Biological and Water Quality Study of Lower Auglaize River Tributaries

Defiance, Mercer, Paulding, Putnam, and Van Wert Counties

Division of Surface Water

Ecological Assessment Section

October 31, 2016

RECOMMENDATIONS

The streams in the lower Auglaize River tributary study area currently listed in the Ohio Water Quality Standards (WQS) are assigned Warmwater Habitat (WWH), Modified Warmwater Habitat (MWH), and Limited Resource Water (LRW) aquatic life use designations.

Twenty-eight streams in the lower Auglaize River tributaries were evaluated for beneficial use potential in 2014 and 2015. Existing and recommended aquatic life use(s) resulting from the survey are summarized in Table 1. Affirmation of existing uses, re-designation of existing, yet unverified uses, or designation of previously unlisted waters and other pertinent information, where needed, are presented below. Attainment status based upon existing and recommended uses and associated causes and sources of waters identified as being impaired are presented in Table 2. Stream habitat quality being an important factor in use attainability, a matrix of riparian, channel, and substrate features and resulting QHEI scores, by station and waterbody, are presented in Table 3. Significant findings include the following**:**

- Eight streams in the study area have been verified as WWH. These include the following: Auglaize River (Defiance Power Dam to mouth), Threemile Creek, Jackson Ditch, Fivemile Creek, Eagle Creek, Little Flatrock Creek (State route 637 (RM 2.2) to the mouth), Flatrock Creek (Kings Church Road (RM 51.68) to the mouth), and Wildcat Creek.

- The Auglaize River from Blanchard River to Defiance Power Dam was previously designated WWH and is now recommended as MWH-Impounded due to the Defiance Power Dam.

- Eleven of the streams in the study area are designated MWH-C and have been verified. This includes: Little Auglaize River, Prairie Creek, West Branch, Hoaglin Creek, Monkey Run, Hagerman Creek, Middle Creek (tributary to Little Auglaize River), Maddox Creek, Town Creek, Roller Creek, Dog Creek, Long Prairie Creek, and Kyle Prairie Creek.

- Four streams have undesignated aquatic life uses in the WQS. Biological sampling conducted on Bobenmyer Ditch, Snyder Ditch, Barcer Run, and Big Run verified that the WWH aquatic life use is appropriate.

- Five streams and stream segments in the study area that have unverified WWH uses in the WQS demonstrated that the MWH-C aquatic life use would be more appropriate. Biological sampling conducted on Sixmile Creek, Little Flatrock Creek (headwaters to State Route 637 (RM 2.2)), Flatrock Creek (headwaters to Kings Church Road), Upper Prairie Creek (headwaters to Middle Creek), and Middle Creek (Tributary to Upper Prairie Creek at RM 0.33) revealed that the MWH-C aquatic life use would be appropriate, as these streams did not support WWH biology and are perpetually under county ditch maintenance. These streams and stream segments had poor habitat with a collective mean QHEI of 31.

- Threemile Creek, Jackson Ditch, Fivemile Creek, Eagle Creek, Sixmile Creek, Little Flatrock Creek, Flatrock Creek, Wildcat Creek, Snyder Ditch, Bobenmyer Ditch, Blue Creek, Barcer Run, Upper Prairie, Middle Creek (Tributary to Blue Creek), and Prairie Creek should all maintain their AWS, IWS and PCR uses.

- Little Auglaize River, Prairie Creek, West Branch, Hoaglin Creek, Monkey Run, Hagerman Creek, Middle Creek, Big Run, Maddox Creek, Town Creek, Roller Creek, Dog Creek, Evans Ditch, Long Prairie Creek, and Kyle Prairie Ditch should all maintain their AWS, IWS, and SCR uses.

- Auglaize River, Flatrock Creek, Little Auglaize River, Town Creek and Evans Ditch should all maintain their PWS uses.

All streams or stream segments in the lower Auglaize 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.

Table 1. Waterbody use designation recommendations for the lower Auglaize River tributaries study area, 2014 and 2015. 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.

Use designations for water bodies in the Auglaize River drainage basin.

