Appendix 1A: Water Chemistry Data

Date	SITE	Time	Temp (C)	DO	pH	TURB	Conductivity	Phos.	Nitrate	TSS	E.coli (MPN)
1/26/22	1	1:53	4.8	10.7	8.3	8.4	1151	0.077	3.96	12	1413.6
2/23/22	1	2:39	3.8	10.2	7.99	20.75	671	0.418	2.29	14	448.4
3/23/22	1	13:29	11.8	10.6	7.41	72	321	1.32	4.06	68	1011.2
4/27/22	1	13:28	13.9	10.5	8.14	2.76	551	0.194	4.83	3	71.4
5/24/22	1	13:12	20.4	9.1	8.34	2.41	631	0.191	4.24	3	101
6/27/22	1	13:00	23.8	6.2	8.2	2.13	693	0.222	4.87	2	280.9
7/25/22	1	12:30	24.4	5	7.88	5.17	484	1.46	2.39	3	2419.6
8/22/22	1	13:55	25	8.3	8.14	2.54	1064	4.29	9.51	3	48
9/28/22	1	12:32	16.8	7.5	8.29	1.83	1402	0.618	10.1	4	78.5
10/24/22	1	13:32	19.4	10.9	8.36	2.15	1568	0.199	5.2	4	93.3
11/16/22	1	12:56	8.6	10.3	8.16	0	1386	0.011	9.4	3	2419.6
12/21/22	1	12:46	7.1	10.2	8.17	7.3	1278	0.06	6.15	5	866.4
1/26/22	2	1:19	3	10.8	8.58	2.11	704	0.081	1.98	4	2
2/23/22	2	2:11	3.1	10.2	8.21	38.7	428	0.909	3.32	44	156.5
3/23/22	2	13:02	10.2	8.2	7.63	156	234	2.08	4.07	164	2419.6
4/27/22	2	13:00	12.3	7.4	8.24	3.69	393	0.085	3.72	6	79.4
5/24/22	2	12:48	19.1	7.9	8.19	2.51	411	0.196	2.89	9	34.5
6/27/22	2	12:37	22.5	6.3	8.2	4.46	415	0.892	1.81	3	178.2
7/25/22	2	11:50	24.5	11.4	8.02	5.8	404	0.426	0.617	4	517.2
8/22/22	2	13:36	23.5	7.5	8.2	3.88	548	0.284	0.222	4	172.5
9/28/22	2	11:41	13.2	10.6	8.26	1.7	560	0.01	0.425	5	218.7
10/24/22	2	13:01	16.4	7.2	8.02	2.75	638	0.045	0.211	6	75.4
11/16/22	2	12:27	4.5	11.3	8.32	0.66	690	0.012	0.4	3	48.3
12/21/22	2	11:51	1.5	11.7	8.44	0.27	513	0.034	0.406	1	47.1
1/26/22	3	1:12	5.5	11.8	8.45	2.59	918	0.037	5.14	6	24.4
2/23/22	3	2:05	2.5	11.2	8.28	28.09	583	0.504	2.95	37	304.6
3/23/22	3	12:55	11.2	9.6	7.66	122	304	1.7	3.66	161	2419.6
4/27/22	3	12:53	13.2	10.7	8.35	2.32	369	0.29	3.99	2	290.6
5/24/22	3	12:42	19.3	9	8.23	0.23	545	0.031	2.84	5	100.5
6/27/22	3	12:31	23.4	6.3	8.26	1.68	568	0.622	1.9	1	277.8
7/25/22	3	11:40	24.5	5.1	8.11	19	233	0.813	1.28	17	2419.6
8/22/22	3	13:30	22.7	8.5	8.39	0.91	1072	1.22	3.71	3	235.9

Date	SITE	Time	Temp (C)	DO	pH	TURB	Conductivity	Phos.	Nitrate	TSS	E.coli (MPN)
9/28/22	3	11:36	12.9	7	8.34	0	819	0.287	1.87	2	248.9
10/24/22	3	12:55	17.4	10	8.15	1.03	1133	0.131	2.03	2	32.7
11/16/22	3	12:24	5	10.2	8.45	0.29	1267	0.002	4.5	2	70.7
12/21/22	3	11:46	2.1	11	8.42	1.16	997	0.007	2.55	6	67.7
1/26/22	4	12:34	3.1	11.9	8.51	1.54	711	0.168	3.36	9	14.3
2/23/22	4	1:51	2	11	8.2	23.99	488	0.581	3.33	21	98.5
3/23/22	4	11:54	10.8	11.1	7.61	144	220	1.99	5.51	127	870.4
4/27/22	4	12:20	12.2	9.4	8.15	1.59	360	0.305	3.71	4	206.4
5/24/22	4	11:44	17.1	8.2	8.08	1.2	418	0.225	3.32	3	196.8
6/27/22	4	11:48	20.8	6.4	8.09	3.15	415	0.25	2.47	4	579.4
7/25/22	4	11:15	22.8	5.1	7.9	3.62	414	0.207	0.978	3	547.5
8/22/22	4	11:45	21.6	5.3	7.88	3.42	550	0.25	0.752	3	816.4
9/28/22	4	11:23	12.7	10.6	8.14	2.09	546	0.313	0.189	4	26.9
10/24/22	4	12:05	16.6	5.9	7.83	1.47	648	0.044	0.567	2	52.1
11/16/22	4	11:44	4.7	11.1	8.01	0	666	0.039	0.863	3	28.2
12/21/22	4	11:33	2.7	10.2	8.22	0	638	0.02	0.915	4	27.5
1/26/22	5	9:32	3.5	11.9	8.61	2.45	772	0.076	3.71	5	11
2/23/22	5	10:14	1.2	7.2	8.06	55	507	0.85	4.64	58	365.4
3/23/22	5	9:45	10.6	9.2	7.76	181	272	2.19	3.12	250	2419.6
4/27/22	5	9:54	11	9	8.19	2.87	370	0.308	3.67	4	93.4
5/24/22	5	10:01	18.6	7.6	8.17	2.15	436	0.258	2.74	5	30.1
6/27/22	5	9:49	23	6.1	8.22	2.31	419	0.281	1.82	6	251
7/25/22	5	8:45	23.6	6.3	8.21	5.41	406	0.203	0.801	7	135.4
8/22/22	5	9:52	21.8	5.7	8.28	5.31	628	0.024	0.314	3	78.4
9/28/22	5	9:40	12.5	9.1	8.38	1.72	700	0.098	1.07	3	43.2
10/24/22	5	10:04	15.2	6.7	8.09	0.31	796	0.011	0.752	2	24.1
11/16/22	5	9:50	3.7	11.4	8.32	0	790	0.033	0.224	3	58.4
12/21/22	5	9:44	0.7	9.1	8.45	0	734	0.043	2.24	3	23.3
1/26/22	6	frozen									
2/23/22	6	11:42	3	8.8	7.88	43.82	427	0.934	4.3	52	218.7
3/23/22	6	12:05	10.3	9	7.69	177	248	2.38	5.12	192	2419.6
4/27/22	6	12:03	12.7	10.3	8.19	2.71	412	0.247	3.67	2	77.1

Date	SITE	Time	Temp (C)	DO	pH	TURB	Conductivity	Phos.	Nitrate	TSS	E.coli (MPN)
5/24/22	6	11:29	17.7	7.8	8.1	1.73	424	0.122	2.88	6	52.9
6/27/22	6	11;37	21.3	6.3	8.17	3.22	448	0.132	1.84	5	344.8
7/25/22	6	11:00	23.6	4.3	8.06	11.78	494	0.623	1.14	11	1986.3
8/22/22	6	13:00	22.2	7.2	8.15	4.92	720	0.027	1.14	5	478.6
9/28/22	6	11:13	13.2	8.4	8.19	1.2	786	1.16	2.01	4	238.2
10/24/22	6	11:55	16.1	6.4	7.95	9.25	837	0.126	1.7	19	56.8
11/16/22	6	11:30	4.2	11.9	8.11	0.26	897	0.019	1.69	3	54.8
12/21/22	6	11:21	2.1	11.2	8.3	0.42	770	0.028	1.44	4	34.1
1/26/22	7	11:57	2.3	11.6	8.17	3.68	707	0.047	4.64	1	29.3
2/23/22	7	1:34	2.8	8.4	7.99	25.6	450	0.517	5.57	30	198.6
3/23/22	7	11:38	10.7	7	7.45	97	234	1.64	4.83	117	456.9
4/27/22	7	11:51	12	11.1	8.14	2.28	375	0.165	6.63	1	118.7
5/24/22	7	11:16	16.8	8.7	8.03	0.47	437	0.223	4.23	7	360.9
6/27/22	7	11:29	21.2	6.1	7.93	0.69	432	0.45	1.9	2	304.4
7/25/22	7	10:45	23.3	6.4	7.94	2.43	433	0.32	1.14	2	179.3
8/22/22	7	13:15	21.8	5.5	8	1.86	562	2.15	0.845	2	648.8
9/28/22	7	11:04	12.7	7.3	8.09	2.04	1619	5	0.942	3	146.7
10/24/22	7	11:45	15.8	6.4	7.72	2.72	672	0.115	0.296	3	133.3
11/16/22	7	11:24	5.2	11	8.03	0.22	680	0.017	0.611	3	2419.6
12/21/22	7	11:13	2.4	5.9	8.1	17.36	741	0.178	0.719	67	920.8
1/26/22	8	10:45	3.1	11.1	8.12	2.62	730	0.206	4.53	2	25.8
2/23/22	8	11:20	2.4	8.4	7.84	21.28	498	0.699	5.81	23	162.4
3/23/22	8	10:50	10	6.2	7.35	77	260	1.6	6.4	73	686.7
4/27/22	8	11:16	11.1	11.7	7.89	2.41	418	0.215	9.38	2	228.2
5/24/22	8	10:55	16.1	8	7.95	1.45	416	0.274	5.87	3	275.5
6/27/22	8	10:58	22	6.3	7.96	1.29	444	0.133	1.06	1	167.4
7/25/22	8	10:03	23.4	5.5	7.88	4.12	469	1.33	0.425	5	201.4
8/22/22	8	10:55	22.1	10.6	8.11	14.54	522	1.25	0.378	109	2419.6
9/28/22	8	10:25	11.8	10.1	7.88	6.72	659	0.005	0.152	8	248.1
10/24/22	8	11:25	14.8	7	7.86	8.53	695	0.012	0.205	14	325.5
11/16/22	8	10:46	4.8	10.9	7.84	2.16	727	0.003	0.261	5	23.6
12/21/22	8	10:37	3.7	10.1	8.11	4.44	627	0.014	0.491	6	12.2

Date	SITE	Time	Temp (C)	DO	pH	TURB	Conductivity	Phos.	Nitrate	TSS	E.coli (MPN)
1/26/22	9	10:20	4.7	10.6	8.48	1.31	695	0.121	10.1	2	104.3
2/23/22	9	10:53	0.5	7	7.89	44.46	463	0.875	7.45	39	378.4
3/23/22	9	10:28	9.3	11.8	7.22	50	287	0.599	9.62	37	1119.7
4/27/22	9	10:54	10.2	10.7	7.93	2.1	376	0.199	8.23	3	66.3
5/24/22	9	10:33	15.5	11.5	8.07	2.63	436	0.337	7.73	3	48.1
6/27/22	9	10:22	19.5	5.7	7.92	1.18	438	0.086	3.59	5	222.4
7/25/22	9	9:30	23	4.2	7.85	5.41	448	1.79	0.528	5	248.1
8/22/22	9	10:23	19.1	7.3	7.94	4.65	536	0.129	0.204	1	48
9/28/22	9	10:02	11.5	8.5	7.89	0.77	569	0.027	0.158	6	21.1
10/24/22	9	10:34	15.5	5.8	7.75	22.23	583	0.129	0.235	8	10.2
11/16/22	9	10:21	4.7	9.5	7.99	20.75	588	0.11	0.321	6	62.1
12/21/22	9	10:16	8.2	11.6	7.26	3.67	732	0.015	0.364	3	20.3
1/26/22	10	9:49	1.8	11.5	8.18	0.4	802	0.169	4.31	2	143.9
2/23/22	10	10:36	2.4	11.3	8.02	21.75	608	0.355	5.07	22	37.3
3/23/22	10	10:06	9.1	11.1	7.27	41.08	290	0.685	5.37	43	172.3
4/27/22	10	10:41	10.2	11.8	8.01	0.33	417	0.248	5.34	2	7.3
5/24/22	10	10:17	14.7	9.7	8.09	0.07	451	0.146	7.3	4	48.7
6/27/22	10	10:06	19.3	7.2	7.8	2.55	444	0.057	3.05	10	145.5
7/25/22	10	9:10	22.6	6.4	7.86	5.3	434	2.26	0.56	6	2419.6
8/22/22	10	dry									
9/28/22	10	dry									
10/24/22	10	dry									
11/16/22	10	dry									
12/21/22	10	frozen									
1/26/22	11	9:08	4.2	9.1	8.37	4.73	687	0.134	3.99	2	23.7
2/23/22	11	9:32	-0.1	10.4	7.78	44.23	525	1.21	5.49	42	107.6
3/23/22	11	9:25	9.7	11.5	7.57	84	262	1.44	5.29	83	172
4/27/22	11	9:28	9	10.1	8.09	8.56	415	0.067	7.02	8	365.4
5/24/22	11	9:31	15.2	9.1	8.23	0.33	420	0.19	4.77	6	76.3
6/27/22	11	9:30	19.7	6.5	8.24	0.32	418	0.121	1.82	2	167
7/25/22	11	8:25	23.2	5.4	8.21	2.45	424	0.822	0.652	4	290.9
8/22/22	11	9:40	21.1	5.2	8.28	0.79	506	0.064	0.273	3	128.1

Date	SITE	Time	Temp (C)	DO	pH	TURB	Conductivity	Phos.	Nitrate	TSS	E.coli (MPN)
9/28/22	11	9:23	12.6	6	8.37	0.66	570	0.16	0.157	2	186
10/24/22	11	9:37	14	6.8	8.05	0.02	638	0.17	0.279	2	93.3
11/16/22	11	9:35	2.9	10.9	8.36	14.7	690	0.05	0.235	5	48.3
12/21/22	11	9:26	0.8	8.4	8.42	0.13	740	0.018	0.798	2	14.5
1/26/22	12	8:49	-2.7	11.2	8.81	3.02	270	0.071	0.879	5	10.1
2/23/22	12	9:20	2.6	11.1	8.39	60	383	1.01	3.98	80	1
3/23/22	12	9:10	11.1	9	7.85	197	297	2.39	3.05	179	2419.6
4/27/22	12	9:13	10	9.5	8.15	4.39	378	0.141	3.49	4	80.5
5/24/22	12	9:09	15.7	7.3	8.27	2.1	426	0.069	2.71	2	275.5
6/27/22	12	9:20	20.4	6	8.27	3.51	472	0.109	1.87	2	56.6
7/25/22	12	8:09	23.3	5.2	8.13	8.79	416	0.323	0.878	9	387.3
8/22/22	12	9:23	21.5	6.2	8.21	5.2	611	0.17	0.327	4	162.4
9/28/22	12	9:12	12.4	5	8.39	1.96	665	0.108	0.581	2	35.5
10/24/22	12	9:21	14.1	6.9	8.21	0.14	752	0.044	0.473	3	46.4
11/16/22	12	9:22	4	11.9	8.38	0.18	747	0.039	0.232	6	70.7
12/21/22	12	9:15	1.2	8	8.55	0	729	0.056	1.14	2	186
1/26/22	13	8:30	-1.1	11.7	8.79	2.16	235	0.069	4.42	4	2
2/23/22	13	8:36	2.3	11.3	8.28	66	407	1.12	4.68	75	259.5
3/23/22	13	8:36	10.2	8.6	7.83	152	309	1.93	3.47	248	2419.6
4/27/22	13	8:54	9.5	11.2	8.18	6.19	421	0.066	4.45	9	258.9
5/24/22	13	8:51	15.9	7.6	8.15	2.29	416	0.244	3.08	3	38.9
6/27/22	13	8:58	21.5	4.6	8.25	1.15	552	0.291	1.97	3	960.6
7/25/22	13	7:48	23.3	4.4	8.14	6.7	431	0.051	1.07	2	238.2
8/22/22	13	8:56	21.6	7.6	8.13	4.19	587	0.249	0.551	4	77.1
9/28/22	13	8:47	12.6	6.4	8.28	3.57	649	0.161	0.527	3	44.1
10/24/22	13	9:02	13.8	7.2	8.18	1.43	684	0.018	0.391	2	27.2
11/16/22	13	8:59	4.1	10.4	8.27	0	765	0.045	0.377	5	28.2
12/21/22	13	8:53	1.4	11	8.49	0.03	713	0.053	1.15	2	11
1/26/22	14	8:14	5.3	10.3	8.32	2.01	807	0.012	4.58	2	19.3
2/23/22	14	8:15	2.4	8.4	8.24	37.82	552	0.612	3.95	45	224.7
3/23/22	14	8:13	11	9.4	8.95	206	257	2.1	3.17	208	2419.6
4/27/22	14	8:18	10.8	11	8.24	0.4	454	0.124	2.42	8	83

Date	SITE	Time	Temp (C)	DO	pH	TURB	Conductivity	Phos.	Nitrate	TSS	E.coli (MPN)
5/24/22	14	8:21	15.8	8.5	8.16	3.04	456	0.124	3.54	4	81.3
6/27/22	14	8:40	19.1	6.6	8.16	2.7	665	0.329	2.62	6	307.6
7/25/22	14	7:15	21.8	3.9	7.88	5.98	562	0.098	1.33	3	547.5
8/22/22	14	8:23	19.9	6.4	8.21	8.51	800	0.16	0.885	12	816.4
9/28/22	14	8:27	12.6	7.4	8.06	3.55	771	0.082	0.766	2	195.6
10/24/22	14	8:40	14.9	8.5	8.18	2.01	903	0.033	0.453	2	79.4
11/16/22	14	8:35	9	7.1	7.85	0	1170	0.063	0.404	4	58.4
12/21/22	14	8:44	2.7	11.6	8.38	0	946	0.014	0.973	3	17.3
1/26/22	15	2:16	8	11.7	8.06	2.21	675	0.155	4.36	5	11.1
2/23/22	15	3:10	3.5	10.4	8.21	21.35	463	0.597	5.94	21	167.4
3/23/22	15	14:14	11.2	8.2	7.6	110	219	2.08	4.92	130	98.4
4/27/22	15	14:05	15.5	10.1	8.24	2.06	392	0.331	3.15	3	35
5/24/22	15	13:50	19.7	9.3	8.31	1.82	413	0.184	3.73	3	98.5
6/27/22	15	13:35	6.3	11.1	8.24	2.89	386	0.37	3.58	3	163.8
7/25/22	15	13:15	23.3	6.1	8.19	2.09	365	0.171	3.02	2	325.5
8/22/22	15	14:35	26.4	9.3	8.2	3.12	603	0.158	2.78	4	325.5
9/28/22	15	13:20	14.7	11.2	8.32	8.28	622	0.039	2.36	17	2419.6
10/24/22	15	14:10	18	8	8.1	0.48	703	0.006	1.93	1	21.6
11/16/22	15	13:38	5.1	10.7	8.26	0	649	0.051	1.35	3	54.8
12/21/22	15	13:20	3.9	8.5	8.46	0.26	681	0.012	1.6	2	12.5
1/26/22	16	2:30	2.7	10.4	8.5	2.63	650	0.121	4.12	7	9
2/23/22	16	3:30	3.2	10.5	8.26	9.66	453	0.184	3.77	6	185
3/23/22	16	13:57	11.7	18	7.61	71	228	1.17	3.89	80	435.2
4/27/22	16	13:50	14.1	11	8.28	0.44	366	0.216	2.47	4	68.9
5/24/22	16	13:37	19.1	8.1	8.14	2.09	400	0.081	3.91	2	235.9
6/27/22	16	13:23	21.8	6.2	8.13	4.28	402	0.156	3.24	5	275.5
7/25/22	16	12:55	22.5	5.3	7.95	4.02	375	0.106	1.24	2	165
8/22/22	16	14:18	23.4	7.1	8.04	9.44	501	0.001	0.545	15	920.8
9/28/22	16	13:07	15.2	7.1	7.98	21.33	732	0.174	0.228	33	727
10/24/22	16	dry									
11/16/22	16	13:24	5.3	9.1	8.09	14.28	609	0.066	0.275	8	2419.6
12/21/22	16	frozen									

Appendix 1B: Fish Species

Table 1. Fish species counts at stream sample sites in the Upper Sugar Creek (USC) watershed in July and August 2022. Fish Index of Biotic Integrity (IBI) scores are provided for each site. Fishes were released after identification. Fish were collected using an ETS ABP-3 backpack electrofisher. All samples were from sites in Montgomery, Boone, and Clinton Counties, Indiana.

Species		Study Site															
Common Name	Scientific Name	USC1	USC2	USC3	USC4	USC5	USC6	USC7	USC8	USC9	USC10	USC11	USC12	USC13	USC14	USC15	USC16
Central Stoneroller	*Campostoma anomalum*	39		177	165	21		139	99	4		280	82		64	91	30
Spotfin Shiner	*Cyprinella spiloptera*	3	19		6	18	20	5		1		11	44	32	6	6	
Bigeye Chub	*Hybopsis amblops*		7	4	13	3						26	53	1	4	1	
Striped Shiner	*Luxilus chrysocephalus*		4		10	13		16	2			25	14	6	35	32	1
Redfin Shiner	*Lythrurus umbratilis*		1		4			4	2	8							1
Hornyhead Chub	*Nocomis biguttatus*												3		9		
River Chub	*Nocomis micropogon*												3				
Silverjaw Minnow	*Notropis bucattus*			37	15	22	15		14	1		5	15				10
Silver Shiner	*Notropis photogenis*		1	1		4		1				44	19		7	4	
Rosyface Shiner	*Notropis rubellus*		3	9	3	10	1					3	5		1		
Sand Shiner	*Notropis stramineus*		18	109	60	13	40	16		16		21	43	1		7	5
Suckermouth Minnow	*Phenacobius mirabilis*													6			
Bluntnose Minnow	*Pimephales notatus*		4		19	3		30	76	44		33	11		4	4	26
Blacknose Dace	*Rhinichthys atratulus*							6									19
Creek Chub	*Semotilus atromaculatus*	5	1	1	60	1		79	69	14					2	4	58
River Carpsucker	*Carpiodes carpio*												1				
White Sucker	*Catostomus commersonii*	2	5		16		1	41	5				3		1	1	20
Western Creek Chubsucker	*Erimyzon oblongus*								6								
Northern Hog Sucker	*Hypentelium nigricans*		11	67	26	9		1				9	17	2	4	13	
Golden Redhorse	*Moxostoma erythrurum*		8		2	1	1	20					3		7	3	
Shorthead Redhorse	*Moxostoma macrolepidotum*		8										1			5	
Yellow Bullhead	*Ameiurus natalis*	7		2	1	2	1	1			7				1		
Stonecat	*Noturus flavus*			3		17						6					
Tadpole Madtom	*Noturus gyrinus*									10	1						
Blackstripe Topminnow	*Fundulus notatus*		1		1			2	2	29	1					1	
Grass Pickerel	*Esox americanus*	1	2							20	24	1	2	3			
Mottled Sculpin	*Cottus bairdii*								12			15			20	9	2
Greenside Darter	*Etheostoma blennioides*	21	2	16	10	6			6	1		70	8	14	6	5	
Rainbow Darter	*Etheostoma caeruleum*	37	1	13	10	13		10				40	3		18	19	
Fantail Darter	*Etheostoma flabellare*		1	3	10	1						2			8		
Johnny Darter	*Etheostoma nigrum*	4	9		13	1		13	17	2			4		11	9	75
Orangethroat Darter	*Etheostoma spectabile*			1	10			2	39	15		11	7		42	5	11
Rock Bass	*Ambloplites rupestris*	3	13	8	8	18	3		18			3		18	9	18	
Green Sunfish	*Lepomis cyanellus*	36	4	8	1	2	1					1		3	4		2
Bluegill	*Lepomis macrochirus*	20	13			2	3						9		1		
Longear Sunfish	*Lepomis megalotis*	1	38	10	11	23	65	28	63	23			47	44	5	13	
Smallmouth Bass	*Micropterus dolomieu*		4	15	1	11	5	1				13	19	3	3	1	
Spotted Bass	*Micropterus punctulatus*						1										
Largemouth Bass	*Micropterus salmoides*	1	5		1										1		
Fish IBI Score		46	54	50	48	54	42	44	44	44	32	46	52	40	54	50	42

Appendix 1C: Macroinverebrates List

Appendix C3							Upper Sugar Macroinvertibrates										
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Ephemeroptera	Baetidae	ctis intercalaris	3		5	3	7							12		10	4	
		B. flavistriga	3		5		3						5	2		4	1	2
		Centroptilum sp.		1					1									
		Cloeon Sp.	3							1	3			5	3			
		Heterocloeon sp.					1										1	
		Pseudocloeon sp.												1				
	Caenidae	Caenis sp.	5	4		22		10	12	14					1		3	6
	Ephemerellidae	erratella sp.	1															
	Ephemeridae	phemera sp.						3										
	Heptageniidae	eptagenia sp.		1	2											1		
		Stenacron interpunctatum				1		1	2	1					1			4
		Stenonema femoratum																3
		S. mediopunctatum		4		2	5							1	1	5	3	
		S. pulchellum		1			4											
		S. terminatum		1			3	1								2		
	Isonychiidae	sonychia sp.					4		1					2		3		
	Leptohyphidae	corythodes sp.	1	11	2		6	16					3	1	30	2	5	
	Leptophlebidae	leptophlebia sp.						1										
	Polymitarcyidae	Ephoron sp.						2								1	1	
	Potamanthidae	tamanthus sp.		3				2							1			
Trichoptera	Brachycentridae	chycentrus sp.								1		1						
	Helicopsychidae	opsyche borealis	1		1													
	Hydropsychidae	topsyche bifida	2		37	12	13	12	1				25	41	4	29	19	
		C. sparna	2													5		
		Cheumatopsyche sp.	21	3	8	39	31	15	8		1		32	19	5	12	8	16
		Hydropsyche betteni	4			1												2
		H. simulans				1							7	4				2
		Potamyia flava					1											
	Hydroptilidae	ydroptilia sp.								1			1					
	Limnephilidae													1				
	Philopotamidae	marra obscura				1							1			2	1	
	Phryganeidae	hryganea sp.							1			1						
	Polycentropodidae	ycentropus sp.		1				1										
Coleoptera	Elmidae	ronyx variegatus	1			1		1	1									
		Dubiraphia sp.	1						1	2				2				3
		Macronychus glabratus		3		1		1										
		Optioservus fastiditus							10	3		1						11
		Stenelmis sp.	6	15	3	4	9	5	30	29	7		3		3	3	32	10
	Gyrinidae	Gyrinus sp.													1			
	Helodidae			1		2				1		10						
	Hydrophilidae											1						
	Psephenidae	phenus herricki			1		2		1						1	1	2	
Odonata	Aeshnidae	Aeshna sp.		2														
		Boyeria sp.				1												
	Calopterygidae	Hetaerina sp.	1	1	7								2	1			2	
	Corduliidae	rocordulia sp.								1								
	Coenagrionidae	Argia sp.										1			1			
		Coenagrion sp.	4															
		Ischnura sp.	1	16		1	1		3	4	9	55		1				
	Gomphidae	ogomphus sp.													1			
Hemiptera	Belostomatidae	elostoma sp.		1								1						
Leptidoptera	Pyralidae	ragyractis sp.															1	
Diptera	Chironomidae-Tanypodinae	esmyia mallochi	5	2		3		1	1							1		2
		A. parajanta		2														
		Ablabesmyia sp.										3						
		Nilotanypus sp.															1	
		Pentaneura sp.								1								
		Procladius sp.	2	6				1		4					13			
		Thienemannimyia sp.			7		1	4	3	2			11		7		2	2
	Chironomidae-Orthocladiinae	rthocladius sp.		1														
		Coryoneura sp.			4												2	
		Cricotopus bicinctus	2		1												1	
		C. trifascia			2													
		Eukiefferiella discoloripes			1		1						1	3		3		
		Orthocladius obumbratus					1						1					2
		Stilocladius sp.											1					

