Beneficial Use Support Document

Lower Muskingum River Tributaries

(Rokeby Lock to the Ohio River)

Division of Surface Water
Ecological Assesment Section
June 2016

Recommendations

The streams in the lower Muskingum River tributaries study area currently listed in the Ohio Water Quality Standards (WQS) are assigned one or more of the following aquatic life use designations: Coldwater Habitat (CWH), Exceptional Warmwater Habitat (EWH), and Warmwater Habitat (WWH). No aquatic life use designations in this survey have been previously verified using biological data; as such, this study used biological data to evaluate and establish aquatic life uses for streams in the lower Muskingum River tributaries study area. Seventy-eight streams were evaluated for aquatic life and recreational use potential between 2012 and 2014 (Table 1). Significant findings include the following:

- Ten streams were verified as WWH. These streams are Oilspring Run, Guyst Fork, Bear Run, Dyes Fork, Horse Run, Congress Run, Bear Creek, Rainbow Creek, Devol Run, and Indian Run.
- Two streams had segments verified as WWH and also segments recommended as EWH.
    - Meigs Creek upstream from the Morgan County line (RM 17.9) was verified WWH; all other segments are recommended EWH. The macroinvertebrate assemblage upstream RM 17.9 was not meeting EWH expectations. Meigs Creek downstream from the Morgan County line has excellent habitat that is able to support very good and exceptional fish and macroinvertebrate communities.
    - Mans Fork from Bear Run (RM 1.25) to the mouth has been verified as WWH, all other segments are recommended EWH. Bear Run is contributing a significant sediment load to the lower section of Mans Fork. If the excessive sediment load from Bear Run is reduced, Mans Fork could meet EWH criteria for all segments.
- Ten streams were verified as EWH. These streams are Bald Eagle Run, Olive Green Creek, Dinner Fork, Keith Fork, West Branch Wolf Creek, Goshen Run, Aldridge Run, Coal Run, Buckeye Run, and Laurel Run.
- Four streams were verified as EWH and also recommended for CWH. These streams were Limestone Run, Little Olive Green Creek, Cow Run, and North Branch Coal Run. All four streams supported exceptional biological communities which included coldwater fish and at least four coldwater macroinvertebrate taxa, as well as temperatures that supported these taxa.
- Thirteen streams have been recommended as CWH. These streams were Doudna Run, Mill Run, Perry Run, Stony Creek, Allen Run, Scott Run (Tributary to Little Olive Green Creek), Elk Run, Peeper Run, Little Wolf Creek, McPherson Run, Scott Run (Tributary to Aldridge Run), Shrader Run, and Chainey Run. These streams had the requisite fish and macroinvertebrate communities to support the CWH designation.
- Two previously undesignated streams had exceptional fish and macroinvertebrate communities that also supported coldwater taxa. These streams were Schrivers Fork and Taylor Fork, and are recommended as EWH and CWH.
- Chaineyville Run upstream from RM 0.33 had fish and macroinvertebrate taxa that reflected communities achieving the CWH taxa thresholds, and has been recommended as CWH. The remaining portion of the stream has been recommended as WWH based solely on the macroinvertebrate assemblage.
- Eight streams have been recommended as EWH. These streams are Fourmile Run, Onion Run, Tributary to West Branch Wolf Creek (RM 33.33), Walnut Run, Big Run, Straight Run, Cat Creek, and Right Branch Cat Creek. These streams had good to excellent habitat that supported very good to exceptional fish and macroinvertebrate assemblages indicating a change from an unverified WWH use.

- Twenty-eight streams had fish and macroinvertebrate assemblages able to support WWH, or habitat that would be able to support WWH fish and macroinvertebrate assemblages. These streams, previously unverified EWH, are Bell Creek, Sharon Fork, Reasoners Run, Wolf Creek, Kickapoo Creek, Pleasant Run, Hedgehog Creek, Buck Run, Browns Run (Tributary to South Branch Wolf Creek), Lick Run, Mile Run, Whitewater Creek, Lucas Run, South Branch Wolf Creek, Horse Run, Halfway Run, Turkeyhen Run, Browns Run (Tributary to West Branch Wolf Creek), South Fork South Branch Wolf Creek, Southwest Fork South Branch Wolf Creek, Painter Run, Plum Run, Flint Run, Duck Creek, Boseman Run, Hayward Run, Cushing Run, and Second Creek.

All streams or stream segments in the lower Muskingum River tributaries study area should retain or be assigned the Primary Contact Recreation use. In addition, all streams in the study area should retain or be assigned the Agricultural Water Supply and Industrial Water Supply uses.
Five sites were impaired due to direct habitat alterations; channelization, loss of riparian habitat, and livestock access to the stream. Turkeyhen Run (RM 1.20) at County Road 126, Browns Run off of Anderson Road (RM 0.35), Painter Run at Anderson Road (RM 0.42), Congress Run at Culver Run Road (RM 1.63), and Cushing Run at Tick Hill Road (RM 1.05) would have aquatic life improvement with the remediation of the habitat alterations.

Table 1. Waterbody use designation recommendations for the lower Muskingum River tributaries. Designations based on the 1978 and 1985 water quality standards appear as asterisks (*). A plus sign (+) indicates a confirmation of an existing use and a triangle (▲) denotes a new recommended use based on the findings of this report.

