

Appendix A

Chagrin River watershed

Biological Attainment Tables

**Chagrin River TMDL
Appendices**

Aquatic Life use attainment status for stations sampled in the Chagrin River basin in **HUC 04110003 020 (Headwaters Chagrin River to downstream Aurora Branch Chagrin River)**, 2003 - 2004. The Index of Biotic Integrity (IBI) and Modified Index of Well-being (MIwb), and Invertebrate Community Index (ICI) are scores derived, respectively, from the composition of fish and macroinvertebrate communities in said samples. The Qualitative Habitat Evaluation Index (QHEI) is a measure of the ability of the physical habitat at a given sampling location to support a biotic community. All sites are located within the Erie- Ontario Lake Plain (EOLP) Ecoregion.

RIVER MILE Fish/Invert.	2003/4 IBI	2003/4 MIwb ^a	2003/4 ICI ^b	2003/4 # CW ^c Fish / bugs	2003/4 QHEI	2003/4 Attainment Status	Site Location	Causes ^d	Sources
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Chagrin River (2003-04 Results)

EOLP: WWH Use Designation (Existing)

49.1/49.2	26*	--	P*	0/0	23.0	NON	Ust. Woodiebrook Road	Habitat Alteration, Flow Alteration	Hydromodification - riparian vegetation loss, drained wetlands, channelization
46.5	--	--	F	0/0	--		Auburn Rd. (Lentic - dst. Bass Lake & Beaver Cr.)	Habitat alteration, Natural wetlands	Hydromodification - channelization
45.2/45.3	32*	--	G	0/3	82.5	PARTIAL	Ust. Fowler Mills Road (lotic)	Habitat Alteration, Flow Alteration	Hydromodification - riparian vegetation loss, drained wetlands, channelization
42.6/42.8	30*	--	G	0/1	58.0	PARTIAL	Rock Haven Rd. (ust. Dewdale Cr.)	Habitat Alteration, Flow Alteration	Hydromodification - riparian vegetation loss, drained wetlands, channelization
40.0	48	8.8	50	0/1	82.0	FULL	Dst. Sperry Road (Sentinel Site)		
36.4/36.6 ^R	52	9.7	50	0/0	85.0	FULL	Ust. Fairmount Rd.		
33.4/33.5 ^R	50	9.5	38	0/0	86.0	FULL	Ust. St. Rt. 87		
30.6	34 ^{ns}	8.2	50	0/1	72.5	FULL	Ust. Ivex between the lakes		
30.0	40	9.1	VG	0/1	75.5	FULL	Dst. Ivex		

Chagrin River (2003-04 Results)

EOLP: WWH Use Designation (Existing) and SSH Use Designation (Recommended)

28.9 / 28.8	48	9.2	48	0/2	77.5	FULL	Ust. Miles Rd. (Sent. Site) Bugs		
28.2	46	8.9	48	0/1	82.0	FULL	Adj. Solon Rd. dst. Chagrin Falls		