	Chironomidae-Chironomni	hironomus sp.								4					3				
	Cryptochironomus fulvus			2		2	1		9	1					3				2
	Dicrotendipes sp.			2	1	1								3	19		2		
	Endochironomus sp.						1												
	Glyptotendipes lobiferus				3	2													
	Microtendipes sp.																1	2	
	Paratendipes sp.																	15	
	Polypedilum convictum			8	4	5	1	7	7	2		1		1			16	5	6
	Stictochironomus sp.									3									4
	Chironomidae-Tanytarsini	cropsectra sp.		5	1														
	Rheotanytarsus sp.								4		8								
	Paratanytarsus sp.			3									2						
	Tanytarsus sp.														2				
	Empididae	herodromia sp.				1								1					3
	Simuliidae	imulium sp.										1		3	1			1	
	Tabanidae	Tabanus sp.				1	1											1	
	Tipulidae	Tipula sp.								1				2					1
Amphipoda	Hyalella azteca				5				2			72							1
Decapoda				9	1	1	1			1	2								1
Isopoda	Caecidotea sp.				1				1										
Platyhelminthes		Dugesia sp.				1							1						
Annelida	Hirudinea									1	3		8						
	Oligochaeta									1	3	1	3						
Mollusca-Gastropoda	Ancylidae				1					1									
	Planorbidae									2	1	1	8						
	Pleuroceridae				1													1	
	Physidae			1	1					2	10	4	3						
	Viviparidae												1						
Mollusca-Bivalvia	Sphaeriidae									1	3								
	Corbiculidae	bicula fluminea		1	1					8	1								
Total				101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116
Metrics Data																			
Total Taxa				29	33	24	22	19	23	28	24	11	17	18	18	20	18	25	23
Total # Individuals				>258	>258	>258	>258	>258	>258	>258	>258	>258	>258	>258	>258	>258	>258	>258	>258
#EPT Taxa				11	10	7	9	11	11	7	5	2	2	7	11	8	12	10	7
% Orthoclads & Tanytarsids				10	2	8	0	2	4	0	8	0	2	3	3	2	3	3	2
Non-Insects (minus crayfish)				2	10	1	0	0	3	16	21	78	24	0	0	0	0	1	1
# Dipteran Taxa				9	9	12	6	5	7	7	6	3	3	9	4	7	4	10	11
% Intolerant				2	6	1	4	14	6	3	1	0	1	3	3	1	11	6	1
% Tolerant				22	40	5	29	1	25	23	43	87	73	3	2	22	1	5	15
%Predators				15	31	12	7	1	12	5	10	9	61	3	2	19	1	4	7
%Shredders & Scrapers				20	35	48	38	56	43	79	70	30	36	34	31	33	57	76	66
% Collector-Filterers				38	5	45	54	49	31	19	13	2	3	68	67	11	51	30	22
% Sprawlers				17	14	3	26	0	21	14	18	0	5	1	0	17	1	4	13
Metrics Scoring																			
Total Taxa				3	3	3	3	1	3	3	3	1	1	1	1	1	1	3	3
Total # Individuals				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
#EPT Taxa				5	3	3	5	3	3	3	3	1	1	3	3	3	5	5	3
% Orthoclads & Tanytarsids				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Non-Insects (minus crayfish)				5	5	5	5	5	5	5	3	1	3	5	5	5	5	5	5
# Dipteran Taxa				3	3	3	1	1	1	1	1	1	1	3	1	1	1	3	3
% Intolerant				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
% Tolerant				3	1	5	1	5	3	3	1	1	1	5	5	3	5	5	3
%Predators				1	3	1	1	1	1	1	1	1	5	1	1	3	1	1	1
%Shredders & Scrapers				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
% Collector-Filterers				1	5	1	1	1	1	3	3	5	5	1	1	3	1	1	1
% Sprawlers				5	5	3	5	1	5	5	5	1	3	1	1	5	1	3	5
Total Score				42	44	40	38	34	38	40	36	28	36	36	34	40	36	42	40

Appendix 1D: QHEI Data

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 43.5

Stream & Location: Upper Sugar Creek Site 1 **RM:** ___._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** ___ **Lat./ Long.:** (NAD 83 - decimal °) ___.___ / 8___.___ Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	___	___	☐☐ HARDPAN [4]	___	___
☐☐ BOULDER [9]	___	___	☐☐ DETRITUS [3]	___	___
☐☐ COBBLE [8]	___	___	☐☐ MUCK [2]	___	___
☐☐ GRAVEL [7]	___	___	☐☐ SILT [2]	___	___
☐☐ SAND [6]	___	___	☐☐ ARTIFICIAL [0]	___	___
☐☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Check ONE (Or 2 & average)

ORIGIN	QUALITY	
☐ LIMESTONE [1]	SILT: ☐ HEAVY [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ FREE [1]	
☐ TILLS [1]	EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]	
☐ WETLANDS [0]		
☑ HARDPAN [0]		
☐ SANDSTONE [0]		
☐ RIP/RAP [0]		
☐ LACUSTURINE [0]		
☐ SHALE [-1]		
☐ COAL FINES [-2]		

Substrate 10 Maximum 20

Comments

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

___ UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]
___ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
___ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]
___ ROOTMATS [1]		

AMOUNT Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☐ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Comments Curly Leaf, Floating Leaf Bridweed, EWM? Algae

Cover Maximum 20: 8

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☑ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 7

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)
River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)	
☐ ☐ NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]	☐ ☐ CONSERVATION TILLAGE [1]
☐ ☐ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]	☐ ☐ URBAN OR INDUSTRIAL [0]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐ ☐ MINING / CONSTRUCTION [0]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]	
	☐ ☐ NONE [0]	☐ ☐ OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Comments Considering I-65 corridor to be urban/industrial

Riparian Maximum 10: 5 (X)

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)
☐ > 1m [6]
☑ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☑ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current Maximum 12: 8

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]
Check ONE (Or 2 & average)

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☑ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 3

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4]
☐ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___
%RUN: ___ %RIFFLE: ___

Gradient Maximum 10: 4

EPA 4520 06/16/06

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 55

Stream & Location: Upper Sugar Creek Site 2 **RM:** _____ **Date:** 07/15/22

River Code: _____ **STORET #:** _____ **Lat./ Long.:** _____ (NAD 83 - decimal °) **Scorers Full Name & Affiliation:** Reuben R. Goforth, PhD, Consultant ☐ Office verified location

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]	___	___	☐ ☐ HARDPAN [4]	___	___
☐ ☐ BOULDER [9]	___	___	☑ ☐ DETRITUS [3]	___	___
☐ ☑ COBBLE [8]	___	___	☐ ☐ MUCK [2]	___	___
☑ ☐ GRAVEL [7]	___	___	☐ ☐ SILT [2]	___	___
☐ ☐ SAND [6]	___	___	☐ ☐ ARTIFICIAL [0]	___	___
☐ ☐ BEDROCK [5]	___	___			

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0]

(Score natural substrates; ignore sludge from point-sources)

Check ONE (*Or 2 & average*)

ORIGIN		QUALITY	
☐ LIMESTONE [1]	SILT	☐ HEAVY [-2]	
☑ TILLS [1]		☐ MODERATE [-1]	
☐ WETLANDS [0]		☐ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]	
☐ RIP/RAP [0]		☑ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments

Substrate 12 *Maximum 20*

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

✓ UNDERCUT BANKS [1]	✓ POOLS > 70cm [2]	✓ OXBOWS, BACKWATERS [1]	
✓ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]	
✓ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	✓ LOGS OR WOODY DEBRIS [1]	
___ ROOTMATS [1]			

AMOUNT Check ONE (*Or 2 & average*)
☐ EXTENSIVE >75% [11] ☐ MODERATE 25-75% [7] ☑ SPARSE 5-<25% [3] ☐ NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20 11 11

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☑ NONE [6]	☐ HIGH [3]
☑ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments 3 1 6 2

Channel Maximum 20 12

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*)
River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)	
☐ ☐ NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]	☐ ☐ CONSERVATION TILLAGE [1]
☑ ☑ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]	☐ ☐ URBAN OR INDUSTRIAL [0]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐ ☐ MINING / CONSTRUCTION [0]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]	
	☐ ☐ NONE [0]	☑ ☐ OPEN PASTURE, ROWCROP [0]	

Indicate predominant land use(s) past 100m riparian.

Comments 2 4

Riparian Maximum 10 6

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
☐ > 1m [6] ☑ 0.7-<1m [4] ☐ 0.4-<0.7m [2] ☐ 0.2-<0.4m [1] ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☐ POOL WIDTH > RIFFLE WIDTH [2] ☑ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1] ☐ VERY FAST [1] ☐ INTERSTITIAL [-1] ☐ FAST [1] ☐ INTERMITTENT [-2] ☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current Maximum 12 7

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*) ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☑ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8 3

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___ %RUN: ___ %RIFFLE: ___

Gradient Maximum 10 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 53

Stream & Location: Upper Sugar Creek Site 3 **RM:** _____ **Date:** 07/15/22

River Code: _____ **STORET #:** _____ **Lat./ Long.:** _____ (NAD 83 - decimal °) 18 _____ **Office verified location** ☐

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]	____	____	☐ ☐ HARDPAN [4]	____	____
☐ ☐ BOULDER [9]	____	____	☐ ☐ DETRITUS [3]	____	____
☐ ☑ COBBLE [8]	____	____	☐ ☐ MUCK [2]	____	____
☑ ☐ GRAVEL [7]	____	____	☐ ☐ SILT [2]	____	____
☐ ☐ SAND [6]	____	____	☐ ☐ ARTIFICIAL [0]	____	____
☐ ☐ BEDROCK [5]	____	____			

(Score natural substrates; ignore sludge from point-sources)

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0]

Check ONE (*Or 2 & average*)

ORIGIN
- ☐ LIMESTONE [1]
- ☑ TILLS [1]
- ☐ WETLANDS [0]
- ☑ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 14 *Maximum 20*

Comments

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

- ☑ UNDERCUT BANKS [1]
- ☑ OVERHANGING VEGETATION [1]
- ☑ SHALLOWS (IN SLOW WATER) [1]
- ☑ ROOTMATS [1]
- ☑ POOLS > 70cm [2]
- ☑ ROOTWADS [1]
- ☑ BOULDERS [1]
- ☐ OXBOWS, BACKWATERS [1]
- ☐ AQUATIC MACROPHYTES [1]
- ☐ LOGS OR WOODY DEBRIS [1]

AMOUNT Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover 8 *Maximum 20*

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☑ LOW [2]	☑ FAIR [3]	☑ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments Some engineered riffles & bank

Channel 10 *Maximum 20*

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☐ ☑ NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]
☑ ☐ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☑ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☑ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☐ ☐ OPEN PASTURE, ROWCROP [0]

☐ ☐ CONSERVATION TILLAGE [1]
☐ ☐ URBAN OR INDUSTRIAL [0]
☐ ☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments 1.5 2 0.5

Riparian ~~4~~ 4.0 *Maximum 10*

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
- ☐ >1m [6]
- ☑ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☑ FAST [1]
- ☐ MODERATE [1]
- ☑ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current 8 *Maximum 12*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☑ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☑ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☐ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☐ LOW [1]
- ☑ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments

Riffle / Run 5 *Maximum 8*

6] GRADIENT
(ft/mi) ☐ VERY LOW - LOW [2-4] ☑ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

DRAINAGE AREA (mi²)

%POOL: ____ %GLIDE: ____ %RUN: ____ %RIFFLE: ____

Gradient 4 *Maximum 10*

EPA 4520 06/16/06

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 49

Stream & Location: Upper Sugar Creek Site 4 **RM:** _ _ _._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant Office verified location ☐

River Code: _ _ _ - _ _ _ - _ _ _ **STORET #:** _ _ _ _ _ _ **Lat/Long:** (NAD 83 - decimal) 18 . _ _ _ _ _

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR/SLABS [10]			☐☐ HARDPAN [4]		
☐☐ BOULDER [9]		5	☐☐ DETRITUS [3]		
☐☐ COBBLE [8]			☐☐ MUCK [2]		
☑☐ GRAVEL [7]			☐☐ SILT [2]		
☐☑ SAND [6]			☐☐ ARTIFICIAL [0]		
☐☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0]

ORIGIN: ☐ LIMESTONE [1] ☑ TILLS [1] ☐ WETLANDS [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIP/RAP [0] ☐ LACUSTURINE [0] ☐ SHALE [-1] ☐ COAL FINES [-2]

QUALITY

SILT: ☐ HEAVY [-2] ☑ MODERATE [-1] ☐ NORMAL [0] ☐ FREE [1]

EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☑ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]

Substrate: 12 Maximum 20

Comments

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

___ UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]
___ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
___ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]
___ ROOTMATS [1]		

AMOUNT
Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☑ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Cover Maximum 20: 8

Comments

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☑ NONE [6]	☐ HIGH [3]
☑ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☑ LOW [1]
☐ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Channel Maximum 20: 11

Comments

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)
☐☐ NONE / LITTLE [3]	☑☐ WIDE > 50m [4]	☐☐ FOREST, SWAMP [3]
☐☑ MODERATE [2]	☐☐ MODERATE 10-50m [3]	☐☐ SHRUB OR OLD FIELD [2]
☑☐ HEAVY / SEVERE [1]	☐☐ NARROW 5-10m [2]	☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
1	☐☐ VERY NARROW < 5m [1]	☐☐ FENCED PASTURE [1]
	☐☐ NONE [0]	☐☐ OPEN PASTURE, ROWCROP [0]
	3.5	1.5

☐☐ CONSERVATION TILLAGE [1]
☐☐ URBAN OR INDUSTRIAL [0]
☐☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Riparian Maximum 10: 6

Comments

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH (Check ONE (ONLY!))
☐ > 1m [6]
☐ 0.7-<1m [4]
☑ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH (Check ONE (Or 2 & average))
☑ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☑ FAST [1] ☐ INTERMITTENT [-2]
☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current Maximum 12: 7

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☑ BEST AREAS < 5cm [metric=0]		☑ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☑ MODERATE [0] ☐ EXTENSIVE [-1]

Riffle / Run Maximum 8: 1

Comments

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4]
☑ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL: %GLIDE: %RUN: %RIFFLE:

Gradient Maximum 10: 4

EPA 4520 06/16/06

80.5

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0

Stream & Location: Upper Sugar Creek Site 5 **RM:** _ _ _._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant Office verified location ☐

River Code: _ _ _ - _ _ _ - _ _ _ **STORET #:** _ _ _ _ _ _ **Lat./ Long.:** (NAD 83 - decimal °) _ _ . _ _ _ _ / 8 _ . _ _ _ _

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]	✓	
☐ ☒ COBBLE [8]	✓	✓	☐ ☐ MUCK [2]		
☒ ☐ GRAVEL [7]	✓		☐ ☐ SILT [2]		
☐ ☐ SAND [6]		✓	☐ ☐ ARTIFICIAL [0]		
☐ ☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☒ 4 or more [2] ☐ 3 or less [0]

Check ONE (*Or 2 & average*)

ORIGIN
- ☒ LIMESTONE [1]
- ☒ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☒ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☒ NONE [1]

Substrate: 20 (Maximum 20)

Comments: 15 2 1 2

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

✓ UNDERCUT BANKS [1]	✓ POOLS > 70cm [2]	OXBOWS, BACKWATERS [1]	
✓ OVERHANGING VEGETATION [1]	✓ ROOTWADS [1]	AQUATIC MACROPHYTES [1]	
✓ SHALLOWS (IN SLOW WATER) [1]	✓ BOULDERS [1]	✓ LOGS OR WOODY DEBRIS [1]	
✓ ROOTMATS [1]			

AMOUNT Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ☒ MODERATE 25-75% [7]
- ☐ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20: 15

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY
- ☐ HIGH [4]
- ☒ MODERATE [3]
- ☐ LOW [2]
- ☐ NONE [1]

DEVELOPMENT
- ☒ EXCELLENT [7]
- ☐ GOOD [5]
- ☐ FAIR [3]
- ☐ POOR [1]

CHANNELIZATION
- ☒ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☐ RECENT OR NO RECOVERY [1]

STABILITY
- ☒ HIGH [3]
- ☐ MODERATE [2]
- ☐ LOW [1]

Comments

Channel Maximum 20: 18

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream

EROSION

L	R	
☒	☒	NONE / LITTLE [3]
☐	☐	MODERATE [2]
☐	☐	HEAVY / SEVERE [1]

RIPARIAN WIDTH

L	R	
☐	☐	WIDE > 50m [4]
☒	☒	MODERATE 10-50m [3]
☒	☒	NARROW 5-10m [2]
☐	☐	VERY NARROW < 5m [1]
☐	☐	NONE [0]

FLOOD PLAIN QUALITY

L	R	
☐	☐	FOREST, SWAMP [3]
☐	☐	SHRUB OR OLD FIELD [2]
☐	☑	RESIDENTIAL, PARK, NEW FIELD [1]
☐	☐	FENCED PASTURE [1]
☒	☒	OPEN PASTURE, ROWCROP [0]
☐	☐	CONSERVATION TILLAGE [1]
☐	☐	URBAN OR INDUSTRIAL [0]
☐	☐	MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments 3 2.5 0

Riparian Maximum 10: 5.5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
- ☒ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☒ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☒ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments 4

Pool / Current Maximum 12: 11

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
- ☒ BEST AREAS > 10cm [2]
- ☐ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☒ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE Check ONE (*Or 2 & average*)
- ☒ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☒ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 7

6] GRADIENT
(ft/mi) DRAINAGE AREA (mi²)

- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☐ HIGH - VERY HIGH [10-6]

%POOL: %GLIDE: %RUN: %RIFFLE:

Gradient Maximum 10: 4

06/16/06

EPA 4520

53.75

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0

Stream & Location: Upper Sugar Creek Site G **RM:** ___ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** ___ **Lat/Long.:** (NAD 83 - decimal °) ___.___ / 8___.___ Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

Check ONE (Or 2 & average)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]	___	___	☐ ☐ HARDPAN [4]	___	___
☐ ☐ BOULDER [9]	___	___	☐ ☐ DETRITUS [3]	___	___
☐ ☐ COBBLE [8]	___	___	☐ ☐ MUCK [2]	___	___
☑ ☐ GRAVEL [7]	___	___	☐ ☐ SILT [2]	___	___
☐ ☑ SAND [6]	___	___	☐ ☐ ARTIFICIAL [0]	___	___
☐ ☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0]

ORIGIN		QUALITY	
☐ LIMESTONE [1]	SILT	☐ HEAVY [-2]	Substrate
☑ TILLS [1]		☑ MODERATE [-1]	
☐ WETLANDS [0]		☐ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	
☐ SANDSTONE [0]	EMBEDDEDNESS	☑ EXTENSIVE [-2]	11
☐ RIP/RAP [0]		☐ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	Maximum 20
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments 13 -3

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

			AMOUNT (Check ONE (Or 2 & average))
___ UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]	☐ EXTENSIVE >75% [11]
___ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]	☐ MODERATE 25-75% [7]
___ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]	☑ SPARSE 5-<25% [3]
___ ROOTMATS [1]			☐ NEARLY ABSENT <5% [1]

Comments (7) (3) Cover Maximum 20: 10

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☑ NONE [6]	☐ HIGH [3]
☑ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☑ LOW [1]
☐ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments Channel Maximum 20: 11

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☐ ☐ NONE / LITTLE [3]	☑ ☑ WIDE > 50m [4]	☑ ☑ FOREST, SWAMP [3]
☑ ☑ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☑ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☐ ☑ OPEN PASTURE, ROWCROP [0]
		☐ ☐ CONSERVATION TILLAGE [1]
		☐ ☐ URBAN OR INDUSTRIAL [0]
		☐ ☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments 2 4 (2) (15) 35/2 1.75

Riparian Maximum 10: 7.75

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply
☑ > 1m [6]	☐ POOL WIDTH > RIFFLE WIDTH [2]	☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ 0.7-<1m [4]	☑ POOL WIDTH = RIFFLE WIDTH [1]	☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ 0.4-<0.7m [2]	☐ POOL WIDTH < RIFFLE WIDTH [0]	☐ FAST [1] ☐ INTERMITTENT [-2]
☐ 0.2-<0.4m [1]		☑ MODERATE [1] ☐ EDDIES [1]
☐ < 0.2m [0]		Indicate for reach - pools and riffles.

Recreation Potential: Primary Contact / Secondary Contact (circle one and comment on back)

Comments (6) (1) (2)

Pool / Current Maximum 12: 9

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☑ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☑ BEST AREAS < 5cm [metric=0]		☑ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☑ EXTENSIVE [-1]

Comments 0 2

Riffle / Run Maximum 8: 1

6] GRADIENT (ft/mi) DRAINAGE AREA (mi²)

☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___ %RUN: ___ %RIFFLE: ___

Gradient Maximum 10: 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 75.5 (0)

Stream & Location: Upper Sugar Creek Site 7 **RM:** ___._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** ___ **Lat./Long.:** (NAD 83 - decimal) ___.___ /8_.___ Office verified location ☐

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	___	___	☐☐ HARDPAN [4]	___	___
☐☐ BOULDER [9]	___	___	☐☐ DETRITUS [3]	___	___
☐☐ COBBLE [8]	___	___	☐☐ MUCK [2]	___	___
☐☐ GRAVEL [7]	___	___	☐☐ SILT [2]	___	___
☐☐ SAND [6]	___	___	☐☐ ARTIFICIAL [0]	___	___
☐☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

Check ONE (*Or 2 & average*)

ORIGIN	QUALITY	
☐ LIMESTONE [1]	SILT: ☐ HEAVY [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ FREE [1]	
☐ TILLS [1]	EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]	
☐ WETLANDS [0]		
☐ HARDPAN [0]		
☐ SANDSTONE [0]		
☐ RIP/RAP [0]		
☐ LACUSTURINE [0]		
☐ SHALE [-1]		
☐ COAL FINES [-2]		

Comments

Substrate 14 *Maximum 20*

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

1 UNDERCUT BANKS [1]	2 POOLS > 70cm [2]	0 OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	1 ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]
2 SHALLOWS (IN SLOW WATER) [1]	0 BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
3 ROOTMATS [1]		

AMOUNT Check ONE (*Or 2 & average*)
☐ EXTENSIVE >75% [11] ☐ MODERATE 25-75% [7] ☐ SPARSE 5-<25% [3] ☐ NEARLY ABSENT <5% [1]

Comments

Cover 16 *Maximum 20*

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☑ NONE [6]	☐ HIGH [3]
☑ MODERATE [3]	☑ GOOD [5]	☐ RECOVERED [4]	☑ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel 11 *Maximum 20*

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)
☑ ☑ NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☐ FOREST, SWAMP [3]
☐ ☐ MODERATE [2]	☐ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
3	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☐ ☐ OPEN PASTURE, ROWCROP [0]
	4	3

☐ ☐ CONSERVATION TILLAGE [1]
☐ ☐ URBAN OR INDUSTRIAL [0]
☐ ☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian 10 *Maximum 10*

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
☐ > 1m [6]
☐ 0.7-<1m [4]
☐ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☑ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☑ FAST [1] ☐ INTERMITTENT [-2]
☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current 11 *Maximum 12*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]
Check ONE (*Or 2 & average*).

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☑ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☑ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☑ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run 4.5 *Maximum 8*

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4]
☑ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___
%RUN: ___ %RIFFLE: ___

Gradient 6 *Maximum 10*

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 (44)

Stream & Location: Upper Sugar Creek Site 8 **RM:** _ _ _._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: _ _ _ - _ _ _ - _ _ _ **STORET #:** _ _ _ _ _ _ _ **Lat./Long.:** (NAD 83 - decimal °) _ _ _ . _ _ _ _ / 8 _ . _ _ _ _ Office verified location ☐

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

Check ONE (*Or 2 & average*)

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR/SLABS [10]	___	___	☐ ☐ HARDPAN [4]	___	___
☐ ☐ BOULDER [9]	___	___	☐ ☐ DETRITUS [3]	___	___
☐ ☐ COBBLE [8]	___	___	☐ ☐ MUCK [2]	___	___
☐ ☐ GRAVEL [7]	___	___	☐ ☐ SILT [2]	___	___
☐ ☐ SAND [6]	___	___	☐ ☐ ARTIFICIAL [0]	___	___
☐ ☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

ORIGIN: ☐ LIMESTONE [1] ☐ TILLS [1] ☐ WETLANDS [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIP/RAP [0] ☐ LACUSTURINE [0] ☐ SHALE [-1] ☐ COAL FINES [-2]

SILT / EMBEDDEDNESS QUALITY: ☐ HEAVY [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ FREE [1] ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]

Substrate Maximum 20: 12

Comments: Most of area sampled sandy with muck silt - small riffle upstream w/cobble

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

2 UNDERCUT BANKS [1]	1 POOLS > 70cm [2]	2 OXBOWS, BACKWATERS [1]
2 OVERHANGING VEGETATION [1]	0 ROOTWADS [1]	1 AQUATIC MACROPHYTES [1]
2 SHALLOWS (IN SLOW WATER) [1]	0 BOULDERS [1]	0 LOGS OR WOODY DEBRIS [1]
2 ROOTMATS [1]		

AMOUNT Check ONE (*Or 2 & average*)
☐ EXTENSIVE >75% [11] ☐ MODERATE 25-75% [7] ☐ SPARSE 5-<25% [3] ☑ NEARLY ABSENT <5% [1]

Cover Maximum 20: 5

Comments: Curly leaf pondweed, duckweed, arrowhead, Floda

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☑ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☑ LOW [1]
☐ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Channel Maximum 20: 9

Comments:

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*) — River right looking downstream

EROSION	L	R	RIPARIAN WIDTH	L	R	FLOOD PLAIN QUALITY	L	R
NONE / LITTLE [3]	☑	☑	WIDE > 50m [4]	☐	☐	FOREST, SWAMP [3]	☐	☐
MODERATE [2]	☐	☐	MODERATE 10-50m [3]	☐	☐	SHRUB OR OLD FIELD [2]	☐	☐
HEAVY / SEVERE [1]	☐	☐	NARROW 5-10m [2]	☐	☐	RESIDENTIAL, PARK, NEW FIELD [1]	☐	☐
			VERY NARROW < 5m [1]	☐	☑	FENCED PASTURE [1]	☐	☑
			NONE [0]	☑	☑	OPEN PASTURE, ROWCROP [0]	☑	☑
						CONSERVATION TILLAGE [1]	☐	☐
						URBAN OR INDUSTRIAL [0]	☐	☐
						MINING / CONSTRUCTION [0]	☐	☐

Indicate predominant land use(s) past 100m riparian.

