TWO LICK CREEK

INDIANA COUNTY

WATER QUALITY STANDARDS REVIEW

STREAM REDESIGNATION EVALUATION REPORT

Segment: Main Stem,
Two Lick Reservoir tailrace to Yellow Creek
Stream Code: 44073
Drainage List: T

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 Two Lick Creek main stem from the tailrace of the Two Lick Reservoir downstream to Yellow Creek in response to a petition from the Ken Sink Chapter of Trout Unlimited that was accepted for study by the Environmental Quality Board (EQB) on February 17, 2004. The petition requests the Two Lick Creek main stem from the tailrace of the Two Lick Reservoir to the Risinger Discharge be redesignated to High Quality – Cold Water Fishes (HQ-CWF). The Two Lick Creek main stem is currently designated Trout Stocking (TSF). Components of this evaluation include two DEP benthic macroinvertebrate surveys conducted in May 2005 and May 2009, as well as Pennsylvania Fish and Boat Commission (PFBC) fish surveys conducted in August 2004.

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 EQB.

GENERAL WATERSHED DESCRIPTION

Two Lick Creek is a tributary to Blacklick Creek in the Allegheny River watershed (Figure 1). The surveyed portion of the main stem consists of approximately 7.98 stream miles. The surrounding area is characterized by relatively steep topography. The current land use of the entire Two Lick Creek basin upstream of the Yellow Creek confluence (including the area upstream of Two Lick Creek Reservoir) consists of a mix of forested (55.3%) and agricultural (32.8%) lands with some urban/developed areas (9.7%). The land use of the Two Lick Creek basin between the Yellow Creek confluence and the Two Lick Reservoir tailrace is much more urban (31.0%), less forested (37.0%), and about the same agricultural (29.3%).

WATER QUALITY AND USES

Surface Water

Biological data was collected to evaluate water quality conditions in the petitioned main stem, since the indigenous aquatic community is a better indicator of long-term water quality conditions.

There is one surface water withdrawal for a public water supply in this basin. The Pennsylvania American Water Company (PAWC) has a treatment plant on Two Lick Creek approximately one mile below the outfall of the Two Lick Reservoir. PAWC also has two NPDES permitted discharges (PA0000302) associated with this treatment plant. Two additional NPDES permitted discharges are