Water Body Segment	Use Designations													Comments
		Aquatic Life Habitat						Water Supply			Recreation			
	SRW	WWH	EWH	MWH	SSH	CWH	LRW	PWS	AWS	IWS	BW	PCR	SCR	
Indian Run		*/+							+	+		+		
Second Creek		▲							+	+		+		
Devol Run		*/+							+	+		+		
Rainbow Creek		*/+							+	+		+		
Bear Creek		*/+							+	+		+		
Cat Creek			▲						+	+		+		
Right Branch Cat Creek			▲						+	+		+		
Big Run			▲						+	+		+		
Straight Run			▲						+	+		+		
Cushing Run		▲							+	+		+		
Congress Run		*/+							+	+		+		
Wolf Creek	*	▲							+	+		+		
Hayward Run	*	▲							+	+		+		
Duck Creek	*	▲							+	+		+		
Boseman Run	*	▲							+	+		+		
Flint Run	*	▲							+	+		+		
South Branch Wolf Creek	*	▲							+	+		+		
Plum Run		▲							+	+		+		
Painter Run	*	▲							+	+		+		
Southwest Fork	*	▲							+	+		+		
South Fork	*	▲							+	+		+		
Browns Run	*	▲							+	+		+		
Turkeyhen Run	*	▲							+	+		+		
Horse Run	*	▲							+	+		+		
Halfway Run	*	▲							+	+		+		
Chainey Run	*					▲			+	+		+		
West Branch Wolf Creek	*		*/+						+	+		+		
Lucas Run	*	▲							+	+		+		
Whitewater Creek	*	▲							+	+		+		
Laurel Run	*		*/+						+	+		+		
Coal Run	*		*/+						+	+		+		
Shrader Run	*					▲			+	+		+		

Water Body Segment	Use Designations													Comments
		Aquatic Life Habitat						Water Supply			Recreation			
	SRW	WWH	EWH	MWH	SSH	CWH	LRW	PWS	AWS	IWS	BW	PCR	SCR	
North Branch	*		*/+			▲			+	+		+		
Buckeye Run	*		*/+						+	+		+		
Mile Run	*	▲							+	+		+		
Walnut Run			▲						+	+		+		
Aldridge Run	*		*/+						+	+		+		
Scott Run	*					▲			+	+		+		
Lick Run	*	▲							+	+		+		
McPherson Run	*					▲			+	+		+		
Goshen Run	*		*/+						+	+		+		
Browns Run	*	▲							+	+		+		
Little Wolf Creek	*					▲			+	+		+		
Chaineyville Run -RM 0.33 to Mouth	*	▲							+	+		+		
-All other segments	*					▲			+	+		+		
Trib at West Branch Wolf Creek RM 33.33			▲						+	+		+		
Buck Run	*	▲							+	+		+		
Pleasant Run	*	▲							+	+		+		
Hedgehog Creek	*	▲							+	+		+		
Kickapoo Creek	*	▲							+	+		+		
Peeper Run	*					▲			+	+		+		
Olive Green Creek	*		*/+						+	+		+		
Cow Run	*		*/+			▲			+	+		+		
Elk Run	*					▲			+	+		+		
Little Olive Green Creek	*		*/+			▲			+	+		+		
Scott Run	*					▲			+	+		+		
Allen Run	*					▲			+	+		+		
Stony Creek	*					▲			+	+		+		
Reasoners Run	*	▲							+	+		+		
Keith Fork	*		*/+						+	+		+		
Taylor Fork			▲			▲			+	+		+		
Schrivers Fork			▲			▲			+	+		+		
Limestone Run	*		*/+			▲			+	+		+		
Sharon Fork	*	▲							+	+		+		
Dinner Fork	*		*/+						+	+		+		

Water Body Segment	Use Designations													Comments
	SRW	Aquatic Life Habitat						Water Supply			Recreation			
		WWH	EWH	MWH	SSH	CWH	LRW	PWS	AWS	IWS	BW	PCR	SCR	
Meigs Creek – Morgan County line (RM 17.9) to the mouth			▲						+	+		+		
Meigs Creek – All other segments		*/+							+	+		+		
Onion Run			▲						+	+		+		
Perry Run						▲			+	+		+		
Fourmile Run			▲						+	+		+		
Dyes Fork		*/+							+	+		+		
Horse Run		*/+							+	+		+		
Mans Fork – Bear Run (RM 1.25) to the mouth		*/+							+	+		+		
Mans Fork – All other segments			▲						+	+		+		
Bear Run		*/+							+	+		+		
Guyst Fork		*/+							+	+		+		
Mill Run						▲			+	+		+		
Bald Eagle Run	*		*/+						+	+		+		
Doudna Run						▲			+	+		+		
Bell Creek		▲							+	+		+		
Oilspring Run		*/+							+	+		+		

SRW = state resource water; WWH = Warmwater Habitat; EWH = Exceptional Warmwater Habitat; MWH = Modified Warmwater Habitat; SSH = Seasonal Salmonid Habitat; CWH = Coldwater Habitat; LRW = Limited Resource Water; PWS = Public Water Supply; AWS = Agricultural Water Supply; IWS = Industrial Water Supply; BW = Bathing Water; PCR = Primary Contact Recreation; SCR = Secondary Contact Recreation.

