Contents

2023 LEBAF LARGE RIVER Swan Creek Analysis

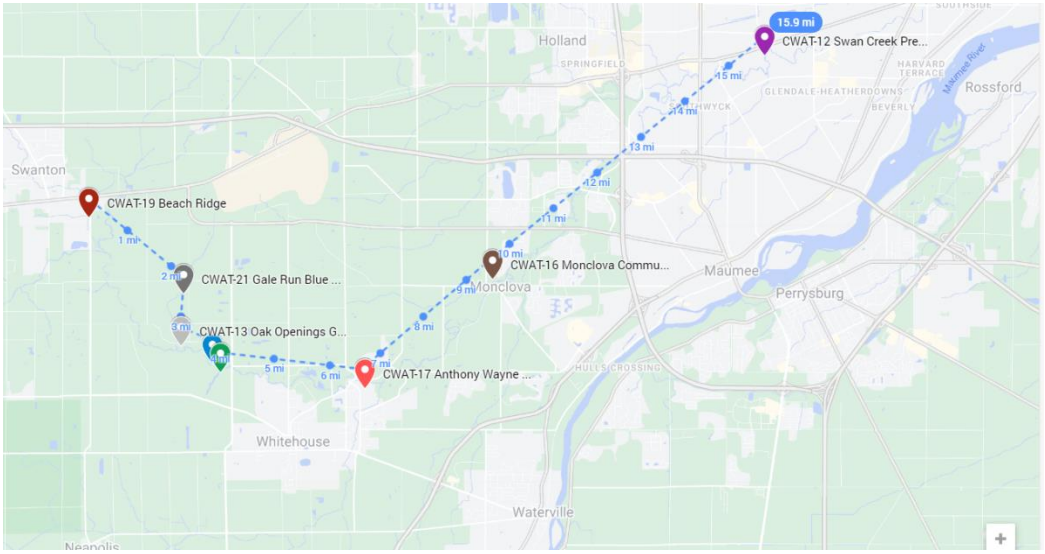
1. **Name of Organization and statement about organizations mission and participation in LEBAF:**

   Community Water Action Toledo: CWAT aims to increase understanding of water quality in Lake Erie tributaries and drive improvement for water quality across Northwest Ohio through aligning our members' sampling protocols with LEBAF, harnessing our collective programs' existing strengths, and engaging a wide range of volunteers in citizen science.

2. **Station information, summary of stations, locations, proximity to each other, how long monitoring and any other information useful for a data user**

   LEBAF Monitoring at all stations began in 2023.

   CWAT-12: Swan Creek Preserve (4659 Airport Hwy, Toledo, OH 43615)
   CWAT-13: Oak Openings Gale Run (5406 Wilkins Rd #5406, Whitehouse, OH 43571)
   CWAT-15: Horse Trail (Evergreen Lake Trail, Whitehouse, OH 43571) *Blue
   CWAT-16: Monclova Community Park (4395 Albon Rd, Monclova, OH 43542)
   CWAT-17: Anthony Wayne High School (5967 Finzel Rd, Whitehouse, OH 43571)
   CWAT-18: Evergreen Lake (Evergreen Lake Trail, Whitehouse, OH 43571) *Green
   CWAT-19: Beach Ridge (3520 Waterville Swanton Rd, Swanton, OH 43558)
   CWAT-21: Gale Run Blue Trail (5230 Wilkins Rd, Whitehouse, OH 43571)



   Map shows approximate distances between stations and station locations relative to each other. Lake Erie influence on Swan Creek happens downstream from all sampling locations, so lacustrine dynamics do not need to be considered in our analysis.

   Land use information from OEPA:

   The watershed drains 204 square miles. An estimated 49,000 citizens reside in the Swan Creek watershed year round. The Village of Swanton, with nearly 3,500 people, draws

drinking water from Swan Creek. The lower reaches of Swan Creek run through the southern portion of the City of Toledo until joining with the Maumee River in downtown Toledo. Overall, the land use in the Swan watershed is 55 percent row crop and pasture land, 21 percent urban/residential, and 18 percent forest. (Swan Creek TMDL Report, 2010)

Land use within the Swan Creek watershed changes significantly from rural agricultural lands in the headwaters to the creek's confluence with the Maumee River in the City of Toledo. A significant area of natural lands in the Oak Openings region have been preserved by Metroparks Toledo. The region's primary airport (Eugene F. Kranz Toledo Express Airport) and rural residential properties dot this significant natural resource. Continued urban sprawl into the upper reaches of the watershed is a concern. (STEM 2017 Report).

3. **2023 data summary, what parameters were sampled, sample season deviations, anything of importance to note. 2023 data summary, what parameters were sampled, sample season deviations, anything of importance to note.**

   Pull it together and find the story

   a. Compile the summary conditions of each parameter, complete this table, support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, except Average Conductivity uses its own four bin conditions

Temp	pH	DO	*Avg Conductivity	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Acceptable	Concern for Biota	Degrading	Acceptable

Chloride	Salinity	TDS/ DW
Acceptable	Acceptable	n/a

   b. Review and complete the items below, using information above:

Exceeded parameter, %	Dates exceedances occurred	Stations exceedances occurred
Conductivity/Biocondition, 91.67%	All	All
DO, 11.67%	May 31, June 27, August 30 September 27 October 5 October 29	CWAT-18 CWAT-16, CWAT 19 CWAT-17 CWAT-16

Salinity, 3.33%	June 20, October 3	CWAT-12 Swan Creek
Water temperature, 6.67%	May 31,	CWAT-13, CWAT-14, CWAT-15, CWAT-21 (all Oak Openings Sites)

Key Metadata reviewed or to consider for interpretation:
Upstream and adjacent land use, Ohio EPA reports for the Swan Creek, LEBAF parameter thresholds and metadata tables.

c. Collective and combined analysis statements from all exceeded parameters, include a characterization of extent, are these occurring at one or several locations or all, are they occurring all year or at specific times of year?
Collective Analysis statements:

For the purposes of screening most of the measured LEBAF parameters (pH, DO, Water Temperature, Salinity, Chloride) indicate acceptable or healthy stream conditions in Swan Creek from April – October 2023. Conductivity/Biocondition exceeded the benchmarks with a 91.67% exceedance rate, wich all stations monitored on the river experiencing exceedances throughout the sampling season. This indicates that based on the collected data as whole, conductivity may degrade this stream for aquatic life during the summer and fall. Overall, all other collected data indicates a healthy waterway.

4. Aggregated Recommendations. Review Summary Recommendations from respective STATION Fact sheets and above and draft a location, parameter recommendation that overall conveys actions to protect, explore or restore that either LEBAF or others could embark.