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	
| | | | | | | |														
Auglaize river - headwaters to Blanchard river (RM 26.2)		+							+	+		+		
- at Agerter rd. (RM 64.58)		+						+	+	+		+		PWS intake - Lima
- Blanchard river to Defiance power dam (RM 5.8)				△					*/+	*/+		*/+		HELP ecoregion - impounded
- Defiance power dam to the mouth		*/+							*/+	*/+		*/+		
Threemile creek		*/+							*/+	*/+		*/+		

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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	
| | | | | | | |														
Jackson ditch		*/+							*/+	*/+		*/+		
Beetree creek		*							*	*		*		
Fivemile creek		*/+							*/+	*/+		*/+		
Eagle creek		*/+							*/+	*/+		*/+		
Sixmile creek				△					*/+	*/+		*/+		HELP ecoregion – channel modification
Bull creek		*							*	*		*		
Little Flatrock creek - headwaters to state route 637 (RM 2.2)				△					*/+	*/+		*/+		HELP ecoregion – channel modification
- State route 637 (RM 2.2) to the mouth		*/+							*/+	*/+		*/+		

Use designations for water bodies in the Auglaize River drainage basin.

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	
| | | | | | | |														
Flatrock creek - at RM 14.13		+						o	+	+		+		PWS intake - Paulding
- Kings church road (RM 51.68) to the mouth		+							+	+		+		
- headwaters to Kings church road (RM 51.68)				△					+	+		+		HELP ecoregion - channel modification
Wildcat creek		*/+							*/+	*/+		*/+		
Snyder ditch (Auglaize river RM 12.98)		△							△	△		△		
Bobenmyer ditch (Auglaize river RM 13.17)		△							△	△		△		
Blue creek				+					+	+		+		HELP ecoregion - channel modification
Barcer run		*/+							*/+	*/+		*/+		

Use designations for water bodies in the Auglaize River drainage basin.

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	
| | | | | | | |														
Dalaet-Broughton ditch (Blue creek RM 8.1)				+					+	+			+	HELP ecoregion - channel modification
Zielke ditch (aka Webster ditch)				+					+	+			+	HELP ecoregion - channel modification
Cunningham creek		*							*	*		*		
Buchanan ditch		*							*	*		*		
Upper Prairie creek – headwaters to Middle Creek (RM 0.33)				△					*/+	*/+		*/+		HELP ecoregion – channel modification
- Middle creek (RM 0.33) to the mouth		*							*	*		*		
Middle creek				△					△	△		△		HELP ecoregion – channel modification
Parker ditch		*							*	*		*		

Use designations for water bodies in the Auglaize River drainage basin.

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	
| | | | | | | |														
Sponseller ditch		*							*	*		*		
Little Auglaize river - at RM 23.40				+				o	+	+			+	HELP ecoregion - channel modification; PWS intake - Delphos
- all other segments				+					+	+			+	HELP ecoregion - channel modification
Prairie creek				+					+	+			+	HELP ecoregion - channel modification
West branch				+					+	+			+	HELP ecoregion - channel modification
Hog run				+					+	+			+	HELP ecoregion - channel modification
Hoaglin creek				+					+	+			+	HELP ecoregion - channel modification

Use designations for water bodies in the Auglaize River drainage basin.

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	
| | | | | | | |														
Monkey run				+					+	+			+	HELP ecoregion - channel modification
Dog run				+					+	+			+	HELP ecoregion - channel modification
Hagerman creek				+					+	+			+	HELP ecoregion - channel modification
Dry creek				+					+	+			+	HELP ecoregion - channel modification
Middle creek				+					+	+			+	HELP ecoregion - channel modification
Big run		△							△	△			△	
Maddox creek				+					+	+			+	HELP ecoregion - channel modification
Balyeat ditch				+					+	+			+	HELP ecoregion - channel modification

Use designations for water bodies in the Auglaize River drainage basin.

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	
| | | | | | | |														
Sheets ditch (Maddox creek RM 21.7)				+					+	+			+	HELP ecoregion - channel modification
Town creek - at RM 18.35				+				+	+	+			+	HELP ecoregion - channel modification; PWS intake - Van Wert
- all other segments				+					+	+			+	HELP ecoregion - channel modification
Roller creek				+					+	+			+	HELP ecoregion - channel modification
Dog creek				+					+	+			+	HELP ecoregion - channel modification
Emmit Bell ditch				+					+	+			+	HELP ecoregion - channel modification
Spice run				+					+	+			+	HELP ecoregion - channel modification

Use designations for water bodies in the Auglaize River drainage basin.

