

Maumee River Watershed

Volume 1

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The Maumee River Watershed chapter addresses Hydrologic Unit 04100009 090. Although, the Ohio EPA addresses the Maumee River mainstem as an independent Large River Unit, for the purposes of this report information on the Maumee River is included under this Hydrologic Unit along with Grassy Creek and Duck Creek.

The Maumee River is the largest Great Lakes tributary, draining all or part of 17 Ohio counties, two Michigan counties, and five Indiana counties. The total river basin covers 8,316 square miles. The mainstem of the Maumee River is approximately 130 miles in total length with 105 miles in Ohio. Only the lower 22.8 miles of the Maumee River is included in the Maumee AOC, therefore only this lower portion is addressed by the *Stage 2 Watershed Plan*.

The river drains about 6,586 square miles, of which about 85 percent is agricultural. Daily average discharge ranges from a high of 94,000 cubic feet per second (cfs) to a low of 32 cfs, and contributes about 25 percent of the total tributary discharge into Lake Erie, exclusive of the Detroit River. The average annual rainfall on the river basin is 34.5 inches.¹

The Maumee River begins in Fort Wayne at the confluence of the St. Joseph and St. Mary’s rivers. It flows through Defiance and Napoleon, and then into Toledo. Along the way several major tributaries join the Maumee: the Tiffin, Auglaize, and Blanchard rivers. In Wood and Lucas counties, several smaller streams flow into the Maumee: Beaver Creek and Tontogany Creek from the south; and Swan Creek, which join the Maumee in downtown Toledo. The area in Wood and Lucas counties draining directly into the Maumee River is comparatively small. Most drainage flows to the tributaries, which then flow into the Maumee River. Most of the Oak Openings Region is in the Maumee River Basin and the Great Black Swamp in the area formerly covers a large part of the basin south of the river.



The Maumee River was designated a State Scenic River on July 18, 1974 from the Ohio/Indiana state line to the US Route 24 bridge west of Defiance. This Scenic River designation includes 43 miles of the Maumee River. It also designated as a State Recreational River in July 1974 from the US Route 24 bridge west of Defiance to the Maumee/Perrysburg Bridge (State Route 25/US Route 20) at RM 15.1. This Recreational River segment includes 53 miles of the Maumee River. These two designated areas have special restrictions on development, permitted discharged, etc. within them.

Fishing on the Maumee River normally occurs upstream from the Maumee-Perrysburg Bridge. Sailing and power boating occur from Perrysburg to the mouth of the Maumee River, as do the other water-based activities. Canoeing is popular both upstream and downstream from the

Maumee-Perrysburg Bridge, with the upstream area being the most important. The lower portion of the River (RM 7) including areas just below RM 5, at the Swan Creek confluence near Promenade park, is considered polluted. This also happens to be one of the areas most impacted by combined sewer overflows (CSO). Despite the pollution, people swim, ski and sailboard in this area.

The highest elevations of 1,100 feet above mean sea level occur in the Michigan portion of the watershed. At the Ohio/Indiana border the elevation of the Maumee River is 707 feet above mean sea level. While at its mouth at Maumee Bay, the river is 573 feet above mean sea level, dropping an average of 1.3 feet per mile.² The steepest section is between Waterville and Maumee, at 5 feet per mile.³ Below Rossford, the Maumee is at the same elevation as Lake Erie.⁴

Lower Maumee River Watershed Use Attainment Data⁵

River Mile	Sample Year	ICI Score	HELP Ecoregion ICI Criteria	Lacustrary ICI Score*	HELP Ecoregion Lacustrary ICI Criteria*	Modified Index of Well Being Score	HELP Ecoregion Miwb Criteria	IBI Score	HELP Ecoregion IBI Criteria	Lacustrary IBI Score*	HELP Ecoregion Lacustrary IBI Criteria*	QHEI Score	HELP Ecoregion QHEI Criteria
<i>Maumee River</i>													
0.6	1986											54	60
0.6	1993			36	42								
0.6	1996					6.671	8.6			26	42		
0.6	1996					6.323	8.6			32	42		
0.6	1996					5.493	8.6			16	42		
0.6	1996					6.507	8.6			27	42		
0.6	1996					5.555	8.6			30	42		
0.6	1996					6.687	8.6			30	42		
0.7	1986					5.475	8.6			18	42	54.5	60
0.7	1986					6.041	8.6			22	42		
0.7	1986					6.289	8.6			20	42		
0.7	1993					5.928	8.6			20	42	51.5	60
0.7	1993					7.336	8.6			25	42		
0.7	1993					7.735	8.6			30	42		
0.7	1996					3.606	8.6			16	42		
0.7	1996					6.266	8.6			27	42		
0.7	1996					6.403	8.6			27	42		
0.7	1996					5.452	8.6			27	42		
0.7	1996					6.793	8.6			29	42		
0.8	1986			24	42								
1.4	1986											49.5	60
1.4	1993											26.5	60
1.4	1986					6.183	8.6			20	42		
1.4	1986					6.619	8.6			32	42		
1.4	1986					5.608	8.6			21	42		
1.4	1993					6.502	8.6			16	42		
1.4	1993					6.331	8.6			22	42		
1.5	1986			14	42	4.944	8.6			20	42	49.5	60
1.5	1986					6.221	8.6			28	42		
1.5	1993			24	42	7.181	8.6			28	42	55.5	60
1.5	1993					7.689	8.6			36	42		

River Mile	Sample Year	ICI Score	HELP Ecoregion ICI Criteria	Lacustrary ICI Score*	HELP Ecoregion Lacustrary ICI Criteria*	Modified Index of Well Being Score	HELP Ecoregion Miwb Criteria	IBI Score	HELP Ecoregion IBI Criteria	Lacustrary IBI Score*	HELP Ecoregion Lacustrary IBI Criteria*	QHEI Score	HELP Ecoregion QHEI Criteria
<i>Maumee River</i>													
1.5	1993					8.056	8.6			35	42		
1.5	1996					5.468	8.6			13	42		
1.5	1996					7.699	8.6			25	42		
1.5	1996					7.151	8.6			17	42		
1.5	1996					7.772	8.6			31	42		
1.5	1996					6.742	8.6			21	42		
1.5	1996					7.253	8.6			33	42		
1.6	1998			26	42	7.289	8.6			28	42	37	60
1.6	1998					7.011	8.6			22	42		
2.1	1998			28	42	7.198	8.6			23	42	38	60
2.1	1998					7.266	8.6			22	42		
2.6	1998			30	42	6.134	8.6			16	42	37.5	60
2.6	1998					7.478	8.6			23	42		
3.1	1986			22	42								
3.1	1993					5.961	8.6			20	42	57	60
3.1	1993					6.482	8.6			26	42		
3.1	1993					6.629	8.6			26	42		
3.1	1996					5.464	8.6			17	42		
3.1	1996					3.015	8.6			13	42		
3.1	1996					4.605	8.6			24	42		
3.1	1996					5.486	8.6			27	42		
3.1	1996					6.153	8.6			28	42		
3.3	1986					7.128	8.6			24	42	46.5	60
3.3	1986					6.293	8.6			21	42		
3.3	1986					6.137	8.6			24	42		
3.3	1986					6.368	8.6			22	42		
3.3	1996					6.257	8.6			23	42		
3.3	1996					6.563	8.6			34	42		
3.3	1996					7.955	8.6			31	42		
3.3	1996					5.554	8.6			24	42		
3.3	1996					5.357	8.6			28	42		
3.6	1986			28	42	6.682	8.6			17	42	49	60
3.6	1986					6.799	8.6			14	42		
3.6	1986					5.441	8.6			13	42		
3.6	1986					6.604	8.6			25	42		
4.5	1986			20	42								
4.5	1993					7.671	8.6			19	42	37.5	60
4.5	1993					7.298	8.6			23	42		
4.5	1993					7.464	8.6			27	42		
4.5	1996					5.831	8.6			30	42		
4.5	1996					6.64	8.6			29	42		
4.5	1996					5.099	8.6			17	42		
4.5	1996					8.193	8.6			38	42		