Table 2. Aquatic life use attainment status for stations sampled in the lower Muskingum River tributaries study area based on data collected June – October, 2012 and June – October, 2013. The Index of Biotic Integrity (IBI), Modified Index of well-being (MIwb), and Invertebrate Community Index (ICI) are scores based on the performance of the biotic community. The Qualitative Habitat Evaluation Index (QHEI) is a measure of the ability of the physical habitat of the stream to support a biotic community. The lower Muskingum River tributaries are located in the Western Allegheny Plateau (WAP) ecoregion. If biological impairment has occurred, the cause(s) and source(s) of the impairment are noted. Gray-shaded sites denote Limited Warmwater Habitat (LWH)/State Resource Water (SRW) supplemental grant sites.

Location	STORET (RM)[a]	DRAIN. (mi^2)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
Oilspring Run (17-087-000)	**WWH Existing (v)**								
Northwest of McConnelsville at St. Rt. 669	R16G63 (0.10)	6.2^{H}	26^{*}	-	MG^{ns}	66.8	**Non**	- Organic enrichment biological indicators - Other Flow Regime Alterations	- Discharges from Biosolids (SLUDGE) Storage, Application or Disposal - Impacts from Hydrostructure Flow Regulation/Modification
Bell Creek (17-001-014)	**WWH-Recommended**								
At McConnelsville at St. Rt. 376	R16G66 (0.03)	3.8^{H}	42	-	MG^{ns}	60.3	**FULL**		
Doudna Run (17-083-000)	**CWH-Recommended**								
South of McConnelsville at Upper Doudna Rd. (C.R. 70)	302251 (0.25)	3.2^{H}	52	-	G	70.3	**FULL**		
Bald Eagle Run (17-001-001)	**EWH Existing (v)**								
Near Stockport Bridge at Tieber Rd.	R16G69 (0.65)	10.1^{H}	46^{ns}	-	E	68.8	**FULL**		
Mill Run (17-919-000)	**CWH-Recommended**								
West of Luke Chute at St. Rt. 266	R16G70 (0.30)	3.1^{H}	46	-	E	54.8	**FULL**		
Meigs Creek (17-920-000)	**WWH Existing (v)**								
Southeast of Museville at Drake and Martin Rd.	R16G78 (19.84)	18.0^{H}	54	-	G	57.5	**FULL**		
Meigs Creek (17-920-000)	**EWH-Recommended**								
Upstream Mans Fork at St. Rt. 78	R16G77 (11.19)	35.6^{W}	52	9.2^{ns}	46	76.0	**FULL**		
At Unionville, Upstream Dyes Fork at C.R. 11	R16S17 (5.43)	73.0^{W}	50	9.3^{ns}	44^{ns}	72.8	**FULL**		
At Mill Grove at Unionville Rd.	R19S10 (2.28)	136.0^{B}	48^{ns}	9.4	E	78.8	**FULL**		
Guyst Fork (17-935-000)	**WWH Existing (v)**								
Southeast of Museville, at mouth at Rural Dale Rd.	R16G79 (0.05)	6.1^{H}	54	-	MG^{ns}	68.3	**FULL**		
Mans Fork (17-933-000)	**EWH-Recommended**								
At Bone Rd. (Upper Crossing)	R16G40 (5.81)	12.6^{H}	54	-	E	70.3	**FULL**		

Location	STORET (RM)[a]	DRAIN. (mi^2)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
Mans Fork (17-933-000)	**WWH Existing (v)**								
Northeast of McConnelsville Near Mouth at Gerlach Rd.	R19S13 (0.31)	28.0^{W}	46	9.1	44	74.0	**FULL**		
Bear Run (17-934-000)	**WWH Existing (v)**								
At Town of Meigs at St. Rt. 78	R16G38 (0.19)	3.2^{H}	42	-	G	55.0	**FULL**		
Dyes Fork (17-926-000)	**WWH Existing (v)**								
At Woodgrove Rd. (C.R. 27)	302267 (11.70)	16.7^{H}	52	-	VG	84.8	**FULL**		
North of Unionville at St. Rt. 78/83	R19S12 (5.76)	38.0^{W}	47	8.3^{ns}	42	81.0	**FULL**		
At Unionville, Adjacent Stenger Ln.	203910 (0.30)	45.0^{W}	50	8.5	40	76.8	**FULL**		
Horse Run (17-927-000)	**WWH Existing (v)**								
Northeast of Bristol at St. Rt. 83	R16G50 (2.90)	5.6^{H}	46	-	G	70.0	**FULL**		
Fourmile Run (17-924-000)	**EWH-Recommended**								
Southwest of Unionville at Lindmore Rd.	R16G74 (0.54)	12.2^{H}	54	-	E	76.8	**FULL**		
Perry Run (17-923-000)	**CWH–Recommended**								
At Mill Grove at St. Rt. 60	R16G72 (0.11)	3.9^{H}	44	-	E	69.5	**FULL**		
Onion Run (17-921-000)	**EWH-Recommended**								
At McMannis-Riggs Rd.	R16G71 (0.85)	4.3^{H}	48^{ns}	-	E	68.5	**FULL**		
Olive Green Creek (17-070-000)	**EWH Existing (v)**								
Downstream Trib. (RM 18.2)	203861 (18.10)	8.9^{H}	47^{ns}	-	E	72.8	**FULL**		
Upstream Sharon Fork at Jake Forty Rd.	R19G11 (14.43)	12.7^{H}	56	-	E	61.8	**FULL**		
At Center Bend Rd.	R19G04 (13.71)	31.5^{W}	52	9.1^{ns}	E	77.0	**FULL**		
Northwest of Beverly at St. Rt. 83	R19S02 (2.08)	81.0^{W}	54	9.9	E	75.0	**FULL**		
Sharon Fork (17-080-000)	**WWH-Recommended**								
At Morris Ln., south of Rich Valley	R19G06 (0.76)	17.6^{H}	40^{ns}	-	E	65.5	**FULL**		
Dinner Fork (17-081-000)	**EWH Existing (v)**								
North of Rich Valley at T.R. 34 (Dinner Fork Rd.)	302288 (1.22)	2.5^{H}	52	-	E	65.5	**FULL**		
Keith Fork (17-078-000)	**EWH Existing (v)**								
Downstream Limestone Run at Muskrat Slide Rd.	R19G05 (0.37)	13.6^{H}	46^{ns}	-	E	72.8	**FULL**		