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; initiate macroinvertebrate monitoring at stations where feasible- focus on CWAT-12, where conductivity values are highest on this stream. Continue to follow trends, investigate exceedances, and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

5. **Current Water Quality Data Exceedance Table.**

Summary of Exceedances by Waterbody and Parameter

Basin	Sample Run..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceeded	Pct Exceeded
Swan Creek	2023	Chloride	33.58	32.95	15.61	65.59	61.00	0.00	0.00
		Conductivity Biocondition	681.48	668.50	316.80	1,331.00	61.00	55.00	91.67
		Conductivity TDS	368.67	366.85	0.00	732.05	61.00	0.00	0.00
		Dissolved Oxygen	8.07	8.24	2.04	13.69	61.00	7.00	11.67
		pH	7.83	7.83	7.13	8.63	61.00	0.00	0.00
		Salinity	566.04	552.08	245.02	1,167.70	61.00	2.00	3.33
		Water Temperature	17.55	18.70	7.80	24.60	61.00	4.00	6.67

2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards.

6. **Previous Year Water Quality Data Exceedance Table. Summary.**

N/A, first year sampling.

7. ***Summary for pH***

a. *pH:* 61 samples, _0___ # exceedances,__0__ % exceedance rate.
b. Is map illustration of station pH #/% exceedances the same as table: Y N
   Yes
c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y N:
   None
~~a. Insert graph of pH exceedances is below. If no exceedances skip graph export.~~

~~b. Make a statement about the magnitude, frequency and duration of any exceedances:~~

~~c. Does pH behave daily, seasonally, etc. as you would expect? Are there patterns upstream to downstream? Do you see an expected pattern, unexpected? Answer:~~

~~d. Add or adjusted and findings, patterns, etc. after review pH table of meta and ancillary information:~~

e. Overall Condition of this river this year is Acceptable (<20%) Concerning (20-50%) Degrading (>50%):

According to LEBAF thresholds, the pH in Swan Creek is acceptable for the 2023 LEBAF field season.

f. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. All data was collected this season with trained staff members present. Meters were calibrated for pH monthly throughout the field season. Limitations include sampling frequency (pH variation occurs on multiple timescales, from daily to seasonal; we measured 1-2 times monthly, April-October).

g. pH Findings Statement:
The lack of exceedances indicates that pH values for Swan Creek are within the pH LEBAF analytical benchmarks of 6.5 - 9. During the dates and times recorded on this river, pH likely supported aquatic life and this is an indicator of stream health. However, a conclusive statement about the water quality/stream health cannot be made given a limited dataset.

h. pH Recommendations + limitations statement:
A conclusive statement about stream health for Swan Creek cannot be made given a limited dataset. To further support the current 2023 LEBAF pH field season findings and prevent exceedances, we recommend the continuation of further monitoring of pH data at the site and qualification all readings with site images, day of chemistry sampling metadata, and site metadata.

i. Statement from comparing previous years to this year:
N/A, first sampling season.

8. ***Summary for DO***

a. *DO:* 61 samples, __7__ # exceedances,__11.67_ % exceedance rate.

b. Is map illustration of station DO #/% exceedances the same as table: Y N
Yes

c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y N:
May 31, June 27, August 30 (CWAT-18) September 27 (CWAT-16, CWAT-19), October 5 (CWAT-17), October 29 (CWAT-16)

d. Insert graph of DO exceedances is below. If no exceedances skip graph export.

e. Make a statement about the magnitude, frequency and duration of any exceedances:
Exceedances occur throughout season but at different stations, and not on consecutive sampling dates.

f. Does DO behave daily, seasonally, etc. as you would expect? Are there patterns upstream to downstream? Do you see an expected pattern, unexpected?
Answer:
Overall, DO varies as expected seasonally/temporally. Single exceedances at a site could be more reflective of time of sampling. Low levels at Evergreen Lake are likely reflective of low/stagnant water at time of sampling (site specific condition).

~~g. Add or adjusted and findings, patterns, etc. after review DO table of meta and ancillary information:~~

h. Overall condition of this river, this year Acceptable (<20%) Concerning (20-50%) Degrading (>50%):
According to LEBAF thresholds, DO is acceptable for the 2023 LEBAF field season in Swan Creek.

i. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. All data was collected this season with trained staff members present. Meters were not calibrated for DO throughout the field season. Limitations include sampling frequency (DO variation occurs on multiple timescales, from daily to seasonal; we measured 1-2 times monthly, April-October) and sampling location (DO varies spatially within streams). As a result, conclusions about stream health are not possible, but looking at trends can give us a picture of possible stream and aquatic community health. The LEBAF threshold only measures an

exceedance below accepted range; high DO can also be a measure of eutrophication and excessive production, which we did not assess for.

j. DO Findings Statement:

89% of DO values recorded on Swan Creek during the 2023 season were within the LEBAF analytical benchmark of <=5 mg/L. Based on this, we can expect that during most of the sampled dates and times the DO levels in the river supported aquatic life, and this is an indicator of stream health. However, a conclusive statement about the water quality/stream health cannot be made given a limited dataset.

k. DO Recommendations + limitations statement:

A conclusive statement about stream health on Swan Creek cannot be made given a limited dataset. To further support the current 2023 LEBAF DO field season findings and prevent exceedances, we recommend the continuation of further monitoring of DO data on this stream, considering increases in monitoring frequency and/or periodic sampling throughout a day to capture variation on different time scales, and qualification all readings with site images, day of chemistry sampling metadata, and site metadata.

l. Statement from comparing previous years to this year:

N/A; first season sampling.

9. ***Summary for Temperature***

a. *Temperature:* 61 samples, _4___ # exceedances,__6.67__ % exceedance rate.

b. Is map illustration of station Temperature #/% exceedances the same as table: Y N

Yes

c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y N:

May 31, CWAT-13, CWAT-14, CWAT-15, CWAT-21

d. Insert graph of Temperature exceedances is below. If no exceedances skip graph export.

e. Make a statement about the magnitude, frequency and duration of any exceedances:
All exceedances occurred on the same day, May 31, at sites within Oak Openings. Temperatures in Swanton, OH on that day peaked at 89 degrees. Exceedances likely related to abnormally hot conditions for the season.

f. Does Temperature behave daily, seasonally, etc. as you would expect? Are there patterns upstream to downstream? Do you see an expected pattern, unexpected? Answer:
Yes, and no clear upstream/downstream patterns.

Table X. LEBAF Temperature Standards, Cold and Warm Water (F/C)

April	May	June	July	August	September	October
52 F	58 F	64 F	66 F	66 F	63 F	54 F
11 C	14 C	17 C	18 C	18 C	17 C	12 C
April	**May**	**June**	**July**	**August**	**September**	**October**
61 F	70 F	82 F	85 F	85 F	82 F	70 F
16 C	21 C	27 C	29 C	29 C	27 C	21 C

~~g. Add or adjusted and findings, patterns, etc. after review Temperature table of meta and ancillary information:~~

h. Overall condition of this river, this year Acceptable (<20%) Concerning (20-50%) Degrading (>50%): According to LEBAF thresholds, the temperature is acceptable for the 2023 LEBAF field season on the sampled areas of Swan Creek.

i. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. All data was collected this season with trained staff members present. Meters were calibrated throughout the field season. Limitations include sampling frequency (1-2 times monthly). LEBAF temperature benchmarks include both high and low exceedance values within an accepted range. Temperature Findings Statement:

j. Temperature Recommendations + limitations statement:

94% of temperature values recorded on Swan Creek during the 2023 season were within the LEBAF analytical benchmarks. Based on this, we can expect that during the sampled dates and times the water temperature in the stream supported aquatic life, and this is an indicator of stream health. However, a conclusive statement about the water quality/stream health cannot be made given a limited dataset.

k. Statement from comparing previous years to this year:
N/A; first season sampling.