Riparian Maximum 10: 2

Comments: (2) Banks sparsely colonized by herbs and only mod. eroded

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
☐ > 1m [6] ☑ 0.7-<1m [4] ☐ 0.4-<0.7m [2] ☐ 0.2-<0.4m [1] ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
☐ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☐ SLOW [1] ☐ VERY FAST [1] ☐ INTERSTITIAL [-1] ☑ FAST [1] ☐ INTERMITTENT [-2] ☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current Maximum 12: 9

Comments: 4 2 3

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☑ BEST AREAS 5-10cm [1]	☑ MAXIMUM < 50cm [1]	☑ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☑ MODERATE [0] ☐ EXTENSIVE [-1]

Riffle / Run Maximum 8: 3

Comments:

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

%POOL: %GLIDE: %RUN: %RIFFLE:

Gradient Maximum 10: 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 (26)

Stream & Location: Upper Sugar Creek Site (9) **RM:** ___ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant Office verified location ☐

River Code: ___-___-___ **STORET #:** ___ **Lat./Long.:** (NAD 83 - decimal?) ___.____ / 8_.____

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	___	___	☐☐ HARDPAN [4]	___	___
☐☐ BOULDER [9]	___	___	☐☐ DETRITUS [3]	___	___
☐☐ COBBLE [8]	___	___	☑☐ MUCK [2]	___	___
☐☐ GRAVEL [7]	___	___	☐☐ SILT [2]	___	___
☑☐ SAND [6]	___	___	☐☐ ARTIFICIAL [0]	___	___
☐☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0]

Check ONE (Or 2 & average)

ORIGIN	SILT	QUALITY	EMBEDDEDNESS
☐ LIMESTONE [1]		☐ HEAVY [-2]	☐ EXTENSIVE [-2]
☑ TILLS [1]		☐ MODERATE [-1]	☐ MODERATE [-1]
☐ WETLANDS [0]		☐ NORMAL [0]	☐ NORMAL [0]
☐ HARDPAN [0]		☐ FREE [1]	☐ NONE [1]
☐ SANDSTONE [0]		☑ EXTENSIVE [-2]	
☐ RIP/RAP [0]		☐ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Substrate 5 (Maximum 20)

Comments (6) (2) (1) (-4)

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

✓ UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	✓ OXBOWS, BACKWATERS [1]
___ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	2 ✓ AQUATIC MACROPHYTES [1]
✓ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	___ LOGS OR WOODY DEBRIS [1]
___ ROOTMATS [1]		

AMOUNT Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☑ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Comments E. canadensis Lots of algae

Cover Maximum 20: 6

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☑ RECOVERING [3]	☑ LOW [1]
☑ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments

Channel Maximum 20: 6

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (Or 2 per bank & average)

River right looking downstream

EROSION L	EROSION R
☐ NONE / LITTLE [3]	☐
☑ MODERATE [2]	☑
☐ HEAVY / SEVERE [1]	☐

RIPARIAN WIDTH L	RIPARIAN WIDTH R
☐ WIDE > 50m [4]	☐
☐ MODERATE 10-50m [3]	☐
☐ NARROW 5-10m [2]	☐
☐ VERY NARROW < 5m [1]	☐
☑ NONE [0]	☑

FLOOD PLAIN QUALITY L	FLOOD PLAIN QUALITY R
☐ FOREST, SWAMP [3]	☐
☐ SHRUB OR OLD FIELD [2]	☐
☐ RESIDENTIAL, PARK, NEW FIELD [1]	☐
☐ FENCED PASTURE [1]	☐
☑ OPEN PASTURE, ROWCROP [0]	☑

☐ CONSERVATION TILLAGE [1]	☐
☐ URBAN OR INDUSTRIAL [0]	☐
☐ MINING / CONSTRUCTION [0]	☐

Indicate predominant land use(s) past 100m riparian.

Comments (2) (0)

Riparian Maximum 10: 2

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)
☐ > 1m [6]
☐ 0.7-<1m [4]
☑ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2]
☐ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1]
☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ FAST [1] ☐ INTERMITTENT [-2]
☐ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments (2) (0) (1)

Pool / Current Maximum 12: 3

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☑ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4]
☐ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___
%RUN: ___ %RIFFLE: ___

Gradient Maximum 10: 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 (31.25)

Stream & Location: Upper Sugar Creek Site 10 **RM:** ___._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal) ____.____ /8 ____.____ Office verified location ☐

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	____	____	☐☐ HARDPAN [4]	____	____
☐☐ BOULDER [9]	____	____	☐☐ DETRITUS [3]	____	____
☐☐ COBBLE [8]	____	____	☐☑ MUCK [2]	____	____
☐☐ GRAVEL [7]	____	____	☑☐ SILT [2]	____	____
☐☐ SAND [6]	____	____	☐☐ ARTIFICIAL [0]	✓	____
☐☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0] (4)

Check ONE (*Or 2 & average*)

ORIGIN
- ☐ LIMESTONE [1]
- ☑ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2] (1)

SILT / EMBEDDEDNESS

QUALITY
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]
- ☑ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Comments

Substrate 1 *Maximum 20*

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

- ____ UNDERCUT BANKS [1]
- ____ OVERHANGING VEGETATION [1]
- ____ SHALLOWS (IN SLOW WATER) [1]
- ____ ROOTMATS [1]
- ✓ POOLS > 70cm [2]
- ____ ROOTWADS [1]
- ____ BOULDERS [1]
- ✓ OXBOWS, BACKWATERS [1]
- ✓ AQUATIC MACROPHYTES [1]
- ✓ LOGS OR WOODY DEBRIS [1]

AMOUNT Check ONE (*Or 2 & average*)
- ☐ EXTENSIVE >75% [11]
- ☑ MODERATE 25-75% [7]
- ☐ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover 11 *Maximum 20*

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY
- ☐ HIGH [4]
- ☐ MODERATE [3]
- ☐ LOW [2]
- ☑ NONE [1]

DEVELOPMENT
- ☐ EXCELLENT [7]
- ☐ GOOD [5]
- ☐ FAIR [3]
- ☑ POOR [1]

CHANNELIZATION
- ☐ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☑ RECENT OR NO RECOVERY [1]

STABILITY
- ☐ HIGH [3]
- ☐ MODERATE [2]
- ☑ LOW [1]

Comments

Channel 4 *Maximum 20*

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream

EROSION (L / R)
- ☐☐ NONE / LITTLE [3]
- ☑☑ MODERATE [2]
- ☐☐ HEAVY / SEVERE [1]

(2)

RIPARIAN WIDTH (L / R)
- ☐☐ WIDE > 50m [4]
- ☑☐ MODERATE 10-50m [3] (1.5)
- ☐☐ NARROW 5-10m [2]
- ☐☐ VERY NARROW < 5m [1]
- ☐☑ NONE [0]

FLOOD PLAIN QUALITY (L / R)
- ☐☐ FOREST, SWAMP [3]
- ☐☐ SHRUB OR OLD FIELD [2]
- ☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
- ☐☐ FENCED PASTURE [1]
- ☑☑ OPEN PASTURE, ROWCROP [0] (0.75)

- ☐☐ CONSERVATION TILLAGE [1]
- ☐☐ URBAN OR INDUSTRIAL [0]
- ☐☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments

Riparian ____ (4.25) *Maximum 10*

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (*ONLY!*)
- ☑ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (*Or 2 & average*)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☑ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

(1)

CURRENT VELOCITY Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☑ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments

Pool / Current 7 *Maximum 12*

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]

Check ONE (*Or 2 & average*).

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☐ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☐ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☐ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments

Riffle / Run 0 *Maximum 8*

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☐ HIGH - VERY HIGH [10-6]

%POOL: ____ %GLIDE: ____

%RUN: ____ %RIFFLE: ____

Gradient 4 *Maximum 10*

EPA 4520 06/16/06

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 (60)

Stream & Location: Upper Sugar Creek Site | | **RM:** ___.___ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** ___ **Lat./Long.:** (NAD 83 - decimal) ___.___ /8 ___.___ Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☒ BLDR /SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]		
☐ ☐ COBBLE [8]	✓		☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]		✓	☐ ☐ SILT [2]		~
☐ ☐ SAND [6]		✓	☐ ☐ ARTIFICIAL [0]		✓
☒ ☐ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☒ 4 or more [2] ☐ 3 or less [0] (2)

Check ONE (Or 2 & average)

ORIGIN		QUALITY	
☒ LIMESTONE [1]	SILT	☐ HEAVY [-2]	Substrate
☐ TILLS [1]		☒ MODERATE [-1]	16
☐ WETLANDS [0]		☐ NORMAL [0]	
☐ HARDPAN [0]		☐ FREE [1]	Maximum 20
☐ SANDSTONE [0]	EMBEDDEDNESS	☐ EXTENSIVE [-2]	
☐ RIP/RAP [0]		☒ MODERATE [-1]	
☐ LACUSTURINE [0]		☐ NORMAL [0]	
☐ SHALE [-1]		☐ NONE [1]	
☐ COAL FINES [-2]			

Comments (15) (2) (1) (2)

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

___ UNDERCUT BANKS [1]	___ POOLS > 70cm [2]	✓ OXBOWS, BACKWATERS [1]	AMOUNT
✓ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]	Check ONE (Or 2 & average)
✓ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	✓ LOGS OR WOODY DEBRIS [1]	☐ EXTENSIVE >75% [11]
✓ ROOTMATS [1]			☐ MODERATE 25-75% [7]
			☐ SPARSE 5-<25% [3]
			☐ NEARLY ABSENT <5% [1]

Comments LOTS of algae (3) (1) (2) (5)

Cover Maximum 20: 11

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☐ NONE [6]	☒ HIGH [3]
☐ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☒ LOW [2]	☒ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments (2) (1) (6) (3)

Channel Maximum 20: 12

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L R)	RIPARIAN WIDTH (L R)	FLOOD PLAIN QUALITY (L R)
☐ ☐ NONE / LITTLE [3]	☒ ☐ WIDE > 50m [4]	☒ ☐ FOREST, SWAMP [3]
☑ ☑ MODERATE [2]	☐ ☑ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☐ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☐ ☐ OPEN PASTURE, ROWCROP [0]

☐ ☐ CONSERVATION TILLAGE [1]
☐ ☐ URBAN OR INDUSTRIAL [0]
☐ ☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments (2) (3.5) (15)

Riparian Maximum 10: 7

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH	CHANNEL WIDTH	CURRENT VELOCITY
Check ONE (ONLY!)	Check ONE (Or 2 & average)	Check ALL that apply
☐ > 1m [6]	☐ POOL WIDTH > RIFFLE WIDTH [2]	☐ TORRENTIAL [-1] ☒ SLOW [1]
☐ 0.7-<1m [4]	☒ POOL WIDTH = RIFFLE WIDTH [1]	☐ VERY FAST [1] ☐ INTERSTITIAL [-1]
☐ 0.4-<0.7m [2]	☐ POOL WIDTH < RIFFLE WIDTH [0]	☑ FAST [1] ☐ INTERMITTENT [-2]
☒ 0.2-<0.4m [1]		☒ MODERATE [1] ☐ EDDIES [1]
☐ < 0.2m [0]		Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments (1) (1) (3)

Pool / Current Maximum 12: 5

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]

Check ONE (Or 2 & average).

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☒ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☒ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☒ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☒ MODERATE [0]
			☐ EXTENSIVE [-1]

Comments (2) (1) (2)

Riffle / Run Maximum 8: 5

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4]
☐ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___
%RUN: ___ %RIFFLE: ___

Gradient Maximum 10: 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 62

Stream & Location: Upper Sugar Creek Site 12 **RM:** ___._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** _____ **Lat/ Long.:** (NAD 83 - decimal °) __ . ____ /8_ . ____ Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]	___	___	☐ ☐ HARDPAN [4]	___	___
☐ ☐ BOULDER [9]	___	___	☐ ☐ DETRITUS [3]	___	___
☐ ☒ COBBLE [8]	___	___	☐ ☐ MUCK [2]	___	___
☐ ☐ GRAVEL [7]	___	___	☐ ☐ SILT [2]	___	___
☑ ☐ SAND [6]	___	___	☐ ☐ ARTIFICIAL [0]	___	___
☐ ☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☒ 3 or less [0]

Comments (11)

Check ONE (Or 2 & average)

ORIGIN
- ☑ LIMESTONE [1]
- ☐ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☑ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate 18 Maximum 20

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

- 1 UNDERCUT BANKS [1]
- 1 OVERHANGING VEGETATION [1]
- 1 SHALLOWS (IN SLOW WATER) [1]
- 1 ROOTMATS [1]
- ___ POOLS > 70cm [2]
- 1 ROOTWADS [1]
- 1 BOULDERS [1]
- ___ OXBOWS, BACKWATERS [1]
- ___ AQUATIC MACROPHYTES [1]
- 1 LOGS OR WOODY DEBRIS [1]

AMOUNT
Check ONE (Or 2 & average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☑ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments

Cover Maximum 20 9

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY
- ☐ HIGH [4]
- ☑ MODERATE [3]
- ☐ LOW [2]
- ☐ NONE [1]

DEVELOPMENT
- ☐ EXCELLENT [7]
- ☑ GOOD [5]
- ☐ FAIR [3]
- ☐ POOR [1]

CHANNELIZATION
- ☑ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☐ RECENT OR NO RECOVERY [1]

STABILITY
- ☑ HIGH [3]
- ☐ MODERATE [2]
- ☐ LOW [1]

Comments

Channel Maximum 20 17

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

EROSION (River right looking downstream)	L	R
NONE / LITTLE [3]	☐	☑
MODERATE [2]	☐	☐
HEAVY / SEVERE [1]	☐	☐

RIPARIAN WIDTH	L	R
WIDE > 50m [4]	☐	☑
MODERATE 10-50m [3]	☑	☐
NARROW 5-10m [2]	☐	☐
VERY NARROW < 5m [1]	☐	☐
NONE [0]	☐	☐

FLOOD PLAIN QUALITY	L	R
FOREST, SWAMP [3]	☑	☐
SHRUB OR OLD FIELD [2]	☐	☐
RESIDENTIAL, PARK, NEW FIELD [1]	☐	☐
FENCED PASTURE [1]	☐	☐
OPEN PASTURE, ROWCROP [0]	☐	☑

- ☐ ☐ CONSERVATION TILLAGE [1]
- ☐ ☐ URBAN OR INDUSTRIAL [0]
- ☐ ☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments 3 3.5 1.5

Riparian Maximum 10 8

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH
Check ONE (ONLY!)
- ☑ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH
Check ONE (Or 2 & average)
- ☐ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY
Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☑ FAST [1]
- ☑ MODERATE [1]
- ☑ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments 6 1 3

Pool / Current Maximum 12 10

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]

Check ONE (Or 2 & average).

RIFFLE DEPTH
- ☐ BEST AREAS > 10cm [2]
- ☑ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☑ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☑ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☐ LOW [1]
- ☑ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8 4

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)
- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___
%RUN: ___ %RIFFLE: ___

Gradient Maximum 10 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 58.75

Stream & Location: Upper Sugar Creek Site 13 **RM:** ___._ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** ___ **Lat/ Long.:** (NAD 83 - decimal) __.____ /8_.____ Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR/SLABS [10]			☐ ☐ HARDPAN [4]		
☐ ☐ BOULDER [9]			☐ ☐ DETRITUS [3]		
☐ ☐ COBBLE [8]			☐ ☐ MUCK [2]		
☐ ☐ GRAVEL [7]			☐ ☐ SILT [2]		
☑ ☐ SAND [6]			☐ ☐ ARTIFICIAL [0]		
☐ ☑ BEDROCK [5]			(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☑ 4 or more [2] ☐ 3 or less [0]

Check ONE (Or 2 & average)

ORIGIN: ☑ LIMESTONE [1] ☐ TILLS [1] ☐ WETLANDS [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIP/RAP [0] ☐ LACUSTURINE [0] ☐ SHALE [-1] ☐ COAL FINES [-2]

QUALITY: ☐ HEAVY [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ FREE [1]

SILT: ☐ EXTENSIVE [-2] ☑ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]

EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]

Comments (11) (2) (1) (4) -15

Substrate B 12.5 Maximum 20

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

___ UNDERCUT BANKS [1]	✓ POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]
(1) ✓ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
(2) ✓ SHALLOWS (IN SLOW WATER) [1]	(2) ✓ BOULDERS [1]	(1) ✓ LOGS OR WOODY DEBRIS [1]
(2) ✓ ROOTMATS [1]		

AMOUNT Check ONE (Or 2 & average)
☐ EXTENSIVE >75% [11] ☑ MODERATE 25-75% [7] ☐ SPARSE 5-<25% [3] ☐ NEARLY ABSENT <5% [1]

Comments (6) (7)

Cover Maximum 20: 13

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☑ NONE [6]	☑ HIGH [3]
☑ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments (3) (1) (6) (3)

Channel Maximum 20: 13

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L / R)	RIPARIAN WIDTH (L / R)	FLOOD PLAIN QUALITY (L / R)
☐ ☐ NONE / LITTLE [3]	☐ ☑ WIDE > 50m [4]	☐ ☑ FOREST, SWAMP [3]
☑ ☑ MODERATE [2]	☑ ☐ MODERATE 10-50m [3]	☐ ☐ SHRUB OR OLD FIELD [2]
☐ ☐ HEAVY / SEVERE [1]	☑ ☐ NARROW 5-10m [2]	☑ ☑ RESIDENTIAL, PARK, NEW FIELD [1]
	☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
	☐ ☐ NONE [0]	☐ ☐ OPEN PASTURE, ROWCROP [0]
		☐ ☐ CONSERVATION TILLAGE [1]
		☐ ☐ URBAN OR INDUSTRIAL [0]
		☐ ☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments (2) L 2.5 R 3 = 2.75 OS 3 = 5.5

Riparian Maximum 10: 8.25

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH Check ONE (ONLY!)
☐ > 1m [6] ☑ 0.7-<1m [4] ☐ 0.4-<0.7m [2] ☐ 0.2-<0.4m [1] ☐ < 0.2m [0]

CHANNEL WIDTH Check ONE (Or 2 & average)
☐ POOL WIDTH > RIFFLE WIDTH [2] ☑ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY Check ALL that apply
☐ TORRENTIAL [-1] ☑ SLOW [1] ☐ INTERSTITIAL [-1] ☐ VERY FAST [1] ☐ INTERMITTENT [-2] ☐ FAST [1] ☑ MODERATE [1] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments (5) (1) (2)

Pool / Current Maximum 12: 8

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (Or 2 & average). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH	RUN DEPTH	RIFFLE / RUN SUBSTRATE	RIFFLE / RUN EMBEDDEDNESS
☐ BEST AREAS > 10cm [2]	☐ MAXIMUM > 50cm [2]	☐ STABLE (e.g., Cobble, Boulder) [2]	☐ NONE [2]
☐ BEST AREAS 5-10cm [1]	☐ MAXIMUM < 50cm [1]	☐ MOD. STABLE (e.g., Large Gravel) [1]	☐ LOW [1]
☐ BEST AREAS < 5cm [metric=0]		☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]	☐ MODERATE [0] ☐ EXTENSIVE [-1]

Comments

Riffle / Run Maximum 8: 0

6] GRADIENT (ft/mi)
DRAINAGE AREA (mi²)

☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___ %RUN: ___ %RIFFLE: ___

Gradient Maximum 10: 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 80.75

Stream & Location: Upper Sugar Creek Watershed #14 **RM:** ___.___ **Date:** 7/16/22

Scorers Full Name & Affiliation: R.R. Gotarth PhD

River Code: ___-___-___ **STORET #:** _____ **Lat./ Long.:** (NAD 83 - decimal °) ___.___ / 18 .____ Office verified location ☐

1] SUBSTRATE
Check ONLY Two substrate TYPE BOXES; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐☐ BLDR /SLABS [10]	___	___	☐☐ HARDPAN [4]	___	___
☐☐ BOULDER [9]	___	___	☐☐ DETRITUS [3]	___	___
☐☑ COBBLE [8]	___	___	☐☐ MUCK [2]	___	___
☐☐ GRAVEL [7]	___	___	☐☐ SILT [2]	___	___
☐☐ SAND [6]	___	___	☐☐ ARTIFICIAL [0]	___	___
☐☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

Check ONE (Or 2 & average)

ORIGIN
- ☐ LIMESTONE [1]
- ☐ TILLS [1]
- ☐ WETLANDS [0]
- ☐ HARDPAN [0]
- ☐ SANDSTONE [0]
- ☐ RIP/RAP [0]
- ☐ LACUSTURINE [0]
- ☐ SHALE [-1]
- ☐ COAL FINES [-2]

QUALITY

SILT
- ☐ HEAVY [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ FREE [1]

EMBEDDEDNESS
- ☐ EXTENSIVE [-2]
- ☐ MODERATE [-1]
- ☐ NORMAL [0]
- ☐ NONE [1]

Substrate: 16 Maximum 20

Comments: 14 2 1 -1

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

- ___ UNDERCUT BANKS [1]
- ___ OVERHANGING VEGETATION [1]
- ___ SHALLOWS (IN SLOW WATER) [1]
- ___ ROOTMATS [1]
- ___ POOLS > 70cm [2]
- ___ ROOTWADS [1]
- ___ BOULDERS [1]
- ___ OXBOWS, BACKWATERS [1]
- ___ AQUATIC MACROPHYTES [1]
- ___ LOGS OR WOODY DEBRIS [1]

AMOUNT
Check ONE (Or 2 & average)
- ☐ EXTENSIVE >75% [11]
- ☐ MODERATE 25-75% [7]
- ☐ SPARSE 5-<25% [3]
- ☐ NEARLY ABSENT <5% [1]

Comments: 9 7

Cover Maximum 20: 16

3] CHANNEL MORPHOLOGY
Check ONE in each category (Or 2 & average)

SINUOSITY
- ☐ HIGH [4]
- ☐ MODERATE [3]
- ☐ LOW [2]
- ☐ NONE [1]

DEVELOPMENT
- ☐ EXCELLENT [7]
- ☐ GOOD [5]
- ☐ FAIR [3]
- ☐ POOR [1]

CHANNELIZATION
- ☐ NONE [6]
- ☐ RECOVERED [4]
- ☐ RECOVERING [3]
- ☐ RECENT OR NO RECOVERY [1]

STABILITY
- ☐ HIGH [3]
- ☐ MODERATE [2]
- ☐ LOW [1]

Comments: 3.5 6 6 3

Channel Maximum 20: 18.5

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for EACH BANK (Or 2 per bank & average)

River right looking downstream

EROSION (L / R)
- ☐☐ NONE / LITTLE [3]
- ☐☑ MODERATE [2]
- ☐☐ HEAVY / SEVERE [1]

RIPARIAN WIDTH (L / R)
- ☐☑ WIDE > 50m [4]
- ☐☐ MODERATE 10-50m [3]
- ☑☐ NARROW 5-10m [2]
- ☐☐ VERY NARROW < 5m [1]
- ☐☐ NONE [0]

FLOOD PLAIN QUALITY (L / R)
- ☐☑ FOREST, SWAMP [3]
- ☐☐ SHRUB OR OLD FIELD [2]
- ☐☐ RESIDENTIAL, PARK, NEW FIELD [1]
- ☐☑ FENCED PASTURE [1]
- ☑☐ OPEN PASTURE, ROWCROP [0]
- ☐☐ CONSERVATION TILLAGE [1]
- ☐☐ URBAN OR INDUSTRIAL [0]
- ☐☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments: 3 2.5 2.75 3 1.5

Riparian Maximum 10: 9.25

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH
Check ONE (ONLY!)
- ☑ > 1m [6]
- ☐ 0.7-<1m [4]
- ☐ 0.4-<0.7m [2]
- ☐ 0.2-<0.4m [1]
- ☐ < 0.2m [0]

CHANNEL WIDTH
Check ONE (Or 2 & average)
- ☑ POOL WIDTH > RIFFLE WIDTH [2]
- ☐ POOL WIDTH = RIFFLE WIDTH [1]
- ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY
Check ALL that apply
- ☐ TORRENTIAL [-1]
- ☐ VERY FAST [1]
- ☐ FAST [1]
- ☐ MODERATE [1]
- ☐ SLOW [1]
- ☐ INTERSTITIAL [-1]
- ☐ INTERMITTENT [-2]
- ☐ EDDIES [1]

Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments: 6 3 4

Pool / Current Maximum 12: 12

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]

Check ONE (Or 2 & average).

RIFFLE DEPTH
- ☑ BEST AREAS > 10cm [2]
- ☐ BEST AREAS 5-10cm [1]
- ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
- ☐ MAXIMUM > 50cm [2]
- ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
- ☑ STABLE (e.g., Cobble, Boulder) [2]
- ☐ MOD. STABLE (e.g., Large Gravel) [1]
- ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
- ☐ NONE [2]
- ☑ LOW [1]
- ☐ MODERATE [0]
- ☐ EXTENSIVE [-1]

Comments: 2 2 2 1

Riffle / Run Maximum 8: 7

6] GRADIENT
(ft/mi) DRAINAGE AREA (mi²)
- ☐ VERY LOW - LOW [2-4]
- ☐ MODERATE [6-10]
- ☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___
%RUN: ___ %RIFFLE: ___

Gradient Maximum 10: 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 0 / 65

Stream & Location: Upper Sugar Creek Site 15 **RM:** ___.__ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** _____ **Lat/ Long.:** (NAD 83 - decimal °) ___.____ /8 ___.____ Office verified location ☐

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☑ BLDR /SLABS [10]	___	___	☐ ☐ HARDPAN [4]	___	___
☑ ☐ BOULDER [9]	___	___	☐ ☐ DETRITUS [3]	___	___
☑ ☐ COBBLE [8]	___	___	☑ ☐ MUCK [2]	___	___
☐ ☐ GRAVEL [7]	___	___	☐ ☐ SILT [2]	___	___
☐ ☑ SAND [6]	___	___	☐ ☐ ARTIFICIAL [0]	___	___
☐ ☐ BEDROCK [5]	___	___	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☑ 3 or less [0]

ORIGIN (Check ONE (*Or 2 & average*))
☐ LIMESTONE [1] ☐ TILLS [1] ☐ WETLANDS [0] ☐ HARDPAN [0] ☐ SANDSTONE [0] ☐ RIP/RAP [0] ☐ LACUSTURINE [0] ☐ SHALE [-1] ☐ COAL FINES [-2]

QUALITY
SILT: ☐ HEAVY [-2] ☑ MODERATE [-1] ☐ NORMAL [0] ☐ FREE [1]
EMBEDDEDNESS: ☐ EXTENSIVE [-2] ☐ MODERATE [-1] ☐ NORMAL [0] ☐ NONE [1]

Substrate 13 *Maximum 20*

Comments 14

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

___ UNDERCUT BANKS [1]	✓ POOLS > 70cm [2]	___ OXBOWS, BACKWATERS [1]
✓ OVERHANGING VEGETATION [1]	___ ROOTWADS [1]	___ AQUATIC MACROPHYTES [1]
✓ SHALLOWS (IN SLOW WATER) [1]	___ BOULDERS [1]	✓ LOGS OR WOODY DEBRIS [1]
✓ ROOTMATS [1]		

AMOUNT (Check ONE (*Or 2 & average*))
☐ EXTENSIVE >75% [11] ☑ MODERATE 25-75% [7] ☐ SPARSE 5-<25% [3] ☐ NEARLY ABSENT <5% [1]

Comments 6 (5) *Cover Maximum 20* 11

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☑ EXCELLENT [7]	☐ NONE [6]	☐ HIGH [3]
☑ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☐ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Comments 3 7 4 3

Channel Maximum 20 17

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*)

River right looking downstream	EROSION	RIPARIAN WIDTH	FLOOD PLAIN QUALITY
L R		L R	L R
☐ ☐	NONE / LITTLE [3]	☐ ☐ WIDE > 50m [4]	☐ ☑ FOREST, SWAMP [3]
☑ ☐	MODERATE [2]	☑ ☐ MODERATE 10-50m [3]	☑ ☐ SHRUB OR OLD FIELD [2]
☐ ☐	HEAVY / SEVERE [1]	☑ ☐ NARROW 5-10m [2]	☐ ☐ RESIDENTIAL, PARK, NEW FIELD [1]
		☐ ☐ VERY NARROW < 5m [1]	☐ ☐ FENCED PASTURE [1]
		☐ ☐ NONE [0]	☐ ☑ OPEN PASTURE, ROWCROP [0]

☐ ☐ CONSERVATION TILLAGE [1] ☐ ☐ URBAN OR INDUSTRIAL [0] ☐ ☐ MINING / CONSTRUCTION [0]

Indicate predominant land use(s) past 100m riparian.