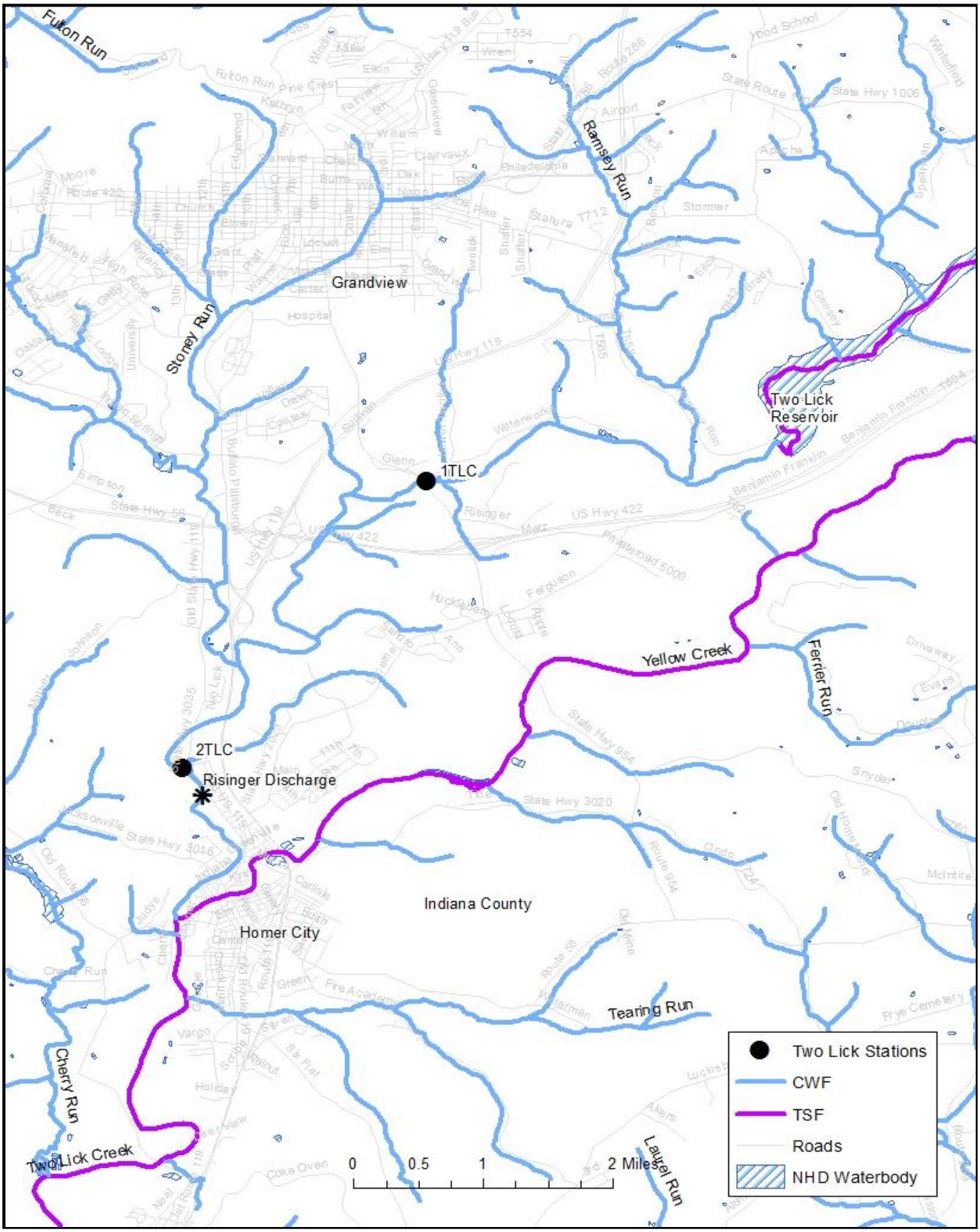

Figure 1. Two Lick Creek – Station Locations

located on the candidate reach. Prime Metals and Alloys Inc. (PA0041378) has a sewage discharge and AI Construction (PAR706117) has a stormwater discharge.

There are also several abandoned mine drainage (AMD) discharges along the candidate reach. The Lucerne 3A discharge is located upstream from Station 1TLC. This is a low pH and high metals concentration discharge, but since it is a small percentage of the total flow of Two Lick Creek its effects are rapidly diluted as indicated by the presence of five genera of Mayflies at 1TLC (Table 5). There are two low flow alkaline discharges located between station 1TLC and 2TLC that have very little effect on the water quality of Two Lick Creek. At River Mile (RM) 7.8 in Homer City there is a large AMD discharge called the Risinger Discharge (Figure 1). Two Lick Creek is currently listed on the Commonwealth's 303(d) list of impaired waters (Category 5 of the Integrated Report) for the aquatic life use.

Table 1. Two Lick Creek – Station Locations

STATION	LOCATION
1TLC	Two Lick Creek (07253), 30 meters upstream from the SR954 Bridge. White Township, Indiana County Lat: 40.5913 Long: -79.1391
2TLC	Two Lick Creek (07253), 650 meters downstream from the SR3035 Bridge. Center Township, Indiana County Lat: 40.5583 Long: -79.1663
R1 (Ref)	Cross Fork (23765), 15 meters downstream of the ford of the old road (T416). Stewardson Township, Potter County Lat: 41.4949 Long: -77.8206
R2 (Ref)	Kettle Creek (23661), 130 meters upstream of SR144 Bridge. Stewardson Township, Potter County Lat: 41.5009 Long: -77.7706

Table 2. Two Lick Creek – Water Chemistry

STATION	2TLC[1]
Field Parameters	
Temp (°C)	17.4
Sp. Cond (µs/cm)	315
DO (mg/L)	11.9
Laboratory Parameters	
pH	7.7
Alkalinity (mg/L)	34
Acidity (mg/L)	3.0
Hardness (mg/L)	102
TDS (mg/L)	176
TSS (mg/L)	2
NH_3 –N (mg/L)	0.04
NO_2 –N (mg/L)	0.01
NO_3 –N (mg/L)	1.27
Total P (mg/L)	0.12
Ca (mg/L)	25.6
Mg (mg/L)	9.15
Cl (mg/L)	24.5
SO_4 (mg/L)	83.4
As (µg/L)	< 4.0
As Diss (µg/L)	< 4.0
Cd (µg/L)	< 0.2
Cd Diss (µg/L)	< 0.2
Cr (µg/L)	<50
Cu (µg/L)	< 4.0
Cu Diss (µg/L)	< 4.0
Fe (µg/L)	259
Pb (µg/L)	< 1.0
Pb Diss (µg/L)	< 1.0
Mn (µg/L)	104
Ni (µg/L)	4.8
Ni Diss (µg/L)	< 4.0
Zn (µg/L)	< 5.0
Zn Diss (µg/L)	< 5.0
Al (µg/L)	72.3
Fecal (CFU/100 mL)	60

"<" indicate concentrations below the reporting limit.

