus	Report Annl Avg	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	Grab

Development of Effluent Limitations

Outfall No. 001 **Design Flow (MGD)** .012
Latitude 39º 46' 36.81" **Longitude** -77º 53' 3.36"
Wastewater Description: Sewage Effluent

Technology-Based Limitations

The following technology-based limitations apply, subject to water quality analysis and 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	30	Average Monthly	133.102(b)(1)	92a.47(a)(1)
	45	Average Weekly	133.102(b)(2)	92a.47(a)(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)

Water Quality-Based Limitations

CBOD5, NH3-N and Dissolved Oxygen (DO)
WQM 7.0 version 1.0b is a water quality model designed to assist DEP to determine appropriate permit requirements for CBOD5, NH3-N and DO. DEP's technical guidance no. 391-2000-007 describes the technical methods contained in the model for conducting wasteload allocation analyses and for determining recommended limits for point source discharges. Th model output indicates that all existing permit requirements are still appropriate. No changes are therefore recommended.

Total Residual Chlorine (TRC)
DEP's TRC_CALC worksheet was used to determine if a WQBEL for TRC is appropriate. The worksheet indicates that the existing average monthly BAT limit if 0.5 mg/L and the instantaneous maximum limit of 1.6 mg/L are still adequate.

Toxics
DEP's minor sewage facility permit application does not require sampling of toxic pollutants. Further, the facility only treats sanitary wastewater generated from the church camp. No toxic pollutants have therefore been taken into consideration as pollutants of concern at this time.

Best Professional Judgment (BPJ) Limitations

Dissolved Oxygen
A minimum of 5.0 mg/L for D.O. is an existing effluent limit and will remain unchanged in the draft permit as recommended by DEP's SOP. This requirement has also been assigned to other major sewage facilities in the region. 5.0 mg/L is taken directly from 25 Pa. Code § 93.7(a) (i.e., water quality criteria for CWF waters) and it is also determined to be appropriate according to water quality modeling.

Additional Considerations

Flow Monitoring
The requirement to monitor the volume of effluent will remain in the draft permit per 40 CFR § 122.44(i)(1)(ii).

Local Total Maximum Daily Load (TMDL)
The discharge is located in a stream segment listed as attaining uses; therefore, no TMDL has been taken into consideration during this review.

E. Coli Monitoring Requirement
DEP's SOP no. BCW-PMT-033 recommends a routine monitoring for E. Coli in all new and reissued sewage permits. As a result, an annual monitoring requirement for E. Coli will be included in the permit given the facility's design flow is greater than 0.002 MGD and less than 0.05 MGD.

Total Phosphorus and Total Nitrogen Monitoring
DEP's SOP no. BCW-PMT-033 recommends a routine monitoring of Total Phosphorus and Total Nitrogen for sewage facilities greater than 0.002 MGD. Also, DEP's current Chesapeake Bay Phase II Watershed Implementation Plan recommends monitoring of these nutrients. Consequently, existing monitoring requirements will be maintained in the permit.

Anti-Degradation Requirements
All effluent limitations and monitoring requirements have been developed to ensure that existing instream water uses and the level of water quality necessary to protect the existing uses are maintained and protected.

Anti-Backsliding Requirements
Unless stated otherwise in this fact sheet, all permit requirements proposed for the upcoming permit renewal have been developed at least as stringent as those specified in the existing permit.

Class A Wild Trout Stream
No Class A Wild Trout Fishery is impacted by this discharge.

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.

Outfall 001, Effective Period: Permit Effective Date through Permit Expiration Date.