10. ***Summary for Conductivity Verification against Reference / Survey***

a. Placeholder for the table for your station/river from the *Conductivity Results by Ohio EPA:* HELP River

Ecoregion	Stream Size	Stream Type	Min	x.25%	x.50%	x.75%	x.90%	x.95%
HELP	Headwaters	**Reference**	**510**	588	707	875	1119	1151
HELP	Streams	**Reference**	**166**	529	653	778	952	1107
HELP	Rivers	**Reference**	**142**	543	659	744	877	1043
HELP	Headwaters	Survey	**500**	570	680	821	1074	1345
HELP	Streams	Survey	248	491	633	740	836	959
HELP	Rivers	Survey	152	573	679	808	1039	1275

b. **Review** Min, 50th/Median and max conductivity

Summary of Exceedances by Waterbody and Parameter

Basin	Sample Run..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceeded	Pct Exceeded
Swan Creek	2023	Conductivity Biocondition	681.48	668.50	316.80	1,331.00	61.00	55.00	91.67

c. After comparing overlap for both reference and survey, min, max and median, difference between median and average characterize findings, qualify any information known about the site, record representativeness and comparability findings statement here:

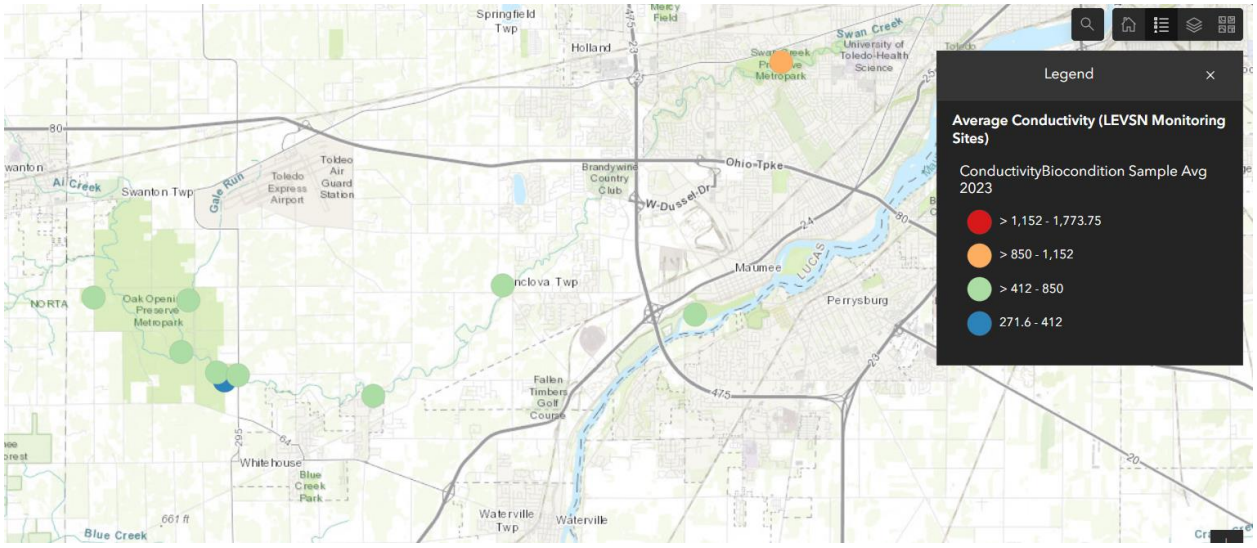
Collected data overlaps with reference and survey data, with Max values slightly exceeding reference/survey data. Mean and Median values are very close to reference/survey median values. Data has overlap and comparability to reference/survey values.

11. ***Summary for Average Conductivity Combined Criteria Analyzes***

a. *Average overall conductivity is:* 681.48

b. Average conductivity condition bin: excellent/healthy, concern for biota, likely threats, impacts or likely impaired average: Concern for biota

c. Placeholder for view of average conductivity map if desired



d. Does conductivity behave daily, seasonally, etc. as you would expect? Are there patterns upstream to downstream? Do you see an expected pattern, unexpected? Answer:
Conductivity can be expected to be higher in Winter and Spring months due to runoff from road salts. High flow/storm events can cause spikes in conductivity due to increased runoff from urban, agricultural, or wastewater input sources. Note that CWAT-12, Swan Creek, is the only station higher than the 412-850 range for average conductivity. The headwater station CWAT-18 has the lowest average conductivity. There appears to be a pattern of lower conductivity upstream and higher conductivity downstream, which aligns with land use moving from rural/natural Oak Openings to urbanized Toledo suburbs.

e. Add or adjusted and findings, patterns, etc. after review Conductivity table of meta and ancillary information:

Swan Creek

Water quality samples were collected at 13 locations from the Swan Creek main stem. One site was located within the lacustuary (Lake Erie seiche affected) zone. The remaining sites were located in free flowing segments. Sample results that exceeded the Ohio WQS numerical criteria or target values are presented in Table 6. E. coli sample results exceeded the primary contact recreational use geometric mean criteria of 126/100 ml. at all Swan Creek sites (Fig. 7). The E. coli geometric mean criterion is based on not less than five samples collected in a thirty-day period. E.coli exceedances were attributed to faulty septic systems in rural communities within the upper portion of the Swan Creek watershed and CSO's in the urbanized lower reaches of the watershed. The median phosphorus concentrations in the lower segments of Swan Creek were at or above the target value of 0.10 mg/l (Fig. 8). The median nitrate+nitrite concentrations exceeded the target nutrient value of 1.0 mg/l in Swan Creek (Figure 9). Elevated nutrients found in the watershed resulted from NPS agricultural runoff in the upper portion of the watershed, urbanization and agricultural runoff in the middle portion, and stormwater runoff in the lower portion of the watershed. No dissolved oxygen, pH or temperature exceedances were recorded.

From OEPA report. Note that nutrient levels were elevated and sources identified. Could indicate a possible source of high conductivity values.

f. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. All data was collected this season with trained staff members present. Meters were calibrated for conductivity monthly throughout the field season. Limitations include sampling frequency (1-2 times monthly). As a result, conclusions about stream health are not possible, but looking at trends can give us a picture of possible stream and aquatic community health.

g. Conductivity Findings Statement:
Conductivity trends on Swan Creek indicate that macroinvertebrate communities could be under stress due to this parameter.

h. Was Average Conductivity >851 No N, placeholder for chloride, salinity, TDS/DW exceedance table below. Did you conduct chloride, salinity or ~~TDS/DW~~ analyzes, Y N? If desired, put condition of Chloride, Salinity and/or TDS/DW in fact sheet condition summary.