River Mile	Sample Year	ICI Score	HELP Ecoregion ICI Criteria	Lacustrary ICI Score*	HELP Ecoregion Lacustrary ICI Criteria*	Modified Index of Well Being Score	HELP Ecoregion Miwb Criteria	IBI Score	HELP Ecoregion IBI Criteria	Lacustrary IBI Score*	HELP Ecoregion Lacustrary IBI Criteria*	QHEI Score	HELP Ecoregion QHEI Criteria
<i>Maumee River</i>													
4.5	1996					6.019	8.6			23	42		
4.5	1996					6.93	8.6			20	42		
4.6	1993					8.064	8.6			30	42	42.5	60
4.6	1993					6.663	8.6			20	42		
4.6	1993					6.756	8.6			24	42		
4.7	1986					7.599	8.6			23	42	36	60
4.7	1986					7.523	8.6			25	42		
4.7	1986					6.61	8.6			32	42		
4.7	1986					7.252	8.6			27	42		
5.8	1993					7.504	8.6			23	42	59	60
5.8	1993					6.259	8.6			24	42		
5.8	1993					7.453	8.6			30	42		
5.8	1996					5.882	8.6			16	42		
5.8	1996					4.705	8.6			24	42		
5.8	1996					4.791	8.6			15	42		
5.8	1996					7.471	8.6			30	42		
5.8	1996					5.696	8.6			26	42		
5.8	1996					6.595	8.6			30	42		
7.2	1986			18									
7.3	1986			24		8.612	8.6			21	42	61	60
7.3	1986					7.056	8.6			22	42		
7.3	1986					6.519	8.6			25	42		
7.3	1986					7.264	8.6			18	42		
7.3	1986					7.279	8.6			27	42		
7.4	1986					7.997	8.6			23	42	58.5	60
7.4	1986					7.444	8.6			14	42		
7.4	1986					6.672	8.6			16	42		
7.4	1986					5.202	8.6			22	42		
7.4	1986					6.239	8.6			26	42		
7.4	1993					7.453	8.6			22	42	46	60
7.4	1993					6.261	8.6			20	42		
7.4	1993					7.752	8.6			22	42		
7.5	1993					6.346	8.6			21	42	59.5	60
7.5	1993					7.232	8.6			23	42		
7.5	1996					6.978	8.6			21	42		
7.5	1996					5.53	8.6			19	42		
7.5	1996					6.781	8.6			18	42		
7.5	1996					7.05	8.6			21	42		
7.5	1996					6.471	8.6			22	42		
7.5	1996					5.656	8.6			22	42		
8.8	1986			24	42								
9.4	1986					7.206	8.6			22	42	61	60
9.4	1986					6.189	8.6			16	42		

River Mile	Sample Year	ICI Score	HELP Ecoregion ICI Criteria	Lacustuary ICI Score*	HELP Ecoregion Lacustuary ICI Criteria*	Modified Index of Well Being Score	HELP Ecoregion Miwb Criteria	IBI Score	HELP Ecoregion IBI Criteria	Lacustuary IBI Score*	HELP Ecoregion Lacustuary IBI Criteria*	QHEI Score	HELP Ecoregion QHEI Criteria
<i>Maumee River</i>													
9.4	1986					6.471	8.6			13	42		
9.4	1986					8.072	8.6			32	42		
9.4	1993					5.983	8.6			22	42	54	60
9.4	1993					7.223	8.6			20	42		
12	1996					5.374	8.6			21	42		
12	1996					6.758	8.6			22	42		
12	1996					6.764	8.6			25	42		
12	1996					8.187	8.6			29	42		
12	1996					5.933	8.6			28	42		
12	1996					7.481	8.6			27	42		
13.3	1986			22	42								
13.6	1986			26	42								
13.7	1986					7.124	8.6			28	42	47	60
13.7	1986					6.674	8.6			21	42		
13.7	1986					7.484	8.6			21	42		
13.7	1993					7.976	8.6			29	42	58.5	60
13.7	1993					8.162	8.6			31	42		
13.7	1993					7.054	8.6			28	42		
14.1	1986					8.963	8.6			38	42	45	60
14.1	1986					7.315	8.6			25	42		
14.1	1986					7.641	8.6			26	42		
14.2	1986					7.066	8.6			21	42		
14.7	1993					8.297	8.6			27	42	50.5	60
14.7	1993					7.586	8.6			32	42		
14.7	1993					8.128	8.6			29	42		
14.8	1986					7.588	8.6			28	42	64	60
14.8	1986					7.802	8.6			30	42		
14.8	1986					8.259	8.6			24	42		
15	1986			30	34								
16	1986					6.467	8.6	34	34				
17.2	1986					8.786	8.6	28	34			71.5	60
17.2	1986					7.461	8.6	28	34				
17.2	1997					8.858	8.6	38	34			77.5	60
17.2	1997					9.195	8.6	38	34				
17.9	1997	54											
18.3	1997	50											
19.1	1997					6.992	8.6	36	34			70.5	60
19.1	1997					9.131	8.6	46	34				
19.8	1986					8.263	8.6	24	34			78	60
19.8	1986					8.798	8.6	30	34				
<i>Delaware Crk</i>													
1	1993											39.5	60

*The double horizontal line represents the lacustuary divide of the Maumee River, although it is noted that lacustuary lengths are approximate and fluctuate with lake levels and wind direction.⁶