Comments 1.5 2.5 1

Riparian Maximum 10 5

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH (Check ONE (*ONLY!*))
☐ > 1m [6] ☑ 0.7-<1m [4] ☐ 0.4-<0.7m [2] ☐ 0.2-<0.4m [1] ☐ < 0.2m [0]

CHANNEL WIDTH (Check ONE (*Or 2 & average*))
☑ POOL WIDTH > RIFFLE WIDTH [2] ☐ POOL WIDTH = RIFFLE WIDTH [1] ☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)
☐ TORRENTIAL [-1] ☐ VERY FAST [1] ☑ FAST [1] ☑ MODERATE [1] ☐ SLOW [1] ☐ INTERSTITIAL [-1] ☐ INTERMITTENT [-2] ☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Comments 4 2 3

Pool / Current Maximum 12 9

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
☐ BEST AREAS > 10cm [2] ☑ BEST AREAS 5-10cm [1] ☐ BEST AREAS < 5cm [metric=0]

RUN DEPTH
☑ MAXIMUM > 50cm [2] ☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE (Check ONE (*Or 2 & average*))
☐ STABLE (e.g., Cobble, Boulder) [2] ☐ MOD. STABLE (e.g., Large Gravel) [1] ☐ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
☐ NONE [2] ☐ LOW [1] ☑ MODERATE [0] ☐ EXTENSIVE [-1]

Comments 1 2 2

Riffle / Run Maximum 8 5

6] GRADIENT
DRAINAGE AREA (ft/mi) (mi²)

☐ VERY LOW - LOW [2-4] ☐ MODERATE [6-10] ☐ HIGH - VERY HIGH [10-6]

%POOL: ___ %GLIDE: ___ %RUN: ___ %RIFFLE: ___

Gradient Maximum 10 4

OhioEPA Qualitative Habitat Evaluation Index and Use Assessment Field Sheet

QHEI Score: 044 (44.5)

Stream & Location: Upper Sugar Creek Site 16 **RM:** ___.___ **Date:** 07/15/22

Scorers Full Name & Affiliation: Reuben R. Goforth, PhD, Consultant

River Code: ___-___-___ **STORET #:** _____ **Lat./Long.:** (NAD 83 - decimal °) ___.____ /8 ___.____ Office verified location ☐

1] SUBSTRATE
Check *ONLY* Two substrate *TYPE BOXES*; estimate % or note every type present

BEST TYPES	POOL	RIFFLE	OTHER TYPES	POOL	RIFFLE
☐ ☐ BLDR /SLABS [10]	____	____	☐ ☐ HARDPAN [4]	____	____
☐ ☐ BOULDER [9]	____	____	☐ ☐ DETRITUS [3]	____	____
☐ ☐ COBBLE [8]	____	____	☐ ☐ MUCK [2]	____	____
☐ ☐ GRAVEL [7]	____	____	☐ ☐ SILT [2]	____	____
☐ ☐ SAND [6]	____	____	☐ ☐ ARTIFICIAL [0]	____	____
☐ ☐ BEDROCK [5]	____	____	(Score natural substrates; ignore sludge from point-sources)		

NUMBER OF BEST TYPES: ☐ 4 or more [2] ☐ 3 or less [0]

ORIGIN (Check ONE (*Or 2 & average*))
☐ LIMESTONE [1]
☐ TILLS [1]
☐ WETLANDS [0]
☐ HARDPAN [0]
☐ SANDSTONE [0]
☐ RIP/RAP [0]
☐ LACUSTURINE [0]
☐ SHALE [-1]
☐ COAL FINES [-2]

QUALITY
SILT
☐ HEAVY [-2]
☐ MODERATE [-1]
☐ NORMAL [0]
☐ FREE [1]
EMBEDDEDNESS
☐ EXTENSIVE [-2]
☐ MODERATE [-1]
☐ NORMAL [0]
☐ NONE [1]

Substrate 12 *Maximum 20*

Comments

2] INSTREAM COVER
Indicate presence 0 to 3: 0-Absent; 1-Very small amounts or if more common of marginal quality; 2-Moderate amounts, but not of highest quality or in small amounts of highest quality; 3-Highest quality in moderate or greater amounts (e.g., very large boulders in deep or fast water, large diameter log that is stable, well developed rootwad in deep / fast water, or deep, well-defined, functional pools.

1 UNDERCUT BANKS [1]	____ POOLS > 70cm [2]	____ OXBOWS, BACKWATERS [1]
1 OVERHANGING VEGETATION [1]	____ ROOTWADS [1]	____ AQUATIC MACROPHYTES [1]
1 SHALLOWS (IN SLOW WATER) [1]	____ BOULDERS [1]	1 LOGS OR WOODY DEBRIS [1]
____ ROOTMATS [1]		

AMOUNT (Check ONE (*Or 2 & average*))
☐ EXTENSIVE >75% [11]
☐ MODERATE 25-75% [7]
☑ SPARSE 5-<25% [3]
☐ NEARLY ABSENT <5% [1]

Cover *Maximum 20* 6

Comments

3] CHANNEL MORPHOLOGY
Check ONE in each category (*Or 2 & average*)

SINUOSITY	DEVELOPMENT	CHANNELIZATION	STABILITY
☐ HIGH [4]	☐ EXCELLENT [7]	☑ NONE [6]	☐ HIGH [3]
☑ MODERATE [3]	☐ GOOD [5]	☐ RECOVERED [4]	☐ MODERATE [2]
☐ LOW [2]	☐ FAIR [3]	☐ RECOVERING [3]	☐ LOW [1]
☐ NONE [1]	☑ POOR [1]	☐ RECENT OR NO RECOVERY [1]	

Channel *Maximum 20* 12

Comments 3 1 6 2

4] BANK EROSION AND RIPARIAN ZONE
Check ONE in each category for *EACH BANK* (*Or 2 per bank & average*)

EROSION (River right looking downstream)	L	R	RIPARIAN WIDTH	L	R	FLOOD PLAIN QUALITY	L	R
NONE / LITTLE [3]	☐	☐	WIDE > 50m [4]	☐	☐	FOREST, SWAMP [3]	☐	☐
MODERATE [2]	☑	☐	MODERATE 10-50m [3]	☐	☑	SHRUB OR OLD FIELD [2]	☐	☐
HEAVY / SEVERE [1]	☐	☑	NARROW 5-10m [2]	☐	☐	RESIDENTIAL, PARK, NEW FIELD [1]	☐	☐
			VERY NARROW < 5m [1]	☐	☐	FENCED PASTURE [1]	☐	☐
			NONE [0]	☐	☐	OPEN PASTURE, ROWCROP [0]	☑	☑
						CONSERVATION TILLAGE [1]	☐	☐
						URBAN OR INDUSTRIAL [0]	☐	☐
						MINING / CONSTRUCTION [0]	☐	☐

1.5 3 — 3.5 — 1.5

Indicate predominant land use(s) past 100m riparian.

Riparian *Maximum 10* 6.5

Comments

5] POOL / GLIDE AND RIFFLE / RUN QUALITY

MAXIMUM DEPTH (Check ONE (*ONLY!*))
☐ > 1m [6]
☐ 0.7-<1m [4]
☑ 0.4-<0.7m [2]
☐ 0.2-<0.4m [1]
☐ < 0.2m [0]

CHANNEL WIDTH (Check ONE (*Or 2 & average*))
☐ POOL WIDTH > RIFFLE WIDTH [2]
☑ POOL WIDTH = RIFFLE WIDTH [1]
☐ POOL WIDTH < RIFFLE WIDTH [0]

CURRENT VELOCITY (Check ALL that apply)
☐ TORRENTIAL [-1]
☐ VERY FAST [1]
☐ FAST [1]
☐ MODERATE [1]
☐ SLOW [1]
☐ INTERSTITIAL [-1]
☐ INTERMITTENT [-2]
☐ EDDIES [1]
Indicate for reach - pools and riffles.

Recreation Potential
Primary Contact
Secondary Contact
(circle one and comment on back)

Pool / Current *Maximum 12* 4

Comments

Indicate for functional riffles; Best areas must be large enough to support a population of riffle-obligate species: Check ONE (*Or 2 & average*). ☐ NO RIFFLE [metric=0]

RIFFLE DEPTH
☐ BEST AREAS > 10cm [2]
☐ BEST AREAS 5-10cm [1]
☑ BEST AREAS < 5cm [metric=0]

RUN DEPTH
☐ MAXIMUM > 50cm [2]
☐ MAXIMUM < 50cm [1]

RIFFLE / RUN SUBSTRATE
☐ STABLE (e.g., Cobble, Boulder) [2]
☐ MOD. STABLE (e.g., Large Gravel) [1]
☑ UNSTABLE (e.g., Fine Gravel, Sand) [0]

RIFFLE / RUN EMBEDDEDNESS
☐ NONE [2]
☐ LOW [1]
☐ MODERATE [0]
☑ EXTENSIVE [-1]

Riffle / Run *Maximum 8* 0

Comments

6] GRADIENT (ft/mi) DRAINAGE AREA (mi²)
☑ VERY LOW - LOW [2-4]
☐ MODERATE [6-10]
☐ HIGH - VERY HIGH [10-6]

%POOL: ____ %GLIDE: ____
%RUN: ____ %RIFFLE: ____

Gradient *Maximum 10* 4

EPA 4520 06/16/06

Appendix E: Subwatershed Data

Subwatershed Name	Headwaters Little Potatoe Creek	Bowers Creek	Lye Creek Drain	Little Potatoe Creek-Lye Creek	Little Creek-Little Sugar Creek	Little Sugar Creek	Town of Linnsburg-Walnut Fork Sugar Creek
HUC	051201100201	051201100202	051201100203	051201100204	051201100301	051201100302	051201100303
Area (acres)	11,674	11,927	10,910	16,114	16,181	12,917	30,600
% of Watershed	6%	6%	6%	8%	8%	7%	16%
Stream (miles)	17.3	13.9	14.9	30.5	43.7	31.9	88.6
Impaired ECOLI 4A (miles)	10.84			10.20			51.93
Impaired Nutr 5A (miles)				0.02			
Impaired PCBs 5B (miles)					0.00	19.93	51.94
Impaired biotic comm (miles)							
Impaired DO (miles)							
HEL (acres)	6,329.3	4,917.2	5,011.0	9,321.1	9,402.5	8,953.9	20,250.7
HEL (%)	54.2%	41.2%	45.9%	57.8%	58.1%	69.3%	66.2%
Hydric (acres)	5,212.7	6,416.4	6,248.2	6,281.8	6,452.9	3,052.0	8,281.4
Hydric (%)	44.7%	53.8%	57.3%	39.0%	39.9%	23.6%	27.1%
Septic-VeryLimited	11,573.3	11,915.0	10,887.1	15,764.7	16,169.2	12,741.7	30,285.9
Septic-VL (%)	99.1%	99.9%	99.8%	97.8%	99.9%	98.6%	99.0%
Floodplain (acres)		23	2	278	533	625	1,456
Floodplain (%)	0%	0%	0%	2%	3%	5%	5%
CFO (animals)	6,725	2,978	21,164	6,274		16,530	7,800
Hobby Farm (animals)	50	67	76	161	150	113	379
Manure estimate (tons)	29,892	1,467	1,652	3,472	1,855	2,467	7,536
Manure N estimate (lb)	537	697	799	1,707	2,279	1,180	4,330
Manure P estimate (lb)	267	342	394	841	1,090	580	2,113
Manure Ecoli Estimate (col)	2.78E+13	4.17E+13	4.56E+13	1.04E+14	5.80E+14	6.93E+13	4.84E+14
Municipal Sludge App (acres)	73	192	155	53	169	246	302
Livestock Access (miles)	0.0	0.3	1.2	1.2	1.7	0.5	4.5
Livestock Access (%)	0.0%	2.2%	8.3%	3.9%	3.9%	1.7%	5.1%
Streambank Erosion (miles)	1.3	1.7	1.2	7.9	9.8	6.7	17.1
Streambank Erosion (%)	7.7%	12.5%	8.3%	25.8%	22.5%	21.1%	19.2%
Narrow Buffer (miles)	3.1	0.0	1.6	1.5	4.3	1.0	9.7
Narrow Buffer (%)	18.0%	0.0%	10.9%	5.0%	9.9%	3.2%	11.0%

Subwatershed Name	Headwaters Little Potatoe Creek	Bowers Creek	Lye Creek Drain	Little Potatoe Creek-Lye Creek	Little Creek-Little Sugar Creek	Little Sugar Creek	Town of Linnsburg-Walnut Fork Sugar Creek
HUC	051201100201	051201100202	051201100203	051201100204	051201100301	051201100302	051201100303
Land Use (%)							
Ag - Row +Pasture	92.9%	94.7%	94.8%	87.8%	90.8%	85.5%	84.5%
Forest	1.0%	0.5%	0.9%	4.8%	3.6%	8.5%	7.4%
Wetland + Open water + grass	0.6%	0.6%	0.4%	2.6%	1.2%	0.8%	0.9%
Urban	5.5%	4.1%	3.8%	4.7%	4.3%	5.2%	7.2%
LUST	1	2			2		2
NPDES							Nucor
NPDES SSO							
Superfund							
VRP							
Brownfields							
Industrial Waste							
Solid Waste					1		1
Waste Restricted							
Historic Water Quality Samples Exceeding Targets							
DO	44%	--	0%	23%	37%	25%	34%
Cond	0%	--	0%	2%	1%	3%	5%
Turb	57%	--	67%	71%	90%	50%	68%
pH	11%	--	0%	0%	0%	0%	0%
Nitrate	67%	--	33%	70%	70%	71%	93%
TKN	33%	--	67%	54%	67%	53%	100%
TP	100%	--	100%	20%	71%	71%	59%
E. coli	60%	--	--	4%	6%	2%	79%
Current Water Quality Samples Exceeding Targets							
Temp	0%	0%	0%	0%	0%	0%	0%
DO	8%	8%	14%	8%	20%	17%	17%
pH	0%	8%	0%	0%	0%	0%	0%
Turb	42%	33%	29%	33%	50%	25%	33%
Cond	0%	0%	0%	0%	0%	0%	8%
TP	67%	83%	86%	67%	80%	67%	67%
Nitrate	50%	58%	100%	67%	80%	100%	83%
TSS	25%	17%	29%	17%	20%	25%	17%
Ecoli	42%	25%	86%	17%	60%	25%	33%

Subwatershed Name	Sanitary Ditch-Prairie Creek	Deer Creek-Prairie Creek	Wolf Creek	Goldsberry Creek-Sugar Creek	Withe Creek-Sugar Creek	Hazel Creek-Sugar Creek	Town of Garfield-Sugar Creek
HUC	051201100401	051201100402	051201100403	051201100404	051201100405	051201100406	051201100407
Area (acres)	14,226	17,381	16,258	11,307	10,902	16,166	7,973
% of Watershed	7%	9%	8%	6%	6%	8%	4%
Stream (miles)	62.3	62.9	42.4	30.1	24.4	42.2	25.2
Impaired ECOLI 4A (miles)				12.36	10.57	15.51	14.63
Impaired Nutr 5A (miles)				0.00	10.55	0.00	
Impaired PCBs 5B (miles)							20.26
Impaired biotic comm (miles)							
Impaired DO (miles)							
HEL (acres)	6,544.5	10,143.9	9,609.3	6,532.3	6,269.4	10,204.7	5,126.0
HEL (%)	46.0%	58.4%	59.1%	57.8%	57.5%	63.1%	64.3%
Hydric (acres)	6,656.6	5,609.1	5,898.4	3,459.3	3,373.1	4,610.2	1,599.0
Hydric (%)	46.8%	32.3%	36.3%	30.6%	30.9%	28.5%	20.1%
Septic-VeryLimited	14,166.9	17,182.4	16,182.6	10,978.7	10,765.0	16,028.8	7,693.2
Septic-VL (%)	99.6%	98.9%	99.5%	97.1%	98.7%	99.2%	96.5%
Floodplain (acres)	1,588	1,790	66	842	749	1,054	986
Floodplain (%)	11%	10%	0%	7%	7%	7%	12%
CFO (animals)			54,375		10,000		
Hobby Farm (animals)	10	404	319	120	141	280	182
Manure estimate (tons)	219	8,718	3,141	2,611	3,073	5,259	3,731
Manure N estimate (lb)	104	4,290	4,295	1,260	1,477	3,047	2,066
Manure P estimate (lb)	51	2,123	2,301	620	726	1,652	1,051
Manure Ecoli Estimate (col)	6.22E+12	2.34E+14	2.82E+14	7.23E+13	8.57E+13	1.37E+14	7.92E+13
Municipal Sludge App (acres)	258	1609	150	98	201	520	1371
Livestock Access (miles)	0.0	0.5	2.3	1.2	0.0	1.5	0.9
Livestock Access (%)	0.0%	0.8%	5.4%	3.9%	0.0%	3.5%	3.4%
Streambank Erosion (miles)	0.5	9.9	7.8	3.0	5.2	7.2	6.7
Streambank Erosion (%)	0.9%	15.8%	18.4%	10.1%	21.2%	17.0%	26.3%
Narrow Buffer (miles)	0.6	0.0	1.7	0.0	0.0	0.0	1.8
Narrow Buffer (%)	0.9%	0.0%	3.9%	0.0%	0.0%	0.0%	7.1%

Subwatershed Name	Sanitary Ditch-Prairie Creek	Deer Creek-Prairie Creek	Wolf Creek	Goldsberry Creek-Sugar Creek	Withe Creek-Sugar Creek	Hazel Creek-Sugar Creek	Town of Garfield-Sugar Creek
HUC	051201100401	051201100402	051201100403	051201100404	051201100405	051201100406	051201100407
Land Use (%)							
Ag - Row +Pasture	71.5%	79.7%	89.7%	85.0%	84.1%	83.7%	75.2%
Forest	1.8%	4.7%	4.7%	5.3%	7.7%	7.4%	17.1%
Wetland + Open water + grass	1.8%	1.4%	1.0%	2.5%	2.1%	2.1%	2.3%
Urban	24.8%	14.1%	4.6%	7.1%	6.1%	6.8%	5.3%
LUST	78	18	1	8	6	7	1
NPDES	lebanon			Thorntown and WEBC	colfax	darlington	
NPDES SSO							
Superfund							
VRP							
Brownfields	4						
Industrial Waste							
Solid Waste	2 (lebanon)			1	1	1	
Waste Restricted							
Historic Water Quality Samples Exceeding Targets							
DO	--	0%	--	0%	0%	29%	0%
Cond	--	0%	--	--	0%	0%	0%
Turb	--	93%	--	100%	90%	42%	78%
pH	--	0%	--	0%	0%	0%	0%
Nitrate	--	--	--	75%	100%	100%	50%
TKN	--	--	--	--	100%	100%	60%
TP	--	--	--	--	100%	100%	50%
E. coli	--	--	--	0%	100%	80%	60%
Current Water Quality Samples Exceeding Targets							
Temp	0%	0%	0%	0%	0%	0%	0%
DO	75%	50%	42%	9%	50%	17%	8%
pH	0%	0%	0%	0%	0%	0%	0%
Turb	33%	25%	17%	31%	17%	25%	33%
Cond	50%	25%	0%	4%	0%	0%	0%
TP	75%	67%	75%	78%	58%	58%	50%
Nitrate	100%	100%	92%	96%	83%	75%	83%
TSS	8%	25%	17%	26%	17%	17%	17%
Ecoli	58%	58%	33%	48%	25%	25%	42%

Appendix 2: Educational Materials

WHAT IS A WATERSHED?

A watershed is the land area that drains to a common point, such as a location on a river. All of the water that falls on a watershed will move across the landscape collecting in low spots and drainageways until it moves into the waterbody of choice. A healthy watershed is vital for a healthy river, and a healthy river can enhance the community and helps maintain a healthy local economy.

FOR MORE INFO

montgomerycoswcd.com/sugarcreek/

Email Kristen Latzke
klatzke@montgomerycoswcd.com
Or Sara Peel, Arion Consultants
speel@arionconsultants.com

765.362.0405 ext 3

Funded by IDEM Clean Water Act Section 319 Grant

WAYS YOU CAN PARTICIPATE

The Upper Sugar Creek Watershed project is looking for volunteers and partners from all backgrounds. Ways you can get involved:

Education and Outreach
- Staff an educational booth
- Spread the word to other groups
- Attend a field day or workshop
- Participate in a watershed clean up
- Attend a listening session
- Attend public meetings

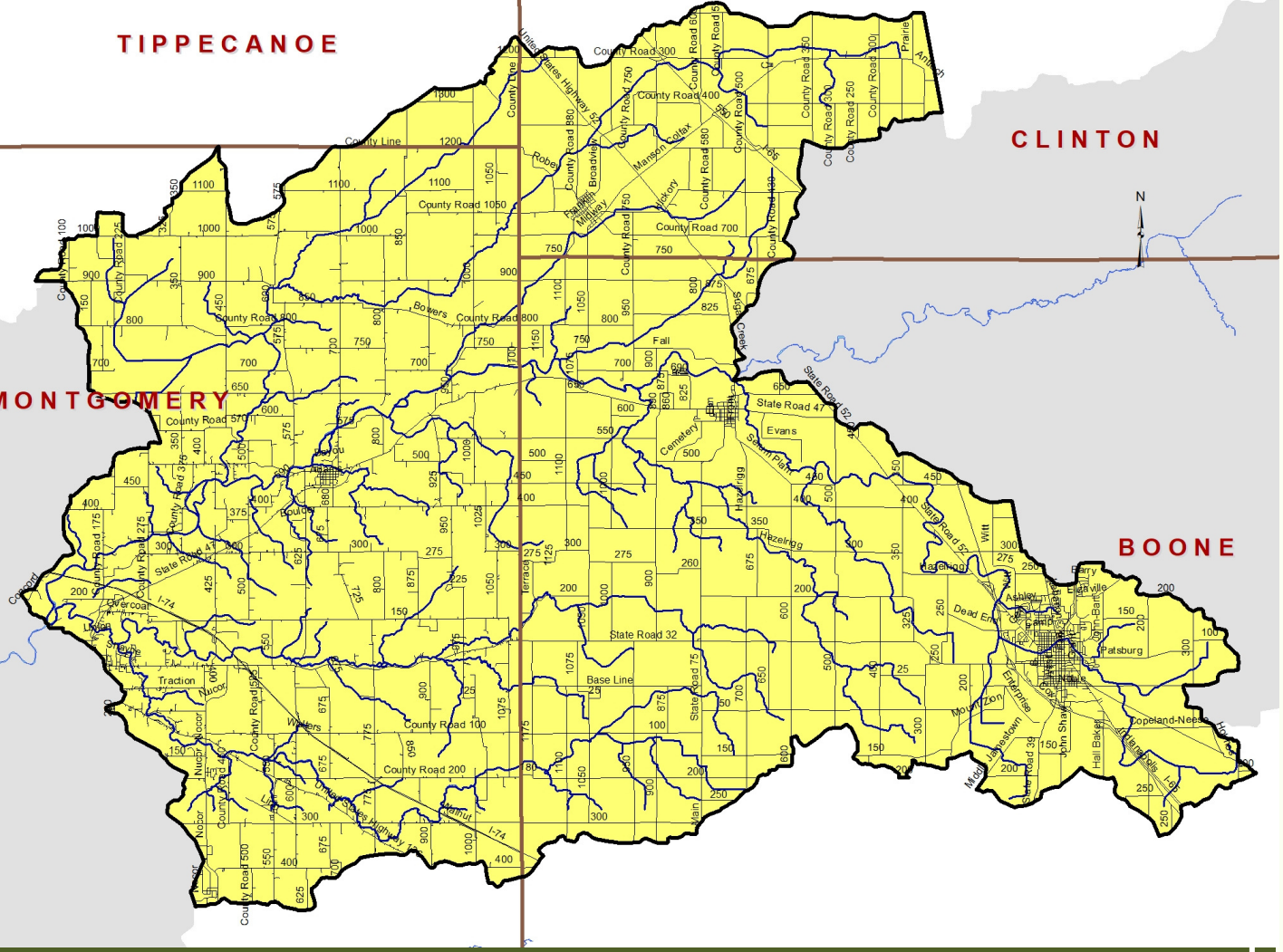
Monitoring
- Become a volunteer stream monitor
- Provide any available data, plans or reports relevant to the watershed
- Participate in float trips, clean up events and on-stream inventory events
- Volunteer to assist with biological sampling within the watershed

Other Efforts
- Assist with watershed inventory efforts
- Help identify water quality project areas
- Help identify on-the-ground practices
- Host a workshop, field day, listening session or community event
- Identify implementation program needs

Are you ready to get involved? Fill out the form today at bit.ly/SugarCreekVolunteers

THE UPPER SUGAR CREEK WATERSHED PROJECT

montgomerycoswcd.com/sugarcreek/



Upper Sugar Creek Watershed. See a larger version on our website at Montgomerycoswcd.com/sugarcreek

PROJECT BENEFITS

Recreation
Many activities include fishing, kayaking, canoeing, and tubing on lakes and creeks.

Economic Impact
Increase property values. Recreation activities drive local businesses for things like canoe rentals and fishing equipment.

Habitat
Provides natural habitat for both plants and animals, drawing wildlife to the area.

Flood Control
Provides designated areas for water to pool during large rain events.

Natural Drainage
Keeps water flowing. Prevents erosion and water backflow in urban areas.

Water Filtration
Aides in cleaning wastewater while consuming less energy to do so.

SPECIAL THANKS TO OUR PARTNERS

- Boone, Clinton, Montgomery County Purdue Extensions
- Boone County Surveyors office
- Boone, Clinton, Montogomery, Tippecanoe County Soil &Water Conservation Districts
- Ceres Solutions
- Crawfordsville Mayor Todd Barton
- City of Crawfordsville WWTP
- Clinton County Area Planning Commission
- Clinton County Commissioners
- Clinton County Health Department
- Clinton County Surveyor
- Friends of Sugar Creek
- Hoosier Heartland State Bank
- Indiana American Water
- Indiana State Department of Ag
- Montgomery County Drainage Board
- Montgomery County Health Department
- Montgomery County Surveyor
- Moving Water Outfitters
- NICHES Land Trust
- Pheasants Forever - 462 Coal Creek Chapter
- Purdue University FNR 572
- Sugar Creek Advisory Board
- Tippecanoe County Surveyor-Tri County
- Town of Darlington
- The Nature Conservancy
- Wabash College Democracy and Public Discourse Initiative

CONSERVATION IS VALUABLE

The goals of this project are intrugal not only to the beautification of the watershed, but also the health and wellbeing of the community. Through these efforts, we hope to also make change through agricultural, economic, and cultural efforts.

MONTGOMERY COUNTY
SOIL & WATER CONSERVATION DISTRICT

3RD ANNUAL FARMER FLOAT TRIP

Thank you farmers for all your work conserving soil and keeping our waters clean! Please bring your family and join the Montgomery SWCD for a FREE canoe trip with lunch included!

WHEN: July 25th

WHERE: on Sugar Creek

(exact start and stop dependent on water levels)

RSVP: Email canoe@friendsofsugarcreek.org and provide your name, contact information, and the number of participants. Please note if participants are under the age of 18. We cannot accommodate those under the age of 5 for this event.

MONTGOMERY COUNTY
SOIL & WATER CONSERVATION DISTRICT

DO YOU FARM IN THE UPPER SUGAR CREEK WATERSHED?

THEN JOIN US FOR DINNER, AUGUST 15TH, AT *THE DAPPLED WILLOW!*

You're invited!

UPPER SUGAR CREEK WATERSHED FARMER LISTENING SESSION

Join the Montgomery, Clinton, Boone and Tippecanoe County SWCDs and the Upper Sugar Creek Project to provide your input on farming, conservation needs, Sugar Creek and more at The Dappled Willow (6289 IN-47, Darlington, IN 47940) on August 15th from 6-8 PM.

Please RSVP by August 10th to the Montgomery County SWCD at (765) 362-0405 ext. 3 or at bit.ly/2022SugarListeningSession

Join us for dinner! The farmer listening session is a great opportunity to voice concerns or ask questions about the Upper Sugar Creek Watershed Project.

For more information on the Upper Sugar Watershed, please visit our website:
MontgomeryCoSWCD.com/SugarCreek

Funded by IDEM Clean Water Act Section 319 Grant

THEN JOIN US FOR DINNER, JULY 31ST, AT *THE HOOSIER HEARTLAND SUCCESS CENTER*!

Montgomery County Soil & Water Conservation District
2036 E, Lebanon Road
Crawfordsville, IN 47933

Place postage here

You're invited!