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	
| | | | | | | |														
Evans ditch							+		+	+			+	Small drainageway maintenance
Long Prairie creek				+					+	+			+	HELP ecoregion - channel modification
Kyle Prairie ditch				+					+	+			+	HELP ecoregion - channel modification
Greens ditch				+					+	+			+	HELP ecoregion - channel modification
Prairie creek		*							*	*		*		

Table 2. Aquatic life use attainment status for sampling locations in the lower Auglaize River tributary study area, 2014 and 2015. The Index of Biotic Integrity (IBI), Modified Index of well-being (MIwb), and Invertebrate Community Index (ICI) and macroinvertebrate narrative scores are based on the performance of the biological community. The Qualitative Habitat Evaluation Index (QHEI) is based on the ability of the stream habitat to support a biological community. The lower Auglaize River tributary study area is located in the Huron Erie Lake Plain (HELP) ecoregion. If biological impairment has occurred, the cause(s) and source(s) of the impairment are noted. Peach shaded sites were sampled in 2015.

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
0.70[H]	BOBENMYER DITCH @ STOUFFER RD.	302568	Recommended WWH	28	NA	-	P*	47.0	**Non**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
0.30[H]	SNYDER DITCH @ STOUFFER RD.	302569	Recommended WWH	20*	NA	-	LF*	42.5	**Non**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
0.87 [H]	THREEMILE CREEK @ CANAL RD.	303308	WWH	30	NA	-	LF*	67.5	**Partial**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
0.05 [H]	JACKSON DITCH @ POWER DAM RD. (WATSON RD.)	303309	WWH	26[ns]	NA	-	P*	51.0	**Non**	Sedimentation/siltation, Other flow regime alterations, Upstream Dam or Impoundment	Agriculture, Crop production with subsurface drainage

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
1.7 [H]	FIVEMILE CREEK @ DEFINACE/PAULDING COUNTY LINE	302539	WWH	20*	NA	-	P*	33.3	**Non**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
1.57 [H]	EAGLE CREEK WNW OF JUNCTION @ RIVER RD. (UPPER CROSSING)	P06K28	WWH	20*	NA	-	LF*	49.5	**Non**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
3.90[H]	SIXMILE CREEK @ DOTTERER RD.	302541	Recommended MWH	24	NA	-	F	54.3	**Full**		
5.90[H]	L. FLATROCK CREEK @ BROUGHTON RD.	302542	Recommended MWH	20	NA	-	LF*	21.0	**Partial**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
1.53[H]	L. FLATROCK CREEK @ OLD ST. RT. 111	302543	WWH	24[ns]	NA	-	MG[ns]	68.5	**Full**		
51.68[H]	FLATROCK CREEK @ KINGS CHURCH RD.	302600	Recommended MWH	34	NA	-	F	25.3	**Full**		
48.30[H]	FLATROCK CREEK @ WERNER RD.	302544	WWH	30	NA	-	MG[ns]	51.0	**Full**		
28.84[W]	FLATROCK CREEK UPST. PAYNE @ PUGH RD.	P06S37	WWH	32	7.03[ns]	30[ns]	-	58.0	**Full**		

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
23.72[W]	FLATROCK CREEK NE OF PAYNE @ ST. RT. 613	P06S35	WWH	33	8.02	36	-	76.0	**Full**		
13.80[W]	FLATROCK CREEK AT PAULDING, DST. DAM	P06S33	WWH	39	8.56	36	-	59.5	**Full**		
9.70[W]	FLATROCK CREEK UPST. PAULDING WWTP LAGOONS	P06S32	WWH	27*	7.92	14*	F*	69.0	**Non**	Sedimentation/Siltation	Agriculture
8.13[W]	FLATROCK CREEK DST. PAULDING WWTP @ BROUGHTON RD.	P06S31	WWH	40	7.93	34	-	69.5	**Full**		
6.02[W]	FLATROCK CREEK NE OF PAULDING @ LOUCK RD.	P06S30	WWH	33	7.66	44	-	81.5	**Full**		
0.27[H]	WILDCAT CREEK NE OF PAYNE @ ST. RT. 500	P06P02	WWH	36	NA	-	F*	37.3	**Partial**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
31.95[H]	BLUE CREEK @ DIXON CAVETT RD.	302545	MWH-C	34	NA	-	F	24.8	**Full**		
29.43[H]	BLUE CREEK @ SUGAR GROVE CHURCH RD.	P06K31	MWH-C	40	NA	-	MG	47.5	**Full**		
22.00[W]	BLUE CREEK @ YOAKUM RD.	302546	MWH-C	35	8.72	18*	F	56.5	**Full**		
17.15[W]	BLUE CREEK @ ALLISON RD.	302547	MWH-C	28	8.87	36	-	57.00	**Full**		