[1] Collected May 2005

Water Chemistry

No long-term water quality data were available to allow a direct comparison to water quality criteria. A discrete water chemistry sample, collected in 2005 by the DEP at Station 2TLC, showed water quality characteristic of anthropogenic influences (Table 2). This sample showed elevated levels of chloride, sulfate and magnesium.

Aquatic Biota

The indigenous aquatic community is an excellent indicator of long-term conditions and is used as a measure of water quality. DEP staff collected habitat and benthic macroinvertebrate data at 3 stations (2 candidate and 1 reference) during the May 2005 survey and at 2 stations (1 candidate and 1 reference) during the May 2009 survey (Figure 1, Table 1).

Habitat. Instream habitat was assessed at each station within the petitioned main stem as well as the Cross Fork reference station in 2005, and again in 2009 at 2TLC and the reference station on Kettle Creek. Total habitat scores (Table 3) were within the suboptimal range at 185 – 186. Suboptimal scores were due to a combination of increased embeddedness, reduced availability of velocity/depth regimes and reduced riparian vegetation zone width. An optimal score was found at the Cross Fork reference station and a suboptimal score was found at the Kettle Creek reference station.

Table 3. Two Lick Creek – Habitat Assessment Results

PARAMETER	STATIONS[1]			REFERENCE[2]	
	1TLC[3]	2TLC[3]	2TLC[4]	R1[3]	R2[4]
1. instream cover	15	18	16	16	16
2. epifaunal substrate	18	16	17	19	17
3. embeddedness	16	11	12	17	18
4. velocity/depth	12	16	17	15	18
5. channel alterations	17	17	17	18	15
6. sediment deposition	17	15	15	18	14
7. riffle frequency	16	16	14	17	17
8. channel flow status	15	14	17	13	15
9. bank condition	16	15	15	15	10
10. bank vegetation protection	17	16	17	17	11
11. grazing/disruptive pressure	15	17	17	18	19
12. riparian vegetation zone width	12	14	12	17	19
Total Score	186	185	186	200	189
Rating[5]	SUB	SUB	SUB	OPT	SUB

[1] Refer to Figure 1 and Table 1 for station locations
[2] Reference Stations – Refer to Table 1 for locations
[3] Collected May 2005
[4] Collected May 2009
[5] OPT=Optimal (≥192); SUB=Suboptimal (132-192)

Benthos. Benthic macroinvertebrate samples were collected at all stations (Table 4) using the DEP's benthic sampling methodology, which is a modification of EPA's Rapid Bioassessment Protocols (RBPs; Plafkin, et al 1989; Barbour, et al 1999). Taxonomic diversity was moderate at station 1TLC with a mixture of individuals from taxa that are sensitive to water quality degradation (e.g. *Ephemerella, Haploperla, and Antocha*) and taxa that are more tolerant of such pollution (e.g. *Baetis, Hydropsyche, Stenelmis, and Chironomidae*). Very few intolerant taxa were present at 2TLC in both the 2005 and 2009 samples. The numbers of tolerant individuals greatly outnumbered

Table 4. Two Lick Creek – Semi-Quantitative Benthic Macroinvertebrate Data

TAXA		STATIONS[1]			REFERENCE[2]	
		1TLC[3]	2TLC[3]	2TLC[4]	R1[3]	R2[4]
MAYFLIES						
Baetidae	***Acentrella***				19	1
	Baetis	8		1	35	
Isonychiidae	***Isonychia***		1	2		14
Heptageniidae	***Epeorus***				16	5
	Leucrocuta					2
	Stenacron	3	1			
	Stenonema	2				
	Maccaffertium			3		1
	Cinygmula				2	6
Ephemerellidae	***Drunella***				39	37
	Ephemerella	1			17	29
	Serratella				2	14
Caenidae	***Caenis***		1	1		
Leptophlebiidae	***Leptophlebiidae***	1				
	Paraleptophlebia				21	
Ephemeridae	***Ephemera***					1
STONEFLIES						
Pteronarcidae	***Pteronarcys***					2
Nemouridae	***Amphinemura***	3			3	1
Leuctridae	***Leuctra***	1			9	5
Perlidae	***Paragnetina***					2
	Acroneuria					7
Perlodidae	***Diploperla***				1	
	Isoperla				2	
Chloroperlidae	***Alloperla***		1			
	Haploperla	2				
CADDISFLIES						
Philopotamidae	***Chimarra***	6				1
	Dolophilodes				6	2
Polycentropodidae	***Polycentropus***	1				
Hydropsychidae	***Diplectrona***				1	
	Ceratopsyche			4		2
	Cheumatopsyche	30	3	18	7	17
	Hydropsyche	57		2	11	
Rhyacophilidae	***Rhyacophila***				2	
Lepidostomatidae	***Lepidostoma***					1
Uenoidae	***Neophylax***				1	2