Location	STORET (RM)[a]	DRAIN. (mi^2)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
Limestone Run (17-079-000)	**EWH Existing (v) and CWH-Recommended**								
Northeast of Centerville at Slater Rd.	302182 (0.17)	1.2[H]	52	-	VG[ns]	53.0	**FULL**		
Schrivers Fork (17-078-002)	**EWH and CWH-Recommended**								
At Braden Rd.	302330 (0.10)	4.2[H]	50	-	E	80.0	**FULL**		
Taylor Fork (17-078-001)	**EWH and CWH-Recommended**								
At Braden Rd.	302329 (0.10)	3.5[H]	50	-	E	76.0	**FULL**		
Reasoners Run (17-077-000)	**WWH-Recommended**								
At Center Township Rd. off T.R. 329	302181 (0.06)	4.6[H]	36[*]	-	VG	73.5	**Partial**	- Cause Unknown	- Source Unknown
Stony Creek (17-076-000)	**CWH-Recommended**								
Southeast of Moscow Mills at Stony Run Rd.	302180 (0.47)	1.0[H]	42	-	G	72.0	**FULL**		
Little Olive Green Creek (17-073-000)	**EWH Existing (v) and CWH-Recommended**								
At Center Bend Rd.	R19G02 (2.18)	16.2[H]	56	-	E	69.3	**FULL**		
Allen Run (17-075-000)	**CWH-Recommended**								
Upstream and adjacent Allen-Hollow Rd.	302430 (1.1)	0.6[H]	-	-	MG[ns]	-	**-**		
At mouth at Allen-Hollow Rd.	302179 (0.05)	1.7[H]	44	-	VG	71.5	**FULL**		
Scott Run (17-074-000)	**CWH-Recommended**								
West of Centerville at North Creek Rd.	302178 (0.11)	3.0[H]	46	-	VG	61.0	**FULL**		
Elk Run (17-072-000)	**CWH-Recommended**								
At Dixon Hollow Rd.	302364 (0.18)	0.9[H]	42	-	VG	67.0	**FULL**		
Cow Run (17-071-000)	**EWH Existing (v) and CWH-Recommended**								
At mouth, T.R. 633	302177 (0.01)	1.4[H]	50	-	VG[ns]	73.5	**FULL**		
Wolf Creek (17-030-000)	**WWH-Recommended**								
At St. Rt. 339 (2nd Bridge upstream mouth)	R19K20 (1.08)	227.0[B]	28[*]	7.6[*]	G	69.0	**Partial**	-High Flow Regime	-Freshets or Major Flooding
West Branch Wolf Creek (17-044-000)	**EWH Existing (v)**								
Southwest of McConnelsville at C.R. 16	201304 (39.20)	19.2[H]	52	-	VG[ns]	53.5	**FULL**		
Southwest of Beverly, 600 m upstream St. Rt. 377	201302 (24.50)	72.0[W]	55	9.8	50	79.8	**FULL**		
At Patten Mills, at C.R. 206	R19S01 (13.90)	115.0[W]	54	9.3[ns]	44[ns]	79.8	**FULL**		