UPPER SUGAR CREEK WATERSHED PUBLIC MEETING

Join the Montgomery, Clinton, Boone and Tippecanoe County SWCDs and the Upper Sugar Creek Project to learn more about the project work and share your thoughts with the team. We'll meet at The Hoosier Heartland Success Center (1623 US-231, Crawfordsville, IN 47933) on July 31st from 5:30-7:30 PM.

Please RSVP by July 24th to the Montgomery County SWCD at (765) 362-0405 ext. 3 or at bit.ly/SugarMtgJuly31 (case sensitive)

Join us for dinner! The public meeting is a great opportunity to voice concerns or ask questions about the Upper Sugar Creek Watershed Project.

For more information on the Upper Sugar Watershed, please visit our website: MontgomeryCoSWCD.com/SugarCreek

Funded by IDEM Clean Water Act Section 319 Grant

Place Address label here

Montgomery County CISMA Invasive Open House

Join us Friday June 30th 9am - 11am

or Saturday July 1st 9am- 11am

Parking at both 3177 N 175 E Crawfordsville, IN

and on Southwest side of bridge over Sugar Creek

Join Montgomery County Community Invasive Species Management Area (CISMA) for an Invasive Species Management workshop at Moore Family Tree Farms. This piece of land has previously been a tree plantation but has been neglected for many years and is infested with bush honeysuckle, privet, periwinkle, autumn olive, and more. Landowner Raoul Moore will speak on how invasive plant removal, Timber Stand Improvement, and Crop Tree Release can turn a neglected forest into a productive one for both healthy timber and wildlife. Long pants and closed toe shoes recommended. restroom available.

Questions or want to set an individual time?
call 765-362-0405 ext. 121 or email
programs@montgomerycoswcd.com

MONTGOMERY COUNTY
SOIL & WATER CONSERVATION DISTRICT

MONTGOMERY COUNTY Est. 2020 CISMA

UPPER SUGAR CREEK

Final Public Meeting

JOIN US FOR A WATERSHED PROJECT UPDATE OVER DINNER!

JULY 31, 5:30-7:30 PM

HOOSIER HEARTLAND SUCCESS CENTER

Do you live, work, or play in the Sugar Creek watershed? Join us

Whether you spend your weekends in the creek, or live in the area surrounding - knowing what is going on in the watershed you call home is important! Join us to learn more about the project work and share your thoughts with the team

Dinner is provided, so please RSVP

Dinner is being provided for this session. As a result, we are requiring an RSVP so we are able to prepare ample food and be aware of any dietary restrictions. bit.ly/SugarMtgJuly31

Learn more about the project

In 2020, the Montgomery County SWCD launched efforts to protect and improve the Upper Sugar Creek Watershed, which drains 320 square miles of Clinton, Boone, Montgomery, and Tippecanoe counties. Learn more at at montgomerycoswcd.com/sugarcreek/

Register Now at **bit.ly/SugarMtgJuly31**

Register Now!

Hoosier Heartland Success Center
1623 US-231, Crawfordsville, IN

QUESTIONS? REACH OUT.

765-362-0405, EXT. 3
KLatzke@montgomerycoswcd.com

UPPER SUGAR CREEK

Recreation Listening Session

JOIN US FOR A RECREATION CONVERSATION OVER DINNER!

JANUARY 24, 6-8 PM

HOOSIER HEARTLAND SUCCESS CENTER

Do you recreate on or in Sugar Creek or its watershed? Join us to share ...

Recreation is a valuable part of life in the watershed. Whether you like to canoe, hike, or fish the waters of the Sugar Creek - we want your input on recreation in the Upper Sugar Creek Watershed.

Dinner is provided, so please RSVP

Dinner is being provided for this session. As a result, we are requiring an RSVP so we are able to prepare ample food and be aware of any dietary restrictions. bit.ly/RecListeningSessionJan24

Learn more about the project

In 2020, the Montgomery County SWCD launched efforts to protect and improve the Upper Sugar Creek Watershed, which drains 320 square miles of Clinton, Boone, Montgomery, and Tippecanoe counties. Learn more at at montgomerycoswcd.com/sugarcreek/

Register Now at **bit.ly/RecListeningSessionJan24**

Register Now!

Hoosier Heartland Success Center
1623 US-231, Crawfordsville, IN

QUESTIONS? REACH OUT.

765-362-0405, EXT. 3
KLatzke@montgomerycoswcd.com

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MONTGOMERY COUNTY
SOIL & WATER CONSERVATION DISTRICT

MONTGOMERY COUNTY Est. 2020 CISMA

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For more information on the Upper Sugar Watershed, please visit our website: MontgomeryCoSWCD.com/SugarCreek

Funded by IDEM Clean Water Act Section 319 Grant

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MONTGOMERY COUNTY
SOIL & WATER CONSERVATION DISTRICT

CONSERVATION CONNECTION

Vol 3 Issue 1

81st Annual Meeting

Thank you to everyone who was able to attend our Annual Meeting in February. We had about 75 people in attendance. An additional thank you to Lali Hess and the Juniper Spoon team for a delicious meal. Thank you to our speaker sponsor, Farm Credit, and our 2023 sponsors so far Nutrien Ag Solutions and Genswein Farm and Land for your support.

During the meeting, we were able to reflect on last year. Kristen shared a video documenting just some of what we were able to accomplish. If you missed the video check out our Facebook page for a link to view it! We also heard a great talk on streambank erosion from Robert Barr, a research scientist at IUPUI. Raoul Moore was re-elected to serve a 3-year term on our board. He has been a supervisor on our board for two years now and we appreciate the knowledge he brings to the role and his dedication to serving the citizens of Montgomery County.

We also bid farewell to Megan Sweeney. She was our Program Coordinator for the last year and a half. We thank her for her hard work and wish her the best of luck on her new journey in Ohio. We

Upper Sugar Creek Watershed Project
5th Quarter Update: November 18th- February 17th
Sara Peel, Arion Consultants

The third draft of the Watershed Management Plan (WMP) was submitted to IDEM on February 13, 2023. Agricultural Conservation Planning Framework (ACPF) preliminary runs are complete. The data needs to be field checked and pushed out to conservation partners. These activities will occur in the next quarter.

Water chemistry monitoring occurred on December 21, 2022, this quarter, and was the final session. Macroinvertebrate community identification is complete and the species list and IBI, mIBI, and QHEI data are included in the most recent draft of the Watershed Management Plan.

The Upper Sugar Creek steering committee met on January 24, 2023, and reviewed stakeholder concerns then discussed problems, causes, and sources. The Recreation Listening Session occurred on January 24, 2023, with 38 people in attendance. Comments and responses are being compiled and will be incorporated into the WMP. The project website was updated within the Montgomery County SWCD website and has been updated several times since its creation. The Montgomery County SWCD social media will be used to promote the project and has been updated 22 times with information relevant to the project during this quarter. The Upper Sugar Creek informational brochure continues to be distributed including at the farmer listening session and at high-profile locations. The SWCD newsletter was distributed in December 2022 and contained an update on the Sugar Creek project. A press release promoting the Recreational Listening Session was sent on December 10, 2022. The social survey mailing occurred this quarter and will continue into the next with the first letter mailed on January 3, the first survey mailed on January 10 and the postcard mailed on January 24, 2023. The second survey mailing occurred on February 7 and the final reminder letter will be mailed on February 21, 2023. As of February 5, 2023, 108 survey responses have been received from 459 sent with quality addresses for a response rate of 24%. Boone County SWCD held a cover crop/regenerative ag workshop on February 1, 2023. Plans to launch farmer meetings revolving around ACPF data outputs are underway - this will occur in the next quarter.

Franz Reynolds Farm Awarded Conservationist of the Year

Franz Reynolds Farm is the recipient of this year's Conservationist of the Year Award. This farm is a total of 191 acres and is run by siblings Barb, Tom, and Nancy. Nancy Burkett accepted the award on behalf of the farm. In 1927, the first 97 acres were purchased by Franz Reynolds the grandpa of Barb, Tom, and Nancy.

The entire farm operation has had various conservation techniques and practices put in over the years. The farm has been no-tilled for the past 30 years to help preserve the soil health of the cropland. Gulley and ephemeral erosion were addressed through the development of a few grassed waterways. In the coming years, warm-season grasses will be planted through the CRP program with various field borders.

In the past, cattle were allowed to roam and graze on areas of the property that area is now in trees. After some time, the cattle were removed from the land and the siblings noticed they were unable to move through their forest as easily as before because of all of the overgrowth. This led them to bring in two foresters to explain invasive species and the importance of managing them. After this talk, they were encouraged to take action to manage the invasive species in their woods. The Franz Reynolds Farm is now in the 3rd year of an Environmental Quality Incentives Program (EQIP) contract to remove the invasive species in their forest.

Get to Know Us!

Jordan Gillenwater, Chairman

Jordan lives with his wife in the northern part of the county near Darlington. This is where they farm and raise cows and pigs. They are part owners of a local grocery store called Four Seasons Local Market where they sell a lot of their products. Some conservation projects the Gillenwaters participate in include multiple EQIP projects, a high tunnel, heavy-use areas for livestock, some CRP acres, fencing projects for rotational grazing, and pasture improvement projects.

Daniel Bullerdick, Supervisor

Daniel joined the board in 2021 as Supervisor. He and his dad have a small family farm where they produce corn and soybeans. They have used various conservation practices on their farm over the years. They have no-tilled soybeans for about 30 years and no-tilled corn since the mid-2000s. The Bullerdicks also have a considerable amount of CRP (Conservation Reserve Program). A personal goal of his on their farm is to reduce surface runoff and the leaching of nutrients from the soil.

3rd Annual Farmer Float Trip

Thank you farmers for all that you do for conservation! Bring your family and join us July 25th from about 9 am- 2 pm for a canoe trip on Sugar Creek. This is a FREE event with lunch included. Spots are limited and are restricted to farmers and their families. Children must be over the age of 5. Each participant will be provided a life jacket. The exact start and end locations will be determined by the water level leading up to the day of the event.

Important Dates and Upcoming Events

- April 6th: April SWCD Board Meeting in the USDA Service Center conference room at 8 am
- April 7th: Office Closed
- April 16th: War of the Weeds shifts at Bachner Nature Preserve 10 am-1 pm and 1 pm- 4 pm
- April 20th: CISMA steering committee meeting in the USDA Service Center conference room at 5 pm
- May 2nd: Office Closed
- May 4th: May SWCD Board Meeting in the USDA Service Center conference room at 8 am
- May 29: Office Closed

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Subscribe to physical mailings

Montgomery County SWCD
2036 E. Lebanon Road
Crawfordsville, Indiana 47933

To subscribe to email newsletters visit: www.montgomerycoswcd.com/subscribe

Upcoming Events & Important Dates

- Dec. 23th-26th: Office Closed
- January 2nd: Office Closed
- January 5th: January SWCD Board Meeting in the USDA Service Center conference room at 8 am
- January 16th: Office Closed
- January 19th: CISMA Steering Committee Meeting at 5pm in the USDA Service Center Conference Room
- January 24th: Upper Sugar Creek Project steering committee meeting 2pm HHSB Success Center
- January 24th: Recreationalist Listening Session at 6 pm HHSB Success Center
- February 2nd: SWCD Board Meeting at 8 am at the USDA Service Center Conference Room
- February 20th: Office Closed
- February 27th: 2023 Montgomery County Annual Meeting Stone Creek Lodge 5 pm
- April 6th: April SWCD Board Meeting in the USDA Service Center conference room at 8 am
- April 7th: Office Closed

This publication funded in part by an IDEM Clean Water Act Section 319 Grant.

CONSERVATION CONNECTION

The Montgomery County Soil & Water Conservation District Newsletter

DECEMBER 2022 | VOL 2 ISSUE 4

In this newsletter:

Director's Statement

What a year! We accomplished a lot in 2022 with new events, new partnerships, and a brand new urban soil health working group, Community Growers of Montgomery County (CGMC)! We are still navigating hybrid events as we continue to offer some meetings both in-person and on Zoom. I was able to experience my first 4th grade field days after two years of cancellations. It is simply amazing what our team was able to accomplish over those few days. We reached hundreds of students and were grateful for the wonderful weather.

The year brought some challenges as well. This year we had twice the fieldwork in the fall as we were checking two years' worth of CRP practices. Double the waterways and double the filter strips to equal about 400 practices reviewed!

We have greatly expanded our outreach to include urban communities and we look forward to reaching new producers, community groups, and gardeners in the coming year. Thank you to all of our partners, the USDA service center staff, and the dedicated citizens of the county for all their help in propelling our programs forward and helping to conserve the county's natural resources!

Kristen Latzke
Conservation Director

Upper Sugar Creek Watershed Project

4th Quarter Update: August 18th- November 17th

Sara Peel, Arion Consultants

The second draft of the watershed management plan was submitted to IDEM on August 15, 2022. The steering committee met on October 25, 2022, to review stakeholder concerns and associated data.

Water chemistry monitoring occurred on August 17th, September 28th, October 24th, and November 16th, and will occur through the end of the year. Biological monitoring occurred in July and August with fish community assessments occurring on July 18th-20th and August 1st and macroinvertebrate community and habitat assessments occurring on July 15th and 16th. Macroinvertebrate community identification is underway and the species list and IBI, mIBI and QHEI data will be included in the next draft of the watershed management plan.

The Upper Sugar Creek steering committee met on October 25, 2022, reviewed stakeholder concerns and associated evidence as well as discussed upcoming outreach events. Wabash College students are working to compile public meeting comments and results and transcriptions from the farmer listening session, which will be incorporated into the next WMP draft. The Montgomery County SWCD social media will be used to promote the project and has been updated 18 times with relevant information. The Upper Sugar Creek informational brochure continues to be distributed including at the farmer listening session and at high-profile locations.

Annual Meeting Save the Date!

Stonecreek Lodge 2865 IN-47 Crawfordsville, IN

5:30 PM - 8:30 PM

February 27th, 2023

RSVP by calling 765-362-0405 ext. 3

or using the QR code to the right

October Events

Here at the office we had an October full of forestry themed events! We removed a ton of invasive species, both on the Sugar Creek Trail and our office complex, including honey suckle, burning bush, and spirea with the help from the public and two lab sections from Wabash college. We also had a Women4theLand Forestry Learning Circle where women landowners were able to learn, ask questions, and teach each other about all things forest management. We have wrapped up all of our events for the year, but check back in next year on our website at https://montgomerycoswcd.com/events/ to find events that may interest you.

Below: Wabash students stand with a pile of honeysuckle. This was just a fraction that was removed during this weed wrangle.

To the left: attendees of learning circle during introductions.

To the right: attendees of learning circle learn about pruning techniques.

Get to Know Us!

Raoul Moore, Secretary/Treasurer

Raoul's family moved to the area in 1954 when his father got an English Professor job at Wabash. In 1956 his family moved to a 40 acre hobby farm north of town at junction of Walnut Fork and Sugar Creek. They grew most of their food and truck farmed for some income. His father did timber stand improvement and planted a hard to access field near the creek to trees in 1958. One of those walnut seedlings is now 24” diameter at breast height (DBH). The Moore Family Farm currently has about 700 acres of woodlands with about half of those as plantations from 25 different years. The changes in AG have made many smaller, high perimeter to volume fields uneconomic to farm. Some soils since the clearing off of the state and 100 years of plowing have lost fertility also making them unattractive for farming. Raoul's hope is to get more people nurturing their woodlands and converting areas to trees.

CONSERVATION CONNECTION

The Montgomery County Soil & Water Conservation District Newsletter

MARCH 2022 | VOL 2 ISSUE 1

In this newsletter:

Upper Sugar Creek Watershed Project

In November 2021 we were approved to start a $131,000 IDEM Section 319 grant. This project will run until November 2023. We will provide quarterly updates here in our newsletter and also on the project website. Please visit this site for the most up to date information and upcoming events: **www.montgomerycoswcd.com/sugarcreek**

1st Quarter Update
Sara Peel, Arion Consultants

The first draft of the Upper Sugar Creek watershed management plan (WMP) was submitted to IDEM on February 16, 2022. The draft was sent to the steering committee for review concurrent with this submission and will be posted to the project website. Watershed inventory efforts began this quarter with steering committee members completing 4 of 29 targeted inventory areas. Additionally, targeted discussions with county surveyors regarding legal drains and with the Lebanon MS4 coordinator about stormwater impacts to the Upper Sugar Creek Watershed occurred this quarter.

The Quality Assurance Project Plan, or QAPP, (report required before chemical water testing can begin) was submitted to IDEM on December 13, 2021, and approved on January 7, 2022. Water chemistry monitoring occurred on January 26, 2022, and will occur monthly thereafter. Biological monitoring is scheduled to start in July 2022.

The Upper Sugar Creek steering committee met on January 19, 2022, with the goal of kicking off the project and engaging stakeholders in all aspects of the project. The first public meeting occurred on March 16, 2022 - promotion of this meeting occurred this quarter and will continue into the next quarter. The project website was created on the Montgomery County SWCD website and has been updated several times since its creation. The Montgomery County SWCD social media will be used to promote the project and has been updated eight times with information relevant to the project. The Upper Sugar Creek informational brochure has been reviewed by the steering committee and was printed this quarter. Distribution will occur in subsequent quarters. Hoosier Riverwatch training is scheduled for the next quarter.

Springtime Makes Some Invasives Easy to Spot

Oftentimes invasive species are easy to spot as they have a tendency to green up before other species both in the forest and in ornamental settings. One of the best examples of this is the Callery Pear Tree, with the most notable cultivar being the Bradford Pear. All ornamental pear trees are considered Callery pears; some cultivars include Aristocrat, Cleveland Select, Autumn Blaze, and Capital. This species is native to China, Taiwan, Japan, and Vietnam.

These trees have been widely planted in the past because they are attractive and fast-growing. With the creation of multiple cultivars, the once sterile trees now have abundant fruit. Birds eat the fruit and carry the seeds across the landscape which allows them to invade natural areas. Now the Callery pear is recognized as an invasive species that forms dense thickets, outcompetes natural plants, degrades wildlife habitat, and creates problems along roadsides.

This is why planting native plants is so vital. Native plants are beautiful and they benefit birds and other wildlife. They are able to support multiple pollinators and insects which provides food for Indiana birds. Also as they evolved in this area with other species native to the area, natives have a tendency to be more resistant to disease and insects requiring less maintenance. This means you save time and money!

A few native alternatives to the Callery Pear include Serviceberry, Flowering Dogwood, and Redbud. We have a few of these species available at our native plant sale coming up later this month. Check out the info to the right to see what species we have available and how you can plant some natives on your land.

2nd Annual Native Plant Sale!

Plant pre-sale April 11th - May 16th

Plant Pick up on May 20th from 4-7 pm at the Beef Barn at the Montgomery Co. Fairgrounds.

To learn more visit the plant sale page on our website: montgomerycoswcd.com

Species for sale

- Allegheny Serviceberry
- Redbud
- Witch Hazel
- Tulip Poplar
- Sycamore
- White Oak
- Common Milkweed
- Purple Coneflower
- Black-eyed Susan
- Butterfly Weed
- Wild Bergamot
- Prairie Blazing Star

You can order plants through our online store https://shopmocoswcd.square.site/, by picking up a paper form at our office, and calling 765-362-0405 ext. 121.

Upcoming Events & Important Dates

- **April 7th: SWCD board meeting at 8:15 am**
- **April 11th: Native plant sale starts**
- **April 15th: Office Closed**
- **April 18th: 2nd Quarterly Meeting for Community Growers of Montgomery County at USDA Service Center Conference Room (open to the public) 9 - 11 am**
- **April 19th: Elementary Explorers with the Crawfordsville Public library 4 - 4:30 pm**
- **April 22nd- May 1st: DIY creek clean-up with FOSC. Grab your friends and family and help clean up Sugar Creek! Send a photo of your work to canoe@friendsofsugarcreek.org for a free T-shirt!**
- **April 23rd: Garlic Mustard Pull at Bacher Nature Preserve with NICHES. Shifts are 10 am-1 pm and 1 pm-4 pm. Email Sam at sam@nicheslandtrust.org to sign up.**
- **April 26th: Upper Sugar Creek project steering committee meeting 2pm HHSB Success Center**
- **April 30th: Garlic Mustard pull at Shades State Park 1-3 pm, Meet at the Hickory Shelter**
- **May 3rd: Office closed**
- **May 5th: SWCD board meeting 8:15 am**
- **May 16th: Native plant sale ends**
- **May 20th: Plant pickup- 4H fairgrounds 4-7pm**
- **May 30th: Office closed**
- **June 2nd: SWCD board meeting 8:15 am**
- **June 11th: Weed Wrangle Location and Time TBD**
- **June 18th: Nature Day at Carnegie Museum 1-4 pm**

The 80th Annual Meeting

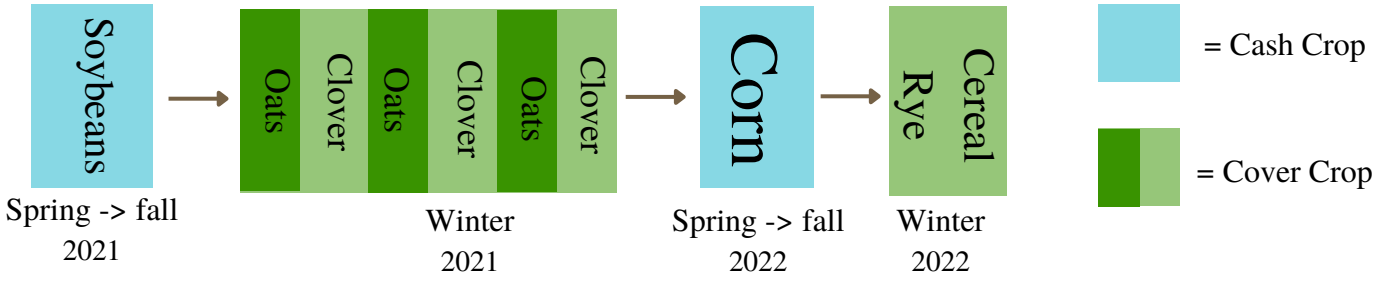
We hosted our 80th Annual Meeting on March 7th at Stone Creek Lodge! It was catered by The Juniper Spoon and we were very thankful to have Lali Hess as a keynote speaker. A special thank you to our friends at Farm Credit Mid-America for sponsoring this year's keynote.

In addition to celebrating 80 years of conservation, we were able to recognize multiple community members for their outstanding work. We highlighted Jeff Lough for 24 years on the district board. We also recognized Cain's Farms Inc. as they were awarded the River-Friendly Farmer award at last year's state fair. The 2021 Conservation Farmer of the Year was awarded to Hester Brothers Farms LLC. Dave Stanley, NRCS District Conservationist (pictured right with Brian and Todd Hester) presented awards to all three. You can read more about the Hester brothers below!

The Hester Family is Committed to Conservation

Brian and Todd Hester from Hester Brothers Farms LLC new New Market were awarded the 2021 Conservation Farmer of the Year Award. The two brothers were influenced by their father, Russell Hester, who farmed before them. Russell started conservation in the mid-1980s by creating temporary critical areas seeding wheat cover on highly erosive areas. A few years later he began no-tilling soybeans into corn stalks. After seeing success of no-till beans, three years later they started no-tilling corn into soybean stubble. They had to adapt their CaseIH 900 cyclo air-planter for starter fertilizer and no-till accessories in order to plant no-till corn. Starting in the 90s along with their 100% no-till operation they started experimenting with side dressing nitrogen and feeding the plants when they need nitrogen instead of using pre-plant nitrogen. The Hester brothers learned that higher rates of nitrogen in starter fertilizer along with planting when conditions are dry and warm made for successful no-till corn. Once the no-till system became prosperous it allowed them to get their own sprayer and GPS technology to help improve weed control and spraying conditions.

In the past few years, the Hester brothers have been experimenting with increased soil health practices. Along with their no-till system they are planting cereal rye into corn stalks to use as a cover crop. In the Spring, they plant soybeans into the green cereal rye and use it to mulch the beans. They are also experimenting with interseeding corn in 15 inch rows in a clover cover crop. The corn is planted once the oats are winterkilled. This clover will produce nitrogen for the growing corn crop next year. Thank you to the Hester family for your commitment to conversation.



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Montgomery County SWCD
2036 E. Lebanon Road
Crawfordsville, Indiana 47933

Get to Know Us!

During our annual meeting we shared a video introducing the staff and board members of the district. Here we will share a little bit about us in case you missed the meeting!

Kristen Latzke

Conservation Director

Marc Roberts

Board Chair

Kristen is originally from South Bend, Indiana. She attended Purdue and received a bachelor's degree in Animal Science from the College of Agriculture. She spent a few years focused on wildlife conservation before coming to the district to focus on natural resource conservation. Her favorite part of her job is the grant work, especially when she can be out in the field. She lives on the Northwest side of Indianapolis with her husband, daughter, and two dogs.

Marc lives East of Mace with his wife and 4 kids. He sells seed, has a small agronomics projects business, and farms with his father-in law. Some of the conservation practices that he's used include CRP for grassed waterways, CSP primarily for cover crops, and EQIP for heavy use areas, timber stand improvement , and currently is working on an EQIP fencing project.

This publication funded in part by an IDEM Clean Water Act Section 319 Grant.

CONSERVATION CONNECTION

The Montgomery County Soil & Water Conservation District Newsletter

JUNE 2022 | VOL 2 ISSUE 2

In this newsletter:

Farm Tour

The Community Growers of Montgomery County held a Farm Tour with Gillenwater Farms and Trinity Acres Farm on June 4th. Attendees included fellow producers, homesteaders, and customers of the two farms. The speakers of this tour were Jordan and Paige Gillenwater at Gillenwater Farms and Gary Cox and David Schamber at Trinity Acres Farm. The Gillenwaters spoke about their produce, hogs, beef, selling at Four Seasons Local Market in comparison to farmers markets, and more. Gary and David spoke about their CSA boxes (Community Supported Agriculture), selling at farmers markets, extending their growing season with high tunnels, being organic, and how they suppress weed pressure. Attendees were able to ask various questions which led to great conversation throughout the entire event. We hope to make Farm Tours throughout the County an annual event.

To the left: Attendees at Gillenwater Farms listening to Jordan Gillenwater discuss their raised beds.

To the right: Attendees at Trinity Acres Farm listening to Gary Cox (out of photo) discuss their operations.

Upper Sugar Creek Watershed Project

2nd Quarter Update: February 18th- May 17th

Sara Peel, Arion Consultants

Watershed inventory efforts continued this quarter with steering committee members completing 12 of 29 targeted inventory areas. Water chemistry monitoring occurred on February 23rd, March 23rd, and April 27th, 2022, and will occur monthly. Biological monitoring is scheduled to start in July 2022. The Upper Sugar Creek steering committee met on April 26th, 2022, and reviewed desktop inventory efforts completed to date. The first public meeting occurred on March 16th, 2022, in partnership with the Wabash Democracy & Public Discourse (WDPD). The students are working to compile meeting comments and results and those will be incorporated into the next Watershed Management Plan (WMP) draft.

The project website has been updated several times this quarter. The Montgomery County SWCD social media continues to promote the project and has been updated 16 times with information relevant to the project. The Upper Sugar Creek informational brochure distribution continues to partner groups and in high-profile locations. The project was promoted at the four SWCD annual meetings occurring on February 19th (Boone), February 23rd (Tippecanoe), March 1st (Clinton) and March 8th (Montgomery). Additional promotional events are scheduled to occur in the next quarter including Hoosier Riverwatch training on June 21st and the Farmer Float Trip with Friends of Sugar Creek on July 26th.

Thank you for your support!

Our 2nd annual native plant sale was a big success! A special thank you to members of the Community Growers of Montgomery County for helping with plant pickup.

By choosing native plants you are choosing plants that naturally grow in Indiana. These often require less maintenance, are hardier, and require less water and this saves you time and money!

If you would like recommendations on what native plants would thrive in your yard feel free to reach out! We also offer FREE invasive species site visits!

Get to Know Us!

During our annual meeting we shared a video introducing the staff and board members of the district. Here we will share a little bit about us in case you missed the meeting!