[1] Refer to Figure 1 and Table 1 for station locations
[2] Reference Stations – Refer to Table 1 for locations
[3] Collected May 2005
[4] Collected May 2009

Table 4 (cont.). Two Lick Creek – Semi-Quantitative Benthic Macroinvertebrate Data

TAXA		STATIONS[1]			REFERENCE[2]	
		1TLC[3]	2TLC[3]	2TLC[4]	R1[3]	R2[4]
TRUE FLIES						
Ceratopogonidae	***Ceratopogon***			1		
Empididae	***Hemerodromia***	1		1		
Tipulidae	***Antocha***	10		1	1	
Simuliidae	***Prosimulium***					2
	Simulium	3			16	22
Chironomidae	***Chironomidae***	24	154	54	10	27
MISC. INSECT TAXA						
Gomphidae	***Lanthus***					1
Corydalidae	***Nigronia***					2
Psephenidae	***Psephenus***			7		13
Elmidae	***Optioservus***	15	1	32	2	6
	Oulimnius				1	
	Stenelmis	7		24		
NON-INSECT TAXA						
Turbellaria				9		
Nematoda				1		
Ancylidae	***Ancylidae***			1		
Pisidiidae	***Sphaeriidae***			1		
Oligochaeta		1	29	46		1
Crangonyctidae	***Crangonyx***		2	5		
Asellidae	***Caecidotea***			1		
	Richness	19	9	21	23	29
	Total Taxa	176	193	215	224	226

[1] Refer to Figure 1 and Table 1 for station locations
[2] Reference Stations – Refer to Table 1 for locations
[3] Collected May 2005
[4] Collected May 2009

intolerant individuals at both stations. All stations had elevated numbers of Chironomidae that made up 14% to 80% of the subsamples. Elevated Chironomidae numbers along with the numbers of the other tolerant taxa listed above would indicate that the candidate reach is receiving some nutrient enrichment from the basin above the Two Lick Reservoir.

Fishes. The PFBC surveyed the candidate reach in August 2004 (Table 5). Wild brown trout, including young-of-year, were collected at two stations within the candidate reach. At the upstream station (near Station 1TLC) a wild brown trout population of 10.4 kg/ha was estimated. The PFBC also collected mottled sculpin, another cold water fish species, in good numbers (Lorson et al 2005).

Table 5. Two Lick Creek – PFBC Fish Data

COMMON NAME	SCIENTIFIC NAME	RIVER MILE	
		11.8	8.4
Brown trout	***Salmo trutta***	X	X
Bluntnose minnow	***Pimephales notatus***	X	
Blacknose dace	***Rhinichthys atratulus***	X	X
Creek chub	***Semotilus atromaculatus***	X	X
Central stoneroller	***Campostoma anomalum***	X	X
White sucker	***Catostomus commersoni***	X	X
Mottled sculpin	***Cottus bairdi***	X	X
Rock bass	***Ambloplites rupestris***	X	X
Smallmouth bass	***Micropterus dolomieui***	X	X
Largemouth bass	***Micropterus salmoides***		X
Pumpkinseed	***Lepomis gibbosus***		X
Bluegill	***Lepomis macrochirus***	X	
Johnny darter	***Etheostoma nigrum***	X	

BIOLOGICAL USE QUALIFICATIONS

The biological use qualifying criteria applied to Two Lick Creek was the DEP's integrated benthic macroinvertebrate scoring test described at 25 Pa. Code §§ 93.4b(a)(2)(i)(A) and 93.4b(b)(1)(v). Selected benthic macroinvertebrate community metrics from Two Lick Creek stations collected in 2005 were compared to those from the Cross Fork (R1) reference station. The Two Lick Creek station collected in 2009 (2TLC) was compared to Kettle Creek (R2) (Table 6). The stations on Cross Fork and Kettle Creek were used as references because candidate and reference streams are freestone streams and have similar drainage areas. In addition, Cross Fork and Kettle Creek have served as EV reference streams in other DEP surveys. The comparisons were done using the following metrics that were selected as being indicative of community health: taxa richness, modified EPT index, modified Hilsenhoff Biotic Index, percent dominant taxon, and percent modified mayflies.