Lower Maumee River Watershed DELT Data⁷

River Mile	Sample Year	Percent DELT Anomalies	Percent Deformities	Percent Eroded Fins	Percent Lesions	Percent Tumors	Relative Number of Fish Collected	Relative Number of Species Collected	Relative Number of Fish Minus Tolerants	Relative Weight of Fish Collected (in grams)
<i>Maumee River</i>										
0.6	1996	0	0	0	0	0	48	10	36	32.948
0.6	1996	0	0	0	0	0	34	10	28	10.318
0.6	1996	0	0	0	0	0	82	6	64	44.556
0.6	1996	0	0	0	0	0	696	12	670	66.23
0.6	1996	0	0	0	0	0	344	11	316	45.884
0.6	1996	0	0	0	0	0	258	14	250	22.457
0.7	1986	3.23	0	3.23	0	0	62	7	56	10.501
0.7	1986	1.94	0	0	1.94	0	118	10	96	31.241
0.7	1986	0	0	0	0	0	1172	5	1156	42.316
0.7	1993	7.5	0	5.08	2.42	0	1102	11	1016	216.724
0.7	1993	0.11	0	0	0.11	0	1790	11	1758	68.339
0.7	1993	1.29	0	0.94	0.09	0.13	2290	18	2232	124.933
0.7	1996	0	0	0	0	0	20	4	12	23.468
0.7	1996	0	0	0	0	0	92	8	70	88.168
0.7	1996	0	0	0	0	0	628	13	590	85.751
0.7	1996	0	0	0	0	0	594	10	576	70.49
0.7	1996	0	0	0	0	0	1782	14	1734	114.193
1.4	1986	0	0	0	0	0	71.72	7	67.38	16.373
1.4	1986	0	0	0	0	0	108	11	94	16.372
1.4	1986	0	0	0	0	0	364	6	360	13.057
1.4	1993	0.42	0	0.42	0	0	2365	4	2310	99.429
1.4	1993	5.58	0	3.14	1.05	0	956.55	12	873.24	122.691
1.5	1986	0	0	0	0	0	144	7	124	23.504
1.5	1986	0	0	0	0	0	370	13	336	45.35
1.5	1993	4.8	0	2.99	1.81	0	650	21	542	202.856
1.5	1993	3.5	0	2.26	1.24	0	1688	25	1592	158.626
1.5	1993	3.41	0	2.15	0.18	1.07	2204	26	2024	344.425
1.5	1996	0	0	0	0	0	22	4	16	24.018
1.5	1996	0	0	0	0	0	78	11	58	86.97
1.5	1996	0	0	0	0	0	156	5	138	91.852
1.5	1996	0	0	0	0	0	1098	20	1072	82.694
1.5	1996	0	0	0	0	0	132	7	116	39.914
1.5	1996	0	0	0	0	0	312	17	288	96.659
1.6	1998	2.38	0	0	2.38	0	93.31	12	77.76	37.862
1.6	1998	0.3	0.3	0	0	0	746.58	8	733.25	52.88
2.1	1998	5.56	1.85	0	3.7	0	108	11	102	27.823
2.1	1998	0.91	0.91	0	0	0	658	15	652	35.349
2.6	1998	3.33	0	3.33	0	0	60	9	44	50.947
2.6	1998	0.34	0.17	0.17	0	0	1168	11	1150	74.01
3.1	1993	5.35	0	4.27	1.08	0	542	10	486	133.001
3.1	1993	0	0	0	0	0	1364	10	1346	66.048
3.1	1993	5.04	0	0.34	3.7	1.01	1348	17	1276	179.347

River Mile	Sample Year	Percent DELT Anomalies	Percent Deformities	Percent Eroded Fins	Percent Lesions	Percent Tumors	Relative Number of Fish Collected	Relative Number of Species Collected	Relative Number of Fish Minus Tolerants	Relative Weight of Fish Collected (in grams)
<i>Maumee River</i>										
3.1	1996	0	0	0	0	0	26	5	20	33.432
3.1	1996	0	0	0	0	0	24	4	10	23.156
3.1	1996	0	0	0	0	0	278	7	248	82.282
3.1	1996	0	0	0	0	0	694	14	688	23.078
3.1	1996	0	0	0	0	0	292	8	274	44.246
3.1	1996	0	0	0	0	0	206	13	198	20.288
3.3	1986	2.82	1.41	0	1.41	0	142	13	104	17.25
3.3	1986	1.41	0	0	1.41	0	142	7	128	23.977
3.3	1986	3.92	0	0	3.92	0	102	9	70	31.314
3.3	1986	0	0	0	0	0	616	9	604	25.273
3.3	1996	0	0	0	0	0	116	9	98	47.142
3.3	1996	0	0	0	0	0	232	17	212	51.68
3.3	1996	0	0	0	0	0	1998	18	1962	92.163
3.3	1996	0	0	0	0	0	262	11	228	72.102
3.3	1996	0	0	0	0	0	176	12	154	17.578
3.6	1986	10.27	0	0	10.27	0	146	10	126	36.449
3.6	1986	2.38	0	0	2.38	0	84	8	68	28.888
3.6	1986	5.26	0	1.75	3.51	0	114	7	108	7.022
3.6	1986	0.34	0	0	0.34	0	590	11	574	30.296
4.5	1993	17.43	0	14.43	3	0	280	15	206	106.233
4.5	1993	0.74	0	0.65	0.08	0	2404	13	2356	78.884
4.5	1993	2.85	0	0.29	1.43	1.14	1450	17	1368	131.87
4.5	1996	0	0	0	0	0	30	7	28	8.44
4.5	1996	0	0	0	0	0	54	8	46	19.478
4.5	1996	0	0	0	0	0	88	5	72	38.09
4.5	1996	0	0	0	0	0	620	18	582	122.915
4.5	1996	0	0	0	0	0	224	11	194	56.988
4.5	1996	0	0	0	0	0	104	8	78	118.76
4.6	1993	4.07	0.81	1.63	0.81	0	246	16	204	83.819
4.6	1993	0.31	0	0	0.31	0	1294	9	1290	19.376
4.6	1993	0.78	0	0.41	0.37	0	2438	15	2396	108.855
4.7	1986	5.13	0	1.28	3.85	0	156	13	118	23.922
4.7	1986	0	0	0	0	0	104	11	76	21.19
4.7	1986	0	0	0	0	0	1012	9	990	18.025
4.7	1986	0	0	0	0	0	1156.56	9	1143.23	23.839
5.8	1993	6.29	0.63	2.52	2.52	0	318	15	288	50.118
5.8	1993	0.5	0	0	0.5	0	806	9	788	25.019
5.8	1993	0.55	0.11	0	0.22	0	2042	16	2020	51.105
5.8	1996	0	0	0	0	0	20	5	16	27.586
5.8	1996	0	0	0	0	0	38	9	28	19.354
5.8	1996	0	0	0	0	0	50	5	34	21.732
5.8	1996	0	0	0	0	0	422	15	410	61.817
5.8	1996	0	0	0	0	0	366	10	326	94.861

River Mile	Sample Year	Percent DELT Anomalies	Percent Deformities	Percent Eroded Fins	Percent Lesions	Percent Tumors	Relative Number of Fish Collected	Relative Number of Species Collected	Relative Number of Fish Minus Tolerants	Relative Weight of Fish Collected (in grams)
<i>Maumee River</i>										
5.8	1996	0	0	0	0	0	168	16	142	48.43
7.3	1986	4.47	1.71	1.2	1.55	0	576	16	484	232.65
7.3	1986	0.4	0	0.4	0	0	498	11	468	180.528
7.3	1986	0	0	0	0	0	84	11	58	28.143
7.3	1986	2.49	1.11	0	1.38	0	434	12	380	93.398
7.3	1986	0.29	0	0	0.29	0	692	13	666	29.958
7.4	1986	7.2	2.35	0	4.85	0	176	14	140	68.825
7.4	1986	6.78	0	0	6.78	0	118	10	88	28.568
7.4	1986	5.68	1.14	2.27	2.27	0	176	11	142	13.884
7.4	1986	0	0	0	0	0	402	7	384	25.739
7.4	1986	0	0	0	0	0	580	10	572	4.638
7.4	1993	1.82	0	0.4	1.42	0	988	11	960	64.766
7.4	1993	0.11	0	0	0.11	0	1828	8	1824	19.474
7.4	1993	0.12	0	0.04	0	0.04	5144	10	5140	55.323
7.5	1993	10.03	0	1.04	8.65	0	578	11	520	83.108
7.5	1993	7.92	1.32	0.32	6.29	0	632	20	488	230.818
7.5	1996	0	0	0	0	0	48	7	40	41.13
7.5	1996	0	0	0	0	0	52	6	34	17.454
7.5	1996	0	0	0	0	0	120	7	100	51.132
7.5	1996	0	0	0	0	0	376	11	318	99.886
7.5	1996	0	0	0	0	0	182	10	154	57.556
7.5	1996	0	0	0	0	0	118	11	96	41.364
9.4	1986	2.5	0	0	2.5	0	160	16	118	47.678
9.4	1986	2.27	0	0	2.27	0	88	10	62	22.318
9.4	1986	11.11	0	2.22	8.89	0	90	9	70	18.616
9.4	1986	0	0	0	0	0	374	17	348	18.217
9.4	1993	6.2	0	2.89	3.31	0	484	11	446	29.721
9.4	1993	0.16	0	0.08	0.08	0	2488	9	2460	52.075
12	1996	0	0	0	0	0	36	6	28	4.678
12	1996	0	0	0	0	0	104	11	68	37.08
12	1996	0	0	0	0	0	310	10	304	38.851
12	1996	0	0	0	0	0	1190	14	1166	70.114
12	1996	0	0	0	0	0	492	9	466	57.187
12	1996	0	0	0	0	0	768	12	750	48.176
13.7	1986	4.46	0	0	4.46	0	262	12	250	62.604
13.7	1986	0	0	0	0	0	92	10	78	13.636
13.7	1986	1.35	0	0.68	0.68	0	296	11	272	19.538
13.7	1993	10.73	0.43	5.75	4.55	0	488	20	284	137.914
13.7	1993	0.88	0	0.48	0.4	0	1502	18	1404	98.175
13.7	1993	0.77	0.17	0.17	0.43	0	1556	18	1494	118.42
14.1	1986	1.41	0	0	1.41	0	142	22	116	39.856
14.1	1986	0	0	0	0	0	114	15	52	14.988
14.1	1986	1.46	0.49	0	0.98	0	410	15	372	33.646