Megan Sweeney, Program Coordinator

Megan started as the Program Coordinator with the SWCD in August of 2021. She is in charge of programming, events, and outreach for the district. Megan graduated from in May of 2020 Ohio University with a degree in Environmental Biology. After graduating she served as an AmeriCorps Member with Green Iowa AmeriCorps. Through this position she was able to work with Practical Farmers of Iowa to help create farmer-led programming for other farmers. Megan graduated from the Indiana Watershed Leadership Academy through Purdue Extension this month which she will use in her day to day work. Contact Megan with any questions relating to upcoming events, invasive species, or backyard conservation techniques.

Upcoming Garden Walk

If you are interested in either starting a garden, are interested in learning news way to garden, or would like to meet fellow gardeners in Crawfordsville stop by our Garden Walk on July 30th! This event will take place from 10 am - 2 pm starting at 207 West Main Street in Crawfordsville. We will have multiple stops along Main Street in Crawfordsville with all types of gardens and gardeners. At each stop the gardeners themselves will be the host of their own garden and will be able to answer any questions. This event is for gardeners of all experiences as we have hosts that have been gardening for 2-3 years all the way up to multiple decades. For this walk we will be walking together from garden to garden to allow gardeners to meet as many other gardeners in the area as possible and to allow the hosts to attend each others gardens. We will have signs posted at each of the gardens with the time we will be viewing that location. There will be more information with the addresses and timing for each stop on our website in the coming weeks. Feel free to drive or bike from spot to spot if you have limited mobility or to join in at any point on the route. Looking forward to seeing you there!

2nd Annual Farmer Float Trip

Calling all farmers! Bring your family and join us as we co-host a canoe trip with Friends of Sugar Creek (FOSC) on July 26th from about 9 am- 2 pm. This is a FREE event with lunch included.

Learn about what the FOSC and the district are doing to preserve Sugar Creek for all future generations to enjoy.

Spots are limited and are restricted to farmers and their families. Children must be over the age of 5. Each participant will be provided a life jacket. The exact start and end locations will be determined by the water level leading up to the day of the event.

To secure your spot RSVP to canoe@friendsofsugarcreek.org with your name, number attending, and age of any minors.

To subscribe to email newsletters visit: www.montgomeryco swcd.com/subscribe

Montgomery County SWCD
2036 E. Lebanon Road
Crawfordsville, Indiana 47933

Upcoming Events & Important Dates

- July 4th: SWCD office closed
- July 7th: board meeting in the USDA Service Center conference room at 8 am
- July 9th: tabling at the Crawfordsville Farmer's Market 8 am- 1 pm
- July 12th: Upper Sugar Creek Project steering committee meeting 2 pm HHSB Success Center
- July 15th-21st: County Fair
- July 16th: tabling at Shades State Park 75th Anniversary celebration
- July 20th: Community Growers of Montgomery County meeting in the USDA Service Center conference room at 1:30 pm.
- July 26th: Farmer Float Trip with FOSC on Sugar Creek
- July 29th- August 21st: Indiana State Fair
- July 30th: Garden Walk 10 am - 2 pm starting point is 207 W. Main St., Crawfordsville
- August 4th: board meeting in the USDA Service Center conference room at 8 am
- August 15th: Farmer listening session 6 pm location TBD - voice concerns or ask questions about Sugar Creek.
- September 1st: board meeting in the USDA Service Center conference room at 8 am
- September 5th: SWCD office closed

SAVE THE DATE! Women 4 the Land learning circle October 19th

This publication funded in part by an IDEM Clean Water Act Section 319 Grant.

CONSERVATION CONNECTION

The Montgomery County Soil & Water Conservation District Newsletter

SEPTEMBER 2022 | VOL 2
ISSUE 3

In this newsletter:

We Welcome Back 4th Grade Field Days!

After two years of cancellations, we were able to bring back 4th grade field days! This is the 23rd year we have taught the 4th graders about the importance of natural resources through a variety of stations. We had 455 students join us at Cain's Homelike Farms in Darlington this year with all of the schools in the county attending.

The students were thrilled to be out of school for the day and on a working farm. We, the organizers, were happy to see the kid's eyes light up with excitement as they got off the bus and saw the pond, the tractors, the hay ride, and more. The students who started in the morning at the Water Quality station (shown above) spent their time until lunch alternating walking or riding around the pond to the Incredible Journey, Wetlands, and Erosion stations. After lunch, they transferred to the back 4 stations in the more forested area of the property. Here they learned about forestry, agriculture, wildlife/pollinators, and soils.

When students were asked what their favorite part of the day was most replied with kissing the fish at Water Quality, the erosion table, or seeing all of the cool animals and insects at Wetlands. This is a huge event that takes many volunteers donating their time. This year with the time spent preparing for the event, the two field days, and tearing down we had a total of 301 volunteer hours. We would like to thank all of our volunteers again for creating such an amazing event and especially the Cain Family for hosting and all the hard work they contribute to this event every year.

Upper Sugar Creek Watershed Project

3rd Quarter Update: May 18th- August 17th

Sara Peel, Arion Consultants

The second draft of the Watershed Management Plan was submitted to IDEM on August 15, 2022. Watershed inventory efforts continued this quarter with steering committee members completing 8 of 29 (20 of 29 total) targeted inventory areas. Historic water quality data and desktop inventory and windshield survey data were added to the draft Watershed Management Plan.

Water chemistry monitoring occurred on May 24, June 27, and July 25, 2022, this quarter and will continue monthly. Biological monitoring occurred in July and August with fish community assessments occurring July 18-20 and August 1 and macroinvertebrate community and habitat assessments occurring July 15-16, 2022. Macroinvertebrate community identification is underway and the species list as well as IBI, mIBI and QHEI data will be included in the next draft of the watershed management plan.

The Upper Sugar Creek steering committee met on July 12, 2022, and reviewed desktop inventory efforts completed to date to identify relevant relationships; selected water quality benchmarks, and reviewed upcoming education and outreach events. The Wabash College students are working on compiling public meeting comments and results and those will be incorporated into the next WMP draft. The project website was updated within the Montgomery County SWCD website and has been updated several times since its creation. The Montgomery County SWCD social media is used to promote the project and has been updated 9 times this quarter with information relevant to the project. The Upper Sugar Creek informational brochure continues to be distributed including at the Montgomery, Boone, and Clinton County 4H fairs (July 10-23, 2022) and at high-profile locations. Hoosier Riverwatch training occurred on June 21, 2022, with 10 participants trained and can now monitor in the Sugar Creek Watershed. The farmer float trip occurred on July 26, 2022. The farmer's listening session occurred on August 15, 2022, with 60+ farmers in attendance. The SWCD newsletter was distributed on July 22, 2022, and contained an update on the Sugar Creek project. A press release highlighting the farmer listening session was deployed on August 4, 2022.

Get to Know Us!

David Stanley- District Conservationist NRCS - assists the District with putting local conservation on the ground.

During our annual meeting we shared a video introducing the staff and board members of the district. Here we will share a little bit about us in case you missed the meeting!

Dave graduated from Purdue University with a degree in Soil and Crop Management in 1991. Dave started back in 1990 with NRCS - Natural Resources Conservation Service - back then the Soil Conservation Service as a student trainee. He has been in his current position as the District Conservationist in Montgomery County since 1994. Dave farms on his family farm with a corn and soybean rotation and he has been no-till since 1994.

If you are a private landowner in Montgomery County and have a resource concern like soil erosion, water quality, invasive species, etc. you can reach out to Dave about possible programs to help fund solutions for those resource concerns.

Forestry Field Day

Hosted at a property of Moore Family Tree Farm

Use the address 2235 N 175 E to find the Property. We will be meeting at the lane south of the house furthest from the I-74 overpass. There will be signs to point you in the correct direction.

Wednesday, October 5th, 2022 From 1:30 pm-4:00pm

RSVP TO MONTGOMERY COUNTY SWCD AT 765-362-0405 EXT. 3



PURDUE UNIVERSITY | Extension - Forestry and Natural Resources

- **HOW TO GET STARTED IN TREE FARMING**
- **WHY TREES MATTER ECONOMICALLY**
- **TIMBER STAND IMPROVEMENT**

Women4theLand Forestry Learning Circle

Join us October 19th 9 am - 3 pm

At Fusion 54 101 West Main St. Crawfordsville IN 47933 at the Training Area on the fourth floor

We have partnered with the Hendricks County SWCD to host this Women4theLand Learning Circle with a focus on forestry and invasive species. Learn the importance of managing invasive species for yourself, your family, and your land! In the morning we will be offering educational sessions and networking opportunities. At 11 am we will move our discussion outdoors to Moore Family Tree Farm where multiple demonstrations such as tool use, timber stand improvement, and more will be shown. Attendees will later see first hand some aspects that were discussed in the morning session.

Light morning refreshments and lunch will be provided. This event is FREE but spots are limited! Please **RSVP** with the QR code, calling the office at 765-362-0405 ext. 3 or emailing msweeney@montgomerycoswcd.com by October 14th. **Learn more at montgomerycoswcd.com**

Women 4 the Land

Hendricks County Soil & Water Conservation District

To subscribe to email newsletters visit: www.montgomerycoswcd.com/subscribe

Montgomery County SWCD
2036 E. Lebanon Road
Crawfordsville, Indiana 47933

Upcoming Events & Important Dates

- October 5th: Forestry Field day 1:30 pm - 4:00 pm see more info above
- October 6th: SWCD board meeting at 8 am
- October 10th: SWCD office closed- Indigenous People's Day/Columbus Day
- October 17th: Weed Wrangle 1:30 - 3:30 pm meeting location TBD
- October 18th: Weed Wrangle 1:30 - 3:30 pm meeting location TBD
- October 19th: Women 4 the Land learning circle- Forestry and Invasive Species
- November 3rd: SWCD board meeting at 8 am
- November 5th: Low-head dam panel discussion at the Carnegie Museum 2-3 pm
- November 8th: SWCD office closed- Election Day
- November 11th: SWCD office closed- Veteran's Day
- November 24th-25th: SWCD office closed- Thanksgiving
- December 1st: SWCD board meeting at 8 am
- December 23rd-26th: SWCD office closed- Christmas

Plant a Tree & Make History!

200 MONTGOMERY COUNTY
BICENTENNIAL • 1822-2022

This year we celebrate Montgomery County's bicentennial! To celebrate 200 years the county has a goal of planting 200 trees! If you have planted a tree this year you can submit your information to be recorded in a historical document that will be displayed in the Carnegie Museum. To add your tree(s) to the list submit your name, address, type, and number of trees to Tom.Klein@montgomerycounty.in.gov by the end of the year. The fall is a great time to plant new trees!!

This publication funded in part by an IDEM Clean Water Act Section 319 Grant.

Press Release from…
The Upper Sugar Creek Watershed Project
Montgomery County SWCD
2036 E, Lebanon Rd, Crawfordsville, IN 47933

IMMEDIATE RELEASE: 1 December 2022
CONTACT: Sara Peel (765) 337-9100; speel@arionconsultants.com

You're invited! Upper Sugar Creek Watershed Recreation Listening Session to occur January 24th, 6 pm

The Upper Sugar Creek Watershed Project is looking for input from ALL Sugar Creek Recreationalists! Whether you live, work, or farm in the Upper Sugar Creek drainage - recreation is a valuable part of loving where you live. We value and request your participation in our meeting on January 24th, at 6 PM at the Hoosier Heartland Success Center at 1623 US-231, Crawfordsville, IN 47933. Dinner will be included, so RSVP is requested for this free listening session at bit.ly/RecListeningSessionJan24.

With over $131,000 provided through the Indiana Department of Environmental Management (IDEM) section 319 grant, efforts are being made to protect and improve water quality in your community. Now is the perfect time to get involved and share your opinions and knowledge about recreation along Sugar Creek, its tributaries and the land that drains into the basin!

At this meeting, the staff of the area SWCDs (Boone, Clinton, Montgomery, and Tippecanoe counties) will be on hand to listen to your thoughts and concerns regarding recreation in the watershed. Outdoor enjoyment takes many forms, be that canoeing and kayaking on the Sugar Creek, to fishing or hunting along the shoreline. We want to better understand the ways people enjoy our natural resources and what the project can do to improve access to them.

We look forward to meeting with you over dinner and conversation about recreation in the Upper Sugar Creek Recreation watershed, on January 24th from 6-8 PM at the Hoosier Heartland Success Center at 1623 US-231, Crawfordsville, IN 47933. Your RSVP is requested, at bit.ly/RecListeningSessionJan24. For questions on the public meeting, cost share, or other ways to get involved prior to the meeting, contact the Montgomery County SWCD.

Additional information about the project's progress and the upcoming Recreation Listening Session can be found at https://montgomerycoswcd.com/sugarcreek/.

###

Appendix 3A: Social Indicator Survey

Dear agricultural producer/landowner,

The Upper Sugar Creek Watershed Project, comprised of the Boone County, Clinton County, Montgomery County, and Tippecanoe County Soil and Water Conservation Districts is conducting this survey in coordination with local partners to understand soil and water quality issues in the Upper Sugar Creek Watershed. Your insights are particularly important in helping us understand and facilitate technical and financial assistance for local conservation efforts.

There are two ways in which you can complete our survey:

1. The most convenient way is for you to enter the following website address into your web browser and provide your responses securely online:

bit.ly/UpperSugarSurvey2023

If you choose to complete the survey online you will need to enter the following code: This will indicate that you completed the survey and we will stop sending reminders. The information you provide is confidential and will never be linked to your name, only to this code, which we use to know who has responded to the survey.

2. We have also included this paper version with a postage-paid return envelope if you prefer to respond by mail.

We ask that this survey be completed by the person in your home **who makes most of the agricultural management decisions** and is at least 18 years old.

Your voluntary participation in this survey will help us understand the needs and concerns of agricultural producers in your area. Your answers will be kept confidential and will be released only as summaries where answers cannot be linked to individual respondents.

Unless otherwise instructed, please check the selection that **best describes your situation or opinion** for the agricultural operation located **within the portion of the Upper Sugar Creek watershed indicated in the map on page 2, highlighted in yellow.** The survey should take approximately 20 minutes to complete.

For more information regarding the survey, please contact your local Soil & Water Conservation District, as listed below. Thank you in advance for your help!

Sheryl Vaughn
District Administrator,
Boone County
765.482-6355 ext. 8676

Stephen Miller
Resource Conservation
Specialist, Clinton Co.
765.659.1223 ext. 3

Kristen Latzke
Conservation Director,
Montgomery County
765.362.0405 ext. 3

Kris Gertz
District Administrator,
Tippecanoe County
7765.474.9992 ext. 4001

UPPER SUGAR CREEK WATERSHED

Your views on local water resources.

Take this survey digitally at bit.ly/UpperSugarSurvey2023 (case sensitive)

ID No :

Date :

For Administrative Use Only:

Special Note:

For questions concerning this survey, do not hesitate to contact Kristen Latzke, Conservation Director, at (765) 362-0405 Ext 1 or KLatzke@MontgomeryCoSWCD.com

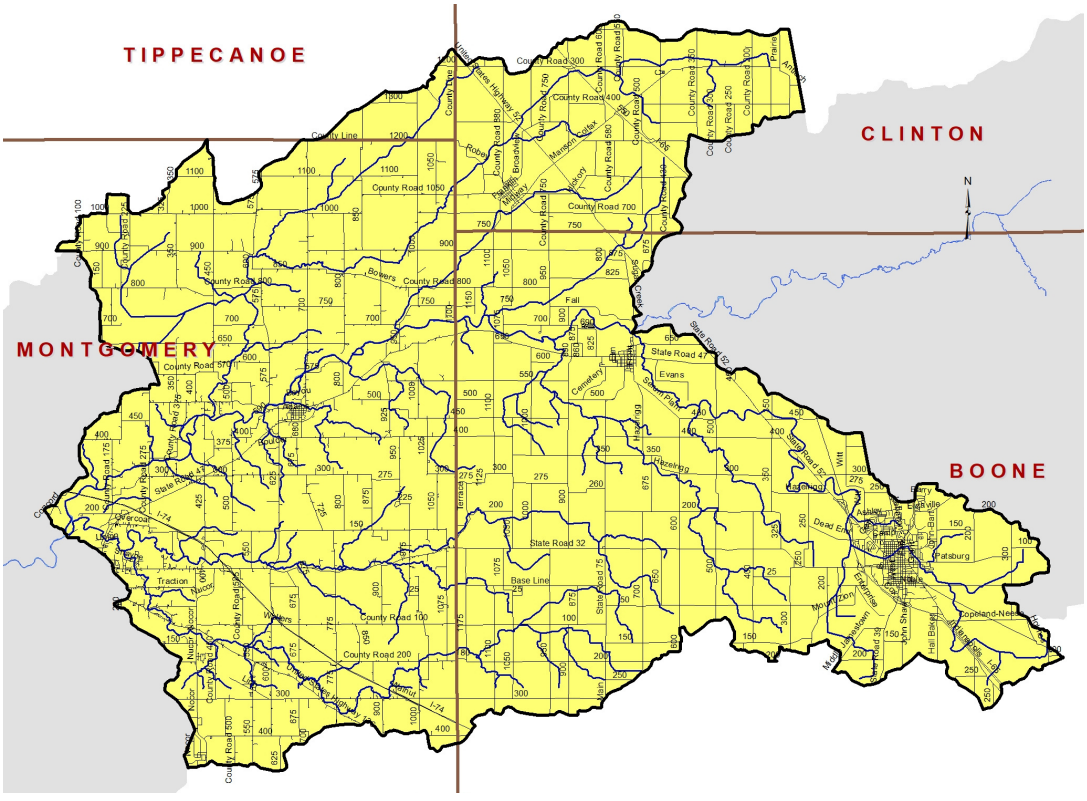
Section I - Rating of Water Quality

1. Overall, how would you rate the quality of the water in your area?

	POOR	OKAY	GOOD	DON'T KNOW
For canoeing/kayaking/other boating	○	○	○	○
For swimming	○	○	○	○
For scenic beauty	○	○	○	○
For fish habitat	○	○	○	○

2. Of these activities, which is the *most* important to you?

- O For picnicking and family activities
- O For fish habitat
- O For scenic beauty
- O For canoeing / kayaking / other boating
- O For eating locally caught fish
- O For swimming



Map of the Upper Sugar Creek Watershed, with counties and roads labeled for ease of reference.

Section II - Septic Systems

1. Do you have a septic system?

- O No
- O Don't Know
- O Yes

STOP: If you answered "No" to question one, skip to section III.

2. If you answered "Yes" to the previous question, in what year was it installed?

Year: _____

3. In the future, would you like a reminder from your local health department regarding inspection/maintenance of your septic system?

- O Yes
- O No
- O Don't know

4. Is your septic system designed to treat sewage or get rid of waste?

- O Treat sewage
- O Get rid of waste
- O Both
- O Neither
- O Don't know

5. Do you think a local government agency should handle the inspection and maintenance of septic systems?

- O No
- O Don't Know
- O Yes

6. Does your septic system have an absorption field (finger system)?

- O Yes
- O No
- O Don't know

7. Within the last five years, have you had any of the following problems? ***(Check all that apply)***

- ☐ Slow drains
- ☐ Sewage backup in house
- ☐ Bad smells near tank or drain field
- ☐ Sewage on the surface
- ☐ Sewage flowing to ditch
- ☐ Frozen septic
- ☐ Other
- ☐ None
- ☐ Don't know

8. How would you know if your septic system was NOT working properly? ***(Check all that apply)***

- ☐ Slow drains
- ☐ Sewage backup in house
- ☐ Bad smells
- ☐ Toilet backs up
- ☐ Wet spots in lawn
- ☐ Pumping tank monthly or more
- ☐ Straight pipe to ditch
- ☐ Frozen septic
- ☐ Don't know
- ☐ Other

9. Do you have a garbage disposal?

- O Yes, I use it daily
- O Yes, I use it occasionally
- O Yes, but I don't use it
- O No

Section III - Your Opinions

Please indicate your level of agreement or disagreement with the statements below.

Statement	Strongly Disagree	Disagree	Neither Agree Nor Disagree	Agree	Strongly Agree
The way that I care for my lawn and yard can influence water quality in local streams and lakes.	◯	◯	◯	◯	◯
Using recommended management practices on farms improves water quality.	◯	◯	◯	◯	◯
It is my personal responsibility to help protect water quality.	◯	◯	◯	◯	◯
It is important to protect water quality even if it slows economic development.	◯	◯	◯	◯	◯
My actions have an impact on water quality.	◯	◯	◯	◯	◯
I would be willing to pay more to improve water quality (for example: through local taxes or fees)	◯	◯	◯	◯	◯
I would be willing to change the way I care for my lawn and yard to improve water quality.	◯	◯	◯	◯	◯
I would be willing to change management practices to improve water quality.	◯	◯	◯	◯	◯
The quality of life in my community depends on good water quality in local streams, rivers and lakes.	◯	◯	◯	◯	◯

Water Impairments

Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

Impairment	Not a problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
Sedimentation (dirt & soil) in the water	◯	◯	◯	◯	◯
Nitrogen	◯	◯	◯	◯	◯
Phosphorus	◯	◯	◯	◯	◯
Bacteria and viruses in the water (such as E.coli / coliform)	◯	◯	◯	◯	◯
Pesticides	◯	◯	◯	◯	◯
Trash or debris in the water	◯	◯	◯	◯	◯
Algae in the water	◯	◯	◯	◯	◯
Habitat alteration harming local fish	◯	◯	◯	◯	◯

Consequences of Poor Water Quality

Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?

Consequence	Not a problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
Loss of desirable fish species	◯	◯	◯	◯	◯
Reduced beauty of lakes or streams	◯	◯	◯	◯	◯
Contaminated drinking water	◯	◯	◯	◯	◯
Reduced opportunities for water recreation	◯	◯	◯	◯	◯
Reduced quality of water recreation activities	◯	◯	◯	◯	◯
Excessive aquatic plants or algae	◯	◯	◯	◯	◯
Fish kills	◯	◯	◯	◯	◯
Polluted swimming areas	◯	◯	◯	◯	◯

Sources of Water Pollution

The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

Pollution Source	Not a problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know
Discharges from industry into streams	◯	◯	◯	◯	◯
Soil erosion from construction sites	◯	◯	◯	◯	◯
Soil erosion from farm fields	◯	◯	◯	◯	◯
Soil erosion or vegetation removal along streambanks	◯	◯	◯	◯	◯
Excessive use of lawn fertilizers and/or pesticides	◯	◯	◯	◯	◯
Trash or debris in the water	◯	◯	◯	◯	◯
Improperly maintained septic systems	◯	◯	◯	◯	◯
Manure from farm animals	◯	◯	◯	◯	◯
Land development or redevelopment	◯	◯	◯	◯	◯
Discharges from sewage treatment plants	◯	◯	◯	◯	◯
Stormwater runoff from rooftops and/or parking lots	◯	◯	◯	◯	◯
Littering/illegal dumping of trash	◯	◯	◯	◯	◯
Excessive use of fertilizers for crop production	◯	◯	◯	◯	◯
Inappropriate waste disposal	◯	◯	◯	◯	◯
Dredging of streams or ditches	◯	◯	◯	◯	◯

Practices to Improve Water Quality

Please indicate which statement most accurately describes your level of experience with each practice listed below.

Practice	Not relevant for my property	Never heard of it	Somewhat familiar	Know how to use it; not using it	Currently use it
Following the manufacturer's instructions when fertilizing or using pesticides for lawn, garden, or turf	◯	◯	◯	◯	◯
Use manure in accordance with its nutrient content	◯	◯	◯	◯	◯
Avoid fall application of manure or nitrogen fertilizer to reduce environmental losses	◯	◯	◯	◯	◯
Use field records of crops, pests and pesticide use to help develop pest control strategies	◯	◯	◯	◯	◯
Use heavy use area protection for waste management	◯	◯	◯	◯	◯
Use no-till to reduce erosion	◯	◯	◯	◯	◯
Use reduced-tillage to reduce erosion	◯	◯	◯	◯	◯
Use cover crops for erosion protection and soil improvement	◯	◯	◯	◯	◯
Use a grassed waterway to reduce erosion and soil loss	◯	◯	◯	◯	◯
Rotate crops to control soil erosion	◯	◯	◯	◯	◯
Follow an approved grazing management plan	◯	◯	◯	◯	◯
Use fencing to exclude animals from critical areas	◯	◯	◯	◯	◯
Plant trees/shrubs/prairie installations	◯	◯	◯	◯	◯
Follow an approved forest management plan	◯	◯	◯	◯	◯
Create or Restore/enhance wetland	◯	◯	◯	◯	◯
Maintain/ Plant vegetated, forested or herbaceous riparian buffer and/or stabilize streambanks	◯	◯	◯	◯	◯
Decommission well	◯	◯	◯	◯	◯

Section IV - Constraints for Specific Practices

Cover Crops

(Planting cover crops for erosion protection and soil improvement.)

How familiar are you with this practice?

- O Not relevant for my property
- O Never heard of it
- O Somewhat familiar
- O Know how to use it; Not using it
- O Currently use it

If the practice is not relevant, please explain:

_____

_____

Are you willing to try this practice?

O Yes/Already do O Maybe O No

How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't know
Don't know how to do it	◯	◯	◯	◯	◯
Time required	◯	◯	◯	◯	◯
Cost	◯	◯	◯	◯	◯
The features of my property make it difficult	◯	◯	◯	◯	◯
Insufficient proof of water quality benefit	◯	◯	◯	◯	◯
Desire to keep things the way they are	◯	◯	◯	◯	◯
Hard to use with my farming system	◯	◯	◯	◯	◯
Lack of equipment	◯	◯	◯	◯	◯

Variable Rate Application

(Use variable rate application technology for fertilizer to reduce environmental losses)

How familiar are you with this practice?

- O Not relevant for my property
- O Never heard of it
- O Somewhat familiar
- O Know how to use it; Not using it
- O Currently use it

If the practice is not relevant, please explain:

_____

_____

Are you willing to try this practice?

O Yes/Already do O Maybe O No

How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't know
Don't know how to do it	◯	◯	◯	◯	◯
Time required	◯	◯	◯	◯	◯
Cost	◯	◯	◯	◯	◯
The features of my property make it difficult	◯	◯	◯	◯	◯
Insufficient proof of water quality benefit	◯	◯	◯	◯	◯
Desire to keep things the way they are	◯	◯	◯	◯	◯
Hard to use with my farming system	◯	◯	◯	◯	◯
Lack of equipment	◯	◯	◯	◯	◯

Drainage Water Management

(Manage the water level in tile lines/drainage water management utilizing blind inlets, boxes, inline structures)

How familiar are you with this practice?

- O Not relevant for my property
- O Never heard of it
- O Somewhat familiar
- O Know how to use it; Not using it
- O Currently use it

If the practice is not relevant, please explain:

_____

_____

Are you willing to try this practice?

O Yes/Already do O Maybe O No

How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't know
Don't know how to do it	◯	◯	◯	◯	◯
Time required	◯	◯	◯	◯	◯
Cost	◯	◯	◯	◯	◯
The features of my property make it difficult	◯	◯	◯	◯	◯
Insufficient proof of water quality benefit	◯	◯	◯	◯	◯
Desire to keep things the way they are	◯	◯	◯	◯	◯
Hard to use with my farming system	◯	◯	◯	◯	◯
Lack of equipment	◯	◯	◯	◯	◯

Soil Testing: Frequency, Sampling procedure

(Conduct regular soil tests for pH, phosphorus, nitrogen and potassium)

How familiar are you with this practice?

- O Not relevant for my property
- O Never heard of it
- O Somewhat familiar
- O Know how to use it; Not using it
- O Currently use it

If the practice is not relevant, please explain:

_____

_____

Are you willing to try this practice?

O Yes/Already do O Maybe O No

How much do the following factors limit your ability to implement this practice?