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RIVER MILE Fish/Invert.	2003/4 IBI	2003/4 MIwb ^a	2003/4 ICI ^b	2003/4 # CW ^c Fish / bugs	2003/4 QHEI	2003/4 Attainment Status	Site Location	Causes ^d	Sources
Aurora Branch Chagrin River (2003-04 Results)							EOLP: WWH Use (Existing)		
16.6	40	NA	P*	0+/0	66.5	NON	Dst. Chamberlain Rd.	Nutrients, Unknown Toxicity, Habitat Alteration	Package Plants (Small plants), NPS runoff, Riparian vegetation removal
14.5	22*	NA	G	0/0	77.0	NON	Dst. Pioneer Trail and Sunny Lake	Periodic Toxicity	Algal discharges from Sunny Lake
12.0	32*	NA	42	0+/2	79.5	PARTIAL	SR 82	Periodic Toxicity, Siltation	Algal discharges from Sunny Lake, Land development/Suburbanization
11.3	36 ^{ns}	NA	42	0+/1	76.5	FULL	Ust. Aurora Central WWTP		
11.1 / 11.0	40	NA	42	0+/2	71.5	FULL	Dst. Aurora Central WWTP		
9.1	40	NA	48	0+/1	83.0	FULL	Ust. SR 306		
7.4 / 7.3	32*	7.7 ^{ns}	VG	0+/5	74.5	PARTIAL	Brewster Road, dst sand & gravel operation @ RM 9.0	Organic enrichment, siltation	Urban runoff/Storm sewers, Septic tanks; Urban runoff, gravel mining
5.6/5.1 ^R , 5.5 ^R	38	8.5	48/56	0+/5	74.0	FULL	Adj. Geauga Lk Rd near Fields Rd.		
3.8, 3.7 / 3.5, 3.7	44/38	8.3/8.4	54/50	0+/4,2	79.5	FULL	Ust. McFarland Cr. WWTP		
3.4	30*	7.8 ^{ns}	48	0+/6	79.5	PARTIAL	Dst. McFarland Cr. WWTP	Organic enrichment, Siltation	Major Municipal Point Source, Hydromodification - Streambank destabilization (bridge construction)
1.0 / 0.9	36 ^{ns}	7.9	VG	0+/1	54.0	FULL	Dst Solon Rd.		
							EOLP: WWH Use (Existing) & SSH Use Designation (Recommended)		
0.3	-	-	46	- /1	-	(FULL)	Ust. bridge abutment		

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RIVER MILE Fish/Invert.	2003/4 IBI	2003/4 MIwb ^a	2003/4 ICI ^b	2003/4 # CW ^c Fish / bugs	2003/4 QHEI	2003/4 Attainment Status	Site Location	Causes ^d	Sources
McFarland Creek (2004)						EOLP: EWH Use Designation (Existing)			
2.3	38*	--	VG ^{ns}	0+/3	78.5	PARTIAL	Dst. Chagrin Rd (dst. development)	Flow Alteration, Direct Habitat Alteration, Sedimentation, organic enrichment	Suburbanization, NPS stormwater runoff, riparian vegetation removal
0.2	44*	--	VG ^{ns}	0+/3	75.0	PARTIAL	Chagrin River Rd. (near mouth)	Flow Alteration, Direct Habitat Alteration, Sedimentation	Suburbanization, NPS stormwater runoff, riparian vegetation removal
N. Branch McFarland Creek (2004)						EOLP: CWH Use Designation (Recommended)			
0.1 / 0.2	34	--	VG	1+/6	70.0	FULL	Ust. Chagrin Blvd.	Threatened by Habitat alteration	Land development / Suburbanization
Smith Creek (2004)						EOLP: CWH Use Designation (Recommended)			
1.1	38	--	E	1+/4	79.0	FULL	South Spring Valley Park Drive		
Trib. to Smith Creek (2004)						EOLP: CWH Use Designation (Recommended)			
0.6	30	--	VG	1+/6	67.5	FULL	Crackel Rd.		Wetland influence
Silver Creek (2004)						EOLP: CWH Use Designation (Existing)			
5.1	46	--	E	0+/4	76.0	FULL	Music St.		
0.8 / 04	40	--	54	0/3	81.0	--	Ust. St. Rt. 306/ Dst.306 and Hitching Post Lane	Deferred attainment status and any use designation decisions for lower reaches until future assessment after recovery from park dam failure and ongoing subsequent restoration project upstream (stream restoration / riparian revegetation).	
South Branch Silver Creek (2004)						EOLP: WWH Use Designation (Existing)			
1.1	36 ^{ns}	--	G	0/0	79.5	FULL	Music St.		

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RIVER MILE Fish/Invert.	2003/4 IBI	2003/4 Mlwb ^a	2003/4 ICI ^b	2003/4 # CW ^c Fish / bugs	2003/4 QHEI	2003/4 Attainment Status	Site Location	Causes ^d	Sources
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Trib. to Chagrin R. (@ 38.32) (Marsh Hawk Run) EOLP: WWH Use Designation (Recommended)

0.7 / 0.3	32*	--	F*	0+/3	60.5	NON	Sperry Rd.	Nutrients, organic enrichment / D.O.,NH ₃	Wastewater (package plant), On-site septic runoff, Storm sewers
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Dewdale Creek (2004)

