3.4 Maumee River & Subbasin Swan Creek

3.4.1 Monitoring Organizations: Currently, the only organization in the LEBAF Network monitoring the Maumee River Watershed and Subbasin Swan Creek Watershed is the Community Water Action Toledo (CWAT). CWAT aims to increase the understanding of water quality in Lake Erie tributaries and drive improvement of water quality across Northwest Ohio by aligning sampling protocols with LEBAF, harnessing the existing strengths of collective programs, and engaging a wide range of volunteers in citizen science. Participating members in 2024 included Metroparks Toledo, Partners for Clean Streams, the Toledo Zoo, and TMACOG. Monitoring began in 2023 and continued through 2024.

3.4.2 Station Summary:

Maumee River Main Stem - Monitoring, using the LEBAF protocol, began in 2023 at 6 stations on the Maumee (CWAT-6*+, CWAT-7*+, CWAT-8*+, CWAT-9, CWAT-10, and CWAT-11). Station CWAT-6 is the most upstream site monitored, moving numerically downstream with CWAT-11 being the most downstream. Stations with an (*) have been monitored by Metroparks Toledo for macroinvertebrate data since 2021. Stations with an (+) have been monitored by ODNR Scenic Rivers for macroinvertebrate data during the 2024 season. Stations CWAT-9, CWAT-10 and CWAT-11 are within the lacustrine zone on the river and urbanized areas, with no buffers and residential or commercial adjacent land use. Stations CWAT-6 and CWAT-7 have primarily agricultural adjacent land use, with wooded buffers. Station CWAT-8 has agricultural and residential adjacent land use. The Maumee River is 140 miles long and is the largest direct tributary to Lake Erie, draining parts of Michigan, Indiana, and Ohio. Most of the watershed (~ 73 %) is in Ohio, draining 5,024 square miles over 107.8 river miles. Monitored stations are all on the Lower Maumee. Land Use is dominated by row crop agriculture (75.82%).

Swan Creek Subbasin - All 2023 stations monitored on Swan Creek were upstream of the City of Toledo. In 2024, two stations (CWAT-14 and CWAT-20) within the City of Toledo were added to capture a broader picture of the watershed. Stations CWAT-13, CWAT-15, CWAT-18, CWAT-19, and CWAT-21 are all located within Oak Openings Metropark, a 5,000 acre preserve of natural lands and ecosystems managed by Metroparks Toledo and are the most upstream sites monitored. Stations CWAT-16 and CWAT-17 are in the middle of the monitored section of the stream, and have primarily residential and agricultural row crop adjacent land use, with wooded buffers. Station CWAT-12 is located in a preserve within an urban area. Swan Creek joins with the Maumee River in downtown Toledo. Overall, the land

use in the Swan watershed is characterized by row crop agriculture (55%), although compared to the Maumee watershed as a whole, there are higher proportions of urban/residential (21%) and forest (18%) land use.

3.4.3 Summary of 2024 Findings and Analysis

Table 10. Maumee River Summary Statistics and Exceedances – 100 total samples, 6 stations

Parameter	Mean	Median	Min	Max	Sample Count	N Exceedance	% Exceedance
Conductivity Biocondition	574.91	560.00	247.50	1002	96	92	95.8
DO (mg/L)	9.65	8.92	5.07	22.15	94	0	0
pH	8.33	8.17	7.44	9.79	98	12	12.24
Water Temperature	21.49	22.25	8.80	34.70	96	19	19.8

Usable sample count varied per parameter. See text below for specifics.

Maumee River Main Stem

pH – There were 12 pH exceedances out of 98 samples (12.24%) observed. Exceedances occurred on June 15, June 20, July 26, August 9, August 14, September 9, October 18, and October 30. All exceedances were slightly above pH 9. 7 exceedances occurred at CWAT-8 Sidecut, 2 exceedances at CWAT-7 Farnsworth, 2 exceedances at CWAT-6 Providence and 1 exceedance at CWAT-9 Walbridge Park. Per Ohio EPA, alkalinity in the basin can be expected due to the geology of the watershed. Sidecut is located in the middle of sampled stations; given the lack of a difference between pH values observed at stations upstream versus downstream of this site, the high pH values observed at Sidecut likely reflect local site conditions. Sidecut sampling occurred in a side channel from the main stem of the Maumee River, where low-flow conditions are more common over the summer. Data collected do not indicate pH as a cause for concern for impairment in the Maumee River based on LEBAF standards.