Location	STORET (RM)[a]	DRAIN. (mi²)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
Southwest of Waterford at T.R. 68	R19K21 (0.25)	144.0[W]	45[*]	9.1[ns]	E	77.3	**Partial**	-Natural conditions (habitat)	-Natural Sources
Peeper Run (17-065-000)	**CWH-Recommended**								
East of Portersville at mouth, upstream White Dr.	302176 (0.10)	0.9[H]	46	-	VG	70.8	**FULL**		
Kickapoo Creek (17-064-000)	**WWH-Recommended**								
West of Joetown at St. Rt. 37	302175 (0.12)	2.3[H]	38[*]	-	G	72.0	**Partial**	-Natural conditions (flow or habitat)	-Natural Sources
Pleasant Run (17-062-000)	**WWH-Recommended**								
West of Malta at Harry Brock Whitzel Rd.	302378 (0.50)	0.75[H]	44	-	-	54.5	**(FULL)**		
Hedgehog Creek (17-063-000)	**WWH-Recommended**								
Northeast of Morganville at Nicewanger-Deerfield Rd.	302174 (0.09)	2.5[H]	34[*]	-	G	62.8	**Partial**	-Natural conditions (flow or habitat)	-Natural Sources
Buck Run (17-061-000)	**WWH-Recommended**								
Southeast of Morganville at mouth at St. Rt. 78	302173 (0.08)	5.5[H]	42[ns]	-	MG[ns]	60.5	**FULL**		
Trib. West Branch Wolf Creek (33.33) (17-044-001)	**EWH-Recommended**								
At T.R. 104	201305 (0.50)	8.6[H]	50	-	E	56.5	**FULL**		
Little Wolf Creek (17-059-000)	**CWH-Recommended**								
Southwest of Pennsville, downstream C.R. 13	201311 (1.00)	10.6[H]	44	-	E	72.5	**FULL**		
Chaineyville Run (17-060-000)	**CWH-Recommended**								
West of McConnelsville at St. Rt. 78	302386 (1.48)	0.4[H]	42	-	VG	74.0	**FULL**		
Chaineyville Run (17-060-000)	**WWH-Recommended**								
Near mouth	302172 (0.05)	1.4[H]	-	-	MG[ns]	-	**-**		
Browns Run (17-058-000)	**WWH-Recommended**								
At Syphens Ln.	302387 (0.20)	0.53[H]	40[ns]	-	MG	64.5	**FULL**		
Goshen Run (17-057-000)	**EWH Existing (v)**								
Southwest of Stockport at mouth, Adjacent C.R. 73	201310 (0.10)	9.3[H]	54	-	VG[ns]	58.8	**FULL**		
McPherson Run (17-056-000)	**CWH-Recommended**								
Adjacent to Adrian Rd., southwest of Todds	302400 (0.10)	0.9[H]	44	-	E	61.5	**FULL**		
Aldridge Run (17-053-000)	**EWH Existing (v)**								
South of Stockport, downstream T.R. 466	201309 (0.10)	12.1[H]	48[ns]	-	E	58.0	**FULL**		

Location	STORET (RM)[a]	DRAIN. (mi²)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
Lick Run (17-055-000)	**WWH-Recommended**								
East of Todds, adjacent Lick Run Rd.	302379 (0.05)	0.85[H]	46	-	G	63.8	**FULL**		
Scott Run (17-054-000)	**CWH-Recommended**								
South of Stockport at mouth	302170 (0.01)	3.0[H]	43	-	VG	60.4	**FULL**		
Walnut Run (17-044-002)	**EWH-Recommended**								
At Coler Cemetery	302401 (0.02)	1.1[H]	-	-	E	-	**-**		
Coal Run (17-048-000)	**EWH Existing (v)**								
Southeast of Chesterhill at St. Rt. 555	201307 (4.90)	16.9[H]	52	-	E	69.0	**FULL**		
North of Patten Mills at T.R. 203	201306 (0.60)	21.8[W]	51	9.4	E	64.3	**FULL**		
Mile Run (17-052-000)	**WWH-Recommended**								
West of Bartless at St. Rt. 550	302169 (0.72)	1.3[H]	42[ns]	-	G	62.5	**FULL**		
Buckeye Run (17-051-000)	**EWH Existing (v)**								
At mouth, adjacent Roberts Rd. West of Bartlett	302263 (0.05)	3.2[H]	50	-	E	74.5	**FULL**		
North Branch Coal Run (17-050-000)	**EWH Existing (v) and CWH-Recommended**								
South of Chesterville, downstream T.R. 11, downstream trib.	302168 (1.80)	4.65[H]	50	-	E	75.5	**FULL**		
Shrader Run (17-049-000)	**CWH-Recommended**								
Dille Rd.	302429 (1.4)	0.8[H]	-	-	VG	-	**-**		
At mouth, at St. Rt. 676	201308 (0.10)	2.3[H]	44	-	E	80.5	**FULL**		
Laurel Run (17-047-000)	**EWH Existing (v)**								
East of Patten Mills at Old T288, Northeast of Bartlett	302165 (0.65)	6.8[H]	46[ns]	-	VG[ns]	71.5	**FULL**		
Whitewater Creek (17-046-000)	**WWH-Recommended**								
At town of Wolf Creek at Pugh Rd.	302164 (0.01)	3.6[H]	46	-	MG[ns]	82.0	**FULL**		
Lucas Run (17-045-000)	**WWH-Recommended**								
North of town of Wolf Creek at C.R. 88 (Orndorf Rd.)	302163 (0.85)	4.1[H]	44	-	G	59.8	**FULL**		
South Branch Wolf Creek (17-035-000)	**WWH-Recommended**								
Southwest of Waterton at C.R. 2	201294 (16.30)	27.2[W]	44	9.0	48	68.3	**FULL**		
Northwest of Waterton at Camp Hervida Rd.	R19S03 (6.20)	75.0[W]	47	9.6	54	55.0	**FULL**		

