



# Biological and Water Quality Study of the Ashtabula River and Select Tributaries, 2011

Ashtabula County



Division of Surface Water  
Ecological Assessment Section  
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## RECOMMENDATIONS

The majority of the streams listed in the Ohio Water Quality Standards for the study area are assigned the WWH aquatic life use designation (Table 1). These streams were originally designated for aquatic life uses in the 1978 Ohio WQS. The techniques used then did not include standardized approaches to the collection of instream biological data or numerical biological criteria. For a number of streams in the study area, this study was the first time that biological data was used to evaluate and verify aquatic life uses.

Thirteen streams were evaluated for aquatic life use and recreation use potential during 2011. Significant findings include the following.

- Five undesignated streams were evaluated for the first time and are recommended for the WWH aquatic life use designation (Table 1). Tributary to Ashtabula River at RM 16.98, Tributary to West Branch Ashtabula River at RM 3.50, East Branch of East Branch Ashtabula River, Tributary to East Branch Ashtabula River at RM 1.35 and Tributary to East Branch Ashtabula River at RM 1.35, 0.80 were supporting biological communities that were meeting or marginally meeting WWH expectations, except for E. Br. of E. Br. Ashtabula River in which the macroinvertebrate community was evaluated as fair due to natural conditions (interstitial flow) (Table 2). All of these streams had instream habitat sufficient to support WWH biological communities with QHEI scores between 60.0 and 89.3 (Table 3).
- Ashtabula Creek was evaluated for the first time during this study and its current WWH aquatic life use designation is confirmed (Table 1). The stream was supporting biological communities that were meeting or marginally meeting WWH expectations (Table 2) and the instream habitat was sufficient to support WWH biological communities with QHEI scores of 76.5 and 86.0 (Table 3).
- Hubbard Run and the Tributary to Hubbard Run at RM 0.20 were evaluated for the first time during this study. Both of these streams are recommended for the Coldwater Habitat (CWH) aquatic life use designation (Table 1). They both were supporting cold water macroinvertebrate communities with eight and seven cold water taxa, respectively. Reproducing populations of rainbow trout were also present in both streams.

The remaining streams in this study should retain their current aquatic life habitat, water supply and recreation uses.

**Table 1.** Waterbody use designation recommendations for the Ashtabula River watershed. Designations based on the 1978 and 1985 water quality standards appear as asterisks (\*). Designations based on Ohio EPA biological field assessments appear as a plus sign (+) and a delta (▲) indicates a new recommendation based on the findings of this report. Plus sign designations shaded in gray are to be replaced by the new recommendations (▲). Designations based on the 1978 and 1985 standards for which the results of a biological and habitat assessment are now available are displayed to the left of the existing markers.

Water Body Segment	Use Designations											Comments	
	S R W	Aquatic Life Habitat						Water Supply			Recreation		
		W W H	E W H	M W H	S S H	C W H	L R W	P W S	A W S	I W S	B W		P C R
Ashtabula River – st. rte. 11 (RM 5.8) to mouth		+			O			+	+		+		
- all other segments		+						+	+		+		
Strong Brook						+			*/+		*/+	Small drainageway maintenance	
Fields Brook		+							+		+		
West Brook						+			+			Small drainageway maintenance	
Hubbard Run		*				▲		*/+	*/+		*/+		
Tributary to Hubbard Run @ RM 0.20						▲		▲	▲		▲		
Tributary to Ashtabula River @ RM 16.98		▲						▲	▲		▲		
Ashtabula Creek		*/+						*/+	*/+		*/+		
West Branch		+						+	+		+		
Tributary to West Branch @ RM 3.50		▲						▲	▲		▲		
East Branch		+						+	+		+		
East Branch of East Branch		▲						▲	▲		▲		
Tributary to East Branch @ RM 1.35		▲						▲	▲		▲		
Trib. to Trib. to East Branch @ RM 1.35, 0.80		▲						▲	▲		▲		

**Table 2.** Aquatic life use attainment status for stations sampled in the Ashtabula River basin based on data collected June-October 2011. 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 biological communities. The Qualitative Habitat Evaluation Index (QHEI) is a measure of the ability of the physical habitat to support a biological community. The Ashtabula River basin is located in the Erie-Ontario Lake Plain ecoregion.