	Not at all	A little	Some	A lot	Don't know
Don't know how to do it	◯	◯	◯	◯	◯
Time required	◯	◯	◯	◯	◯
Cost	◯	◯	◯	◯	◯
The features of my property make it difficult	◯	◯	◯	◯	◯
Insufficient proof of water quality benefit	◯	◯	◯	◯	◯
Desire to keep things the way they are	◯	◯	◯	◯	◯
Hard to use with my farming system	◯	◯	◯	◯	◯
Lack of equipment	◯	◯	◯	◯	◯

Section VI - About your Farm Operation

1. Please select the option that best describes who generally makes management decisions for your operation.

O Me alone or with my spouse
O Me with my family partners (siblings, parents, children)
O Me with the landowner
O Me with my tenant
O Me and my business partners
O Someone else makes the decisions for the operation
O Other

2. Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.

_____ **Acres**

3. How many years have you been farming?

_____ **Years**

4. Do you currently use a crop advisor or agronomist?

O No, I have never used a crop advisor or agronomist.
O No, I do not currently use a crop advisor or agronomist, but have used one in the past.
O Yes, I currently use a crop advisor.
If yes, please specify:

_____

_____

5. Did any family member own and operate this farm before you did?

O Yes
O No

6. If you answered 'yes' to the previous question, how many years has the farm been in the family?

_____ **Years**

7. How likely is it that any family member will continue farm operations when you retire or quit farming?

O Definitely will not happen
O Probably will not happen
O Probably will happen
O Definitely will not happen

8. How regularly do you conduct soil testing?

_____

_____

9. Are your application recommendations based on current soil testing?

O No
O Don't Know
O Yes

10. Do you have a nutrient management plan for your farm operation?

O Yes
O No

11. Five years from now, which statement best describes your farm operation?

O It will be about the same as it is today
O It will be larger
O It will be smaller
O I don't know

12. What is included in your nutrient management plan?

O Commercial Nutrients
O Livestock Manure
O Septic Waste
O Municipal or industrial sludge
O Other

14. Does the property you manage touch a stream, river, lake, or wetland?

O Yes
O No

15. Who developed your current nutrient management plan?

O My local Conservation District, University Extension, or NRCS office
O A private-sector agronomist or crop consultant
O I created my own plan
O I don't know
O Other

13. In 2022, how many acres of each of the following did you manage in the portion of the Upper Sugar Creek Watershed indicated on the map? *(If none, enter 0.)*

Crop Type	*Acres*
Corn Acres	_____ Acres
How many corn acres were no-till, strip-till, or ridge-till?	_____ Acres
How many corn acres were in cover crops?	_____ Acres
Soybean Acres	_____ Acres
How many soybean acres were no-till, strip-till, or ridge-till?	_____ Acres
How many soybean acres were in cover crops?	_____ Acres
Other (Specify)	_____ Acres
Total Conservation Acreage set aside (e.g. Conservation Reserve Program, Wetland Reserve Program)	_____ Acres

16. How many of the following animals are a part of your farming operation in the portion of the Upper Sugar Creek Watershed indicated on the map? *(If none, enter 0.)*

Species	*Head*
Dairy Cattle (including heifers and young stock)	_____
Beef Cattle (including young stock)	_____
Hogs (including contract hog barns)	_____
Poultry	_____
Horses	_____
Other Livestock (Specify)	_____

Section VII - About You

1. Do you make the home and lawn care decisions in your household?

O Yes
O No

2. What is your gender?

O Male
O Female

3. What is your age?

_____ **Years**

4. What is the highest grade in school you have completed?

O Some formal schooling
O High School/GED
O Some college
O 2-year college degree
O 4-year college degree
O Post-graduate degree

5. What is the approximate size of your residential lot?

O 1/4 acre or less
O More than 1/4 acre but less than 1 acre
O 1 acre to less than 5 acres

6. Do you own or rent your home?

O Own
O Rent

7. How long have you lived at your current residence?

_____ **Years**

8. Which of the following best describes where you live?

O In a town, village, or city
O In an isolated, rural, non-farm residence
O Rural subdivision or development
O On a farm

9. In addition to your residence, which of the following do you own or manage? ***(Check all that apply)***

☐ An agricultural operation
☐ Forested Land
☐ Rural recreational property
☐ None of these

10. What is your ethnicity?

O African American
O American Indian
O Asian/Asian American/Pacific Islander
O Hispanic/Latino
O White/Caucasian
O Multi-racial
O Other

11. Do you use a professional lawn care service?

O Yes, just for mowing
O Yes, for mowing and fertilizing
O Yes, just for fertilizing and pest control
O Yes, for mowing, fertilizing, and pest control
O No

12. Do you regularly read a local newspaper?

O Yes
O No

Section VII - Information Sources

1. Where are you likely to seek information about soil and water conservation issues? ***(Check all that apply)***

- ☐ Newsletters/brochure/factsheet
- ☐ Internet
- ☐ Radio
- ☐ Workshops/demonstrations/meetings
- ☐ Conversations with others
- ☐ Trade publications/magazines
- ☐ None of the above

Information Sources

People get information about water quality from a number of different sources. To what extent do you trust those listed below as a source of information about soil and water?

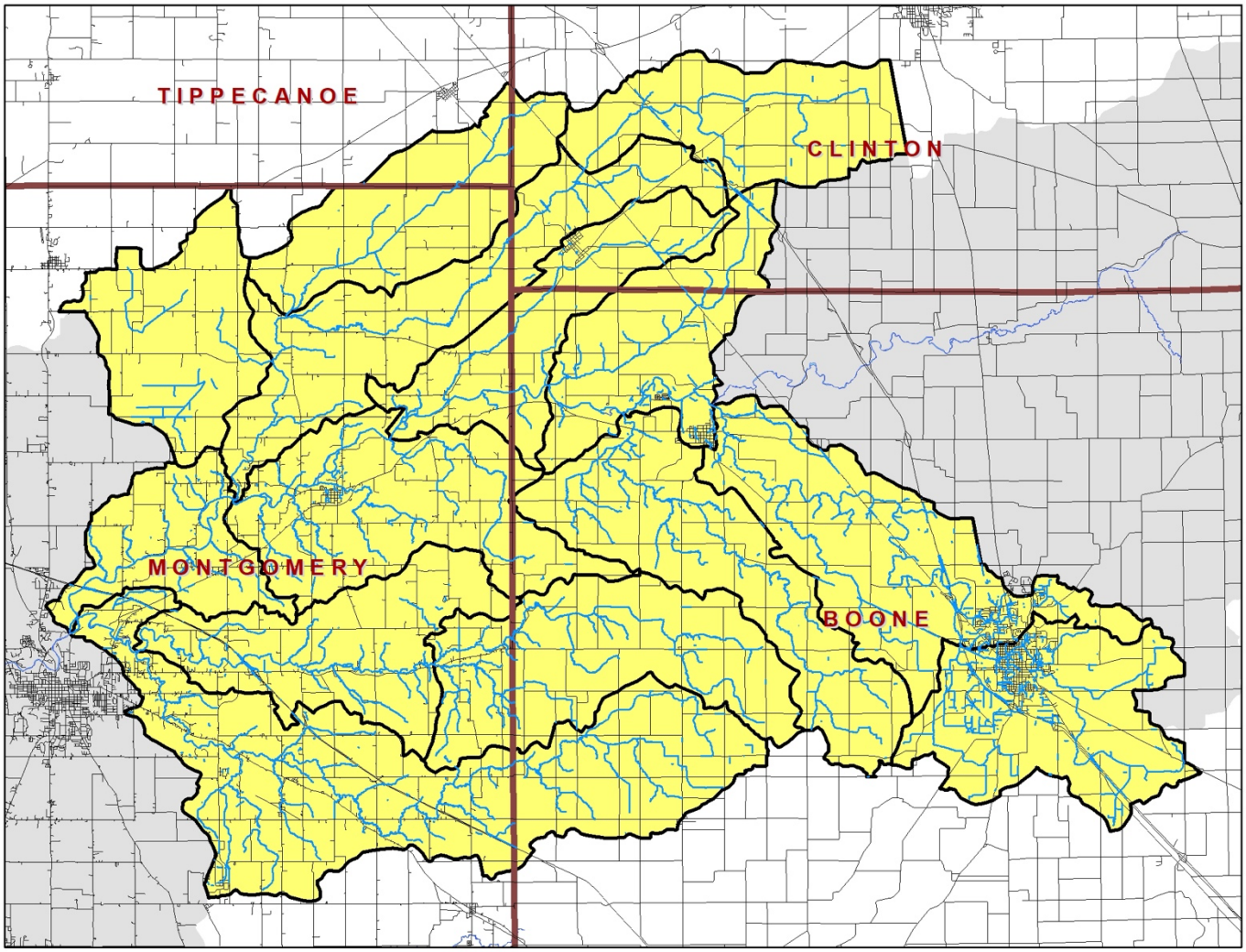
	Not at all	Slightly	Moderately	Very Much	Am not familiar
Soil and Water Conservation District	◯	◯	◯	◯	◯
Natural Resources Conservation Service	◯	◯	◯	◯	◯
Purdue University Extension	◯	◯	◯	◯	◯
Nonprofit Environmental groups	◯	◯	◯	◯	◯
Neighbors / friends	◯	◯	◯	◯	◯
Farm Service Agency	◯	◯	◯	◯	◯
Farm Bureau	◯	◯	◯	◯	◯
Local watershed project	◯	◯	◯	◯	◯
Fertilizer representatives	◯	◯	◯	◯	◯
Crop consultants	◯	◯	◯	◯	◯
Land trust	◯	◯	◯	◯	◯
Local government	◯	◯	◯	◯	◯
U.S. Environmental Protection Agency	◯	◯	◯	◯	◯
Indiana State Department of Agriculture	◯	◯	◯	◯	◯
Indiana Department of Environmental Management	◯	◯	◯	◯	◯
Local community leader	◯	◯	◯	◯	◯
Department of Natural Resources	◯	◯	◯	◯	◯
County Health department	◯	◯	◯	◯	◯

Thank you for your time and assistance!

Please return your completed survey in the postage-paid envelope provided. Please use the space on the back of this survey for any additional comments about this document or water resource issues in your community.

Appendix 3B: Social Indicator Survey Results

Human Dimensions of Water Quality in the Upper Sugar Creek Watershed



I. Methods

Mail Survey

- 472 Surveys distributed
    - Of which, 239 also sent by email
- 40 Bad addresses, or deceased individuals
- 189 Completed (43.75% response rate after accounting for bad addresses)

Date Mailed	Item Delivered
1/3/2023	Advanced Letter
1/10/2023	Questionnaire #1 + Introduction Letter
1/24/2023	Reminder Postcard
2/7/2023	Questionnaire #2 + Reminder Letter
2/21/2023	Final Notice Letter

Results
Upper Sugar Creek Survey
April 7th 2023, 8:52 pm EDT

Section 1 – Rating of Water Quality
Q1 - Overall, how would you rate the quality of the water in your area?

Question	Poor	Okay	Good	Total
For scenic beauty	4 (3%)	33 (24.8%)	96 (72.2%)	133
For canoeing/kayaking/other boating	15 (12.6%)	24 (20.2%)	80 (67.2%)	119
For swimming	23 (20.5%)	49 (43.8%)	40 (35.7%)	112
For fish habitat	9 (8.2%)	48 (43.6%)	53 (48.2%)	110

Q2 - Of these activities, which is the most important to you?

Answer	Count (%)
For swimming	2 (1.6%)
For eating locally caught fish	10 (7.8%)
For picnicking and family activities	16 (12.5%)
For canoeing / kayaking / other boating	19 (14.8%)
For fish habitat	25 (19.5%)
For scenic beauty	56 (43.8%)
Total	128 (100%)

Section 2 – Septic Systems
Q3 - Do you have a septic system?

Answer	Count (%)
No	28 (15.7%)
Yes	150 (84.3%)
Total	178 (100%)

Q4 - If you answered "Yes" to the previous question, in what year was it installed?

Average year in which septics were installed: 1993
Respondents who were unsure or did not know: 22

1970's	2013	1995	?	2001
2000	No idea	2018	1977	2014
2020	?	2005	1960 i think	2010
1994	1989	1998	??	1993
1993	2007	2010	?	1960
2013	2005	1994	2004	1967
2009	1978	1979	1994	2022
2005	?	Don't know	unknown	1974
2000	2000	2005	1986	1975
1992	? Don't know	2002	2021	1990
1995	1985?	1950?	1960	1994
2000	1976	2010	1995	1996
Don't know	1975	1993	2000	Unknown
?	2018	1999	1980	2001
1994	1977	2002	2004	2012
2020	Early 70s	1998	1980	2013
2000	1998	1996	not sure	1972
2005	1976 + 2010	1955	1979	2007
?	1955	1996	1976	2006
1950's?	1970	2002	?	2021
1978	1986	1977	1973	1975
2022	1988	Don't know	2005	1969
1988	2021	2000	2008	1977
1977	2009	2018	2008	2020
1918	2005	?	1999	
2004	1991	2006	2004	
1950?	?	2021	1979	
1988	1995	2005	1980	

illegible	Don't know	No idea	?	
1991	2013	2004	1994?	

Q5 - In the future, would you like a reminder from your local health department regarding inspection/maintenance of your septic system?

Answer	Count (%)
Yes	8 (5.8%)
No	131 (94.2%)
Total	139 (100%)

Q6 - Is your septic system designed to treat sewage or get rid of waste?

Answer	Count (%)
Neither	4 (2.6%)
Treat sewage	16 (10.5%)
Don't know	26 (17.1%)
Get rid of waste	44 (29%)
Both	62 (40.8%)
Total	152 (100%)

Q7 - Do you think a local government agency should handle the inspection and maintenance of septic systems?

Answer	Count (%)
Yes	18 (13.4%)
No	116 (86.6%)
Total	134 (100%)

Q8 - Does your septic system have an absorption field (finger system)?

Answer	Count (%)
No	19 (13.6%)
Yes	121 (86.4%)
Total	140 (100%)

Q9 - Within the last five years, have you had any of the following problems? (Check all that apply)

Answer	Count (%)
Frozen septic	0 (0.00%)
Sewage flowing to ditch	1 (0.6%)
Sewage on the surface	2 (1.3%)
Other	2 (1.3%)
Sewage backup in house	3 (1.9%)
Bad smells near tank or drain field	4 (2.5%)
Don't know	4 (2.5%)
Slow drains	6 (3.8%)
None	137 (86.2%)
Total	159 (100%)

Of these responses, all problems came from 12 respondents.

Q10 - How would you know if your septic system was NOT working properly? (Check all that apply)

Answer	Count (%)
Frozen septic	2 (0.3%)
Sewage flowing to ditch	7 (1.2%)
Sewage on the surface	19 (3.2%)
Other	22 (3.8%)
Sewage backup in house	59 (10.1%)
Bad smells near tank or drain field	77 (13.1%)
Don't know	81 (13.8%)
Slow drains	95 (16.2%)
None	110 (18.7%)
Total	115 (19.6%)

Q11 - Do you have a garbage disposal?

Answer	Count (%)
Yes, but I don't use it	8 (5.3%)
Yes, I use it daily	27 (18%)
Yes, I use it occasionally	53 (35.3%)
No	62 (41.3%)
Total	150 (100%)

Q12 - Please indicate your level of agreement or disagreement with the statements below.

Question	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Total
The way that I care for my lawn and yard can influence water quality in local streams and lakes.	10 (5.4%)	15 (8.1%)	37 (20%)	93 (50.3%)	30 (16.2%)	185
Using recommended management practices on farms improves water quality.	4 (2.6%)	4 (2.6%)	10 (5.4%)	135 (72.6%)	33 (17.7%)	186
It is my personal responsibility to help protect water quality.	4 (2.1%)	2 (1.1%)	14 (7.5%)	119 (63.3%)	49 (26.1%)	188
It is important to protect water quality even if it slows economic development.	4 (2.1%)	6 (3.2%)	31 (16.6%)	111 (59.4%)	35 (18.7%)	187
My actions have an impact on water quality.	3 (1.6%)	8 (4.0%)	26 (14%)	112 (60.2%)	37 (19.9%)	186
I would be willing to pay more to improve water quality (for example: through local taxes or fees)	36 (19.5%)	39 (21.1%)	69 (37.3%)	33 (17.8%)	8 (4.3%)	185
I would be willing to change the way I care for my lawn and yard to improve water quality.	8 (4.4%)	25 (13.8%)	64 (35.4%)	73 (40.3%)	11 (6.1%)	181
I would be willing to change management practices to improve water quality.	3 (1.6%)	15 (8.1%)	71 (38.4%)	86 (46.5%)	10 (5.4%)	185
The quality of life in my community depends on good water quality in local streams, rivers and lakes.	7 (3.7%)	7 (3.7%)	26 (13.9%)	117 (62.6%)	30 (16%)	187

Q14 - Water Impairments

Below is a list of water pollutants and conditions that are generally present in water bodies to some extent. The pollutants and conditions become a problem when present in excessive amounts. In your opinion, how much of a problem are the following water impairments in your area?

Question	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know	Total
Phosphorus	41 (22.3%)	42 (22.8%)	33 (18.5%)	7 (3.8%)	60 (32.6%)	184
Sedimentation (dirt & soil) in the water	33 (17.8%)	52 (28.1%)	67 (36.2%)	11 (6%)	22 (11.8%)	185
Pesticides	44 (23.8%)	48 (26%)	28 (15.1%)	14 (7.6%)	51 (27.6%)	185
Nitrogen	43 (23.1%)	44 (23.7%)	35 (18.8%)	6 (3.2%)	58 (31.2%)	186
Bacteria and viruses in the water (such as E.coli / coliform)	48 (25.8%)	35 (18.8%)	32 (17.2%)	10 (5.4%)	61 (32.8%)	186
Habitat alteration harming local fish	59 (31.7%)	31 (16.7%)	32 (17.2%)	8 (4.3%)	56 (30.1%)	186
Trash or debris in the water	37 (19.8%)	50 (26.7%)	55 (29.4%)	24 (12.8%)	21 (11.2%)	187
Algae in the water	56 (30%)	49 (26.2%)	38 (20.3%)	6 (3.2%)	38 (20.3%)	187

Q15 - Consequences of Poor Water Quality

Poor water quality can lead to a variety of consequences for communities. In your opinion, how much of a problem are the following issues in your area?

Question	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know	Total
Contaminated drinking water	64 (35.2%)	33 (18.1%)	23 (12.6%)	17 (9.3%)	45 (24.7%)	182
Reduced beauty of lakes or streams	48 (26.2%)	61 (33.3%)	36 (19.7%)	11 (6%)	27 (14.8%)	183
Loss of desirable fish species	53 (28.8%)	34 (18.5%)	32 (17.4%)	10 (5.4%)	55 (29.9%)	184
Reduced opportunities for water recreation	71 (38.6%)	34 (18.5%)	33 (17.9%)	6 (3.3%)	40 (21.74%)	184
Reduced quality of water recreation activities	68 (34%)	36 (19.6%)	32 (17.4%)	5 (2.7%)	43 (23.4%)	184
Excessive aquatic plants or algae	54 (29.4%)	44 (23.9%)	29 (15.8%)	11 (6%)	46 (25%)	184
Fish kills	69 (37.5%)	32 (17.4%)	21 (11.4%)	12 (6.5%)	50 (27.2%)	184
Polluted swimming areas	57 (31%)	39 (21.2%)	21 (11.4%)	16 (8.7%)	51 (27.7%)	184

Q16 - Sources of Water Pollution

The items listed below are sources of water quality pollution across the country. In your opinion, how much of a problem are the following sources in your area?

Question	Not a Problem	Slight Problem	Moderate Problem	Severe Problem	Don't Know	Total
Soil erosion from farm fields	29 (16.1%)	72 (40%)	52 (28.9%)	11 (6.1%)	16 (8.9%)	180
Soil erosion from construction sites	42 (23.2%)	53 (29.3%)	44 (24.3%)	7 (3.9%)	35 (19.3%)	181
Discharges from industry into streams	44 (24.2%)	35 (19.2%)	36 (19.8%)	18 (9.9%)	49 (26.9%)	182
Improperly maintained septic systems	45 (24.6%)	47 (25.7%)	28 (15.3%)	9 (4.9%)	54 (29.5%)	183
Manure from farm animals	75 (41%)	47 (25.7%)	21 (11.5%)	6 (3.3%)	34 (18.6%)	183
Inappropriate waste disposal	38 (20.8%)	51 (27.9%)	34 (18.6%)	14 (7.7%)	46 (25.1%)	183
Dredging of streams or ditches	83 (45.4%)	41 (22.4%)	11 (6%)	5 (2.7%)	43 (23.5%)	183
Stormwater runoff from rooftops and/or parking lots	47 (25.5%)	48 (26.1%)	35 (19%)	13 (7.1%)	41 (22.3%)	184
Soil erosion or vegetation removal along streambanks	42 (22.7%)	62 (33.5%)	39 (21.1%)	14 (7.6%)	28 (15.1%)	185
Excessive use of lawn fertilizers and/or pesticides	41 (22.2%)	36 (19.5%)	42 (22.7%)	22 (11.9%)	44 (23.8%)	185
Trash or debris in the water	26 (14.1%)	60 (32.4%)	56 (30.3%)	17 (9.2%)	26 (14.1%)	185
Land development or redevelopment	35 (18.9%)	36 (19.5%)	50 (27%)	35 (18.9%)	29 (15.7%)	185
Discharges from sewage treatment plants	52 (28.1%)	33 (17.8%)	28 (15.1%)	10 (5.4%)	62 (33.5%)	185
Littering/illegal dumping of trash	22 (11.9%)	59 (31.9%)	52 (28.1%)	27 (14.6%)	25 (13.5%)	185
Excessive use of fertilizers for crop production	59 (31.9%)	60 (32.4%)	18 (9.7%)	9 (4.9%)	39 (21.1%)	185

Q17 - Practices to Improve Water Quality

Please indicate which statement most accurately describes your level of experience with each practice listed below.

Question	Not relevant for my property	Never Heard of it	Somewhat familiar	Know how to use it; not using it	Currently use it	Total
Rotate crops to control soil erosion	20 (11.1%)	1 (0.6%)	8 (4.4%)	5 (2.8%)	147 (81.2%)	181
Plant trees/shrubs/prairie installations	70 (38.7%)	2 (1.1%)	24 (13.3%)	30 (16.6%)	55 (30.4%)	181
Decommission well	113 (62.4%)	18 (9.9%)	14 (7.7%)	16 (8.8%)	20 (11.1%)	181
Use heavy use area protection for waste management	96 (52.8%)	28 (15.4%)	22 (12.1%)	13 (7.1%)	23 (12.6%)	182
Create or Restore/enhance wetland	107 (58.8%)	4 (2.2%)	22 (12.1%)	28 (15.4%)	21 (11.5%)	182
Maintain/ Plant vegetated, forested or herbaceous riparian buffer and/or stabilize streambanks	65 (35.7%)	5 (2.8%)	22 (12.1%)	20 (11%)	70 (38.5%)	182
Use manure in accordance with its nutrient content	81 (44.3%)	3 (1.6%)	17 (9.3%)	30 (16.4%)	52 (28.4%)	183
Use field records of crops, pests and pesticide use to help develop pest control strategies	31 (16.9%)	6 (3.3%)	25 (13.7%)	16 (8.7%)	105 (57.4%)	183
Use no-till to reduce erosion	25 (13.7%)	1 (0.6%)	13 (7.1%)	27 (14.8%)	117 (63.9%)	183
Use a grassed waterway to reduce erosion and soil loss	21 (11.5%)	2 (1.1%)	11 (6%)	18 (9.8%)	131 (71.6%)	183
Follow an approved grazing management plan	113 (61.8%)	2 (1.1%)	12 (6.6%)	25 (13.7%)	31 (16.9%)	183
Follow an approved forest management plan	104 (56.8%)	8 (4.4%)	17 (9.3%)	34 (18.6%)	20 (10.9%)	183
Avoid fall application of manure or nitrogen fertilizer to reduce environmental losses	55 (29.9%)	2 (1.1%)	26 (14.1%)	42 (22.8%)	59 (32.1%)	184
Use cover crops for erosion protection	29 (15.8%)	1 (0.5%)	19 (10.3%)	77 (41.9%)	58 (31.5%)	184

and soil improvement						
Use reduced-tillage to reduce erosion	31 (16.8%)	2 (1.1%)	13 (7%)	20 (10.8%)	119 (64.3%)	185
Use fencing to exclude animals from critical areas	119 (64.3%)	2 (1.1%)	10 (5.4%)	18 (9.7%)	36 (19.5%)	185
Following the manufacturer's instructions when fertilizing or using pesticides for lawn, garden, or turf	48 (25.8%)	4 (2.2%)	17 (9.1%)	28 (15.1%)	89 (47.9%)	186

Q18 - Cover Crops

How familiar are you with this practice? (Cover Crops: Planting cover crops for erosion protection and soil improvement.)

Answer	Count (%)
Never heard of it	2 (1.1%)
Not relevant for my property	18 (10.1%)
Somewhat familiar	28 (15.7%)
Currently use it	51 (28.7%)
Know how to use it; Not using it	79 (44.4%)
Total	178 (100%)

Are you willing to try this practice?

Answer	Count (%)
Yes/Already do	45 (35.2%)
Maybe	56 (43.8%)
No	27 (21.1%)
Total	128 (100%)

How much do the following factors limit your ability to implement this practice?

Question	Not at all	A little	Some	A lot	Don't know	Total
Don't know how to do it	89 (57.1%)	14 (9%)	27 (17.3%)	12 (7.7%)	14 (9%)	156
The features of my property make it difficult	93 (59.6%)	12 (7.7%)	24 (15.4%)	7 (4.5%)	20 (12.8%)	156
Lack of equipment	60 (38.2%)	20 (12.7%)	31 (19.8%)	34 (21.7%)	12 (7.6%)	157
Hard to use with my farming system	54 (34%)	24 (15.1%)	33 (20.8%)	27 (17%)	21 (13.2%)	159
Cost	34 (21.3%)	22 (13.8%)	41 (25.6%)	47 (29.4%)	16 (10%)	160
Insufficient proof of water quality benefit	83 (51.9%)	15 (9.4%)	20 (12.5%)	7 (4.4%)	35 (21.9%)	160
Time required	45 (28%)	18 (11.2%)	50 (31.1%)	32 (19.9%)	16 (9.9%)	161
Desire to keep things the way they are	79 (49.1%)	18 (11.2%)	20 (12.4%)	26 (16.2%)	18 (11.2%)	161

If the practice is not relevant, please explain:

My tenant farms are good stewards regular test and follow good conservation practices
We no longer own property in Montgomery county
Don't actively farm; tillable acres rented out.
Takes moisture away from crop in dry year
we don't plant crops on our property (3 acres)
I don't farm
Permanent pasture and hay
Up to tenant farming property
Rent the farmland
This is a church property and parsonage area
I currently lease this farm so this survey should probably be completed by him
I am retiring - age 80
Retired from farming
Not needed for erosion control. Never gets big enough to improve soil. Lessons yields
Hay fields on our property
My land is rented out to farm
The acres we use are in grasses and alfalfa
Don't want to use it
Don't farm
All wooded property
Don't have time
I have no row crops except in my garden
Most of our fields are flat and not next to creeks/ditches, do use c.c. some, but not every where
Do not farm
Pasture only + hay field
My field has been planted in CRP (pollinator habitat)
This bottom ground is leased out and farmed, although things may change with a new tenant this year.
Hay field and pastures

Q19 - Variable Rate

How familiar are you with this practice? (Variable Rate Application: Use variable rate application technology for fertilizer to reduce environmental losses)

Answer	Count (%)
Currently use it	115 (66.9%)
Know how to use it; Not using it	13 (7.6%)
Not relevant for my property	14 (8.1%)
Somewhat familiar	21 (12.2%)
Never heard of it	9 (5.2%)
Total	172 (100%)

Are you willing to try this practice?

Answer	Count (%)
No	13 (12.5%)
Maybe	18 (17.3%)
Yes/Already do	73 (70.2%)
Total	104 (100%)

How much do the following factors limit your ability to implement this practice?

