

**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)  
DIVISION OF WATER QUALITY STANDARDS  
BUREAU OF CLEAN WATER  
DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**2016**

## **INTRODUCTION**

The Department 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 Department 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.

## **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 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).

### **Water Chemistry**

No long-term water quality data were available to allow a direct comparison to water quality criteria. A grab sample, collected in 2005 by the Department 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. Department 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.

**Benthos.** Benthic macroinvertebrate samples were collected at all stations (Table 5) using the Department'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 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 4). 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).

## **BIOLOGICAL USE QUALIFICATIONS**

The biological use qualifying criteria applied to Two Lick Creek was the Department's integrated benthic macroinvertebrate scoring tests 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 Departmental 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)).

## **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 Department provided public notice of this redesignation 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.

## **RECOMMENDATIONS**

Based on applicable regulatory definitions and requirements of § 93.3 and § 93.4b, the Department 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 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 in the Pennsylvania Integrated Water Quality Monitoring and Assessment Report as impaired for the aquatic life use.

## REFERENCES

- Barbour, Michael T., Jeroen Gerritsen, Blaine D. Snyder, James B. Stribling. 1999. Rapid Bioassessment Protocols For Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish. Second Edition. United States Environmental Protection Agency. EPA 841-B-99-002
- Lorson, R, G. Smith. 2005. Two Lick Creek, Sections 01, 02, and 03 (818D) Management Report. Pennsylvania Fish and Boat Commission
- Plafkin, JL, MT Barbour, KD Porter, SK Gross, & RM Hughes. 1989. Rapid Bioassessment Protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. United States Environmental Protection Agency. EPA/444/4-89-001.