DO – There were 0 exceedances out of 94 samples (0%) observed. 100% of the DO values recorded on the Maumee River during the 2024 season were within LEBAF standards; therefore DO levels in the river are expected to support aquatic life throughout most of the year.

Temperature – There were 19 exceedances out of 96 samples (19.8%) observed. Exceedances occurred on April 17, April 18, May 26, June 15, June 19, June 20, June 23, July 26, August 9, August 14, and September 19. Exceedances occurred at upstream and downstream locations. All exceedances were close to the threshold limit, only slightly above benchmark.

Conductivity - The Maumee River watershed falls in the Huron-Erie Lake Plain ecoregion, which serves as the reference for our observed values. In 2024, conductivity values in the Maumee River ranged from 247.50 to 1002 µS cm-1 with a 50th percentile value of 562 µS cm-1. The median and maximum values are comparable to the 50th percentile value of 659 µS cm-1 and 95th percentile value of 1043 µS cm-1 for Huron-Erie Lake Plain rivers reference. This comparison with the ecoregion references shows good overlap with our dataset and provides additional confidence in using our conductivity results.

Conductivity results can be used to evaluate how well a stream supports aquatic life. The Ohio EPA sets conductivity thresholds of < 412 µS cm-1 to denote a healthy macroinvertebrate community, values between 412 and 655 µS cm-1 indicates a degrading macroinvertebrate community, and those > 655 µS cm-1 indicates a degraded community. In 2024, 4 out of 96 samples fell under 412 µS cm-1, 76 out of 96 samples fell in the degrading range, and 16 out of96 samples were > 655 µS cm-1. Overall, this data suggests that macroinvertebrate communities in the Maumee River are degrading or degraded. However, supplemental data collected by Metroparks Toledo and ODNR Scenic Rivers at 3 of the 6 sites suggest some resilience within the macros community. Calculated salinity and chloride parameters based on measured conductivity values, did not show any exceedances. The Maumee River watershed drains a heavily used agricultural area, with extensive field tiling and drainage system alterations. Nutrient pollution is a known issue within the watershed, and high conductivity values likely reflect some of that influence.

Table 11. Swan Creek Summary Statistics and Exceedances – 112 total samples, 10 stations

Parameter	Mean	Median	Min	Max	Sample Count	N Exceedance	% Exceedance
Conductivity Biocondition	597	605	219.1	1056	112	95	84.8
DO (mg/L)	7.29	7.28	1.33	12.01	109	10	9.17
pH	7.89	7.91	6.93	8.71	112	0	0

Water Temperature	20.60	21.9	8.3	26.8	112	7	6.25

Swan Creek Subbasin

pH – Data collected in 2024 do not indicate pH as a cause for concern for impairment in Swan Creek based on LEBAF standards.

DO – There were 10 exceedances out of 109 samples (9.17%) observed. Low readings occurred on May 22, July 31, August 12, August 30, September 11, and October 30. 5 exceedances occurred at CWAT-18 Oak Openings: Evergreen Lake. Additionally, 2 exceedances occurred at CWAT-19 Oak Openings: Beach Ridge. While 1 exceedance occurred at CWAT-15, CWAT-16, and CWAT-17. Overall, exceedances occurred throughout the sampling season at different stations. At CWAT-18 Oak Openings: Evergreen Lake had consecutive DO exceedances throughout the sampling season. DO varied as expected seasonally and temporally. Single exceedances at a site are likely more reflective of time of sampling rather than conditions on the stream. Low levels at CWAT-18 Evergreen Lake are likely reflective of low or stagnant water at the time of sampling, a reoccurring site-specific condition. Approximately, 91% of DO values recorded on Swan Creek during the 2024 season were within the LEBAF analytical benchmark of ≥5 mg L^{-1}.