River Mile <sup>a</sup> - Location	Station	Drain. (mi <sup>2</sup> )	IBI	MIwb <sup>b</sup>	ICI <sup>c</sup>	QHEI	Attainment Status <sup>d</sup>	Causes	Sources
<b>Ashtabula River (07-001-000) <i>WWH Existing</i></b>									
27.2 <sup>W</sup> /27.0 – Hilldom Road	A01S02	65.2	45	9.6	42	75.0	FULL		
23.7 <sup>W</sup> /23.8 – Kelloggsville Road	502810	88.4	50	9.8	42	73.5	FULL		
19.0 <sup>W</sup> /19.03 – Benetka Road	A01W20	94	57	9.4	50	75.0	FULL		
14.0 <sup>W</sup> /13.9 – Green Hill Road	A01K09	113	49	9.3	50	67.0	FULL		
10.1 <sup>W</sup> /9.9 – Hadlock Road	A01K07	118	47	8.1	E	64.0	FULL		
5.8 <sup>W</sup> /6.24 – State Road	502760	121	53	9.2	E	71.0	FULL		
3.6 <sup>W</sup> – Tannery Hill Road	301398	127	47	9.3	50	76.0	FULL		
<b>Ashtabula River - Lacustrary</b>									
2.3 <sup>B</sup> /2.4 – 24 <sup>th</sup> Street	502790	132	44	9.0	44/-	53.1	FULL		
1.8 – upstream Fields Brook	A01K03	132	-	-	20*/-	-	(NON)		
1.6 <sup>B</sup> – ust. & across Fields Brook	301777	132	46	9.0	12*/24*	38.5	PARTIAL		
1.3 <sup>B</sup> – downstream Fields Brook	A01K02	137	43	8.5*	-	33.0	(PARTIAL)		
1.2 <sup>B</sup> – dst. Fields Br. at fish shelf	301776	137	46	9.9	-	65.0	(FULL)		
1.1 <sup>B</sup> – at 5½ slip	300381	137	37*	8.7	32*/44	54.5	PARTIAL		
0.9 <sup>B</sup> – downstream 5½ slip	301397	137	40*	9.3	28*/22*	67.0	PARTIAL		
0.6 <sup>B</sup> – coast guard station	A01S23	137	42	9.3	24*/26*	45.0	PARTIAL		
0.3 – near mouth	A01K01	137	-	-	24*/-	-	(NON)		

River Mile <sup>a</sup> - Location	Station	Drain. (mi <sup>2</sup> )	IBI	MIwb <sup>b</sup>	ICI <sup>c</sup>	QHEI	Attainment Status <sup>d</sup>	Causes	Sources
<b>West Branch Ashtabula River (07-004-000)</b>		<i>WWH Existing</i>							
11.2 <sup>H</sup> /11.28 – Hall Road	301394	7.6	36 <sup>NS</sup>	-	MG <sup>NS</sup>	49.5	FULL		
8.8 <sup>H</sup> /9.04 – North Richmond Rd.	301393	12.9	42	-	VG	62.0	FULL		
6.3 <sup>H</sup> – Schrambling Road	301392	15.1	42	-	E	70.5	FULL		
2.7 <sup>W</sup> – Graham Road	A01K12	31	42	8.4	42	67.8	FULL		
<b>Tributary to West Branch Ashtabula River at RM 3.50 (07-026 / 07-004-001)</b>		<i>Undesignated / WWH Recommended</i>							
1.0 <sup>H</sup> /0.92 – Caine Road	301391	6.8	38 <sup>NS</sup>	-	G	67.5	FULL		
<b>East Branch Ashtabula River (07-005-000)</b>		<i>WWH Existing</i>							
8.0 <sup>H</sup> /7.97 – Turner Road	301390	9.3	48	-	G	75.0	FULL		
5.5 <sup>H</sup> /5.47 – Caine Road	301389	13.0	48	-	E	72.0	FULL		
2.4 <sup>W</sup> /2.7 – Adams Road	301388	21.0	46	8.8	46	75.5	FULL		
<b>East Branch of East Branch Ashtabula River (07-027 / 07-005-001)</b>		<i>Undesignated / WWH Recommended</i>							
0.4 <sup>H</sup> /0.39 – SR 7	301387	2.5	38 <sup>NS</sup>	-	F*	76.5	PARTIAL	Natural conditions (interstitial flow)	
<b>Tributary to East Branch Ashtabula River at RM 1.35 (07-028 / 07-005-002)</b>		<i>Undesignated / WWH Recommended</i>							
1.1 <sup>H</sup> – Scribner Road	301385	4.9	40	-	G	72.0	FULL		
<b>Tributary to tributary to East Branch Ashtabula River at RM 1.35, 0.80 (07-029 / 07-005-003)</b>		<i>Undesignated / WWH Recommended</i>							
0.3 <sup>H</sup> – Hilldom Road	301386	8.9	44	-	MG <sup>NS</sup>	89.3	FULL		
<b>Ashtabula Creek (07-003-000)</b>		<i>WWH Existing</i>							
5.3 <sup>H</sup> /5.24 – Middle Road	A01S16	10.0	38 <sup>NS</sup>	-	E	76.5	FULL		
0.3 <sup>H</sup> /0.28 – Reger Road	301395	17.3	44	-	48	86.0	FULL		
<b>Tributary to Ashtabula River at RM 16.98 (07-025 / 07-001-002)</b>		<i>Undesignated / WWH Recommended</i>							
0.4 <sup>H</sup> /0.43 – Gageville Road	301396	17.3	48	-	G	60.0	FULL		