River Mile	Sample Year	Percent DELT Anomalies	Percent Deformities	Percent Eroded Fins	Percent Lesions	Percent Tumors	Relative Number of Fish Collected	Relative Number of Species Collected	Relative Number of Fish Minus Tolerants	Relative Weight of Fish Collected (in grams)
<i>Maumee River</i>										
14.2	1986	0	0	0	0	0	68	6	60	80.268
14.7	1993	8.6	0.41	3.3	4.49	0	490	19	370	89.089
14.7	1993	1.29	0	0.39	0.9	0	886	21	778	91.922
14.7	1993	2.6	0	0.95	1.45	0.2	992	17	878	66.428
14.8	1986	1.16	0	0.39	0.77	0	507.89	16	466.71	193.486
14.8	1986	0.83	0	0	0	0.83	237.25	16	149.01	21.117
14.8	1986	1.61	0	0	1.61	0	625.55	16	556.92	46.345
16	1986	0	0	0	0	0	141.24	14	90.04	5.208
17.2	1986	6.75	0.65	4.79	1.31	0	306	19	210	51.02
17.2	1986	0	0	0	0	0	6020	11	5974	107.847
17.2	1997	1.96	0.98	0.98	0	0	204	14	184	95.6
17.2	1997	1.16	0	0.58	0.58	0	344	17	330	99.081
19.1	1997	3.57	0	3.57	0	0	112	8	106	39.65
19.1	1997	0.43	0	0.43	0	0	466	14	458	115.431
19.8	1986	4.5368	1.03	0	3.51	0	215.5	12	193.28	44.714
19.8	1986	1.5617	0.98	0	0.58	0	1016	18	896.01	213.422

*The double horizontal line represents the lacustuary divide of the Maumee River, although it is noted that lacustuary lengths are approximate and fluctuate with lake levels and wind direction.⁸

Maumee River Assessment⁹

Assessment Unit Description	Watershed Size (sq. mi.)		
Maumee River Mainstem (Indiana border to Lake Erie)	6,586		
Aquatic Life Use Assessment			
Sampling Year(s) 1992, 1993, 1996, 1997	AU Total Length (miles):	107.87	
	AU Monitored Miles	94.35	
Aquatic Life Use(s): WWH (Warmwater Habitat)	# Sites Sampled:	51	
	# Miles Full Attainment:	44.00	
Impairment? Yes	# Miles Partial Attainment:	13.15	
	# Miles Non-Attainment:	37.20	
	% Attainment (Monitored Miles)		
	Full	Partial	Non
Large River AU Attainment Status:	46.7%	13.9%	39.4%
High Magnitude Causes:	High Magnitude Sources:		
Flow Alteration	Nonirrigated Crop Production		
Other Habitat Alterations	Channelization - Agriculture		
Turbidity	Combined Sewer Overflow		
Nutrients	Major Municipal Point Source		
Unionized Ammonia			
Siltation			
Total Toxics			

Duck Creek is 3.27 miles long and begins at Hecklinger Pond in East Toledo. It flows northeasterly back and forth over the Toledo/Oregon city limits. Duck Creek is the last stream to join with the Maumee River (RM 0.25) before it enters Maumee Bay. This watershed has limited residential areas near the headwaters. However, most of it is in commercial or industrial use, including rail yards and the Toledo/Lucas County Port Authority docks.

Duck Creek Watershed Use Attainment Data¹⁰

River Mile	Sample Year	ICI Score	HELP Ecoregion ICI Criteria	Lacustrary ICI Score*	HELP Ecoregion Lacustrary ICI Criteria*	Modified Index of Well Being Score	HELP Ecoregion Mibwb Criteria	IBI Score	HELP Ecoregion IBI Criteria	Lacustrary IBI Score*	HELP Ecoregion Lacustrary IBI Criteria*	QHEI Score	HELP Ecoregion QHEI Criteria
0.3	1993					5.703	8.6			23	42		
0.4	1986			22	42								
0.4	1993					4.481	8.6			17	42	13	60
0.5	1986					4.975	8.6			19	42		
0.5	1986					6.67	8.6			22	42		
0.5	1986					5.958	8.6			24	42		
0.5	1993			16	42								
1.4	1993			10	42	6.288	7.3			21	42	18	60
1.4	1993					9.364	7.3			37	42		
1.4	1997			18	42	5.508	7.3			38	42	30.5	60
1.6	1997			20	42	5.698	7.3			34	42	31	60
2.1	1986	10	34			0.767	7.3	16	32				
2.1	1986					3.123	7.3	16	32				
2.1	1986					0	7.3	12	32				
2.1	1993	8	34			6.063	7.3	20	32			20	60
2.1	1997					3.305	7.3	18	32			23	60
2.8	1993					3.858	7.3	20	32			13.5	60
2.9	1993	8	34										
3	1986	2	34			0.263	7.3	18	32				
3	1986					2.746	7.3	22	32				
3	1986					1.469	7.3	18	32				

* The double horizontal line represents the lacustrary divide of Duck Creek, although it is noted that lacustrary lengths are approximate and fluctuate with lake levels and wind direction.¹¹

Duck Creek Watershed DELT Data¹²

River Mile	Sample Year	Percent DELT Anomalies	Percent Deformities	Percent Eroded Fins	Percent Lesions	Percent Tumors	Relative Number of Fish Collected	Relative Number of Species Collected	Relative Number of Fish Minus Tolerants	Relative Weight of Fish Collected (in grams)
0.3	1993	0	0	0	0	0	1293.19	8	1289.86	13.679
0.4	1993	25	0	25	0	0	24	6	14	6.122
0.5	1986	4	0	4	0	0	50	8	16	5.03
0.5	1986	2.3256	0	0	2.33	0	86	13	50	16.156
0.5	1986	0	0	0	0	0	344	11	280	35.065
1.4	1993	0.9132	0	0.91	0	0	1095	11	615	4.837
1.4	1993	1.5106	0	0.15	1.36	0	3310	17	1670	30.456