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
10.01[W]	BLUE CREEK E OF LATTY @ PAULDING CO. RD. 123	P06W4	MWH-C	33	8.75	46	-	69.3	**Full**		
3.43[W]	BLUE CREEK @ CO. RD. 151	P06S02	MWH-C	27	7.65	46	-	62.5	**Full**		
0.75[H]	BARCER RUN @ ST. RT. 637	302548	Recommended WWH	28	NA	-	P*	41.5	**Non**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
0.9[H]	UPPER PRAIRIE CREEK @ VAN WERT PAULDING CO. RD. 12	302549	Recommended MWH	38	NA	-	F	34.5	**Full**		
0.50[H]	MIDDLE CREEK @ PARKER RD.	302556	Recommended MWH	34	NA	-	LF*	20.0	**Partial**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
47.00[W]	L. AUGLAIZE R. AT JONESTOWN @ JONESTOWN RD.	P02S25	MWH-C	31	7.67	34	-	56.0	**Full**		
42.66[W]	L. AUGLAIZE R. N OF VENEDOCIA @ WREN-LANDECK RD.	P02K02	MWH-C	39	8.13	28	-	64.5	**Full**		
38.26[W]	L. AUGLAIZE R. S OF MIDDLE POINT @ ST. RT. 697	P02S35	MWH-C	37	8.28	34	-	63.3	**Full**		

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
34.74[W]	L. AUGLAIZE R. DST. MIDDLEPOINT @ CONVERSE ROSELMS RD	P02S05	MWH-C	31	7.41	36	-	59.3	**Full**		
23.60[W]	L. AUGLAIZE R. AT OTTOVILLE @ U.S. RT. 224	P02S04	MWH-C	36	7.90	48	-	61.5	**Full**		
22.51[W]	L. AUGLAIZE R. DST. OTTOVILLE @ CO. RD. P	P02S03	MWH-C	32	7.90	38	-	52.0	**Full**		
12.65[W]	L. AUGLAIZE R. W OF MANDALE @ ST. RT. 114	204284	MWH-C	37	9.25	44	-	57.8	**Full**		
8.72[W]	L. AUGLAIZE R. @ CO. RD. 60	P02S01	MWH-C	34	9.16	48	-	54.8	**Full**		
2.02[W]	L. AUGLAIZE R. E OF MELROSE @ ST. RT. 613	510200	MWH-C	34	8.93	-	F	52.8	**Full**		
18.04[H]	PRAIRIE CREEK W OF SCOTT @ PAULDING/VAN WERT CO. LINE	P02S11	MWH-C	28	NA	36	-	42.5	**Full**		
12.50[W]	PRAIRIE CREEK NE OF HAVILAND @ ALLISON RD. (TWP. RD. 48)	P02S09	MWH-C	36	8.33	30	-	48.5	**Full**		
5.90[W]	PRAIRIE CREEK S OF MELROSE @ MERCILE RD.	302551	MWH-C	34	7.66	40	-	58.5	**Full**		

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
1.50[W]	PRAIRIE CREEK S OF MELROSE @ ROSELMS RD.	P02S08	MWH-C	38	8.32	44	-	68.0	**Full**		
4.40[W]	WEST BRANCH AT GROVER HILL @ ST. RT. 114	P02W22	MWH-C	38	7.99	38	-	67.8	**Full**		
0.60[W]	WEST BRANCH @ MATSON RD.	302554	MWH-C	37	8.92	48	-	66.0	**Full**		
19.90[H]	HOAGLIN CREEK @ TERRY RD.	302552	MWH-C	32	NA	-	MG	60.5	**Full**		
13.06[W]	HOAGLIN CREEK @ WETSEL RD.	302553	MWH-C	32	6.59	44	-	49.8	**Full**		
3.30[H]	MONKEY RUN @ DULL ROBINSON RD.	302555	MWH-C	32	NA	-	F	20.5	**Full**		
12.22[H]	HAGERMAN CREEK NE OF CONVOY @ RICHEY RD.	P02S14	MWH-C	36	NA	-	F	34.5	**Full**		
0.86[H]	HAGERMAN CREEK E OF HAVILAND @ ALLISON RD. (TWP. RD. 48)	P02K04	MWH-C	32	NA	32	-	61.5	**Full**		
1.32[W]	MIDDLE CREEK NE OF ROSELMS @ CO. RD. 60	P02S18	MWH-C	34	8.77	46	-	67.5	**Full**		
0.97[H]	BIG RUN SE OF GROVER HILL @ TWP. RD. 155	302601	Recommended WWH	26[ns]	NA	-	MG[ns]	31.5	**Full**		