Summary of Exceedances by Waterbody and Parameter

Basin	Sample Run..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceeded	Pct Exceeded
Swan Creek	2023	Chloride	33.58	32.95	15.61	65.59	61.00	0.00	0.00
		Salinity	566.04	552.08	245.02	1,167.70	61.00	2.00	3.33

i. Conductivity Recommendations + limitations statement (use language in conductivity criteria table):

Recommended thresholds for average or median Conductivity in uS/cm		
Threshold	**Condition**	**Action**
< =412	Excellent, healthy	Protection activities
413-850	Concern for biota	Investigate biota diversity. Identify potential sources.
851-2000	Likely threats, impacts	Investigate chloride and salinity, and possibly other contaminants. Identify and investigate potential sources. Remediate sources
> =2001	Likely impaired	Work with state agency to determine further actions.

j. Statement from comparing previous years to this year:
N/A; first year sampling.

12. ***Summary for Conductivity / Biocondition***

a. *Overall Conductivity/Biocondition:* 61 samples, _55__ # exceedances,_91.67__ % exceedance rate.
exceedances <412, 413-654 or >655:
i. # <412, healthy/functioning:____9_____
ii. # >412 but <655 =degrading:____21_____
iii. >655= degraded:____25_____

b. Is map illustration of station C/Biocondition #/% exceedances the same as table:
Y N
Yes

c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y N:
All.

d. Insert graph of C/Biocondition exceedances is below. If no exceedances skip graph export.

e. Make a statement about the magnitude, frequency and duration of any exceedances:
Exceedances for this parameter are consistent across the sampling season. Highest values are at CWAT-12, Swan Creek, and lowest values are at CWAT-18, Evergreen Lake. The range of values is wide, 922.68. Upstream stations appear to have lower conductivity overall than downstream stations.

f. What do you know about the macroinvertebrate community structure, function, habitat, from previous data, others data, etc. Are there patterns upstream to downstream? Answer:
Data from 2009 OEPA Report:

15.3	160	-	41	12 / 13	18 / 21	M / 572	0	Midges (MI,F), hydropsychid caddisflies (F), baetid mayflies (F)	38	-
10.9	192	-	39	6 / 8	6 / 11	L-M / 261	0	Baetid mayflies (F), hydropsychid caddisflies (F), blackflies (F)	36	-

Swan Creek stations between RM 21.7 and 10.9 had good macroinvertebrate communities with higher diversities of EPT and sensitive taxa (Fig. 31, Table 13). These stations were characterized by good riffle quality, natural channel morphology and a nearly closed canopy. A mussel bed was discovered upstream from Salisbury Road (RM 15.65) that contained a large population of the state endangered freshwater mussel Rayed Bean (*Villosa fabalis*) along with 10 other species (Grabarkiewicz 2006). This species has been extirpated from much of its range in Ohio and is becoming rare. The mussel bed is located just east of the beach ridge glacial aquifer. This aquifer has the highest water yield (25-100 Gals./minute) in the watershed. It is possible that groundwater flux is providing stable stream flows and improving mussel persistence at this station.

Data from 2017 OEPA Report:

Table 15 – Summary of macroinvertebrate data collected from artificial substrates (quantitative sampling) and natural substrates (qualitative sampling) in the Swan Creek, Toussaint Creek/River, western Lake Erie tributaries and lower Maumee River tributaries study area, June to September, 2017).

Station	River Mile	Dr. Ar.	Data Notes	Qual. Taxa	Density Qt. / Ql.	EPT Ql./ Total	Sens Ql./ Total	CW Taxa	Predominant Organisms on the Natural Substrates (With Tolerance Categories)	ICI[a]	Narrative Evaluation
Swan Creek (04-003-000)											
P11K01	40.68	7.5	-	58	M	10	6	1	Midges (F, T), caddisflies (F), baetid mayflies (MI, F)	-	Good
P11K02	34.41	14.6	-	45	M	7	4	1	Midges (F), hydropsychid caddisflies (F), baetid mayflies (F, MI)	-	Marg. Good
303790	30.7	28.1	-	43	L / 100	7 / 8	5 / 7	0	Midges (F, MI), hydropsychid caddisflies (F)	38	
P11W12	27.12	86	-	64	M / 568	13 / 14	6 / 7	0	Midges (F), hydropsychid caddisflies (F, MI), baetid mayflies (F, MI)	38	
P11K21	24.7	89	8	49	L / 224	7 / 8	10 / 11	0	Midges (F, MI), elmid beetles (F)	24	Marg. Good
P11K05	18.46	146	15	60	M / 456	14 / 14	11 / 14	0	Hydropsychid caddisflies (MI, F), baetid mayflies (MI, F), midges (F)	42	
P11P08	10.84	192	-	61	L / 2075	7 / 8	9 / 10	0	Midges (F)	36	
P11P05	4.31	200	15	37	L / 588	7 / 7	2 / 3	0	Midges (F, MT)	20	
300132	4.2	200	15	40	L-M / 982	7 / 7	4 / 5	0	Midges (F, MT), sowbugs (MT), hydropsychid caddisflies (F)	32	
P11P03	1.58	203	8,11	15	L / 299	1 / 3	0 / 2	0	Midges (MT)	34[L]	

g. Add or adjusted and findings, patterns, etc. after review of Conductivity table of meta and ancillary information OR what you know about macroinvertebrate conditions:
Data from 2017 OEPA Report showing change over time and locations:

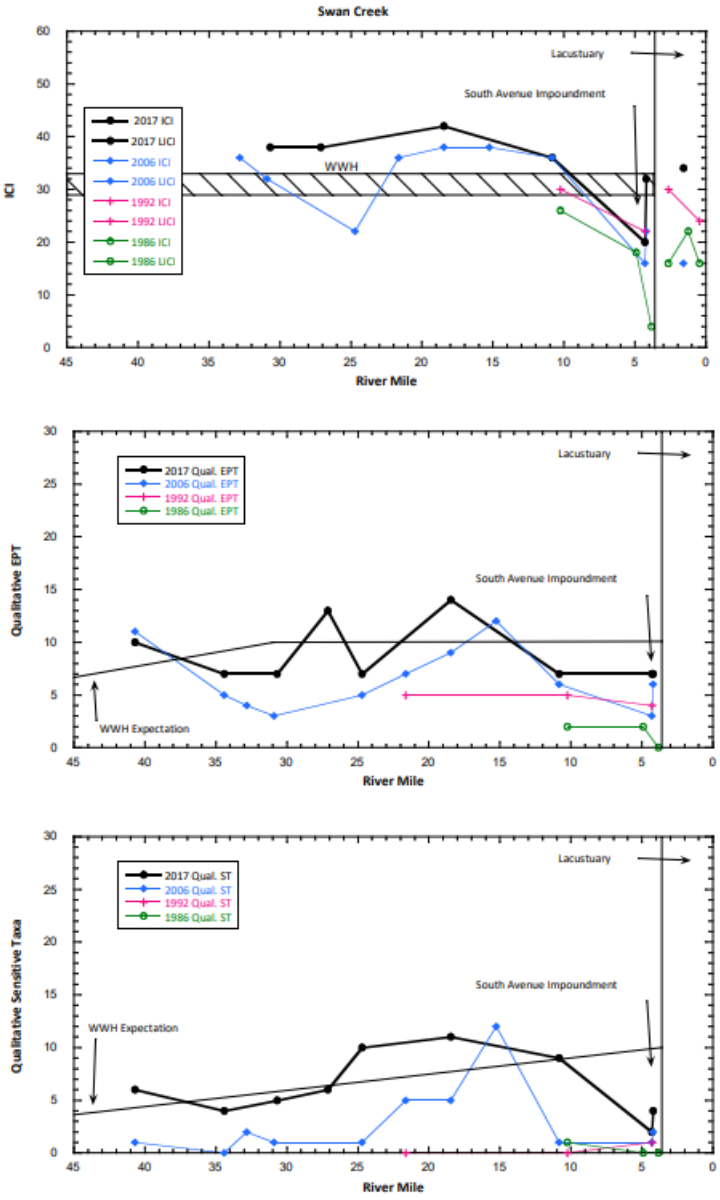


Figure 23 - Longitudinal trend of the Invertebrate Community Index (ICI), qualitative sample EPT diversity, and qualitative sample sensitive taxa diversity (ST) in Swan Creek, 1986-2017.

h. Overall condition of this river this year Acceptable (<20%) Concerning (20-50%) Degrading (>50%): A 91.67% exceedance rate for Conductivity/Biocondition on Swan Creek indicates that this river is degrading for macroinvertebrate communities.

i. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. All data was collected this season with trained staff members present. Meters were calibrated for conductivity monthly throughout the field season. Limitations include sampling frequency (1-2 times

monthly). As a result, conclusions about stream health are not possible, but looking at trends can give us a picture of possible stream and aquatic community health.

j. Conductivity/Biocondition Findings Statement :
Conductivity/Biocondition trends indicate that macroinvertebrate communities could be under stress due to this parameter in Swan Creek. Variations between upstream/downstream stations indicate that conditions vary based on location.

k. Conductivity/Biocondition Recommendations + limitations statement:
Recommend macros sampling on Swan Creek where feasible; potentially as an additional LEBAF standard, or several times a season as a CWAT addition for sites with sustained high conductivity values. Salinity, Chloride, and TDS aquatic life analysis did not provide clear direction on the source of the exceedance; metadata and other chemical water quality parameters likewise do not indicate a clear source. A conclusive statement about stream health at this station cannot be made given a limited dataset. To further support the current 2023 conductivity/biocondition field season findings and prevent exceedances, we recommend the continuation of further monitoring of conductivity data on the river and qualification all readings with site images, day of chemistry sampling metadata, and site metadata.

l. Statement from comparing previous years to this year:
N/A; first year sampling.

13. ***Summary for Conductivity/ TDS Aquatic Life Criteria***

a. *Overall Conductivity/TDS AQ Life:* samples, _0___ # exceedances,__0__ % exceedance rate.
b. Is map illustration of station C/TDS AQ Life #/% exceedances the same as table:
Y N
Yes
c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y N:
None
~~d. Insert graph of C/TDS AQ Life exceedances is below. If no exceedances skip graph export.~~

~~e. Make a statement about the magnitude, frequency and duration of any exceedances:~~

f. ~~Does C/TDS AQ Life behave daily, seasonally, etc. as you would expect? Are there patterns upstream to downstream? Do you see an expected pattern, unexpected? Answer:~~

g. ~~Add or adjusted and findings, patterns, etc. after review of Conductivity table of meta and ancillary information:~~

h. Overall condition of this river, this year Acceptable (<20%) Concerning (20-50%) Degrading (>50%): According to LEBAF thresholds, he Conductivity/TDS aquatic life criteria is acceptable for the 2023 LEBAF field season on Swan Creek.

i. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. This is a calculated metric that is not directly measured, based on conductivity values. All data were collected this season with trained staff members present. Meters were calibrated for conductivity monthly throughout the field season. Limitations include sampling frequency (1-2 times monthly). As a result, conclusions about stream health are not possible, but looking at trends can give us a picture of possible stream and aquatic community health.

j. Conductivity/TDS AQ Life Findings Statement:
All Conductivity/TDS AQ Life values calculated for Swan Creek during the 2023 season were within the LEBAF analytical benchmarks. Based on this, we can expect that during the sampled dates and times this parameter in this stream supported aquatic life, and this is an indicator of stream health. However, a conclusive statement about the water quality/stream health cannot be made given a limited dataset.

k. Conductivity/TDS AQ Life Recommendations + limitations statement:
A conclusive statement about stream health at this station cannot be made given a limited dataset. To further support the current 2023 conductivity TDS LEBAF field season findings and prevent exceedances, we recommend the continuation of further monitoring conductivity data at the site and qualification all conductivity readings with site images, day of chemistry sampling metadata, and site metadata.

l. Statement from comparing previous years to this year:
N/A; first season sampling.

14. ***Summary for Chloride***

a. *Overall Chloride:* 45 samples, __0__ # exceedances,_0__ % exceedance rate.
b. Is map illustration of station Chloride #/% exceedances the same as table: Y N

Yes

c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y N: NONE

~~d. Insert graph of Chloride exceedances is below. If no exceedances skip graph export.~~

~~e. Make a statement about the magnitude, frequency and duration of any exceedances:~~

~~f. Does Chloride behave daily, seasonally, etc. as you would expect? Are there patterns upstream to downstream? Do you see an expected pattern, unexpected? Answer:~~

~~g. Add or adjusted and findings, patterns, etc. after review of Conductivity table of meta and ancillary information:~~

h. Overall condition of this river, this year Acceptable (<20%) Concerning (20-50%) Degrading (>50%):

According to LEBAF thresholds, chloride levels are acceptable in Swan Creek for the 2023 LEBAF field season.

i. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. This is a calculated metric that is not directly measured, based on conductivity values. All data were collected this season with trained staff members present. Meters were calibrated for conductivity monthly throughout the field season. Limitations include sampling frequency (1-2 times monthly). As a result, conclusions about stream health are not possible, but looking at trends can give us a picture of possible stream and aquatic community health.

j. Chloride Findings Statement:
All Chloride values calculated for this river during the 2023 season were within the LEBAF analytical benchmarks. Based on this, we can expect that during the sampled dates and times this parameter in this stream at this station supported aquatic life, and this is an indicator of stream health. However, a conclusive statement about the water quality/stream health cannot be made given a limited dataset.

k. Chloride Recommendations + limitations statement:
A conclusive statement about stream health at this station cannot be made given a limited dataset. To further support the current 2023 chloride field season findings and prevent exceedances, we recommend the continuation of further monitoring conductivity data at the site and qualification all conductivity readings with site images,

day of chemistry sampling metadata, and site metadata. At sites with average conductivity exceeding 851 microsiemens/cm, there may be value in testing directly for chloride. Monitoring during the November-March season may also be of value at these sites to capture exceedance values throughout the year.

l. Statement from comparing previous years to this year:
N/A; first season sampling.