River Mile	Sample Year	Percent DELT Anomalies	Percent Deformities	Percent Eroded Fins	Percent Lesions	Percent Tumors	Relative Number of Fish Collected	Relative Number of Species Collected	Relative Number of Fish Minus Tolerants	Relative Weight of Fish Collected (in grams)
1.4	1997	0.7895	0	0	0	0	2111.28	17	1689.03	0
1.6	1997	0.3086	0	0	0	0	3600.29	15	1205.65	0
2.1	1986	0	0	0	0	0	234.39	4	0	0.547
2.1	1986	0.1517	0.15	0	0	0	988.5	9	30	3.197
2.1	1986	0	0	0	0	0	0	0	0	0
2.1	1993	1.282	0	1.28	0	0	739.01	13	113.71	4.703
2.1	1997	0	0	0	0	0	127.53	7	106.88	0
2.8	1993	1.1765	0	1.18	0	0	1417.5	3	171	1.113
3	1986	0	0	0	0	0	254	2	0	0.599
3	1986	0	0	0	0	0	305	4	15	0.814
3	1986	0	0	0	0	0	208	2	6	0.23

* The double horizontal line represents the lacustuary divide of Duck Creek, although it is noted that lacustuary lengths are approximate and fluctuate with lake levels and wind direction.¹³

Grassy Creek is one of the tributaries that joins the Maumee River within the Maumee AOC and is included in this HUC. Grassy Creek combined with the Grassy Creek Diversion have a drainage basin of 38.6 square miles.¹⁴ Grassy Creek flows parallel to the Maumee River starting in Perrysburg and flowing toward Rossford where it joins with the Maumee River at RM 9.2.

Grassy Creek Watershed Use Attainment Data¹⁵

River Mile	Sample Year	ICI Score	HELP Ecoregion ICI Criteria	Lacustuary ICI Score*	HELP Ecoregion Lacustuary ICI Criteria*	Modified Index of Well Being Score	HELP Ecoregion Miwb Criteria	IBI Score	HELP Ecoregion IBI Criteria	Lacustuary IBI Score*	HELP Ecoregion Lacustuary IBI Criteria*	QHEI Score	HELP Ecoregion QHEI Criteria
0.7	1993											55.5	60
1	1993											47	60
2.2	1993											59.5	60
2.9	1993											68.5	60
2.9	1993					6.919	7.3	38	32				
2.9	1993					7.462	7.3	26	32				
3.9	1993											63	60
4.9	1993											65	60
4.9	1993					5.548	7.3	20	32				
6.2	1993											57.5	60

Grassy Creek Watershed DELT Data¹⁶

River Mile	Sample Year	Percent DELT Anomalies	Percent Deformities	Percent Eroded Fins	Percent Lesions	Percent Tumors	Relative Number of Fish Collected	Relative Number of Species Collected	Relative Number of Fish Minus Tolerants	Relative Weight of Fish Collected (in grams)
2.9	1993	0	0	0	0	0	404.25	15	216.33	5.911
2.9	1993	2	0	1.14	0.29	0	525	14	196.5	14.016
4.9	1993	0	0	0	0	0	604.5	10	160.5	7.529

**Maumee River Watershed
Causes and Sources of Impairments** ¹⁷

Segment	Miles Assessed & Aquatic Life Use Designation[#]	Causes of Impairment*	Sources of Impairment*	Comments
Maumee River (Waterville to Swan Creek)	15.46 (RM 5.22-20.68) WWH	Other habitat alterations-H Siltation-H Pesticides-M Priority organics-M Metals-M Nutrients-M Total toxics-M	CSOs-H Agriculture-M Other urban runoff-M Hydromodification-M	305(b)-1996: Data in this table 305(b)-2000: No data, just these comments - River flows down the BG escarpment in this reach; wide shallow limestone base w/ aquatic community influenced downstream by Lake Erie and upstream by ag drainage; water is turbid year round, Lucas Co WWTP is a source of ammonia
Maumee River (Swan Creek to Lake Erie)	15.46 (RM 0-5.22) WWH	Total toxics-H Pesticides-M Priority organics-M Metals-M Nutrients-M Siltation-M	Major municipal point source-H CSOs-H Agriculture-H Other urban runoff-M Removal of riparian vegetation-M Streambank modification/destabilization-M Drainage/filling of wetlands-M Spills-M	305(b)-1996: Data in this table
Duck Creek	3.56 (RM 0-3.56) WWH	Other habitat alterations-H Pesticides-M Priority organics-M Metals-M Siltation-M Salinity /TDS /chlorides-M Flow alteration-M Oil and grease-M	Other urban runoff-M Sludge-S Channelization-H Removal of riparian vegetation-M Streambank modification/ Destabilization-H Spills-M Contaminated sediments-M	305(b)-1996: Data in this table
Grassy Creek	5.5 (RM 0-5.5) WWH	Other habitat alterations-H Pesticides-M Metals-M Nutrients-M Priority organics-M Siltation-M Organic enrichment /DO-S	Habitat Modifications o/than Hydromod.-H Land development/ Suburbanization-M Other urban runoff-M Onsite wastewater systems (septic tanks)-S	305(b)-2000: PCBs and pesticides were found in fish tissue samples probably from urban runoff & spills; generally a good stream; could improve if urban problems remedied; descent riparian was present in many places.

*Magnitude of that cause or source of impairment: H=high, M=moderate, S=slight, T=identifies a threat

[#]Aquatic Life Use Designation: WWH=Warm Water Habitat, MWH=Modified Warm Water Habitat, LRW=Limited Resource Water

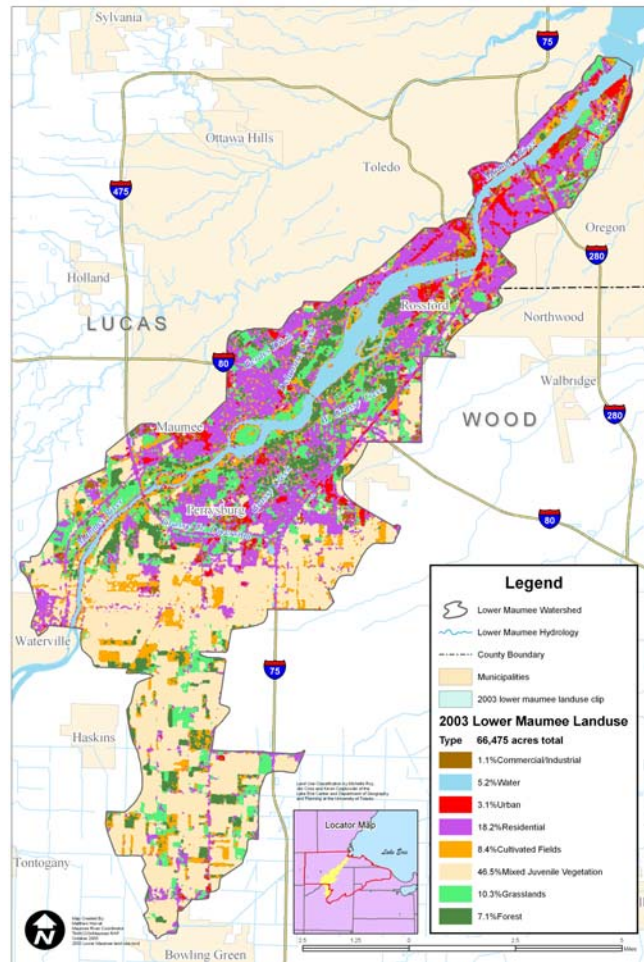
Land Use of the Lower Maumee River Watershed

In 2003 land use classifications produced by The University of Toledo for the Lower Maumee River watershed showed 47 percent of the land used by mixed juvenile vegetation. This vegetation type can be row crops in an early stage of growth, tracts of open space or yards. Forest and grassland account for 7 percent and 10 percent respectively, and 8 percent is in cultivated fields. Approximately 18 percent of the watershed has been developed for residential use, 3 percent for urban uses, and 1 percent for commercial/industrial uses.