Temperature – There were 7 temperature exceedances out of 112 samples (6.25%) observed. Exceedances occurred from May 21 through May 26, at CWAT-13, CWAT-14, CWAT-15, CWAT-16, CWAT-17, CWAT 18 and CWAT-20. Five of these sites are located within the Oak Openings Metropark, on headwaters or small stream catchments. Two sites are located further downstream on headwaters or small stream catchments. Upper level air temperatures were recorded at 90 degrees with high wind conditions. The measured water temperature exceedances are likely related to the abnormally hot conditions for the season and the susceptibility of smaller catchments to weather extremes. Given the constrained geographic and temporal nature of the measured exceedances, data collected do not indicate temperature as an impairment concern in Swan Creek.

Conductivity – The Swan Creek Subbasin of the Maumee River Watershed falls in the Huron-Erie Lake Plain ecoregion, which serves as the reference for our observed values. In 2024, conductivity values in Swan Creek ranged from 219 to 1331 µS cm-1 with a 50th percentile value of 597 µS cm-1. The median and maximum values are comparable to the 50th percentile value of 653 µS cm-1 and 95th percentile value of 1107 µS cm-1 for Huron-Erie Lake Plain streams reference. While the collected maximum value exceeds the reference, this comparison with the ecoregion references shows good overlap with our dataset and provides additional confidence in using our conductivity results.

Conductivity results can be used to evaluate how well a stream supports aquatic life. The Ohio EPA sets conductivity thresholds of < 412 µS cm-1 to denote a healthy macroinvertebrate community, values between 412 and 655 µS cm-1 indicates a degrading macroinvertebrate community, and those > 655 µS cm-1 indicates a degraded community. In 2024, 17 out of 112 samples fell below 412 µS cm-1, 58 out of 112 samples fell in the degrading range, and 37 out of112 samples were > 655 µS cm-1. Overall, this data suggests that macroinvertebrate communities in Swan Creek are degrading or degraded. Upstream sites appeared to have lower average conductivity readings relative to downstream sites, with headwater sites in Oak Openings Metropark, a large natural preserve, having the lowest readings, and more urbanized sites downstream having the highest readings. Calculated salinity and chloride parameters based on measured conductivity values, did not show any exceedances. The Swan Creek watershed drains a heavily used agricultural area, with extensive field tiling and drainage system alterations upstream, and downstream runs through a heavily urbanized area with stormwater inputs. Nutrient pollution is a known issue within the watershed, and high conductivity values may reflect some of that influence.

3.4.4 Summary of 2024 Conclusions, Recommendations, Actions

Table 12. Maumee River Main Stem Water Quality Summary

pH	***Temperature***	***DO***	***Conductivity***
Acceptable	Acceptable	Acceptable	Concern for biota, degrading

Table 13. Swan Creek Subbasin Water Quality Summary

pH	***Temperature***	***DO***	***Conductivity***
Acceptable	Acceptable	Acceptable	Concern for biota, degrading

Overall, 2024 data suggests that the Maumee River and Swan Creek support aquatic life based on LEBAF benchmarks for water temperature, pH, and DO. Persistently high conductivity values in the watershed are a cause for concern due to potential impacts on aquatic life, and based on LEBAF standards both waterways are considered degraded with a concern for biota. We recommend continuing LEBAF monitoring to gain a better understanding of stream health and baseline conditions over time. The data collected this year reflects corresponding trend lines relative to the previous monitoring year. At sites that have local conditions with exceedances in a specific parameter (CWAT-18 & CWAT-19), we recommend increased monitoring where feasible, specific to the parameter of concern,

and in response to climate events as reasonable. Additional DO monitoring for a 24-hour cycle and/or monitoring on consecutive days when an exceedance is noted is recommended. Monitoring for pH on consecutive days, multiple times a day, and/or capturing multiple locations within the channel is recommended. Lastly, for temperature, monitoring on consecutive days would be recommended.

At all sites where feasible and suitable, we recommend initiating macroinvertebrate monitoring several times during the sample season using ODNRs SQM method. Regular monitoring of the macroinvertebrate community, along with continued monitoring of conductivity per LEBAF standards, will expand understanding of the effect of conductivity in the watershed.