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
16.20[H]	MADDOX CREEK @ LIBERTY UNION RD.	302557	MWH-C	40	NA	-	MG	57.3	**Full**		
14.75[W]	MADDOX CREEK NEAR VAN WERT @ W. RIDGE RD. (LINCOLN HIGHWAY)	P02G02	MWH-C	34	6.94	32	-	44.8	**Full**		
12.21[W]	MADDOX CREEK @ DUTCH JOHN RD.	302558	MWH-C	38	7.83	32	-	53.50	**Full**		
0.90[W]	MADDOX CREEK @ ST. RT. 637	302559	MWH-C	31	6.76	38	-	57.5	**Full**		
27.45[H]	TOWN CREEK @ DULL ROBINSON RD.	302560	MWH-C	30	NA	-	P*	31.0	**Non**	Sedimentation/siltation, Other flow regime alterations	Agriculture, Crop production with subsurface drainage
25.35[H]	TOWN CREEK @ RICHEY RD.	302561	MWH-C	40	NA	-	F	60.8	**Full**		
19.67[W]	TOWN CREEK S OF VAN WERT @ PETER COLLINS RD.	P02S21	MWH-C	34	6.86	24	-	50.0	**Full**		
11.32[W]	TOWN CREEK N OF VAN WERT @ STRIPE RD.	P02W10	MWH-C	34	7.85	24	-	51.5	**Full**		
0.72[W]	TOWN CREEK NEAR MOUTH AT VAN VERT PAULDING CO. LINE RD.	P02K05	MWH-C	38	8.53	28	-	56.0	**Full**		

RM	Stream Name	Station ID	Aquatic Life Use	IBI	MIwb	ICI	Macro Narrative[a]	QHEI	Attainment Status	Cause(s)	Source(s)
1.35[H]	ROLLER CREEK @ LIBERTY UNION RD.	302564	MWH-C	32	NA	-	F	36.5	**Full**		
22.10[H]	DOG CREEK @ GAMBLE RD.	302565	MWH-C	30	NA	-	F	45.3	**Full**		
14.06[W]	DOG CREEK @ CHURCH RD	P02K07	MWH-C	39	8.19	46	-	62.5	**Full**		
0.97[W]	DOG CREEK E OF ROSELMS @ ST. RT. 114	P02K06	MWH-C	42	8.67	48	-	69.5	**Full**		
6.79[H]	LONG PRAIRIE CREEK DST. OHIO CITY WWTP @ ST. RT. 709	P02S23	MWH-C	36	NA	-	F	47.8	**Full**		
0.68[H]	LONG PRAIRIE CREEK W OF VENEDOCIA @ JONESTOWN RD.	P02S22	MWH-C	32	NA	-	MG	52.0	**Full**		
3.23[H]	KYLE PRAIRIE CREEK @ VAN WERT MERCER CO. RD. 18	302566	MWH-C	38	NA	-	MG	35.3	**Full**		
0.20[H]	KYLE PRAIRIE CR UPST FRISINGER DITCH @ VAN WERT MERCER CR 18	302567	MWH-C	42	NA	-	F	45.0	**Full**		

Biological Criteria

Huron Erie Lake Plain		
Index – Site Type	**WWH**	**MWH**
IBI – Headwaters	28	20
IBI – Wading	32	22
IBI – Boat	34	20
MIwb – Wading	7.3	5.6
MIwb – Boat	8.6	5.7
ICI	34	22

[a] 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 due to current velocities less than 0.3 f/s flowing over the artificial substrates.) VP=Very Poor, P=Poor, F=Fair, MG=Marginally Good, G=Good, VG=Very Good, E=Exceptional.

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

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

* - Indicates significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the Poor or Very Poor range.

\- No sample collected.

Sampled in 2015

Table 3. Qualitative Habitat Evaluation Index (QHEI) matrix with WWH and Modified Warmwater Habitat (MWH) attribute totals and ratios for the lower Auglaize River tributaries watershed study area, 2014-2015.