Parameter	Effluent Limitations						Monitoring Requirements	
	Mass Units (lbs/day) (1)		Concentrations (mg/L)				Minimum (2) Measurement Frequency	Required Sample Type
	Average Monthly	Average Weekly	Minimum	Average Monthly	Maximum	Instant. Maximum		
Flow (MGD)	Report	Report Daily Max	XXX	XXX	XXX	XXX	1/week	Measured
pH (S.U.)	XXX	XXX	6.0 Daily Min	XXX	9.0 Daily Max	XXX	1/day	Grab
DO	XXX	XXX	5.0 Daily Min	XXX	XXX	XXX	1/day	Grab
TRC	XXX	XXX	XXX	0.5	XXX	1.6	1/day	Grab
CBOD5	XXX	XXX	XXX	25.0	XXX	50	2/month	Grab
TSS	XXX	XXX	XXX	30.0	XXX	60	2/month	Grab
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 Annl Avg	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	Calculation
Ammonia	XXX	XXX	XXX	Report	XXX	XXX	2/month	Grab
Total Phosphorus	Report Annl Avg	XXX	XXX	Report Annl Avg	XXX	XXX	1/year	Grab
E. Coli (No. / 100 mL)	XXX	XXX	XXX	XXX	XXX	Report	1/year	Grab

Tools and References Used to Develop Permit	
☐	WQM for Windows Model (see Attachment)
☐	Toxics Management Spreadsheet (see Attachment)
☐	TRC Model Spreadsheet (see Attachment)
☐	Temperature Model Spreadsheet (see Attachment)
☐	Water Quality Toxics Management Strategy, 361-0100-003, 4/06.
☐	Technical Guidance for the Development and Specification of Effluent Limitations, 386-0400-001, 10/97.
☐	Policy for Permitting Surface Water Diversions, 386-2000-019, 3/98.
☐	Policy for Conducting Technical Reviews of Minor NPDES Renewal Applications, 386-2000-018, 11/96.
☐	Technology-Based Control Requirements for Water Treatment Plant Wastes, 386-2183-001, 10/97.
☐	Technical Guidance for Development of NPDES Permit Requirements Steam Electric Industry, 386-2183-002, 12/97.
☐	Pennsylvania CSO Policy, 386-2000-002, 9/08.
☐	Water Quality Antidegradation Implementation Guidance, 391-0300-002, 11/03.
☐	Implementation Guidance Evaluation & Process Thermal Discharge (316(a)) Federal Water Pollution Act, 386-2000-008, 4/97.
☐	Determining Water Quality-Based Effluent Limits, 386-2000-004, 12/97.
☐	Implementation Guidance Design Conditions, 386-2000-007, 9/97.
☐	Technical Reference Guide (TRG) WQM 7.0 for Windows, Wasteload Allocation Program for Dissolved Oxygen and Ammonia Nitrogen, Version 1.0, 386-2000-016, 6/2004.
☐	Interim Method for the Sampling and Analysis of Osmotic Pressure on Streams, Brines, and Industrial Discharges, 386-2000-012, 10/1997.
☐	Implementation Guidance for Section 95.6 Management of Point Source Phosphorus Discharges to Lakes, Ponds, and Impoundments, 386-2000-009, 3/99.
☐	Technical Reference Guide (TRG) PENTOXSD for Windows, PA Single Discharge Wasteload Allocation Program for Toxics, Version 2.0, 386-2000-015, 5/2004.
☐	Implementation Guidance for Section 93.7 Ammonia Criteria, 386-2000-022, 11/97.
☐	Policy and Procedure for Evaluating Wastewater Discharges to Intermittent and Ephemeral Streams, Drainage Channels and Swales, and Storm Sewers, 386-2000-013, 4/2008.
☐	Implementation Guidance Total Residual Chlorine (TRC) Regulation, 386-2000-011, 11/1994.
☐	Implementation Guidance for Temperature Criteria, 386-2000-001, 4/09.
☐	Implementation Guidance for Section 95.9 Phosphorus Discharges to Free Flowing Streams, 386-2000-021, 10/97.
☐	Implementation Guidance for Application of Section 93.5(e) for Potable Water Supply Protection Total Dissolved Solids, Nitrite-Nitrate, Non-Priority Pollutant Phenolics and Fluorides, 386-2000-020, 10/97.
☐	Field Data Collection and Evaluation Protocol for Determining Stream and Point Source Discharge Design Hardness, 386-2000-005, 3/99.
☐	Implementation Guidance for the Determination and Use of Background/Ambient Water Quality in the Determination of Wasteload Allocations and NPDES Effluent Limitations for Toxic Substances, 386-2000-010, 3/1999.
☐	Design Stream Flows, 386-2000-003, 9/98.
☐	Field Data Collection and Evaluation Protocol for Deriving Daily and Hourly Discharge Coefficients of Variation (CV) and Other Discharge Characteristics, 386-2000-006, 10/98.
☐	Evaluations of Phosphorus Discharges to Lakes, Ponds and Impoundments, 386-3200-001, 6/97.
☐	Pennsylvania's Chesapeake Bay Tributary Strategy Implementation Plan for NPDES Permitting, 4/07.
☐	SOP:
☐	Other:

StreamStats Report

Region ID: PA
Workspace ID: PA20241104152450782000
Clicked Point (Latitude, Longitude): 39.77592, -77.88075
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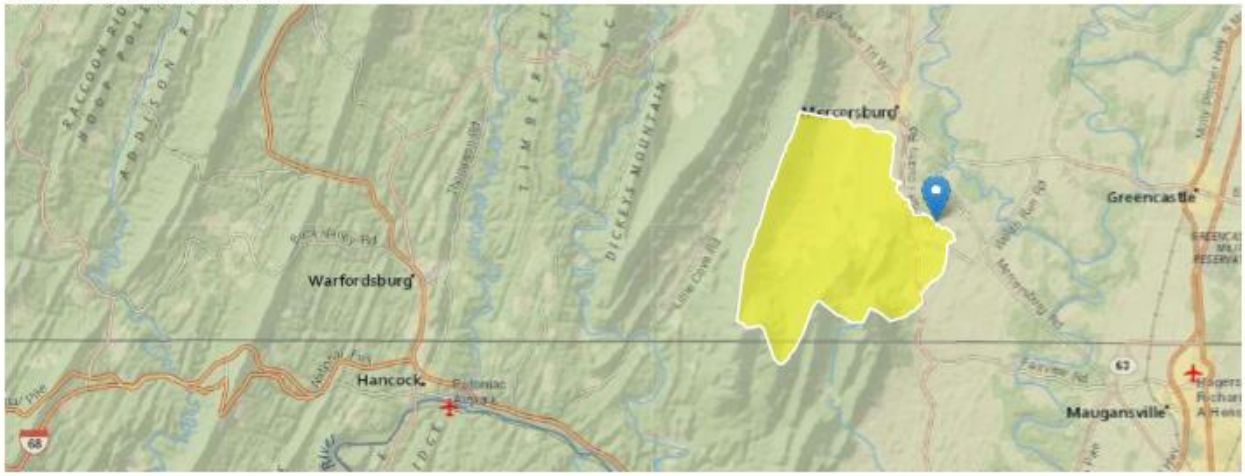

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Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	20.02	percent
DRNAREA	Area that drains to a point on a stream	30.9	square miles
PRECIP	Mean Annual Precipitation	41	inches
ROCKDEP	Depth to rock	4.3	feet
STRDEN	Stream Density -- total length of streams divided by drainage area	2.87	miles per square mile

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	30.9	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	41	inches	35	50.4
STRDEN	Stream Density	2.87	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	4.3	feet	3.32	5.65
CARBON	Percent Carbonate	20.02	percent	0	99

Low-Flow Statistics Flow Report [Low Flow Region 2]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	2.72	ft^3/s	38	38
30 Day 2 Year Low Flow	3.66	ft^3/s	33	33

Statistic	Value	Unit	SE	ASEp
7 Day 10 Year Low Flow	1.27	ft^3/s	51	51
30 Day 10 Year Low Flow	1.72	ft^3/s	46	46
90 Day 10 Year Low Flow	2.53	ft^3/s	36	36

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Application Version: 4.24.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