Location	STORET (RM)[a]	DRAIN. (mi²)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
Southwest Waterton at St. Rt. 339	R19K22 (0.78)	79.0[W]	40[ns]	7.3[*]	E	57.0	**Partial**	-Natural conditions (flow or habitat)	-Natural Sources
Horse Run (17-041-000)	**WWH-Recommended**								
North of McAvan at Benedict Rd.	302256 (0.33)	13.0[H]	44	-	E	66.3	**FULL**		
Halfway Run (17-042-000)	**WWH-Recommended**								
Southeast of Waterton at C.R. 459	201298 (1.00)	8.4[H]	46	-	G	55.0	**FULL**		
Chainey Run (17-043-000)	**CWH-Recommended**								
West of Marietta, adjacent Chainey Run Rd.	302385 (0.52)	0.44[H]	38	-	G	65.0	**FULL**		
Turkeyhen Run (17-040-000)	**WWH-Recommended**								
North of McAvan at C.R. 126	302161 (1.20)	3.3[H]	36[*]	-	G	50.8	**Partial**	- Direct Habitat Alterations	- Loss of Riparian Habitat
Browns Run (17-039-000)	**WWH-Recommended**								
North of Fleming at farm lane off Anderson Rd.	302255 (0.35)	8.35[H]	32[*]	-	MG[ns]	60.5	**Partial**	- Sedimentation Siltation - Direct Habitat Alterations	- Livestock (Grazing or Feeding Operations) - Loss of Riparian Habitat
South Fork South Branch Wolf Creek (17-038-000)	**WWH-Recommended**								
South of Watertown at T.R. 261	201297 (0.80)	7.6[H]	44	-	G	61.3	**FULL**		
Southwest Fork South Branch Wolf Creek (17-037-000)	**WWH-Recommended**								
Southwest of Watertown at T.R. 288	201296 (5.80)	9.4[H]	42[ns]	-	VG	62.8	**FULL**		
Southwest of Watertown at mouth	201295 (0.10)	21.5[W]	43[ns]	9.1	46	47.5	**FULL**		
Painter Run (17-036-000)	**WWH-Recommended**								
At Watertown at C.R. 2 (Anderson Rd.)	302160 (0.42)	2.8[H]	32[*]	-	G	54.8	**Partial**	- Direct Habitat Alterations	- Channelization - Loss of Riparian Habitat
Plum Run (17-035-000)	**WWH-Recommended**								
North of Watertown, adjacent St. Rt. 339 at ford.	302369 (0.13)	2.2[H]	40[ns]	-	G	52.5	**FULL**		
Flint Run (17-034-000)	**WWH-Recommended**								
West of Waterford at T.R. 68 (Flint Rd.)	302159 (0.14)	2.8[H]	30[*]	-	HF[*]	56.5	**Non**	-Natural conditions (flow)	-Natural Sources
Duck Creek (17-032-000)	**WWH-Recommended**								
At Waterford at C.R. 102 (Main St.)	302158 (0.04)	2.8[H]	42[ns]	-	P[*]	65.5	**Non**	- Organic Enrichment Biological Indicators	- SSO's – Collection System Failures
Boseman Run (17-033-000)	**WWH-Recommended**								

Location	STORET (RM)[a]	DRAIN. (mi^2)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
At Waterford at corner of Pond St. and Center St.	302390 (0.22)	0.7^{H}	40^{ns}	-	MG^{ns}	59.5	**FULL**		
Hayward Run (17-031-000)	**WWH-Recommended**								
West of Beverly at C.R. 102 (Milner Rd.)	302157 (0.57)	3.4^{H}	42^{ns}	-	VG	65.0	**FULL**		
Congress Run (17-018-000)	**WWH Existing (v)**								
East of Waterford at Culver Run Rd.	302278 (1.05)	2.3^{H}	36^{*}	-	MG^{ns}	45.3	**Partial**	-Sedimentation/ Siltation	- Livestock (Grazing or Feeding Operations) - Loss of Riparian Habitat
Cushing Run (17-017-000)	**WWH-Recommended**								
West of Coal Run at Tick Hill Rd.	302277 (1.63)	0.6^{H}	$\underline{26}^{*}$	-	G	50.5	**Non**	- Direct Habitat Alterations	- Channelization
Big Run (17-014-000)	**EWH-Recommended**								
Northeast Coal Run at Haas Run (T.R. 14)	302003 (4.49)	9.3^{H}	52	-	E	72.8	**FULL**		
At Big Run Rd.	301749 (2.32)	17.2^{H}	54		E	70.0	**FULL**		
Straight Run (17-015-000)	**EWH-Recommended**								
East of Coal Run at Straight Run Rd.	302004 (0.07)	5.1^{H}	54	-	E	71.0	**FULL**		
Cat Creek (17-010-000)	**EWH-Recommended**								
At Lowell at St. Rt. 60	R19G07 (0.35)	12.1^{H}	50	-	VG^{ns}	78.0	**FULL**		
Right Branch Cat Creek (17-011-000)	**EWH-Recommended**								
North of Lowell at Dixon Ridge Rd.	302000 (0.22)	4.2^{H}	56	-	E	71.3	**FULL**		
Bear Creek (17-009-000)	**WWH Existing (v)**								
Southeast Lowell at St. Rt. 60	R19G08 (0.11)	7.4^{H}	44	-	E	63.0	**FULL**		
Rainbow Creek (17-007-000)	**WWH Existing (v)**								
Northeast of Watertown at Rainbow Creek Rd.	302085 (8.30)	1.5^{H}	50	-	-	63.0	**(FULL)**		
At Huck Rd.	301748 (4.25)	13.7^{H}	50	-	VG	71.8	**FULL**		
At Willow Farm, near mouth at T.R. 32	R19G09 (0.12)	18.7^{H}	54	-	G	72.0	**FULL**		
Devol Run (17-004-000)	**WWH Existing (v)**								
Near Devol at Waterford Rd.	301742 (0.48)	3.0^{H}	50	-	G	65.5	**FULL**		
Second Creek (17-001-018)	**WWH-Recommended**								
Adjacent St. Rt. 821	302377 (0.45)	2.3^{H}	48	-	MG^{ns}	56.8	**FULL**		
Indian Run (17-002-000)	**WWH Existing (v)**								