15. ***Summary for Salinity***

a. *Overall Salinity:* 61 samples, _2___ # exceedances,_3.33__ % exceedance rate.
b. Is map illustration of station Salinity #/% exceedances the same as table: Y N
Yes
c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y N:
June 20, October 3, CWAT-12 Swan Creek
d. Insert graph of Salinity exceedances is below. If no exceedances skip graph export.

e. Make a statement about the magnitude, frequency and duration of any exceedances:
Exceedances occurred in June and October. They were infrequent and not sustained or consecutive. Both occurred at the same station.

f. Does Salinity behave daily, seasonally, etc. as you would expect? Are there patterns upstream to downstream? Do you see an expected pattern, unexpected? Answer:
All exceedances occurred at the most downstream site sampled.

g. Add or adjusted and findings, patterns, etc. after review of Conductivity table of meta and ancillary information:
See discussion re: conductivity.

h. Overall condition of this river, this year Acceptable (<20%) Concerning (20-50%) Degrading (>50%):
According to LEBAF thresholds, the Salinity levels are acceptable in Swan Creek for the 2023 LEBAF field season.

i. Limitations, assumptions, qualifications, if none record NONE:
2 samples were included from CWAT-16, a station that was not fully monitored according to LEBAF standards. This is a calculated metric that is not directly measured, based on conductivity values. All data were collected this season with trained staff members present. Meters were calibrated for conductivity monthly throughout the field season. Limitations include sampling frequency (1-2 times monthly). As a result, conclusions about stream health are not possible, but looking at trends can give us a picture of possible stream and aquatic community health.

j. Salinity Findings Statement:
97% of Salinity values calculated for this station during the 2023 season were within the LEBAF analytical benchmarks. Based on this, we can expect that during the sampled dates and times this parameter in this stream at this station supported aquatic life, and this is an indicator of stream health. However, a conclusive statement about the water quality/stream health cannot be made given a limited dataset.

k. Salinity Recommendations + limitations statement:
A conclusive statement about stream health at this station cannot be made given a limited dataset. To further support the current salinity field season findings and prevent exceedances, we recommend the continuation of further monitoring conductivity data at the site and qualification all conductivity readings with site images, day of chemistry sampling metadata, and site metadata. At sites with average conductivity exceeding 851 microsiemens/cm, there may be value in testing directly for salinity. Monitoring during the November-March season may also be of value at these sites to capture exceedance values throughout the year.

l. Statement from comparing previous years to this year: N/A; first season sampling.

~~16. ***Summary for TDS/ Drinking Water Criteria***~~

~~a. *Overall Conductivity/TDS DW Criteria:* samples, _____ # exceedances, _____ % exceedance rate.~~

~~b. Is map illustration of station C/TDS DW Criteria #/% exceedances the same as table: Y N~~

c. Dates of exceedances: If none record NONE, do # of exceedances on graph match table Y – N:
d. Insert graph of C/TDS DW Criteria exceedances is below. If no exceedances skip graph export.
e. Make a statement about the magnitude, frequency and duration of any exceedances:
f. Does C/TDS DW Criteria behave daily, seasonally, etc. as you would expect? re there patterns upstream to downstream? Do you see an expected pattern, nexpected? Answer:
g. Add or adjusted and findings, patterns, etc. after review of Conductivity table of meta and ancillary information:
h. Overall condition of this river, this year Acceptable (<20%) Concerning (20-50%) Degrading (>50%):

i. Limitations, assumptions, qualifications, if none record NONE: Note no one expects to be able to drink water from rivers without treatment, so DW criteria exceedances are expected, and do provide a continuum of conditions for screening, for example TDS low enough to support AQ life but not DW, or perhaps supports both or neither.
j. C/TDS DW Criteria Findings Statement:
k. C/TDS DW CriteriaRecommendations + limitations statement:
l. Statement from comparing previous years to this year:

Swan Creek: Swan Creek Metropark, CWAT- 12 **Monitoring Since: 2023**

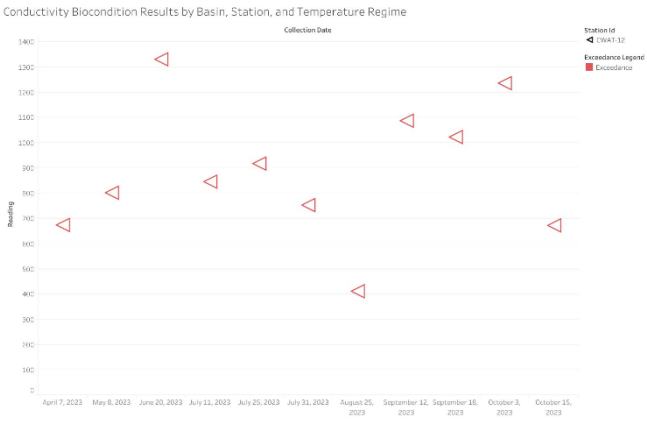
Site Characteristics		Adjacent Landuse Category		Dominant Upstream Landuse		
Drainage size	187	x	Wooded			Urban – high density
Ecoregion	Huron-Lake Erie Plains		Non-wooded			Urban – low density
			Agricultural- row crop			Commercial/Industrial
Aq. Habitat Type	Warm		Agricultural - pasture	x		Agriculture – row crop
Geology/Bedrock	Dolomite		Residential			Agriculture – pasture lands
Buffer width	Wide <50 m		Commercial/Industrial			Natural - woods, wetlands, etc
Buffer Type	Wooded					