EOLP: CWH Use Designation (Recommended)

2.6	36	--	MG	0+/2	76.0	NON	Auburn Rd.	Nutrients (P), possible NH ₃ toxicity, organic enrichment / low D.O.	Suburban NPS stormwater runoff inputs, onsite septic or HSTS inputs, removal of riparian vegetation
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0.6/0.7	44	--	56	(1) ^e +/5	77.0	FULL	Rockhaven Rd.	Threatened by direct habitat alteration, (land development / suburbanization)	
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Beaver Creek (2004)

EOLP: CWH Use Designation (Existing)

2.3	-	--	52	-/12	-	(FULL)	Dst. Bean Rd.		
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Beaver Creek (2004)

EOLP: WWH Use Designation (Existing)

0.6	-	--	54	-/1	-	(FULL)	Sherman Rd.		
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a Mlwb is not applicable to headwater streams with drainage areas ≤ 20 mi².

b A qualitative narrative evaluation based on community composition, EPT taxa richness, and other attributes. E = Exceptional, VG = Very Good, G = Good, MG = Marginally Good, F = Fair, P = Poor, VP = Very Poor.

c Attainment of CWH evaluated on presence and quality of CW fish {OEPA CW list (trouts, sculpins, brook stickleback, and redbreast dace) and other additional species (American Brook lamprey, Longnose dace, and Blacknose dace)} and ≥ 4 CW macroinvertebrates (from OEPA current list) and narrative quality. If CW fish from OEPA CW list were present, the total number of different CW fish taxa were listed, and a plus (+) was added if additional coldwater fish were present from the additional species list. Nonattainment due to lack of quality or decreased quality can be determined also by documented decreases in the coldwater fish assemblages or macroinvertebrate assemblages over time.

d Causes and Sources listed are considered to be a primary influence on water quality, but may not be the only issue leading to impairment. See text for discussion of additional causes that cumulatively have led to impairment.

e Unofficially observed trout juveniles during macroinvertebrate sampling.

* Indicates significant departure from biocriteria (> 4 IBI or ICI units, or > 0.5 Mlwb units).

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

R Regional Reference site

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Aquatic Life use attainment status for stations sampled in the Chagrin River basin in **HUC 04110003 030 (Downstream Aurora Branch to mouth Chagrin River)**, 2003 - 2004. The Index of Biotic Integrity (IBI) and Modified Index of Well-being (MIwb), and Invertebrate Community Index (ICI) are scores derived, respectively, from the composition of fish and macroinvertebrate communities in said samples. The Qualitative Habitat Evaluation Index (QHEI) is a measure of the ability of the physical habitat at a given sampling location to support a biotic community. All sites are located within the Erie- Ontario Lake Plain (EOLP) Ecoregion.

RIVER MILE Fish/Invert.	2003/4 IBI	2003/4 MIwb	2003/4 ICI ^a	2003/4 # CW ^c Fish / bugs	2003/4 QHEI	2003/4 Attainment Status ^b	Site Location	Causes ^d	Sources
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Chagrin River (2003-04)

EOLP: WWH Use Designation (Existing) and SSH (Recommended)

26.7	46	8.8	VG	0/0	-	FULL	Dst. Miles Rd & Aur. Br. confl.		
25.3	-	-	50	0/2	-	(FULL)	Dst. Chagrin Blvd. in park		
24.2 / 23.7	40	7.7 ^{ns}	42	0/3	73.5	FULL	Ust. SR 87 or ust. Kinsman Rd.		
19.4	46	9.3	44	0/0	87.5	FULL	Adj. Chagrin R. Rd dst. Fairmount		
13.0 / 12.8	40	9.2	38	0/0	71.0	FULL	Rodgers Rd. bridge		
9.7 / 8.3	46	8.4	VG	0/2	73.0	FULL	Eagle Rd.		
4.8 / 4.2	48	8.3	38	0/2	74.5	FULL	Todd Field		
2.5	44	7.9	VG	0/1	78.5	FULL	At Park off Reeves Rd.		
1.5 / 1.7	44	8.5	G	0/0	-	FULL	Ust. lacustuary in park near powerline crossing		