Location	STORET (RM)[a]	DRAIN. (mi^2)[b]	IBI	MIwb[c]	ICI[d]	QHEI	Status[e]	Cause(s)	Source(s)
Near Marietta at Indian Run Rd.	301994 (0.73)	2.8[H]	38*	-	G	57.5	**Partial**	- Natural conditions (flow)	- Natural Sources

a - River Mile (RM) represents the Point of Record (POR) for the station, not the actual sampling RM.

b -H=Headwater site, W=Wading site, B=Boat site

c - MIwb is not applicable to headwater streams with drainage areas ≤ 20 mi^2.

d - A narrative evaluation of the qualitative sample based on attributes such as EPT taxa richness, number of sensitive taxa, and community composition was used when quantitative data was not available or considered unreliable. E=Exceptional, VG=Very Good, G=Good, MG=Marginally Good, HF=High Fair, F=Fair, LF=Low Fair, P=Poor, VP=Very Poor.

e - Attainment is given for the proposed status when a change is recommended.

ns - Nonsignificant departure from biocriterion (≤4 IBI or ICI units, or ≤0.5 MIwb units).

* - Significant departure from WAP biocriterion (≤ 39 IBI, ≤ 7.8 MIwb, or ≤ 30 ICI); underlined values indicate a narrative biocriterion score of poor or very poor.

Western Allegheny Plateau Biological Criteria					
IBI			MIwb		ICI
Headwater	Wading	Boat	Wading	Boat	All
EWH					
50	50	48	9.4	9.6	46
WWH					
44	44	40	8.4	8.6	36

QHEI Attributes: **Muskingum R. Tributaries 2012-13 (Rokeby Lock to Ohio River)**

Key QHEI Components

			WWH Attributes																														

QHEI Attributes: **Muskingum R. Tributaries 2012-13 (Rokeby Lock to Ohio River)**

Key QHEI Components

River Mile	QHEI	Gradient (ft/mi)	Not Channelized or Recovered	Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Development	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low/Normal Embeddedness	Max Depth>40cm	Low/Normal Riffle Embeddedness	WWH Attributes	Channelized/No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth <40cm	High-influence Modified Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1 or 2 Cover Types	Intermittent/Poor Pools	No Fast Current	High/Moderate Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	M.I. Modified Attributes	MWH H.I.+1/WWH+1 Ratio	MWH M.I./WWH Ratio
			WWH Attributes											MWH Attributes																				
														High Influence						Moderate Influence														
17-014-000																																		
Year:		**2012**																																
4.5	72.8	35.71	X	X		X	X	X		X	X	X	8						0		X								X			2	0.11	0.33
2.3	70.0	20.00	X	X		X		X		X	X	X	7						0							X		X	X			3	0.13	0.50
17-015-000																																		
Year:		**2012**																																
0.1	71.0	20.62	X	X			X	X		X	X	X	7				X		1						X				X			2	0.25	0.50
17-017-000																																		
Year:		**2013**																																
1.7	50.5	52.63	X	X			X			X	X	X	6				X		1		X			X	X	X		X	X		X	7	0.43	1.14
17-018-000																																		
Year:		**2013**																																
1.1	45.3	43.48	X	X						X		X	4				X	X	2		X				X	X			X			5	0.80	1.40
17-030-000																																		
Year:		**2013**																																
0.8	69.0	2.86	X	X			X				X	X	5				X		1		X				X	X			X	X	X	6	0.33	1.33
17-035-000																																		
Year:		**2013**																																
16.3	68.3	4.83	X	X				X	X	X	X	X	7						0		X				X	X					X	4	0.13	0.75
4.7	55.0	4.00	X	X					X	X	X	X	6			X	X		2						X	X		X				3	0.43	0.57
0.8	57.0	4.66	X						X	X	X	X	5				X		1						X	X		X				3	0.33	0.67
17-035-001																																		
Year:		**2013**																																
0.1	52.5	45.45	X	X				X			X		4						0		X				X	X		X	X	X	X	7	0.20	1.80
17-037-000																																		
Year:		**2013**																																
5.8	62.8	11.05	X	X			X	X	X	X	X	X	8				X		1		X				X	X		X				4	0.22	0.56
0.1	47.5	3.26	X				X	X			X		4				X		1		X		X	X	X			X	X		X	7	0.40	1.80

Report Date: 6/06/2016

QHEI Attributes: **Muskingum R. Tributaries 2012-13 (Rokeby Lock to Ohio River)**

Key QHEI Components

			WWH Attributes																																				

QHEI Attributes: **Muskingum R. Tributaries 2012-13 (Rokeby Lock to Ohio River)**