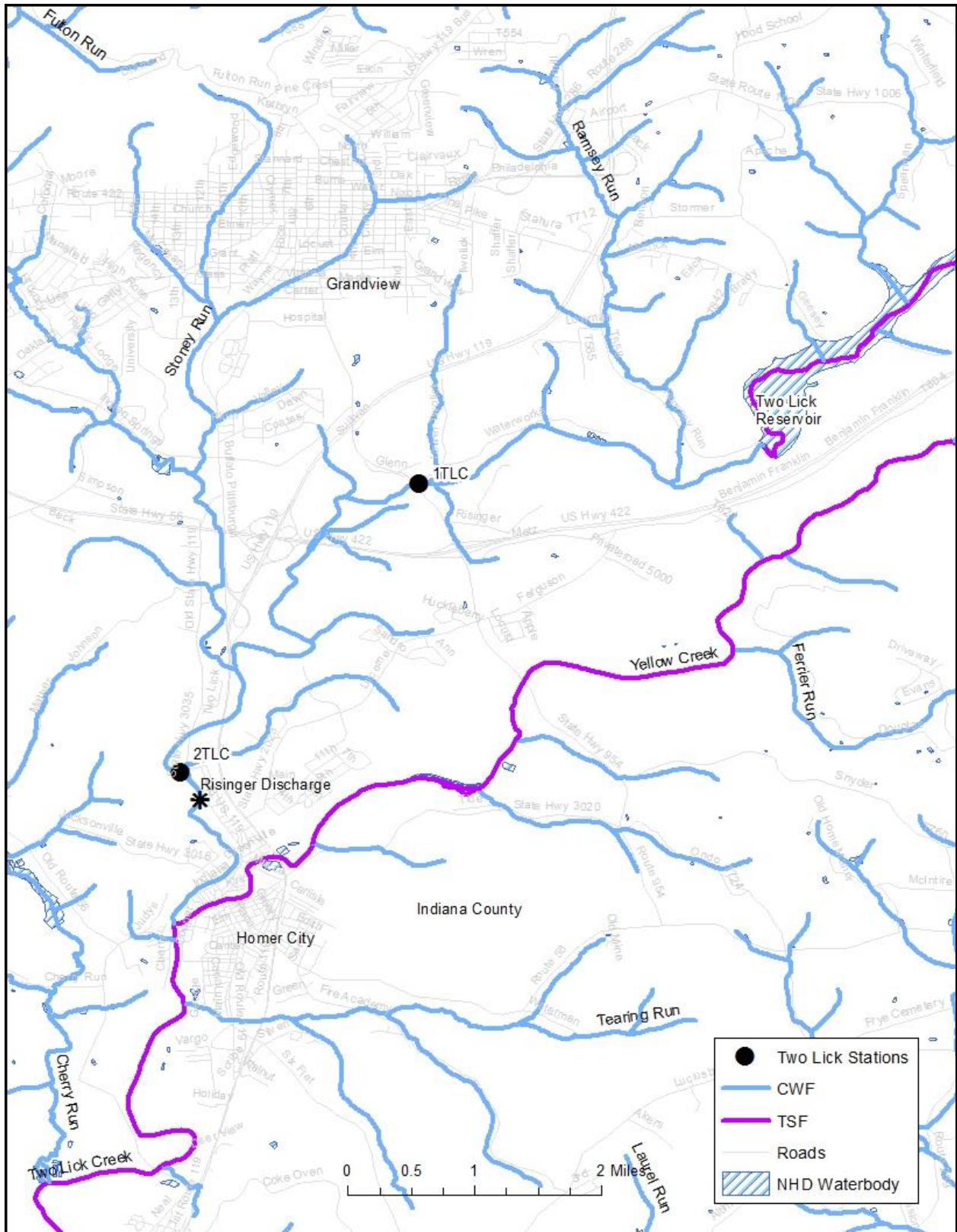


Figure 1. Two Lick Creek – Station Locations

Table 1. Two Lick Creek – Station Locations

<b><u>STATION</u></b>	<b><u>LOCATION</u></b>
1TLC	Two Lick Creek (07253) approximately 30 meters upstream from the SR954 Bridge. White Township, Indiana County Lat: 40.5913      Long: -79.1391
2TLC	Two Lick Creek (07253) approximately 650 meters downstream from the SR3035 Bridge. Center Township, Indiana County Lat: 40.5583      Long: -79.1663
R1 (Ref)	Cross Fork (23765) approximately 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) approximately 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 <sup>1</sup>
<b>Field Parameters</b>	
Temp (°C)	17.4
Sp. Cond (µmhos)	315
DO (mg/l)	11.9
<b>Laboratory Parameters</b>	
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 <sub>3</sub> -N (mg/l)	0.04
NO <sub>2</sub> -N (mg/l)	0.01
NO <sub>3</sub> -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 <sub>4</sub> (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 coliforms	60/100 ml

\*Measurements with "<" indicate concentrations below the reporting limit.

<sup>1</sup> Collected May 2005

Table 3. Two Lick Creek – Habitat Assessment Results

PARAMETER	STATIONS <sup>1</sup>			REFERENCE <sup>2</sup>	
	1TLC <sup>3</sup>	2TLC <sup>3</sup>	2TLC <sup>4</sup>	R1 <sup>3</sup>	R2 <sup>4</sup>
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
<b>Total Score</b>	186	185	186	200	189
<b>Rating<sup>5</sup></b>	SUB	SUB	SUB	OPT	SUB

<sup>1</sup> Refer to Figure 1 and Table 1 for station locations

<sup>2</sup> Reference Stations – Refer to Table 1 for locations

<sup>3</sup> Collected May 2005

<sup>4</sup> Collected May 2009

<sup>5</sup> OPT=Optimal (≥192); SUB=Suboptimal (132-192)

Table 4. Two Lick Creek – PFBC Fish Data

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

Table 5. Two Lick Creek – Semi-Quantitative Benthic Macroinvertebrate Data

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

<sup>1</sup> Refer to Figure 1 and Table 1 for station locations

<sup>2</sup> Reference Stations – Refer to Table 1 for locations

<sup>3</sup> Collected May 2005

<sup>4</sup> Collected May 2009

Table 5 (cont.). Two Lick Creek – Semi-Quantitative Benthic Macroinvertebrate Data

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

- <sup>1</sup> Refer to Figure 1 and Table 1 for station locations  
<sup>2</sup> Reference Stations – Refer to Table 1 for locations  
<sup>3</sup> Collected May 2005  
<sup>4</sup> Collected May 2009

Table 6. Two Lick Creek – RBP Metric Comparison

METRIC	STATIONS <sup>1</sup>			REFERENCE <sup>2</sup>	
	1TLC <sup>3</sup>	2TLC <sup>3</sup>	2TLC <sup>4</sup>	R1 <sup>3</sup>	R2 <sup>4</sup>
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		

<sup>1</sup> Refer to Figure 1 and Table 1 for station locations

<sup>2</sup> Reference Stations – Refer to Table 1 for locations

<sup>3</sup> Collected May 2005

<sup>4</sup> Collected May 2009