StreamStats Report

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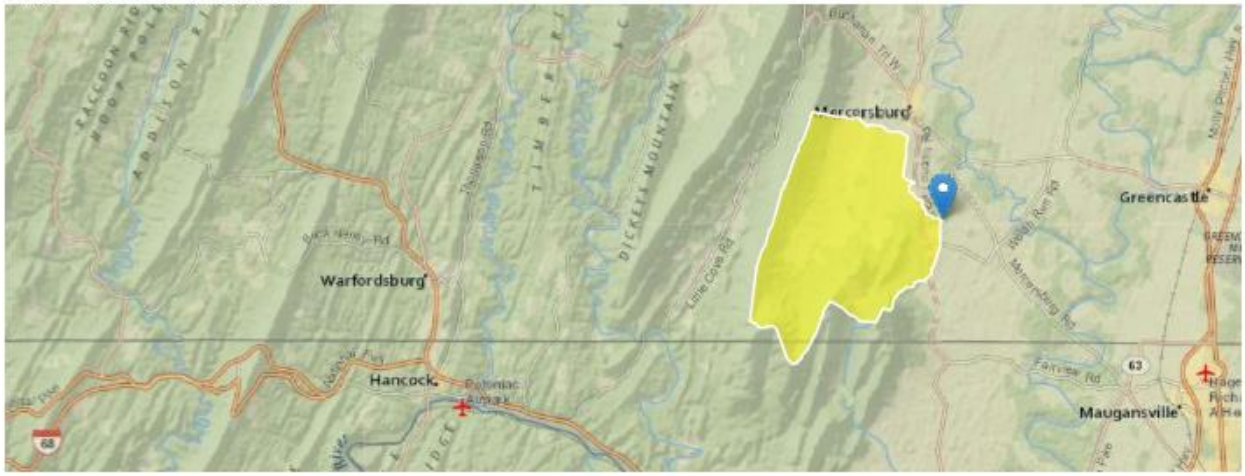

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Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CARBON	Percentage of area of carbonate rock	16.24	percent
DRNAREA	Area that drains to a point on a stream	28.3	square miles
PRECIP	Mean Annual Precipitation	41	inches
ROCKDEP	Depth to rock	4.2	feet
STRDEN	Stream Density -- total length of streams divided by drainage area	2.84	miles per square mile

Low-Flow Statistics

Low-Flow Statistics Parameters [Low Flow Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	28.3	square miles	4.93	1280
PRECIP	Mean Annual Precipitation	41	inches	35	50.4
STRDEN	Stream Density	2.84	miles per square mile	0.51	3.1
ROCKDEP	Depth to Rock	4.2	feet	3.32	5.65
CARBON	Percent Carbonate	16.24	percent	0	99

Low-Flow Statistics Flow Report [Low Flow Region 2]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error, PC: Percent Correct, RMSE: Root Mean Squared Error, PseudoR^2: Pseudo R Squared (other -- see report)

Statistic	Value	Unit	SE	ASEp
7 Day 2 Year Low Flow	2.28	ft^3/s	38	38
30 Day 2 Year Low Flow	3.13	ft^3/s	33	33

Statistic	Value	Unit	SE	ASEp
7 Day 10 Year Low Flow	1.02	ft^3/s	51	51
30 Day 10 Year Low Flow	1.41	ft^3/s	46	46
90 Day 10 Year Low Flow	2.15	ft^3/s	36	36

Low-Flow Statistics Citations

Stuckey, M.H.,2006, Low-flow, base-flow, and mean-flow regression equations for Pennsylvania streams: U.S. Geological Survey Scientific Investigations Report 2006-5130, 84 p. (http://pubs.usgs.gov/sir/2006/5130/)

Application Version: 4.24.0
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
13C	59425	LICKING CREEK	**3.810**	507.00	28.40	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.111	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	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 (°C)	Disc pH
Camp Tohiglo	PA0080608	0.0120	0.0120	0.0120	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	5.00	8.24	0.00	0.00
NH3-N	25.00	0.00	0.00	0.70

Input Data WQM 7.0

SWP Basin	Stream Code	Stream Name	RMI	Elevation (ft)	Drainage Area (sq mi)	Slope (ft/ft)	PWS Withdrawal (mgd)	Apply FC
13C	59425	LICKING CREEK	**3.600**	499.00	30.90	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 (°C)	Tributary pH	Stream Temp (°C)	Stream pH
Q7-10	0.111	0.00	0.00	0.000	0.000	0.0	0.00	0.00	20.00	7.00	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 (°C)	Disc pH
		0.0000	0.0000	0.0000	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	3.00	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
13C	59425	LICKING CREEK