Question	Not at all	A little	Some	A lot	Don't know	Total
Don't know how to do it	96 (67.1%)	5 (3.5%)	16 (11.2%)	7 (7.7%)	15 (10.5%)	143
Time required	86 (59.7%)	13 (9%)	20 (13.9%)	10 (6.9%)	15 (10.4%)	144
Cost	72 (49.3%)	20 (13.7%)	22 (15.1%)	17 (11.6%)	15 (10.3%)	146
The features of my property make it difficult	110 (75.9%)	7 (4.8%)	7 (4.8%)	6 (3.5%)	16 (11%)	145
Insufficient proof of water quality benefit	90 (62.5%)	13 (9%)	13 (9%)	7 (4.9%)	21 (14.6%)	144
Desire to keep things the way they are	94 (64.8%)	11 (7.6%)	17 (11.7%)	13 (9%)	10 (6.9%)	145
Hard to use with my farming system	92 (63.5%)	15 (10.3%)	9 (6.2%)	11 (7.6%)	18 (12.4%)	145
Lack of equipment	81 (56.3%)	12 (8.3%)	14 (9.7%)	23 (16%)	14 (9.7%)	144

If the practice is not relevant, please explain:

Don't actively farm; tillable acres rented out.
I don't farm
Up to tenant farming property
Rent the land. Ditch is covered in hay/grass
I'm not a farmer. I only plant 1 acre of deer food crop and use no fertilizer. The rest of my property is native grasses.
I currently lease this farm so this survey should probably be completed by him
Retiring
My land is rented out to farm
We have hay
I rent my farm ground
All wooded property
Don't have eg (??)
Rent land
No crops except in my garden
Do not farm
Don't use fertilizer
Above
Not using any chemical fertilizer

Q20 - Drainage Water Management
How familiar are you with this practice?
(Drainage Water Management: Manage the water level in tile lines/drainage water management utilizing blind inlets, boxes, inline structures)

Answer	Count (%)
Not relevant for my property	18 (10.3%)
Never heard of it	24 (13.7%)
Know how to use it; Not using it	30 (17.1%)
Currently use it	42 (24%)
Somewhat familiar	61 (34.9%)
Total	175 (100%)

Are you willing to try this practice?

Answer	Count (%)
No	22 (19.5%)
Yes/Already do	34 (30.1%)
Maybe	57 (50.4%)
Total	113 (100%)

How much do the following factors limit your ability to implement this practice?

Question	Not at all	A little	Some	A lot	Don't know	Total
Don't know how to do it	57 (36.5%)	23 (14.7%)	34 (21.8%)	14 (9%)	28 (18%)	156
Time required	37 (24.2%)	32 (20.9%)	34 (22.2%)	19 (12.4%)	31 (20.3%)	153
Cost	23 (14.8%)	22 (14.2%)	27 (17.4%)	49 (31.6%)	34 (21.9%)	155
The features of my property make it difficult	56 (36.4%)	22 (14.3%)	22 (14.3%)	19 (12.3%)	35 (22.7%)	154
Insufficient proof of water quality benefit	63 (41.2%)	20 (13.1%)	22 (14.4%)	13 (8.5%)	35 (22.9%)	153
Desire to keep things the way they are	73 (47.7%)	15 (9.8%)	31 (20.3%)	11 (7.2%)	23 (16%)	153
Hard to use with my farming system	62 (40.5%)	23 (15%)	25 (16.3%)	9 (5.9%)	34 (22.2%)	153
Lack of equipment	30 (19.9%)	21 (13.9%)	32 (21.2%)	36 (23.8%)	32 (21.2%)	151

If the practice is not relevant, please explain:

I am retired
Work with tenant when needed
Retiring
Retired
Regen farmer 100% cover crops - use this a modifier to tile nutrient loss.
My land is rented out to farm
Don't farm
Tried one, It was a joke. Didn't work and just got in the way!
Same as previous
Not farming land
Too much fall in our tile lines, if you plug the outlet it will blow out somewhere else.
Not row crops on our property

Q21 - Soil Testing

How familiar are you with this practice? (Soil Testing: Frequency, Sampling procedure: Conduct regular soil tests for pH, phosphorus, nitrogen, and potassium)

Answer	Count (%)
Never heard of it	2 (1.2%)
Know how to use it; Not using it	6 (3.5%)
Not relevant for my property	7 (4%)
Somewhat familiar	8 (4.6%)
Currently use it	151 (86.8%)
Total	174 (100%)

Are you willing to try this practice?

Answer	Count (%)
No	2 (2%)
Maybe	6 (5.9%)
Yes/Already do	93 (92.1%)
Total	101 (100%)

How much do the following factors limit your ability to implement this practice?

Question	Not at all	A little	Some	A lot	Don't know	Total
Don't know how to do it	118 (82.5%)	7 (4.9%)	6 (4.2%)	6 (4.2%)	6 (4.2%)	143
Time required	104 (73.2%)	15 (10.6%)	11 (7.8%)	4 (2.8%)	8 (5.6%)	142
Cost	86 (61%)	19 (13.5%)	20 (14.2%)	10 (7.1%)	6 (4.3%)	141
The features of my property make it difficult	120 (84.5%)	7 (4.9%)	6 (4.2%)	2 (1.4%)	7 (4.9%)	142
Insufficient proof of water quality benefit	103 (72.5%)	10 (7%)	11 (7.8%)	4 (2.8%)	14 (9.9%)	142
Desire to keep things the way they are	106 (74.7%)	11 (7.8%)	10 (7.0%)	8 (5.6%)	7 (4.9%)	142
Hard to use with my farming system	116 (81.1%)	8 (5.6%)	8 (5.6%)	2 (1.4%)	9 (6.3%)	143
Lack of equipment	101 (70.6%)	14 (9.8%)	12 (8.4%)	8 (5.6%)	8 (5.6%)	143

If the practice is not relevant, please explain:

Someone else farms it
Ditch is not farmed. Farm land is already soil tested
I currently lease this farm so this survey should probably be completed by him
Retiring
Every 4 years grid test
My land is rented out to farm
All wooded property
No crops
Renters do it
Same as previous
Do not farm

Q22 - Please select the option that best describes who generally makes management decisions for your operation.

Answer	Count (%)
Other	2 (1.1%)
Me with the landowner	5 (2.8%)
Me and my business partners	5 (2.8%)
Someone else makes the decisions for the operation	11 (6.2%)
Me with my tenant	20 (11.3%)
Me with my family partners (siblings, parents, children)	57 (32.2%)
Me alone or with my spouse	77 (43.5%)
Total	157 (100%)

Q23 - Please estimate the total tillable acreage (owned and/or rented) of your farming operation this year.
Average tillable acreage: 1,215.2 acres
Total tillable acreage: 206,590.75 acres

545	3	3.6	1250	114	0	6300
112	165	72	33	15	1900	2500
95	800	3500	12	720	32	2000
NA	600	800	4000	458	2000	4200
10000	360	46	3200	2000	1600	7
319	6000	110	198	3000	19	80
800	225	550	1800	100	2000	410
3000	11000	11	1,530	700	4,000	1200
4200	160	1200	600	150	960	354
200	850	3000	160	3500	1300	7500
38	1500	30	2100	143	244	644
900	676	370	2300	1900	150	220
5500	3300	500	4200	2200	2700	200
200	3400	57	2500	20	8.65	1720
155	1200	2700	1500	420	6700	61
327	430	1000	2500	26	850	0
345	1500	19	25	4000	220	800
240	23	490	2000	80	275	
600	140	2200	320	1080	8	
110	170	190	990	1560	1500	
1276	21	500	280	900	300	
11,000+	NA	500	500	135	18	
480	120	660	85	100	1700	
168	500	475	1200	1450	197	
2.5	1500	700	2500	68	1800	
2000	293	94	460	358	147	

Q24 - How many years have you been farming?
Average length of time: 38.5 years

0	28	41	50	60
0	28	42	50	60
0	28	42	50	61
1	29	42	50	62
3	29	42	50	65
5	30	42	50	65
7	30	43	50	75
9	30	44	50	?
9	30	44	50	25 - pasture only
10	30	44	50	40+
10	30	44	50	40+
10	30	44	50	40+
11	30	45	51	50, now retired
11	30	45	52	50+
11	30	45	52	50+
12	30	45	52	50+
12	32	45	52	50+
13	32	45	52	55 years, retired
13	32	45	52	60+
15	34	45	53	I don't
16	35	45	53	landowner only
16	35	45	54	lease
17	35	45	54	life time
18	37	46	55	NA
20	37	47	55	no longer
20	37	47	55	Renting
20	39	48	55	We are a church
23	40	48	57	
23	40	48	59	
23	40	48	60	
23	40	49	60	
24	40	49	60	
25	40	50	60	
25	40	50	60	
25	40	50	60	

Q25 - Do you currently use a crop advisor or agronomist?

Answer	Count (%)
No, I do not currently use a crop advisor or agronomist, but I have used one in the past.	33 (19.3%)
No, I have never used a crop advisor or agronomist.	51 (29.8%)
Yes, I currently use a crop advisor. If yes, please specify:	87 (50.9%)
Total	171 (100%)

Q4 Yes, I currently use a crop advisor. If yes, please specify:

Agronomist	09897 Bob Royer crop
Ceres	Abby Horlacher
Ceres	Co-Alliance - Reagan
Co-Alliance	Advanced Argillitics
Co-Alliance	Co-Alliance - Reagan
Co-Alliance	Local co-op
Co-op	I use an independent agronomist to make fert, chem recommendation
Dr Paul Hodgen	Fertilizer company/agronomist
I use an agronomist when I want a second opinion	Coop Co-Alliance
I was a CCA before I started farming full time	Nickel Plate Consulting - Abby Horlacher
Independent advisor	tenant does it
John McGullicutty	Independent Agronomist
Lamb Farms	Ceres Solutions - Wingate
Levi Collis - Farmers edge	Soil microbiologist and an independent crop scout
Local Co-op	Advanced Agrillitics
Mark Kepple	Co-Alliance
Nutrien	Nicholson Consulting for fertility, Bayer agronomist in season
Nutrien	Seed and fertilizer agronomists
Per the soil test results	Co-Alliance
Reynolds Agronomy	Co-Alliance
Reynolds/Co-Alliance	Helps me nutrient management plan
Seed Fertility New Trends	Co-Alliance
Soil analyst	Co-Alliance
Soil testing	Co-Alliance agronomist
Tenant may, but don't know	Helena

Q26 - Did any family member own and operate this farm before you did?

Answer	Count (%)
Yes	118 (66.3%)
No	60 (33.7%)
Total	178 (100%)

Q27 - How many years has the farm been in your family?

Average years farms have been in respondents' families: 81 years

Total years of ownership in watershed: 10,660 years

3	56	72	100	171	60+
9	56	74	100	192	80+
12	60	74	100	196	80+
14	60	75	100	200	80+ years
15	60	76	100	+/- 100 years	85?
20	60	77	100	~70	90+
23	62	80	100	100 + years	A long time
25	65	80	105	100 years plus	don't know
30	65	80	107	100+	NA
30	65	80	110	100+	Over 100 yr
30	66	80	110	100+	Over 100 yrs
30	66	82	115	100+	Since 1945
30	66	85	124	100+	
32	67	85	125	100+	
35	67	87	125	100+	
47	68	90	130	100+years	
50	68	90	132	150 years	
50	70	90	132	20 years	
50	70	90	140	200 years	
50	70	91	150	32 yrs	
50	70	99	150	50+	
50	70	100	157	60 years	
53	72	100	163	60; 20 years	
55	72	100	170	60+	

Q28 - How likely is it that any family member will continue farm operations when you retire or quit farming?

Answer	Count (%)
Definitely will not happen	19 (11%)
Definitely will happen	19 (11%)
Probably will not happen	41 (23.7%)
Probably will happen	94 (54.3%)
Total	173 (100%)

Q29 - How regularly do you conduct soil testing?

Answer	Count (%)
Annually	40 (24%)
2 year	38 (22.8%)
3 year	18 (10.8%)
4 year	33 (19.8%)
5 year	3 (1.8%)
½ every other year	2 (1.2%)
3-5 years	5 (3%)
Not regular	12 (7.2%)
Never	5 (3%)
Not sure	7 (4.2%)
Unique answers (below)	4 (2.4%)
Total	167 (100%)

Unique responses:

- Every 8 years
- 2-3 times a year
- Every year on 25% of acres, every 5th yr 100%
- 3-4 times a year

Q30 - Are your application recommendations based on current soil testing?

Answer	Count (%)
No	11 (6.9%)
Yes	149 (93.1%)
Total	160 (100%)

Q31 - Do you have a nutrient management plan for your farm operation?

Answer	Count (%)
Yes	122 (73.1%)
No	45 (26.9%)
Total	167 (100%)

Q32 - Five years from now, which statement best describes your farm operation?

Answer	Count (%)
It will be smaller	2 (1.6%)
It will be larger	30 (23.8%)
It will be about the same as it is today	94 (74.6%)
Total	126 (100%)

Q33 - What is included in your nutrient management plan?

Answer	Count (%)
Commercial nutrients	131 (80.9%)
Livestock manure	19 (11.7%)
Septic waste	1 (0.6%)

Municipal or industrial sludge	1 (0.6%)
Other	10 (6.2%)
Total	162 (100%)

Q34 - In 2022, how many acres of each of the following did you manage in the portion of the Upper Sugar Creek Watershed indicated on the map? If none, please enter 0.

Corn acres	Corn w/ conserv. till	Corn w/ cover crop	Soybean acres	Corn w/ conserv. till	Soybean w/ cover crop	Other (Specify)	Total conservation acreage
51			494				10+/-
24	24	0	24	24	24	hay 18, pasture 40	0
95	95						
0	0	0	0	0	0	0	0
372	372	20	441	20			
300	0	0	300	0	0		4
40			160				
				38			
450	450		450	450			12
2750			2750				
100	40		75				
			155	155			
127			100				10
161	161		184	184			
120							5
127			90				
99	99	20					2
620	620		656	656			
			800	800	400		
175			235	235			7.9
845	845		845	845			
300			200				
735	382		311	311		212	3
3.6	3.6						9
1750	1000	160	1750	800			25
400			400				3
46							
193			204				

Corn acres	Corn w/ conserv. till	Corn w/ cover crop	Soybean acres	Corn w/ conserv. till	Soybean w/ cover crop	Other (Specify)	Total conservation acreage
250							
						30 pasture/hay	
600	600		600	600			10
1500	1500		1500	1500			
1400		100	1100			30, hay	
30							
52	all	325	all				8
55	55		33	33			
0			0				20
							13
400	400		400	400	32		
300	300	120	300	300	100		1
260			100				
300	300		300	300			
	117			108			1
5800	4800	2000		5200	2000		75
60			60	60			
400	400	30	400	400	30		
							wheat
1500	100	50	1500	200	50		
1700			1700	500		1200 acres cows	
123			285	285	285		
194			192	192			
600	600		750	750			
45	45		95	95			
			26				
			20	20			
40	40	40	60	60	0		0
250			250	150			

Corn acres	Corn w/ conserv. till	Corn w/ cover crop	Soybean acres	Corn w/ conserv. till	Soybean w/ cover crop	Other (Specify)	Total conservation acreage
							22
132	132		160.67	160.67			
			61				
57							
1350	1350		1350	1350			
500	250	100	500	500	100	10	10
			19				
250	250		240	240			1
1100	1100	900	1100	1100	800		10
110			100	100			
			120	120	120		
240	240		520	420			
264	200		64	64			
185	185		185	185			
44	44		50	50			
47		81	35				
15	15						
400	400	0	320	320	0		0
258			200	200			
1000	1000	20	1000	1000	20		
120				120			
						Hay - 100	
365			230			30	50
150	150	150					
3000	1800	1200	1200	1200	600		70
63	63	63					
249	0	0	0	0	0		0
716	0	132	442	442	442		0
150	150	0	270	270	0		0

Corn acres	Corn w/ conserv. till	Corn w/ cover crop	Soybean acres	Corn w/ conserv. till	Soybean w/ cover crop	Other (Specify)	Total conservation acreage
0	0	0	0	0	0	hay	0
			80	80			
350			300				
618	618		603	603			
400			400				
72			63				
100	100	100	0	0			
			160				
			68	0	0		6
143			130	130			
							8
575	575		550	550			2
			33	33			
						12- wildflowers	
2000	1000		2000	1500			20
1500	900		1500	1200	1000		20
99				99			
450	600			600			
730			800				
300			300				
80			80				
1010				1090			
						800 - trees	
400			200				
						20 - pasture	
950	950	56	950	950			
			32	32			
850	400	450	950	500	450		10
650			650				

Corn acres	Corn w/ conserv. till	Corn w/ cover crop	Soybean acres	Corn w/ conserv. till	Soybean w/ cover crop	Other (Specify)	Total conservation acreage
						18	
1000	200	200	1000	1000	50	-	20
2000	2000		2000	2000		50	50
140			240				
150	0	0	0	0	0		0
187	187		58				
150	150						
250			250	150			
1000	0	0	1000	0	0		
425			422				
60	60	60					
130	130	0	130	130	6		4.5
						hay - 8	
600	500	0	600	500	0	0	
120	120	120	120	120	120	60	10
800	60		600	200			
50	none	none	60		40	Wheat, 60 acres	none
700	0	0	1100	1100	0		0
85	85	0	0	0	0		
400	0	0	400	0	0	0	0
1000	0	0	1500	500	0		50
830	0	0	800	0	0		0
1250	1250	0	1250	1250	0	0	30
0	0	0	0	0	0	0	25
1000	0	0	1000	800	0		
							none
600	600	0	390	390	0		5
120	0	0	160	160	0	0	0
40	40	0	0	0	0		10

Corn acres	Corn w/ conserv. till	Corn w/ cover crop	Soybean acres	Corn w/ conserv. till	Soybean w/ cover crop	Other (Specify)	Total conservation acreage
0	0	0	85	0	0		0
750	80		450	450			2.8
1500	1500	500	1000	1000	600		45
0	0	0	0	0	0		
3200	3200	300	3100	3100	1200		A lot
1200	1200	0	1200	1200	0	Pasture, hayfields	0
1000	1000	0	1000	1000	0		
2000	0	0	2000	2000	0		
0							
0	0	0	75	0	0	5 Hay	0
100	100	0	125	125	0		0
400	0	0	400	400	0		
354	0	0	0	0	0		0
300	300	0	200	200	0		18
0			0				
		20	110	110			25
100	100	Don't know	100	100	Don't know		5.5

Q35 - Does the property you manage touch a stream, river, lake or wetland?

Answer	Count (%)
Yes	112 (65.9%)
No	58 (34.1%)
Total	170 (100%)

Q36 - Who developed your current nutrient management plan?

Answer	Count (%)
My local conservation district, university extension or NRCS office	9 (6.4%)
Other	12 (8.5%)
I created my own plan	35 (24.8%)
A private-sector agronomist or crop consultant	85 (60.3%)
Total	141 (100%)

Q37 - How many of the following animals are a part of your farming operation in the portion of the Upper Sugar Creek Watershed indicated on the map. If none, please enter 0.

Dairy cattle (including heifers and young stock)	Beef cattle (including young stock)	Hogs (including contract hog barns)	Poultry	Horses	Other Livestock (specify)
0	50	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
	50			5	
	25				
	50			14	
	175				
	290				
	2			4	
	30				
	30				
	40		12	40	
0	0	0	0	0	0
	15		26		
	50				
	45				
	150			2	
	20				
	40				
	30 cows, 45 feeders				
0	0	0	0	0	
	35				
	5			4	
	250				
	30		9		
0	0	0	0	0	0
	20-25				
	68				

Dairy cattle (including heifers and young stock)	Beef cattle (including young stock)	Hogs (including contract hog barns)	Poultry	Horses	Other Livestock (specify)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	2	0	0	1	
0	0	0	0	0	0
	25				
	20			2	
	6 - Summer only				
		1100			
			20		
0	0	0	0	0	0
					bees - 12 hives
0	0	0	0	0	
200					
			6		
				4	
	9				
				4	
none	none	none	none	none	
0	0	0	0	0	0
0	12	0	0	0	60 goats
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	13	3	0
0	0	0	0	0	
0	30	0	0	10	15 sheep
0	95	50			

Dairy cattle (including heifers and young stock)	Beef cattle (including young stock)	Hogs (including contract hog barns)	Poultry	Horses	Other Livestock (specify)
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	30	0	0	0	0
0	0	0	10	0	0
	120				
0	8	5	0	0	4 goats
0	200	0	0	0	
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	6	
0	0	0	0	0	0
0	0	0	0	0	0
0	25	0	0	0	
0	0	0	0	0	
0	0	0	0	0	
0	0	0	0	0	0
0	0	0	0	0	0
0	50	0	0	0	0

Q38 - Do you make the home and lawn care decisions in your household?

Answer	Count (%)
Yes	161 (93.6%)
No	11 (6.4%)
Total	172 (100%)

Q39 - What is your gender?

Answer	Count (%)
Male	154 (90.6%)
Female	16 (9.4%)
Total	170 (100%)

Q40 - What is your age in years?
Average age of respondent: 64.5 years

30+	54	62	67	71	82
65-70	54	62	67	72	82
26	54	63	67	72	82
28	55	63	67	72	83
30	55	64	67	72	85
32	55	64	67	72	85
32	56	64	67	73	85
33	56	64	68	73	86
35	57	64	68	73	87
37	57	64	68	73	87
40	57	64	68	73	88
41	58	64	68	74	88
41	59	65	68	74	88
42	59	65	68	74	88
42	59	65	68	74	90
43	59	65	69	74	90
43	59	65	69	75	
43	60	65	69	75	
45	60	65	69	76	
46	60	65	69	76	
49	60	65	70	76	
50	60	66	70	77	
51	60	66	70	77	
51	60	66	70	78	
52	61	66	70	79	
52	62	66	70	80	
52	62	66	70	80	
53	62	66	70	80	
53	62	67	70	81	
53	62	67	70	81	

Q41 - What is the highest grade in school you have completed?

Answer	**Count (%)**
Some formal schooling	1 (0.6%)
Post-graduate degree	13 (7.6%)
2-year college degree	14 (8.2%)
Some college	35 (20.5%)
High School/GED	47 (27.5%)
4-year college degree	61 (35.7%)
Total	171 (100%)

Q42 - What is the approximate size of your residential lot?

Answer	Count (%)
5+ acres	8 (4.8%)
1/4 acre or less	9 (5.4%)
More than 1/4 acre but less than 1 acre	16 (9.6%)
1 acre to less than 5 acres	133 (80.1%)
Total	166 (100%)

Q43 - Do you own or rent your home?

Answer	Count (%)
Own	170 (99.4%)
Rent	1 (0.6%)
Total	171 (100%)

Q44 - How long have you lived at your current residence?

Average duration of time living in home: 28 years

20+	35	28 years	20 years	10	50
32+	35	28 yrs	21	10	50
50+	36	28	22	10	50
don't live here	36	29	22	10	50 years
no residence	37	29	22 years	11	50
1	37	29	23 years	11 years	52
1	37 years	30	23	12	52
1 year	38	30	23	12	53
2	38	30	23	13	55 years
2	40	30	24	13	58
2	40	30	24	13	60
2	40	30	24	13 years	60
2	40 years	30	25	14	68
3	42	31	25	14 years	73
3	44	31	25	14	73
4	44	32	25	15	76
4	45	32	25	15	78
4	45	32 years	25	15	86
5	45	32	25 years	15 years	1994
6	46	32	26	16	10
7	46	32	26	16	50
7 years	47	32 yrs	26	16 years	35
7	48	33	26	17	28
8	48	33	26 years	18	20
8	48 years	33	27	18	
8	48	33	27	19	
9	48	33	28	19	
9	49	34	28	20	

10 years	50	34	28	20	

Q45 - Which of the following best describes where you live?

Answer	Count (%)
Rural subdivision or development	10 (5.8%)
In an isolated, rural, non-farm residence	12 (7%)
In a town, village or city	15 (8.7%)
On a farm	135 (78.5%)
Total	172 (100%)

Q46 - In addition to your residence, which of the following do you own or manage. Please check all that apply.

Answer	Count (%)
Rural recreational property	14 (7.2%)
Other	14 (7.2%)
Forested land	36 (18.6%)
An agricultural operation	130 (67%)
Total	194 (100%)

Q47 - What is your ethnicity?

Answer	Count %
African American	0.00%
American Indian	0.00%
Asian/Asian American/Pacific Islander	0.00%
Hispanic/Latino	0.00%
Multi-racial	1 (0.6%)
Other	2 (1.2%)
White/Caucasian	161 (98.2%)
Total	164 (100%)

Q48 - Do you use a professional lawn care service?

Answer	Count (%)
Yes, just for mowing	1 (0.6%)
Yes for mowing and fertilizing	1 (0.6%)
Yes for mowing, fertilizer and pest control	4 (2.3%)
Yes, just for fertilizing and pest control	28 (16.3%)
No	138 (80.2%)
Total	172 (100%)

Q49 - Do you regularly read a local newspaper?

Answer	Count (%)
Yes	79 (45.7%)
No	94 (54.3%)
Total	173 (100%)

Q50 - Where are you likely to seek information about soil and water conservation issues? Please check all that apply.

Answer	Count (%)
Radio	16 (4.4%)
Workshops/demonstrations/meetings	48 (13.2%)
Trade publications/magazines	56 (15.4%)
Internet	62 (17%)
Conversation with others	90 (24.7%)
Newsletters/brochure/fact sheet	92 (25.3%)
Total	364 (100%)

Q51 - People get information about water quality from a number of different sources. To what extent do you trust those listed below as a sources of information about soil and water?

Question	Not at all	Slightly	Moderately	Very Much	Am not familiar	Total
Local government	66 (39.3%)	42 (25%)	42 (25%)	7 (4.2%)	11 (6.6%)	168
Nonprofit environmental group	64 (37.4%)	38 (22.2%)	47 (27.5%)	8 (4.7%)	14 (8.2%)	171
Fertilizer representatives	27 (15.8%)	45 (26.3%)	65 (38%)	27 (15.8%)	7 (4.1%)	171
Soil and Water Conservation District	6 (3.5%)	10 (5.8%)	48 (27.9%)	101 (58.7%)	7 (4.1%)	172
Natural Resources Conservation Service	9 (5.2%)	13 (7.6%)	49 (28.5%)	91 (52.9%)	10 (5.8%)	172
Farm Services Agency	7 (4.1%)	14 (8.1%)	71 (41.3%)	76 (44.2%)	4 (2.3%)	172
Farm Bureau	24 (14%)	29 (16.9%)	68 (39.5%)	40 (23.3%)	11 (6.4%)	172
Local watershed project	18 (10.5%)	27 (15.7%)	69 (40.1%)	45 (26.2%)	13 (7.6%)	172
Crop consultants	17 (9.9%)	30 (17.4%)	59 (34.3%)	56 (32.6%)	10 (5.8%)	172
Land trust	57 (33.1%)	30 (17.4%)	38 (22.1%)	9 (5.2%)	38 (22.1%)	172
U.S. Environmental Protection Agency	65 (37.8%)	42 (24.4%)	47 (27.3%)	11 (6.4%)	7 (4.1%)	172
Indiana State Department of Agriculture	15 (8.7%)	43 (25%)	76 (44.2%)	32 (18.6%)	6 (3.5%)	172
Local community leader	49 (28.5%)	47 (27.3%)	54 (31.4%)	11 (6.4%)	11 (6.4%)	172
Purdue University Extension	5 (2.9%)	20 (11.6%)	56 (32.4%)	89 (51.5%)	3 (1.7%)	173
Neighbors/friends	12 (6.9%)	42 (24.3%)	90 (52%)	28 (16.2%)	1 (0.6%)	173
Indiana Department of Environmental Management	35 (20.2%)	49 (28.3%)	60 (34.7%)	21 (12.1%)	8 (4.6%)	173
Department of Natural Resources	22 (12.7%)	34 (19.7%)	68 (39.3%)	46 (26.6%)	3 (1.7%)	173
County Health Department	40 (23.1%)	34 (19.7%)	71 (41%)	22 (12.7%)	6 (3.5%)	173