Based on these five metrics, candidate stations 1TLC and 2TLC collected in 2005 had Biological Condition Scores (BCS) of 35% and 0% respectively. The candidate station 2TLC collected in 2009 had a BCS of 33%. As a result, these candidate stations do not meet the 83% comparison standard required to qualify as High Quality Waters (§ 93.4b(a)(2)(i)(A)).

Table 6. Two Lick Creek – RBP Metric Comparison

METRIC	STATIONS[1]			REFERENCE[2]	
	1TLC[3]	2TLC[3]	2TLC[4]	R1[3]	R2[4]
1. TAXA RICHNESS	19	9	21	23	29
Cand/Ref (%)	83	39	72		
Biol. Cond. Score	8	0	5	8	8
2. MOD. EPT INDEX	8	3	2	15	19
Cand/Ref (%)	53	20	11		
Biol. Cond. Score	1	0	0	8	8
3. MOD. HBI	5.00	6.52	6.38	2.94	2.98
Cand-Ref	2.06	3.58	3.40		
Biol. Cond. Score	0	0	0	8	8
4. % DOMINANT TAXA	32	80	25.1	17	16.4
Cand-Ref	15	63	8.7		
Biol. Cond. Score	5	0	8	8	8
5. % MOD. MAYFLIES	4	1	2	52	48.7
Ref-Cand	48	51	46.7		
Biol. Cond. Score	0	0	0	8	8
TOTAL BIOLOGICAL CONDITION SCORE	14	0	13	40	40
% COMPARABILITY TO REFERENCE	**35**	**0**	**33**		

[1] Refer to Figure 1 and Table 1 for station locations
[2] Reference Stations – Refer to Table 1 for locations
[3] Collected May 2005
[4] Collected May 2009

PUBLIC RESPONSE AND PARTICIPATION SUMMARY

Notice of acceptance of the petition by the EQB for study was published in the Pennsylvania Bulletin on February 17, 2004 (34 Pa.B. 1402). The DEP provided public notice of this evaluation and requested any technical data from the general public through publication in the Pennsylvania Bulletin on March 13, 2004 (34 Pa.B. 1520). A similar notice was also published in The Indiana Gazette newspaper on March 12, 2004. In addition, a notice was also sent to Center and White townships along with the Indiana County Office of Planning and Development on March 2, 2004 to notify them of this evaluation.

Final Draft Notice, Comments and Response. Once the final draft report was completed it was made available to the petitioner, affected municipalities, County Planning Commissions, County Conservation Districts, the Department of Conservation and Natural Resources, the PFBC, and the Pennsylvania Game Commission in a letter dated February 24, 2017 with a public comment period ending 45-days later. In addition, the DEP provided public notice of the draft report comment period on the DEP's website. The PFBC offered comments in support of the recommendation, while representatives from the Ken Sink Chapter of Trout Unlimited and the Indiana County Conservation District (the original petitioner group) offered comments in opposition. In addition, comments were provided by the Susquehanna River Basin Commission (SRBC) regarding the current Two Lick Creek listing on the Commonwealth's 303(d) list of impaired waters (Category 5 of the Integrated Report). 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 25 Pa. Code § 93.3 and § 93.4b, the DEP recommends that the designated use of Two Lick Creek main stem from the Two Lick Reservoir tailrace to the confluence of Yellow Creek be changed from the current TSF to CWF designated use based on the presence of a naturally reproducing Salmonidae community and other flora and fauna indigenous to a cold water habitat. This designation affects 6.7 stream miles but does not reflect the HQ designation requested in the petition. Additionally, due to the poor macroinvertebrate diversity and high number of pollution tolerant taxa, Two Lick Creek will continue to be listed on the Commonwealth's 303(d) list of impaired waters (Category 5 of the Integrated Report) for the aquatic life use.

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.

Lorson, R., G. Smith. 2005. Two Lick Creek, Sections 01, 02, and 03 (818D) Management Report. Pennsylvania Fish and Boat Commission.

Plafkin, J.L., M.T. Barbour, K.D. Porter, S.K. Gross, R.M. Hughes. 1989. Rapid Bioassessment Protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. EPA/444/4-89-001. United States Environmental Protection Agency; Office of Water. Washington, D.C.