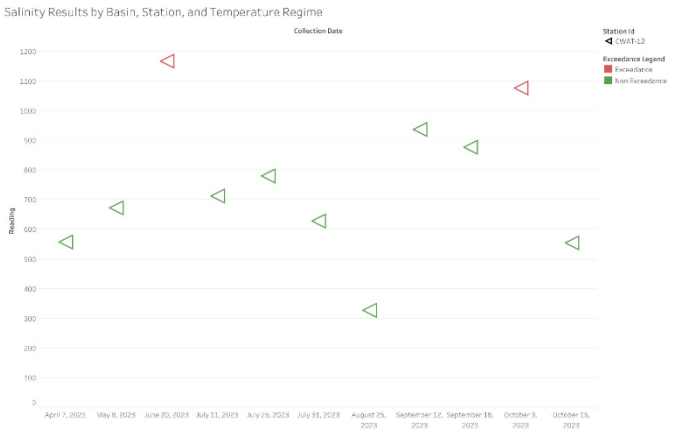
CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-12	Swan Creek Preserve	Chloride	43.67	41.59	20.30	65.59	11.00	0.00
		Conductivity Bioconditi..	886.27	844.00	412.00	1,331.00	11.00	11.00
		Conductivity TDS	487.45	464.20	226.60	732.05	11.00	0.00
		Dissolved Oxygen	8.07	8.23	6.60	10.17	11.00	0.00
		pH	7.85	7.85	7.54	8.11	11.00	0.00
		Salinity	753.34	711.42	326.09	1,167.70	11.00	2.00
		Water Temperature	18.74	19.40	9.60	24.00	11.00	0.00

Graphs of Current Year





OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Acceptable	Likely threats, impacts	Degraded	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/Biocondition, 100% exceedance; Salinity, 18% exceedance

Dates exceedances occurred: Conductivity/biocondition: 4/7/23, 5/8/23, 6/20/23, 7/11/23, 7/25/23, 7/31/23, 8/25/23, 9/12/23, 9/18/23, 10/3/23, 10/15/23. Salinity: 6/20/23, 10/3/23

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. Conductivity/Biocondition exceeded the benchmarks, with Conductivity/Biocondition at 100% exceedance This indicates that based on the collected data as whole, conductivity may degrade this stream at this station during the summer and fall. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able, investigate sources of contamination and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

Swan Creek: Oak Openings Gale Run, CWAT- 13 **Monitoring Since: 2023**

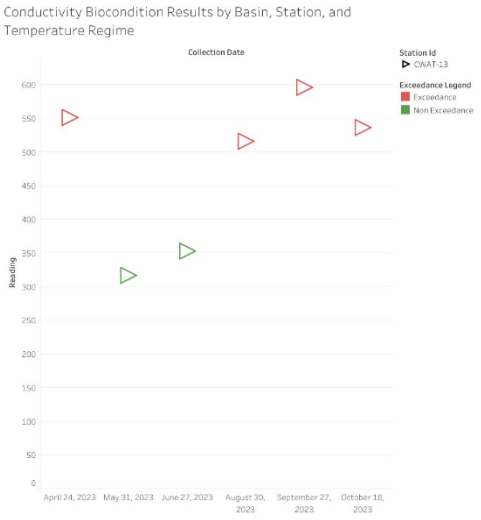
Site Characteristics		Adjacent Landuse Category		Dominant Upstream Landuse	
Drainage size	3.41	x	Wooded		Urban – high density
Ecoregion	Huron-Lake Erie Plains		Non-wooded		Urban – low density
			Agricultural- row crop		Commercial/Industrial
Aq. Habitat Type	Warm		Agricultural - pasture		Agriculture – row crop
Geology/Bedrock	Dolomite		Residential		Agriculture – pasture lands
Buffer width	Wide <50 m		Commercial/Industrial	x	Natural - woods, wetlands, etc
Buffer Type	Wooded				

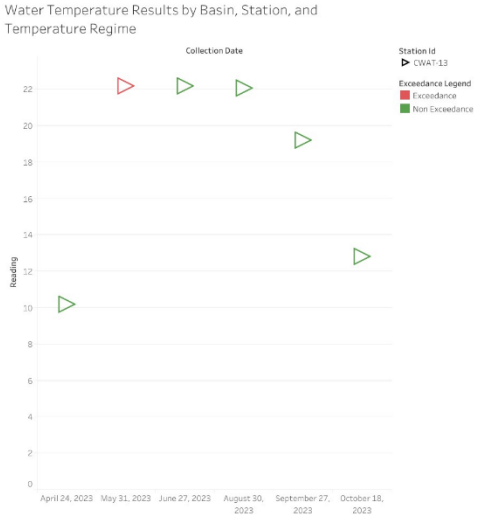
CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-13	Oak Openings: Gale Run	Chloride	23.55	25.90	15.61	29.37	6.00	0.00
		Conductivity Bioconditi..	477.95	525.50	316.80	596.00	6.00	4.00
		Conductivity TDS	262.87	289.03	174.24	327.80	6.00	0.00
		Dissolved Oxygen	8.30	7.95	7.07	10.58	6.00	0.00
		pH	7.83	7.73	7.63	8.20	6.00	0.00
		Salinity	384.17	424.92	245.02	487.26	6.00	0.00
		Water Temperature	18.12	20.65	10.20	22.20	6.00	1.00

Graphs of Current Year





OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Acceptable	Concern for biota	Degrading	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/biocondition, 67%; Water Temperature, 17%

Dates exceedances occurred: Conductivity/biocondition: 4/24/23, 5/31/23, 6/27/23, 8/30/23, 9/27/23, 10/18/23. Water Temperature: 5/31/23.

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. Conductivity/Biocondition exceeded the benchmarks, with Conductivity/Biocondition at 67% exceedance This indicates that based on the collected data as whole, conductivity may degrade this stream at this station during the summer and fall. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able, investigate sources of contamination and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

Swan Creek: Oak Openings Horse Trail, CWAT- 15 **Monitoring Since: 2023**

Site Characteristics		Adjacent Landuse Category			Dominant Upstream Landuse		
Drainage size	67	x		Wooded			Urban – high density
Ecoregion	Huron-Lake Erie Plains			Non-wooded			Urban – low density
				Agricultural- row crop			Commercial/Industrial
Aq. Habitat Type	Warm			Agricultural - pasture	x		Agriculture – row crop
Geology/Bedrock	Dolomite			Residential			Agriculture – pasture lands
Buffer width	Wide <50 m			Commercial/Industrial			Natural - woods, wetlands, etc
Buffer Type	Wooded						

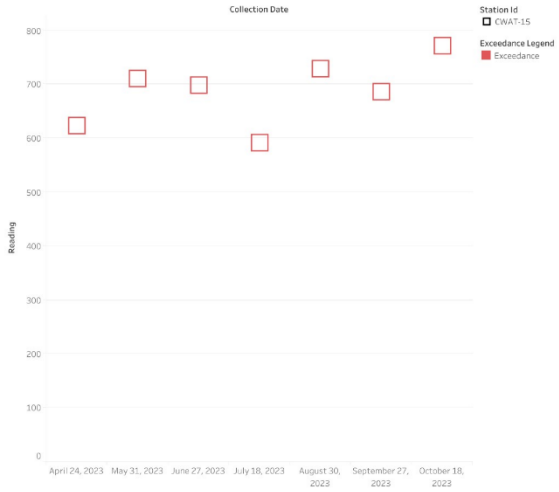
CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-15	Oak Openings: Horse Trail	Chloride	33.88	34.40	29.17	38.04	7.00	0.00
		Conductivity Bioconditi..	687.43	698.00	592.00	772.00	7.00	7.00
		Conductivity TDS	378.09	383.90	325.60	424.60	7.00	0.00
		Dissolved Oxygen	8.77	8.76	6.99	10.45	7.00	0.00
		pH	7.86	7.83	7.62	8.06	7.00	0.00
		Salinity	569.29	578.63	483.71	645.66	7.00	0.00
		Water Temperature	18.29	20.50	8.50	24.60	7.00	1.00