Status of Beneficial Use Impairments

When the Maumee Area of Concern was defined in the late 1980s, the Maumee RAP Public Advisory Council determined which beneficial uses were impaired based on the entire AOC. This was done because the only way of delisting an AOC was a comprehensive one; all listed or all delisted. Now that there are alternative methods for incrementally delisting an AOC by watershed or impairment, the Maumee RAP needed to determine the BUIs by watershed. This was done using data and resources that were available before 1990. The two tables below summarize the BUIs impacting the Maumee River Watershed in 1990 and 2004.

2003 Land Use in the Lower Maumee River Watershed



Following the BUI Summary Tables are maps of this watershed, including the jurisdictions, 14-digit HUCs, and custom-digitized river mile maps made specifically for the Maumee AOC watersheds.

The heart of this plan, the Watershed Project Tables (WPTs), is found in Volume 2. As explained in the Introduction, the WPTs are the living portion of the report that will change and grow, as projects are implemented and goals are attained. These tables have been organized by Causes and Sources and include Projects, Potential Project Partners, Funding Sources, Timeline, Status, Performance/Environmental Measures, HUC/Stream Segment Addressed, and indicate the Beneficial Use Impairment (BUI) that could be effected by the project. Also incorporated into the table (where applicable) is a reference to the ODNR Coastal Management Measures that may benefit from the implementation of an identified project.

There are differing levels of detail in the WPTs, often depending on how soon a project will be implemented, what source will be funding it, or by the amount of data available for that watershed. The status of projects in the WPTs has been organized and color-coded as follows: **In Progress**, **Planning**, **Concept**, **Ongoing**, and **Complete**.

Beneficial Use Impairments In 1990
for the Lower Maumee River (Waterville to mouth)
(as determined in 2002)

Beneficial Use Impairments	Maumee River	Grassy Creek	Duck Creek	Reasons/Data Source
BUI 1: Restriction on fish and wildlife consumption			Impaired	Duck - ODH data re: LE and MR
BUI 2: Tainting of fish & wildlife flavor				
BUI 3: Degradation on fish and wildlife populations			Impaired	Duck - OEPA data, historical data
BUI 4: Fish tumors or other deformities			Impaired	Duck - OEPA data but have Phyllis review/confirm
BUI 5: Bird or animal deformities or reproductive problems				
BUI 6: Degradation of benthos			Impaired	Duck - OEPA data
BUI 7: Restriction on dredging activities			Not applicable	Duck -? Needs clarification?
BUI 8: Eutrophication or undesirable algae			N/A or Not Impaired	Duck - No info
BUI 9: Restrictions on drinking water consumption, or taste and odor			Not applicable	Duck - BPJ
BUI 10: Beach closings			Not applicable	Duck - No designated beaches present in subwatersheds
BUI 11: Degradation of aesthetics			Impaired	Duck - BPJ
BUI 12: Added cost to agriculture and industry				
BUI 13: Degradation of phytoplankton & zooplankton populations				
BUI 14: Loss of fish and wildlife habitat			Impaired	Duck - Historical info, photos, and BPJ

Possible answers – Impaired, Not Impaired, Unknown, Not Applicable

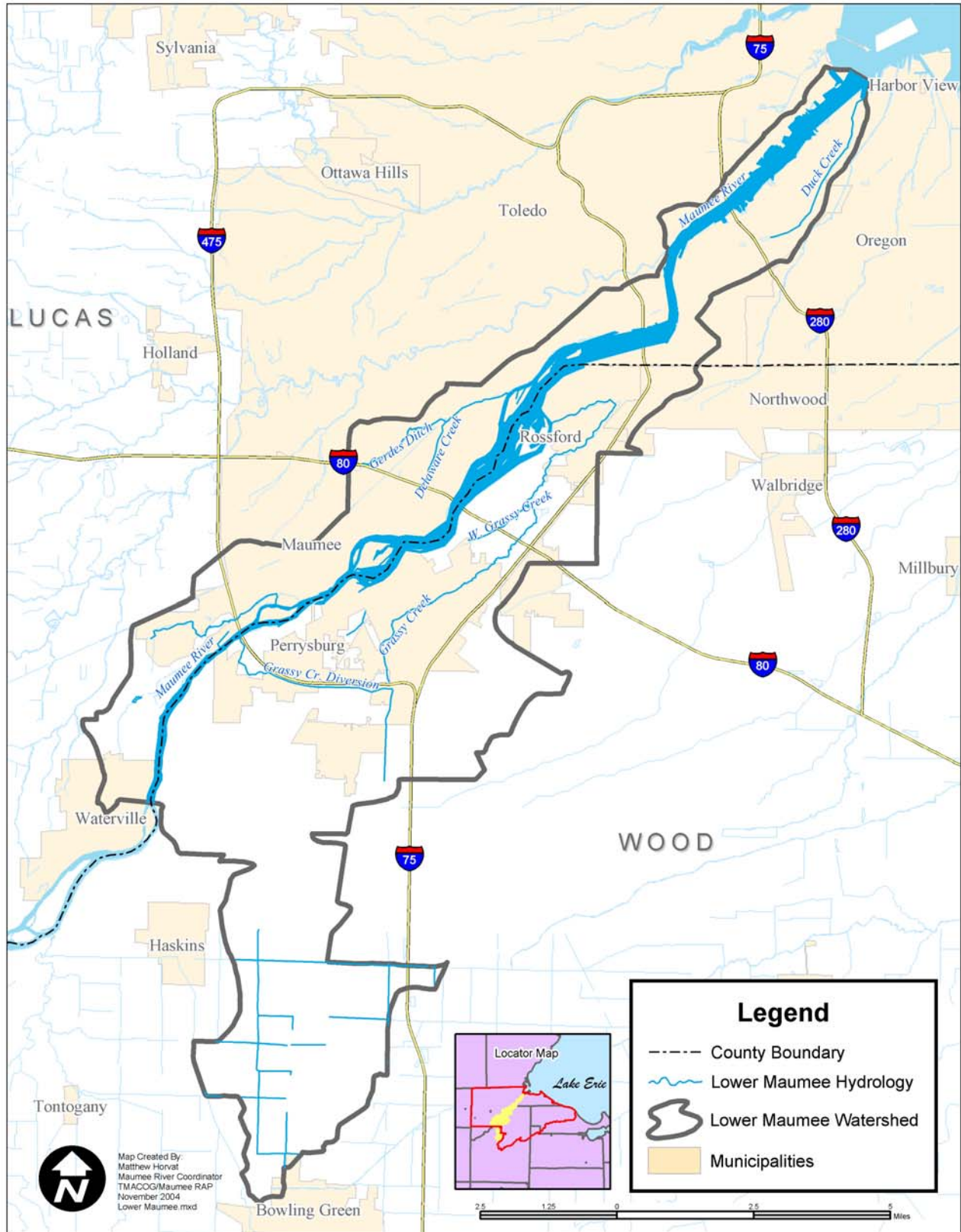
Beneficial Use Impairments In 2005
for the Lower Maumee River (Waterville to mouth)
(last updated 11/5/05)