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 (°C)	Analysis pH
Q7-10 Flow												
3.810	3.15	0.00	3.15	.0186	0.00722	.626	25.58	40.86	0.20	0.065	20.03	7.00
Q1-10 Flow												
3.810	2.74	0.00	2.74	.0186	0.00722	NA	NA	NA	0.18	0.070	20.03	7.00
Q30-10 Flow												
3.810	3.72	0.00	3.72	.0186	0.00722	NA	NA	NA	0.22	0.059	20.02	7.00

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	0.87	Use Inputted Reach Travel Times	☐
Q30-10/Q7-10 Ratio	1.18	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
13C	59425	LICKING CREEK

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
3.810	Camp Tohiglo	16.71	50	16.71	50	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
3.810	Camp Tohiglo	1.88	25	1.88	25	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)		
3.81	Camp Tohiglo	25	25	25	25	5	5	0	0

WQM 7.0 D.O.Simulation

SWP Basin	Stream Code	Stream Name
13C	59425	LICKING CREEK

RMI	Total Discharge Flow (mgd)	Analysis Temperature (°C)	Analysis pH
3.810	0.012	20.029	7.000
Reach Width (ft)	**Reach Depth (ft)**	**Reach WDRatio**	**Reach Velocity (fps)**
25.583	0.626	40.857	0.198
Reach CBOD5 (mg/L)	**Reach Kc (1/days)**	**Reach NH3-N (mg/L)**	**Reach Kn (1/days)**
2.13	0.098	0.15	0.702
Reach DO (mg/L)	**Reach Kr (1/days)**	**Kr Equation**	**Reach DO Goal (mg/L)**
8.224	13.581	Tsivoglou	5
Reach Travel Time (days)			
0.065			

Subreach Results

TravTime (days)	CBOD5 (mg/L)	NH3-N (mg/L)	D.O. (mg/L)
0.006	2.13	0.15	8.24
0.013	2.13	0.15	8.24
0.019	2.13	0.14	8.24
0.026	2.13	0.14	8.24
0.032	2.13	0.14	8.24
0.039	2.13	0.14	8.24
0.045	2.13	0.14	8.24
0.052	2.12	0.14	8.24
0.058	2.12	0.14	8.24
0.065	2.12	0.14	8.24

WQM 7.0 Effluent Limits

SWP Basin	Stream Code	Stream Name
13C	59425	LICKING CREEK

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)
3.810	Camp Tohiglo	PA0080608	0.012	CBOD5	25		
				NH3-N	25	50	
				Dissolved Oxygen			5

TRC_CALC

1A	B	C	D	E	F	G
2	**TRC EVALUATION**					
3	Input appropriate values in B4:B8 and E4:E7					
4	3.15	= **Q stream (cfs)**		**0.5**	= **CV Daily**	
5	0.012	= **Q discharge (MGD)**		**0.5**	= **CV Hourly**	
6	30	= **no. samples**		**1**	= **AFC_Partial Mix Factor**	
7	0.3	= **Chlorine Demand of Stream**		**1**	= **CFC_Partial Mix Factor**	
8	0	= **Chlorine Demand of Discharge**		**15**	= **AFC_Criteria Compliance Time (min)**	
9	**0.5**	= **BAT/BPJ Value**		**720**	= **CFC_Criteria Compliance Time (min)**	
	0	= **% Factor of Safety (FOS)**			=**Decay Coefficient (K)**	
10	Source	Reference	AFC Calculations		Reference	CFC Calculations
11	TRC	**1.3.2.iii**	WLA afc = 54.148		**1.3.2.iii**	WLA cfc = 52.782
12	PENTOXSD TRG	**5.1a**	LTAMULT afc = 0.373		**5.1c**	LTAMULT cfc = 0.581
13	PENTOXSD TRG	**5.1b**	LTA_afc= 20.177		**5.1d**	LTA_cfc = 30.685
14						
15	Source		Effluent Limit Calculations			
16	PENTOXSD TRG	5.1f	AML MULT = 1.231			
17	PENTOXSD TRG	5.1g	AVG MON LIMIT (mg/l) = 0.500		BAT/BPJ	
18			INST MAX LIMIT (mg/l) = 1.635			

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)**