Ward Creek (2004) (Trib. To Chagrin R. @ RM 1.0)

EOLP: WWH Use Designation (Existing) and SSH (Recommended)

0.4 / 0.8	32*	--	F*	1+/0	67.5	NON	Robin Dr. off Reeves Rd.	Sedimentation, flow alteration, organic enrichment, nutrients	Urban runoff & storm sewers
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East Branch Chagrin River (2004)

EOLP: CWH Use Designation (Existing)

16.3	42	--	E	1+/6	76.0	PARTIAL ^e	at Heath Rd.	Thermal Modifications, Direct habitat alteration, Flow alteration	Dams, Removal of riparian vegetation, Suburban development
10.3 / 10.2	42	<u>4.5</u>	E	1+/7	70.0	PARTIAL ^f	Adj. Wisner Rd. dst. Mitchells Mills Rd.	Thermal Modifications, Direct habitat alteration, Flow alteration, Sedimentation	Dredge Mining, Dams, Suburban development, Riparian vegetation removal

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RIVER MILE Fish/Invert.	2003/4 IBI	2003/4 MIwb	2003/4 ICI ^a	2003/4 # CW ^c Fish / bugs	2003/4 QHEI	2003/4 Attainment Status ^b	Site Location	Causes ^d	Sources
East Branch Chagrin River (2004) (cont.)							EOLP: CWH Use Designation (Existing)		
2.4	42	8.2	VG	0+/2	76.0	NON	Ust. Markell Rd.	Thermal modifications, Direct habitat alterations, Flow alteration, Sedimentation	Dredge Mining, Dams, Removal of riparian vegetation, Suburban development
Quarry Creek (2004) (Trib. To E. Br. Chagrin R. @ RM 1.85)							EOLP: CWH (Existing) and EWH Use Designation (Recommended)		
0.1	56	--	VG ^{ns}	1+/5	55.0	FULL/FULL	Markell Rd.		
Stoney Brook (2004) (Trib. To E. Br. Chagrin R. @ RM 3.57)							EOLP: CWH Use Designation (Existing)		
0.1	40	--	VG	0+/4	65.5	PARTIAL	@ Kirtland Chardon Rd. (SR 615)	Thermal modification, nutrients, flow alteration, habitat alteration	Removal of wooded riparian vegetation, suburban NPS storm water runoff, suburbanization, Package plants, onsite septic tanks or HSTS
Pierson Creek (2004) (Trib. To E. Br. Chagrin R. @ RM 6.73)							EOLP: CWH (Existing) and EWH Use Designation (Recommended)		
0.1	56	--	VG ^{ns}	1+/11	66.5	FULL/FULL	Sperry Rd. and Booth Rd.		
Trib. to E. Br. Chagrin R. @ RM 10.13 (2004)							EOLP: CWH (Existing) and EWH Use Designation (Recommended)		
0.1	48 ^{ns}	--	54	1+/12	78.0	FULL/FULL	near mouth dst. Wisner Rd.		
Stebbins Gulch (2004) (Trib. To E. Br. Chagrin R. @ RM 10.6)							EOLP: CWH Use Designation (Existing)		
0.2	38	--	E	1+/14	68.5	FULL	Ust. Wisner Rd. & south of Mitchell Mill Rd.		
Trib. to E. Br. Chagrin R. @ RM 14.62 (east side trib.) (2004)							EOLP: CWH Use Designation (Existing)		
0.1	38	--	E	0+/8	62.5	PARTIAL	Heath Rd.	Habitat Alteration	bridge construction (fish barrier), some removal of riparian vegetation