Beneficial Use Impairments	Maumee River	Grassy Creek	Duck Creek	Reasons/Data Source
BUI 1: Restriction on fish and wildlife consumption	Impaired	Not Impaired	Impaired	Duck: If health dept. LE-wide notices apply to creeks—no creek specific advisory Maumee River: Mouth to Waterville – Do not eat channel catfish (2005 fishing season advisory ¹⁸). Statewide – No more than one fish per week due to mercury ¹⁹ . 2005 Ohio Snapping Turtle Consumption Advisory (mercury ²⁰). Grassy Creek: Ohio EPA DSW website does not list any impairments for the creek.
BUI 2: Tainting of fish & wildlife flavor	Unknown	Not Impaired	Unknown	Maumee River & Duck and Grassy Creeks: No known reports of tainting of fish and wildlife flavor; no known sources of phenols and related compounds.
BUI 3: Degradation on fish and wildlife populations	Impaired	Impaired	Impaired	Maumee River: In most cases, for ICI, Miwb, and IBI the Maumee River scores below the designated criteria. (See data table in Volume 1) Grassy Creek: 1993 data for RMs 2.9 (6.919 & 7.462) and 4.9 (5.548) fall below criteria. No ICI scores. 1993 data for RMs 2.9 is conflicting (38 & 26) and 4.9 (20) is below criteria. No data or determination of degradation of wildlife populations; Unknown Duck: OEPA 305b reports; data from Dennis Minshke
BUI 4: Fish tumors or other deformities	Impaired	Impaired	Impaired	Duck: OEPA DELT data- fish sampling in 1986, 1993, 1997 Maumee River: Data from 1986, 1993, 1996, 1997, and 1998 indicate that there are DELTS from RM 0.6 to RM 19.8. Grassy Creek: Data from 1993 are for RMs 2.9 and 4.9. Eroded fins and lesions recorded at RM 2.9.
BUI 5: Bird or animal deformities or reproductive problems	Unknown	Not impaired	Not Impaired	This BUI was not indicated for the Maumee AOC for its RAP designation.
BUI 6: Degradation of benthos	Impaired	Impaired	Impaired	Maumee : Average 1986 ICI score for RMs 0.8 - 15: 0. Average 1997 ICI score for RMs 17.9 to 18.3: 26. Average 1998 ICI score for RMs 1.6 & 2.6: 0. Grassy: No data available. BPJ assumes impaired Duck: OEPA 305b report data

Beneficial Use Impairments	Maumee River	Grassy Creek	Duck Creek	Reasons/Data Source
BUI 7: Restriction on dredging activities	Impaired	Not applicable	Not applicable	Maumee River: commercially navigable waterbody with dredging activities is the Maumee River. Grassy & Duck Creek: No navigational dredging occurs on Grassy Creek.
BUI 8: Eutrophication or undesirable algae	Unknown	Unknown	Unknown	Maumee & Grassy: Status of this BUI is unknown. No data available on dissolved oxygen or nuisance growths of algae. Duck: Occasionally; not toxic algae
BUI 9: Restrictions on drinking water consumption, or taste and odor	Not applicable	Not applicable	Not applicable	Grassy & Duck: Does not apply- no known drinking water supplies
BUI 10: Beach closings	Impaired	Impaired	Not Impaired	Maumee River: Local fishing spots along the river. Because work is scheduled on CSOs, BPJ would be to indicate impairment. ODH only has information on Lake Erie. ²¹ Grassy Creek: No information available on use of this creek. Duck: Review e.coli data; work w/Health Dept
BUI 11: Degradation of aesthetics	Impaired	Impaired	Impaired	Maumee & Grassy: Public health nuisances associated with raw or poorly treated sewage can be a problem in these streams due to number, density of units (homes), age, poor maintenance, and no monitoring of septic systems. Duck: Clean Your Streams day events, surveys of watershed during WIRP project and tours; past reports of sheens to OEPA and Coast Guard
BUI 12: Added cost to agriculture and industry	Unknown	Unknown	Not impaired	Duck: No known ag or industrial users present
BUI 13: Degradation of phytoplankton & zooplankton populations	Not applicable	Not applicable	Not applicable	Ohio EPA has determined that this BUI does not apply to these waters.
BUI 14: Loss of fish and wildlife habitat	Impaired	Impaired	Impaired	Ohio EPA QHEI scoring in 1986, 1993, 1997 & 1998 indicate that Maumee is impaired. Ohio EPA 1993 QHEI scoring indicate that Grassy Creek is slightly below the desired score.

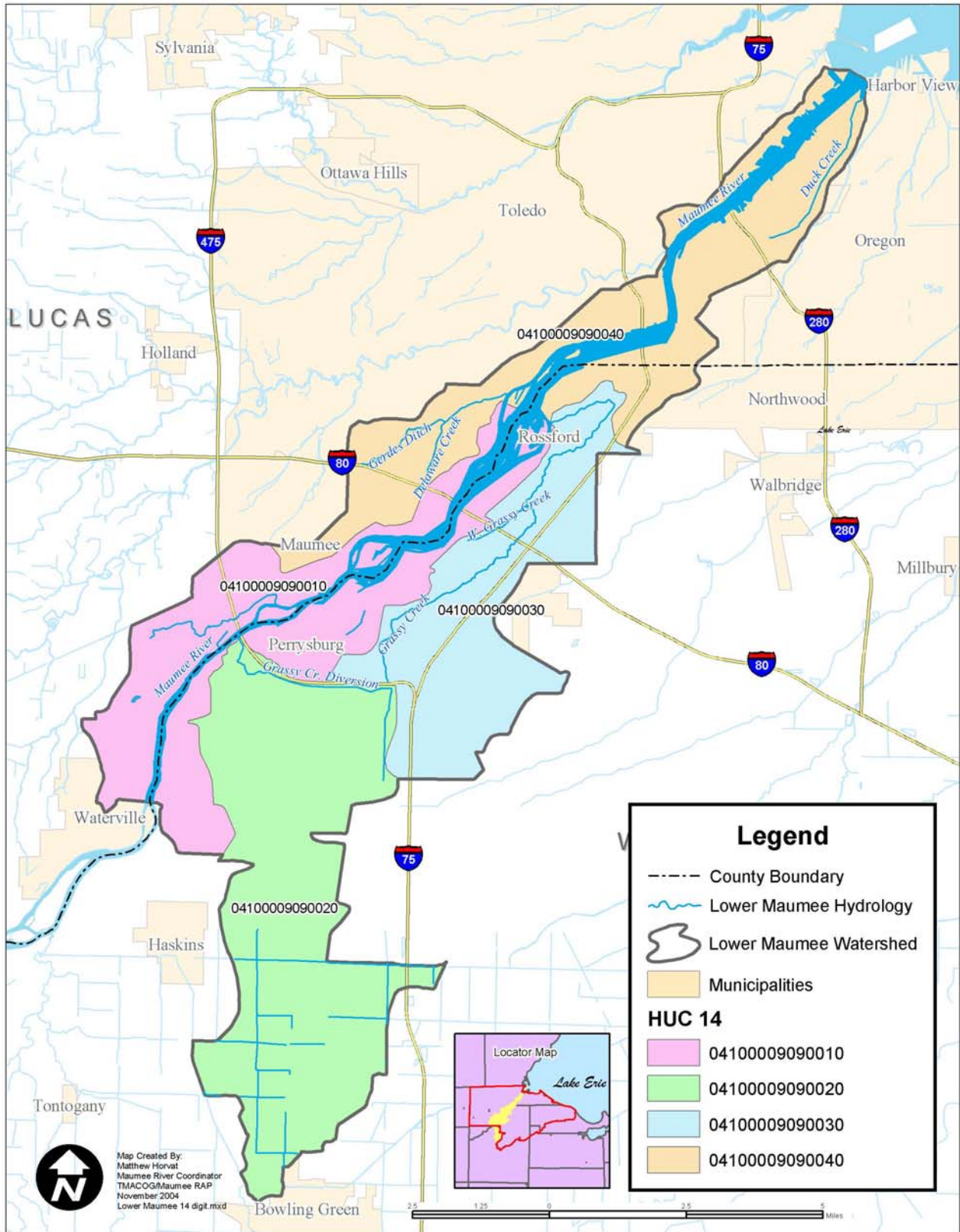
Possible answers – Impaired, Not Impaired, Unknown, Not Applicable