QHEI Attributes: Auglaize River Basin (lower) 2014 TMDL

Key QHEI Components			WWH Attributes																												
													MWH Attributes																		
														High Influence								Moderate Influence									
River Mile	QHEI	Gradient (ft/mi)	Not Channelized or Recovered	Boulder/Cobble/Gravel Substrates	Slit 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	Heavy/Moderate Silt Cover	Recovering Channel	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
04-100-016																																		
Year:		**2014**																																
0.7	47.0	4.81	X			X	X			X		4		X				1		X			X			X	X	X		X	6	0.40	1.40
04-100-017																																		
Year:		**2014**																																
0.3	42.5	8.62	X			X	X			X		4		X				1		X		X	X			X	X	X		X	7	0.40	1.60
04-101-000																																		
Year:		**2015**																																
0.9	67.5	14.50	X	X		X	X	X		X	X	7	X			X		2		X			X	X				X			4	0.38	0.63
04-102-000																																		
Year:		**2015**																																
0.1	51.0	20.00	X	X		X						3				X	X	2		X			X				X	X	X	X	6	0.75	1.75
04-104-000																																		
Year:		**2015**																																
1.7	33.3	5.55	X									1		X		X	X	3	X	X			X	X			X	X	X	X	8	2.50	5.00
04-105-000																																		
Year:		**2015**																																
1.6	49.5	5.70		X				X				2				X	X	2	X	X			X	X			X	X	X	X	8	1.33	3.00
04-106-000																																		
Year:		**2014**																																
3.9	54.3	2.54		X				X			X	3						0	X	X			X	X		X	X	X		X	8	0.50	2.25
04-108-000																																		
Year:		**2014**																																
5.9	21.0	3.76										0	X	X	X	X	X	5	X	X			X	X			X	X		X	7	6.00	8.00
1.6	68.5	6.67	X	X		X	X			X		5						0	X	X			X				X	X	X		6	0.33	1.33
04-109-000																																		
Year:		**2014**																																
51.7	25.3	4.39								X		1	X	X	X	X		4	X	X			X	X		X	X	X	X	X	9	2.50	5.00
48.3	51.0	3.03		X				X		X	X	4				X		1	X	X			X	X		X	X	X	X		8	0.60	2.00
28.9	58.0	1.82		X				X		X		3						0	X	X			X	X			X	X		X	7	0.50	2.25
23.8	76.0	2.62	X	X		X	X	X	X	X		7						0		X			X					X	X		4	0.13	0.75
13.8	59.5	2.00		X				X		X		3			X			1	X	X			X	X			X	X	X	X	8	0.75	2.50
9.7	69.0	1.77	X	X		X	X	X		X		6						0		X			X				X	X	X		5	0.14	1.00