River Mile <sup>a</sup> - Location	Station	Drain. (mi <sup>2</sup> )	IBI	MIwb <sup>b</sup>	ICI <sup>c</sup>	QHEI	Attainment Status <sup>d</sup>	Causes	Sources
<b>Hubbard Run (07-002-000)</b> <i>WWH Existing / CWH Recommended</i>									
0.25 <sup>H</sup> /0.21 – ust. Trib. (RM 0.20)	301399	2.7	38	-	E	82.5	FULL		
<b>Tributary to Hubbard Run at RM 0.20 (07-016 / 07-002-001)</b> <i>Undesignated / CWH Recommended</i>									
0.1 <sup>H</sup> – upstream mouth	301400	2.1	40	-	E	69.3	FULL		
<b>Strong Brook (07-013 / 07-001-001)</b> <i>LRW Existing</i>									
0.6 <sup>H</sup> – Lake Avenue	502800	2.7	12*	-	P	58.3	NON	PCBs and PAHs in sediments	Urban runoff, Inappropriate waste disposal
<b>Fields Brook (07-010-000)</b> <i>WWH Existing</i>									
1.8 <sup>H</sup> /1.84 – State Road	A01W09	1.5	32*	-	F*	47.0	NON	Direct habitat alterations	Channelization
0.5 <sup>H</sup> /0.9 – Columbus Avenue	A01W14	3.4	48	-	MG <sup>NS</sup>	70.0	FULL		

<b>Biological Criteria</b>				
<b>Erie - Ontario Lake Plain</b>				
Index – Site Type	EWH	WWH	MWH	LRW
IBI - Headwaters	50	40	24	18
IBI - Wading	50	38	24	18
IBI - Boat	48	40	24	16
IBI - Lacustrary <sup>e</sup>	-	42	-	-
MIwb - Wading	9.4	7.9	6.2	4.5
MIwb - Boat	9.6	8.7	5.8	5.0
MIwb - Lacustrary <sup>e</sup>	-	8.6	-	-
ICI	46	34	22	8
ICI - Lacustrary <sup>e</sup>	-	42	-	-

- a If two river miles are listed, the first is for the fish station and the second is for the macroinvertebrate station. H = headwater site. W = wading site, B = boat site.
  - b MIwb is not applicable to headwater streams with drainage areas  $\leq 20 \text{ mi}^2$ .
  - c 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 fps flowing over the artificial substrates. VP=Very Poor, P=Poor, LF=Low Fair, F=Fair, MG=Marginally Good, G=Good, VG=Very Good, E=Exceptional. The lacustuary stations were evaluated with the Lacustuary ICI (LICI) and were sampled in the mid-channel (first LICI score) and near the margin (second LICI score).
  - d Attainment status is given for the existing or if a change is proposed then the proposed use designations. Attainment status was not assigned to isolated stream segments that were sampled with only qualitative macroinvertebrate methods.
  - e The lacustuary criteria are preliminary.
- NS Nonsignificant departure from biocriteria ( $\leq 4$  IBI or ICI units, or  $\leq 0.5$  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.