Lower Maumee River
 Duck, Delaware, and Grassy Creeks HUC 04100009 090



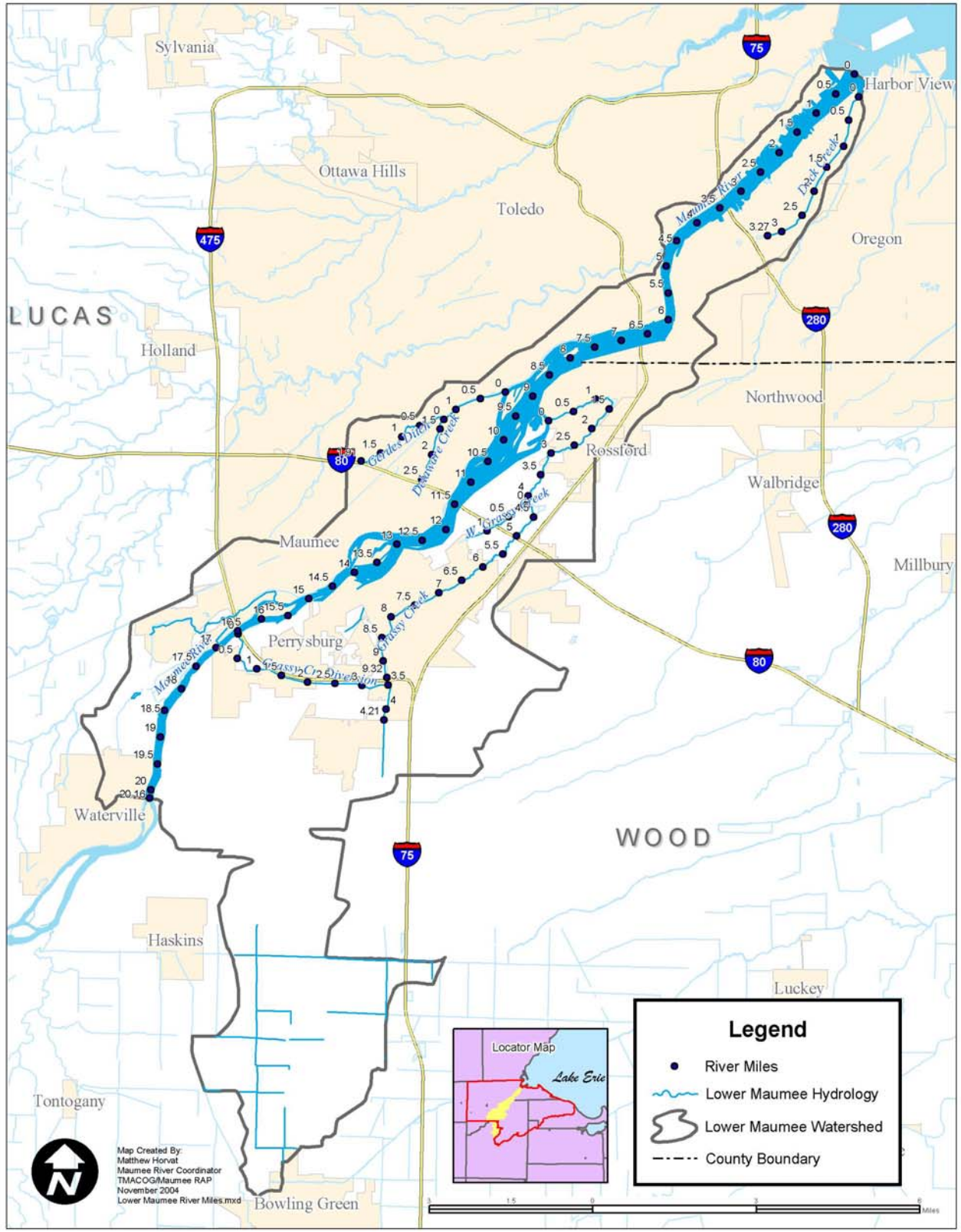
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 Matthew Horvat
 Maumee River Coordinator
 TMACOG/Maumee RAP
 November 2004
 Lower Maumee.mxd

Lower Maumee River - 14 Digit HUC
 Duck, Delaware, and Grassy Creeks HUC 04100009 090



Map Created By:
 Matthew Horvat
 Maumee River Coordinator
 TMACOG/Maumee RAP
 November 2004
 Lower Maumee 14 digit.mxd

Lower Maumee River - River Miles
 Duck, Deleware, and Grassy Creeks HUC 04100009 090



See Volume 2 for the:

- Maumee River Watershed Projects Table
- Grassy Creek Watershed Projects Table
- Duck Creek Watershed Projects Table

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- ¹ *Maumee River Basin Area of Concern Remedial Action Plan Recommendations for Implementation Vol. 4*, TMACOG/Maumee RAP, July 1991. p 3-1.
- ² *Gazetter of Ohio Streams*, Ohio Department of Natural Resources, 1960.
- ³ *A Study of Physical Features for the Toledo Regional Area*, Bowling Green State University Geology Department, Dr. Jane Forsyth, March 1968, pp 23-24.
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- ⁵ Ohio EPA, STORET Data, April 2004.
- ⁶ *Delisting Targets for Ohio Areas of Concern*, Ohio EPA, June 2005.
- ⁷ Ohio EPA, STORET Data, April 2004.
- ⁸ *Delisting Targets for Ohio Areas of Concern*, Ohio EPA, June 2005.
- ⁹ *Ohio 2002 Integrated Water Quality Monitoring and Assessment Report prepared to fulfill the requirements of Sections 305(b) and 303(d) of the Clean Water Act* Ohio EPA Division of Surface Water, October 2002; Table 1 and Appendix C.
- ¹⁰ Ohio EPA, STORET Data, April 2004..
- ¹¹ *Delisting Targets for Ohio Areas of Concern*, Ohio EPA, June 2005.
- ¹² Ohio EPA, STORET Data, April 2004.
- ¹³ *Delisting Targets for Ohio Areas of Concern*, Ohio EPA, June 2005.
- ¹⁴ USDA Natural Resource Conservation Service website: <http://www.oh.nrcs.usda.gov/technical/>.
- ¹⁵ Ohio EPA, STORET Data, April 2004.
- ¹⁶ Ohio EPA, STORET Data, April 2004.
- ¹⁷ *Ohio EPA 305b Report*, Ohio EPA, 1996 and 2000.

Watershed Projects Table Bibliography

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- Screening Analysis Sediment Quality Assessment Study of the Maumee River Area of Concern*, USEPA-GLNPO, 1995-1996.
- OEPA 305(b) Report*, Ohio EPA, 1998.
- ¹⁸ Ohio EPA web site: <http://www.epa.state.oh.us/dsw/fishadvisory/2005%20fish%20advisory%20card.pdf>
 - ¹⁹ Ohio EPA web site: <http://www.epa.state.oh.us/dsw/fishadvisory/limitmeals.html#Grand>
 - ²⁰ Ohio EPA web site: <http://www.epa.state.oh.us/dsw/fishadvisory/turtles.html>
 - ²¹ Ohio Dept of Health web site: <http://www.odh.ohio.gov/odhPrograms/eh/bbeach/beachmon.aspx>