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RIVER MILE Fish/Invert.	2003/4 IBI	2003/4 MIwb	2003/4 ICI ^a	2003/4 # CW ^c Fish / bugs	2003/4 QHEI	2003/4 Attainment Status ^b	Site Location	Causes ^d	Sources
Trib. to E. Br. Chagrin R. @ RM 14.80 (west side trib.) (2004)							EOLP: CWH Use Designation (Existing)		
0.1	48	--	G	0+/6	63.5	PARTIAL	Sperry Rd.	Habitat alteration, Flow alteration, Sedimentation	Dam / bridge construction, Riparian vegetation removal, Suburban NPS stormwater runoff
Trib. to E. Br. Chagrin R. @ RM 15.35 (east side trib.) (2004)							EOLP: CWH (Existing) and EWH Use Designation (Recommended)		
0.2	46 ^{ns}	--	VG ^{ns}	0+/7	72.5	PARTIAL/ FULL	Sperry Rd.	Habitat alteration, Flow alteration, Sedimentation	Road construction (bridge fish barrier), suburban NPS stormwater runoff, Riparian vegetation removal
Trib. to E. Br. Chagrin R. @ RM 16.2 (2004)							EOLP: CWH (Existing) and EWH Use Designation (Recommended)		
0.2 / 0.1	50	--	E	1+/12	72.5	FULL/FULL	Wilson Mills Rd.		
Gully Brook (Trib. to Chagrin R. @ RM 5.54) (2004)							EOLP: WWH Use Designation (Existing) and SSH (Recommended)		
0.6	-	--	MG ^{ns}	- /1	-	-	River Rd.		
Caves Creek (2004) (Trib. to Chagrin R. @ RM 11.52) (2004)							EOLP: CWH Use Designation (Recommended)		
0.9	36 ^{ns}	--	E	1+/8	71.0	FULL	County Line Rd.		
Trib. to Chagrin R. @ RM 22.81 (2004) (Pepper-Luce Creek)							EOLP: WWH Use Designation (Existing)		
0.2	38	--	MG ^{ns}	0/1	66.5	FULL	Chagrin River Rd.	Threatened by siltation (sand / silt bedload), nutrients	Suburban development, storm runoff, possible septic inputs, small package
Griswold Creek (2004)							EOLP: CWH Use Designation (Existing)		
4.4	46	--	G	1+/1	86.0	PARTIAL	Fairmount Rd.	Habitat alteration, Thermal modification	Suburban development, NPS stormwater runoff, Removal of riparian vegetation
0.1	40	--	VG	0+/2	67.5	NON	Falls River Rd.	Habitat alteration, Thermal modification	Streambank modification / dredging, NPS stormwater runoff, Removal of riparian vegetation

Chagrin River TMDL Appendices

- a MIwb is not applicable to headwater streams with drainage areas ≤ 20 mi².
- b A qualitative narrative evaluation based on community composition, EPT taxa richness, and other attributes. E = Exceptional, VG = Very Good, G = Good, MG = Marginally Good, F = Fair, P = Poor, VP = Very Poor.
- c Attainment of CWH evaluated on presence and quality of CW fish {OEPA CW list (trouts, sculpins, brook stickleback, and redbreast dace) and other additional species (American Brook lamprey, Longnose dace, and Blacknose dace)} and > 4 CW macroinvertebrates (from OEPA current list) and narrative quality. If CW fish from OEPA CW list were present, the total number of different CW fish taxa were listed, and a plus (+) was added if additional coldwater fish were present from the additional species list. Nonattainment due to lack of quality or decreased quality can be determined also by documented decreases in the coldwater fish assemblages or macroinvertebrate assemblages over time.
- d Causes and Sources listed are considered to be a primary influence on water quality, but may not be the only issue leading to impairment. See text for discussion of additional causes that cumulatively have led to impairment.
- e This upper reach showed a documented historical decrease in the quality of the CW fish community (no rainbow trout, American brook lamprey, and only a remnant Longnose dace population present compared to earlier data).
- f This reach sampled had a poor fish biomass quality score and high sediment load - directly related to dredging. Also there was a historical decrease in CW fish community quality (loss of brook trout, American brook lamprey, and large decreases (60-80%) in Blacknose dace and Longnose dace). Some stretches of reach contained sandy bedload covering large substrates. Where habitat was better as indicated by QHEI, the macroinvertebrate community was present in those areas.
- * Indicates significant departure from biocriteria (> 4 IBI or ICI units, or > 0.5 MIwb units).
- ns Nonsignificant departure from biocriteria (≤ 4 IBI or ICI units, or ≤ 0.5 MIwb units).