**Table 3.** QHEI attributes for the Ashtabula River basin, 2011.

River Mile	QHEI	Gradient (ft/mi)	WWH Attributes				MWH Attributes				M.I. Modified Attributes	MWH H.I.+1/MWH+1 Ratio	MWH M.I./MWH Ratio	
			Boulder/Cobble/Gravel Substrates Not Channelized or Recovered	Good/Excellent Development Silt Free Substrates	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low/Normal Embeddiness	Max Depth > 40cm	Low/Normal Riffle Embeddiness				High Influence
<b>07-001-000 Ashtabula River</b>														
Year: 2011														
27.2	75.0	8.55	X X	X X X	X X X	8		0		X X		2	0.11	0.33
23.7	73.5	8.26	X X	X X X	X	6		0	X	X X	X	4	0.14	0.71
19.0	75.0	9.43	X X	X X X	X X	7		0	X	X	X	3	0.13	0.50
14.0	67.0	10.75	X X	X X	X X X	7		0	X	X X		3	0.13	0.50
10.1	64.0	15.15	X X	X X	X X	6		0	X	X	X	3	0.14	0.57
5.8	71.0	9.52	X	X X X	X X X	7		0		X		1	0.13	0.25
3.6	76.0	12.50	X X	X X X	X X X	8		0		X		1	0.11	0.22
<b>07-001-001 Strong Brook</b>														
Year: 2011														
0.6	58.3	26.47	X		X X	3	X X	2	X X	X X	X X X X	8	1.00	2.25
Year: 2012														
0.7	58.8	25.00	X X		X X X X	6	X X	2	X	X	X	3	0.57	0.71
0.4	69.5	26.47	X X X X X X X X X X			10		0	X	X		2	0.09	0.27
<b>07-001-002 Trib. to Ashtabula R. (RM 16.98)</b>														
Year: 2011														
0.4	60.0	24.39	X	X	X X X	5	X	1	X	X		2	0.33	0.50
<b>07-002-000 Hubbard Run</b>														
Year: 2011														
0.3	82.5	40.00	X X	X X X X X X X X		9		0				0	0.10	0.10
<b>07-002-001 Trib. to Hubbard Run (RM 0.20)</b>														
Year: 2011														
0.1	69.3	41.67	X X	X X X X X X X X		9		0		X	X	2	0.10	0.30
<b>07-003-000 Ashtabula Creek</b>														
Year: 2011														
5.3	76.5	5.81	X X	X X X	X X X	8		0		X	X	2	0.11	0.44
0.3	86.0	21.28	X X	X X X	X X X	8		0		X		1	0.11	0.22

Table 7. Continued.

River Mile	QHEI	Gradient (ft/mi)	WWH Attributes					MWH Attributes					MWH H.I.+1/MWH+1 Ratio	MWH M.I./MWH Ratio		
			Low/Normal Riffle Embeddness Max Depth <40cm Low/Normal Embeddness Fast Current/Eddies Extensive/Moderate Cover Moderate/High Sinuosity Good/Excellent Development Silt Free Substrates Boulder/Cobble/Gravel Substrates Not Channelized or Recovered	WWH Attributes	Channelized/No Recovery Silt/Muck Substrates No Sinuosity Sparse/No Cover Max Depth <40cm	High Influence	Moderate Influence	High-influence Modified Attributes	No Riffle High/Mod. Riffle Embeddness High/Moderate Embeddness No Fast Current Intermittent/Poor Pools Only 1 or 2 Cover Types Low Sinuosity Fair/Poor Development Hardpan Substrate Origin Sand Substrates (Boat) Heavy/Moderate Silt Cover Recovering Channel							
<b>07-004-000 West Branch Ashtabula River</b>																
Year: 2011																
11.2	49.5	4.35	X	X	X	3	X	X	2	X	X	X	X	6	1.00	2.00
8.8	62.0	8.40	X	X	X	5			0	X	X	X	X	6	0.33	1.17
6.3	70.5	40.00	X	X	X	8			0	X			X	2	0.11	0.33
2.7	67.8	19.61	X	X	X	8			0	X	X	X	X	4	0.11	0.56
<b>07-004-001 Trib. to W. Br. Ashtabula R. (RM 3.50)</b>																
Year: 2011																
1.0	67.5	12.50	X	X	X	8	X		1	X	X	X	X	5	0.22	0.67
<b>07-005-000 East Branch Ashtabula River</b>																
Year: 2011																
8.0	75.0	8.47	X	X	X	7			0	X	X	X	X	6	0.13	0.88
5.5	72.0	16.39	X	X	X	7			0	X	X	X	X	5	0.13	0.75
2.4	75.5	19.61	X	X	X	8			0				X	1	0.11	0.22
<b>07-005-001 E. Br. of East Branch Ashtabula R.</b>																
Year: 2011																
0.4	76.5	43.48	X	X	X	9			0					0	0.10	0.10
<b>07-005-002 Trib to E. Br. Ashtabula R. (RM 1.35)</b>																
Year: 2011																
1.1	72.0	17.54	X	X	X	7	X		1		X	X	X	3	0.25	0.63
<b>07-005-003 Trib to E. Br. Ashtabula R (1.35/0.8)</b>																
Year: 2011																
0.3	89.3	14.93	X	X	X	9			0					0	0.10	0.10
<b>07-010-000 Fields Brook</b>																
Year: 2011																
1.8	47.0	29.41	X	X	X	5	X		1	X	X	X	X	5	0.50	1.00
0.5	70.0	16.67	X	X	X	5	X		1	X	X	X	X	5	0.33	1.00