Report Date: 2/24/2016

QHEI Attributes: **Auglaize River Basin (lower) 2014 TMDL**

Key QHEI Components			WWH Attributes																																			
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
			MWH Attributes											High Influence						Moderate Influence																		
8.2	69.5	2.34		X	X		X	X	X			X		6						0		X			X	X			X	X		X	6	0.14	1.14
6.2	81.5	2.43		X	X		X	X	X	X		X	X	8						0		X								X	X		3	0.11	0.56
04-115-000																																						
Year:		**2014**																																				
0.3	37.3	3.16							X			X		2		X				1	X	X			X	X		X	X	X		X	8	1.00	3.00
04-120-000																																						
Year:		**2014**																																				
32.0	24.8	2.86										X		1	X	X	X	X		4		X			X		X	X	X	X	X		7	2.50	4.00
29.5	47.5	5.21			X							X		2				X		1	X	X			X	X		X	X	X	X		8	1.00	3.33
22.0	56.5	3.47			X			X	X	X		X		5	X					1	X	X			X			X		X	X		6	0.33	1.33
17.2	57.0	2.24			X		X	X	X	X	X	X	X	8				X		1	X	X			X			X		X			5	0.33	0.78
10.1	69.3	2.07		X	X		X	X	X	X	X	X	X	9						0		X								X			2	0.10	0.40
3.5	62.5	1.56			X				X		X	X		4						0	X	X			X	X			X	X		X	7	0.40	1.60
04-121-000																																						
Year:		**2014**																																				
0.8	41.5	2.86		X				X	X			X		4		X				1		X			X			X	X	X		X	6	0.40	1.40
04-125-000																																						
Year:		**2014**																																				
0.9	34.5	3.33												0		X		X	X	3	X	X			X	X			X	X	X		7	5.00	9.00
04-125-001																																						
Year:		**2014**																																				
0.5	20.0	4.03										X		1	X	X	X	X		4	X	X			X		X	X	X	X		X	8	2.50	4.50
04-130-000																																						
Year:		**2014**																																				
47.1	56.0	2.23							X			X		2	X	X				2		X			X	X			X	X	X		6	1.00	2.67
42.7	64.5	1.48			X				X	X		X		4	X					1		X			X	X				X	X		5	0.40	1.20
38.2	63.3	1.36			X				X	X		X	X	5	X					1		X			X	X				X	X		5	0.33	1.17
34.6	59.3	1.06			X				X	X		X	X	5	X			X		2		X			X	X				X			4	0.50	1.00
23.6	61.5	3.23			X				X			X		3	X					1	X	X			X	X			X	X	X		7	0.50	2.00
22.5	52.0	3.50			X					X				2	X			X	X	3	X	X			X	X				X	X		6	1.33	2.33
12.7	60.0	1.74							X	X	X	X	X	5			X	X		2	X	X			X	X				X	X		6	0.67	1.33
12.7	55.5	0.97			X					X		X		3			X	X		2	X	X			X	X				X	X		6	1.00	2.00
8.8	54.8	2.66			X							X		2	X		X	X		3	X	X			X				X	X	X		6	1.33	2.67
2.0	52.8	0.10			X				X			X		3	X		X			2		X			X	X			X	X		X	6	0.75	2.00

Report Date: 2/24/2016

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
														High Influence										*Moderate Influence*										
04-131-000																																		
Year:		**2014**																																
18.1	42.5	2.42		X				X			X		3	X			X		2	X	X			X	X		X	X	X		X	8	0.75	2.50
12.5	48.5	1.40						X	X		X	X	4	X	X	X	X		4		X			X	X				X	X		5	1.00	1.40
5.9	58.5	2.38		X				X	X		X		4						0	X	X			X	X				X	X		6	0.40	1.60
1.5	68.0	1.61		X				X	X		X	X	5			X			1	X	X			X	X				X	X		6	0.50	1.33
04-132-000																																		
Year:		**2014**																																
4.4	67.8	1.96		X				X			X		3						0	X	X			X	X			X	X	X		7	0.50	2.00
0.6	66.0	3.57		X				X	X		X	X	5						0	X	X			X	X				X			5	0.33	1.17
04-134-000																																		
Year:		**2014**																																
19.9	60.5	3.09		X				X	X		X		4	X					1	X	X			X	X				X	X		6	0.40	1.60
13.1	49.8	2.05		X				X			X		3	X					1		X			X	X			X	X		X	6	0.50	2.00
04-135-000																																		
Year:		**2014**																																
3.3	20.5	5.26											0	X	X		X	X	4	X	X			X	X	X		X	X		X	8	5.00	9.00
04-137-000																																		
Year:		**2014**																																
12.3	34.5	2.98											0		X		X	X	3	X	X			X	X			X	X	X		7	5.00	9.00
0.9	61.5	2.92		X				X	X		X	X	5	X					1	X	X			X	X				X			5	0.33	1.17
04-139-000																																		
Year:		**2014**																																
1.4	67.5	5.26		X				X	X		X		4				X		1	X	X			X	X				X	X		6	0.60	1.60
04-139-001																																		
Year:		**2014**																																
1.0	31.5	5.62	X					X					2		X		X	X	3		X			X	X			X	X	X	X	7	1.33	2.67
04-140-000																																		
Year:		**2014**																																
16.2	57.3	4.03		X				X			X		3						0	X	X			X	X		X	X	X	X		8	0.50	2.50
14.8	44.8	2.96						X			X		2	X	X		X		3		X			X	X			X	X	X		6	1.33	2.67
12.2	53.5	3.23						X			X		2	X	X				2		X			X	X			X	X	X		6	1.00	2.67
0.9	57.5	3.29		X					X		X	X	4	X			X		2	X	X			X	X				X			5	0.60	1.20
04-143-000																																		

Report Date: 2/24/2016

QHEI Attributes: Auglaize River Basin (lower) 2014 TMDL

Key QHEI Components

			WWH Attributes																																				