Key QHEI Components

River Mile	QHEI	Gradient (ft/mi)	Not Channelized or Recovered	Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Development	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low/Normal Embeddedness	Max Depth>40cm	Low/Normal Riffle Embeddedness	WWH Attributes	Channelized/No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth <40cm	High-influence Modified Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1 or 2 Cover Types	Intermittent/Poor Pools	No Fast Current	High/Moderate Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	M.I. Modified Attributes	MWH H.I.+1/WWH+1 Ratio	MWH M.I./WWH Ratio
			WWH Attributes											MWH Attributes																				
														High Influence						Moderate Influence														
17-057-000																																		
Year:		**2013**																																
0.1	58.8	4.14	X	X				X	X		X		5				X		1						X	X			X	X		4	0.33	1.00
17-059-000																																		
Year:		**2013**																																
1.0	72.5	10.53	X	X		X	X	X			X		6						0		X								X	X	X	4	0.14	0.86
17-070-000																																		
Year:		**2013**																																
18.1	72.8	16.67	X	X				X	X	X	X	X	7						0						X	X						2	0.13	0.38
14.4	61.8	5.48	X	X			X		X	X	X	X	7				X		1		X		X	X					X			4	0.25	0.63
13.7	77.0	5.48	X	X		X	X	X	X	X	X	X	9						0						X						X	2	0.10	0.30
2.1	75.0	3.12	X	X		X	X	X		X	X	X	8						0		X				X	X			X	X		5	0.11	0.78
17-073-000																																		
Year:		**2013**																																
2.2	69.3	16.39	X	X				X		X	X		5				X		1		X			X	X				X		X	X	6	0.33	1.33
17-078-000																																		
Year:		**2013**																																
0.4	72.8	14.49	X	X			X	X		X	X	X	7						0						X				X			2	0.13	0.38
17-078-001																																		
Year:		**2013**																																
0.1	76.0	31.25	X	X		X	X	X			X	X	7						0		X				X				X	X		4	0.13	0.75
17-078-002																																		
Year:		**2013**																																
0.1	80.0	28.17	X	X				X		X	X	X	6						0						X	X			X			3	0.14	0.57
17-080-000																																		
Year:		**2013**																																
0.8	65.5	12.82		X				X		X	X	X	5	X					1		X				X	X			X			4	0.33	0.83
17-083-000																																		
Year:		**2013**																																
0.3	70.3	66.67	X	X		X	X	X	X	X	X	X	9						0		X		X	X	X							4	0.10	0.50

Report Date: 6/06/2016

QHEI Attributes: **Muskingum R. Tributaries 2012-13 (Rokeby Lock to Ohio River)**

Key QHEI Components

River Mile	QHEI	Gradient (ft/mi)	Not Channelized or Recovered	Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Development	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low/Normal Embeddedness	Max Depth>40cm	Low/Normal Riffle Embeddedness	WWH Attributes	Channelized/No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth <40cm	High-influence Modified Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrates (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1 or 2 Cover Types	Intermittent/Poor Pools	No Fast Current	High/Moderate Embeddedness	High/Mod. Riffle Embeddedness	No Riffle	M.I. Modified Attributes	MWH H.I.+1/WWH+1 Ratio	MWH M.I./WWH Ratio
			WWH Attributes											MWH Attributes																				
														High Influence						Moderate Influence														
17-087-000																																		
Year:		**2013**																																
0.3	66.8	14.52	X	X		X	X		X	X	X	7			X		1		X			X	X		X	X			X	X		5	0.25	0.88
17-919-000																																		
Year:		**2013**																																
0.3	54.8	34.32	X	X		X			X		X	5			X	X	2					X	X					X	X	X		5	0.50	1.00
17-920-000																																		
Year:		**2013**																																
19.8	57.5	13.07	X	X		X			X	X	X	6			X		1					X	X	X	X	X					5	0.29	0.86
11.2	76.0	4.89	X	X	X		X	X	X	X	X	8					0		X		X	X	X								4	0.11	0.67
5.4	72.8	4.98	X	X	X	X	X	X	X	X	X	9					0					X	X					X	X		4	0.10	0.50
2.2	78.8	4.98	X	X	X	X	X	X	X	X	X	9			X		1					X	X								2	0.20	0.40
17-921-000																																		
Year:		**2013**																																
0.9	68.5	40.82	X	X	X				X	X	X	6			X		1					X	X			X					3	0.29	0.57
17-923-000																																		
Year:		**2013**																																
0.1	69.5	57.14		X	X	X	X	X	X	X	X	8			X		1	X											X	X		3	0.33	0.44
17-924-000																																		
Year:		**2013**																																
0.5	76.8	27.78	X	X		X	X		X	X	X	7					0								X				X			2	0.13	0.38
17-926-000																																		
Year:		**2013**																																
11.7	84.8	11.11	X	X	X	X	X	X	X	X	X	9					0								X							1	0.10	0.20
5.8	82.3	12.90	X	X	X	X	X	X	X	X	X	9					0								X							1	0.10	0.20
5.8	79.8	12.82	X	X		X	X	X		X	X	7					0								X					X	X	3	0.13	0.63
0.3	76.8	11.98	X	X	X	X	X	X	X	X	X	9			X		1								X	X						2	0.20	0.40
17-927-000																																		
Year:		**2013**																																
2.9	70.0	22.47	X	X	X	X	X	X		X	X	8					0		X			X			X			X		X	X	5	0.11	0.78

Report Date: 6/06/2016

QHEI Attributes: **Muskingum R. Tributaries 2012-13 (Rokeby Lock to Ohio River)**

Key QHEI Components

			WWH Attributes																																					

QHEI Attributes: **LWH/SRW Assessments (FFY12/13 106 Supplemental Gr.) 2013-15**

Key QHEI Components

| | | | WWH Attributes | | |