Graphs of Current Year

Conductivity Biocondition Results by Basin, Station, and Temperature Regime



Water Temperature Results by Basin, Station, and Temperature Regime

OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Acceptable	Concern for biota	Degrading	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/biocondition, 100%; Water Temperature, 14%

Dates exceedances occurred: Conductivity/biocondition: 4/24/23, 5/31/23, 6/27/23, 7/18/23, 8/30/23, 9/27/23, 10/18/23. Temperature: 5/31/23

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. Conductivity/Biocondition exceeded the benchmarks, with Conductivity/Biocondition at 100% exceedance This indicates that based on the collected data as whole, conductivity may degrade this stream at this station during the summer and fall. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able, investigate sources of contamination and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

Swan Creek: Monclova Community Park, CWAT- 16 **Monitoring Since: 2023**

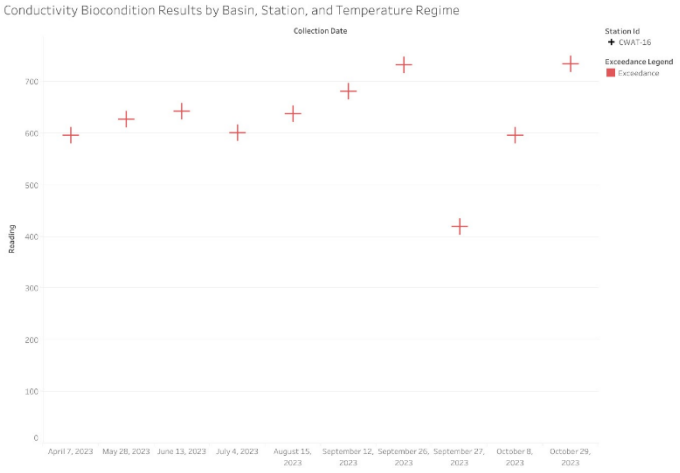
Site Characteristics			Adjacent Landuse Category		Dominant Upstream Landuse
Drainage size	118		Wooded		Urban – high density
Ecoregion	Huron-Lake Erie Plains		Non-wooded		Urban – low density
			Agricultural- row crop		Commercial/Industrial
Aq. Habitat Type	Warm		Agricultural - pasture	x	Agriculture – row crop
Geology/Bedrock	Dolomite	x	Residential		Agriculture – pasture lands
Buffer width	10-50 m		Commercial/Industrial		Natural - woods, wetlands, etc
Buffer Type	Wooded				

CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-16	Monclova Community Park	Chloride	30.86	31.17	20.64	36.17	10.00	0.00
		Conductivity Bioconditi..	626.28	632.50	418.80	734.00	10.00	10.00
		Conductivity TDS	344.45	347.88	230.34	403.70	10.00	0.00
		Dissolved Oxygen	8.72	9.05	2.78	12.93	10.00	2.00
		pH	7.90	7.91	7.17	8.63	10.00	0.00
		Salinity	514.73	519.82	331.95	611.16	10.00	0.00
		Water Temperature	17.21	18.40	9.00	22.90	10.00	0.00

Graphs of Current Year



OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Concerning	Concern for biota	Degrading	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/Biocondition, 100% exceedance; DO, 20% exceedance

Dates exceedances occurred: Conductivity/biocondition: 4/7/23, 5/28/23, 6/13/23, 7/4/23, 8/15/23, 9/12/23, 9/26/23, 9/27/23, 10/8/23, 10/29/23. DO: 9/27/23, 10/29/23

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. Conductivity/Biocondition exceeded the benchmarks, with Conductivity/Biocondition at 100% exceedance This indicates that based on the collected data as whole, conductivity may degrade this stream at this station during the summer and fall. DO exceeded benchmarks at a 20% rate, indicating this could be an area of concern for stress on aquatic life in this stream. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able, investigate sources of contamination and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

Swan Creek: Anthony Wayne High School, CWAT- 17 **Monitoring Since: 2023**

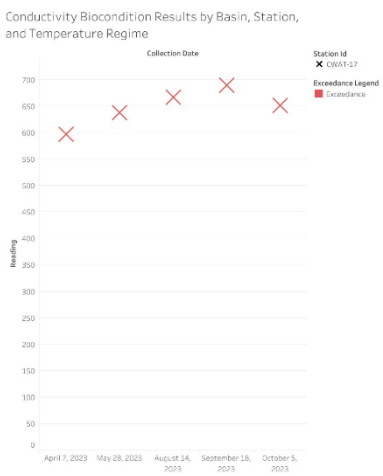
Site Characteristics		Adjacent Landuse Category		Dominant Upstream Landuse	
Drainage size	74.6		Wooded		Urban – high density
Ecoregion	Huron-Lake Erie Plains		Non-wooded		Urban – low density
		x	Agricultural- row crop		Commercial/Industrial
Aq. Habitat Type	Warm		Agricultural - pasture	x	Agriculture – row crop
Geology/Bedrock	Dolomite		Residential		Agriculture – pasture lands
Buffer width	10-50 m		Commercial/Industrial		Natural - woods, wetlands, etc
Buffer Type	Wooded				

CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-17	Anthony Wayne High School	Chloride	31.96	32.08	29.42	34.00	5.00	0.00
		Conductivity Bioconditi..	648.60	651.00	597.00	690.00	5.00	5.00
		Conductivity TDS	356.73	358.05	328.35	379.50	5.00	0.00
		Dissolved Oxygen	7.64	7.80	4.53	10.17	5.00	1.00
		pH	7.78	7.93	7.22	8.00	5.00	0.00
		Salinity	534.28	536.37	488.15	571.42	5.00	0.00
		Water Temperature	16.58	16.50	9.00	22.60	5.00	0.00

Graphs of Current Year



OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Concerning	Concern for biota	Degrading	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/Biocondition, 100% exceedance; DO, 20% exceedance

Dates exceedances occurred:
Conductivity/biocondition: 4/7/23, 5/28/23, 8/14/23, 9/18/23, 10/5/23. DO: 10/05/23

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. Conductivity/Biocondition exceeded the benchmarks, with Conductivity/Biocondition at 100% exceedance This indicates that based on the collected data as whole, conductivity may degrade this stream at this station during the summer and fall. DO exceeded benchmarks at a 20% rate, indicating this could be an area of concern for stress on aquatic life in this stream. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able, investigate sources of contamination and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

Swan Creek: Oak Openings Evergreen Lake, CWAT- 18 **Monitoring Since: 2023**

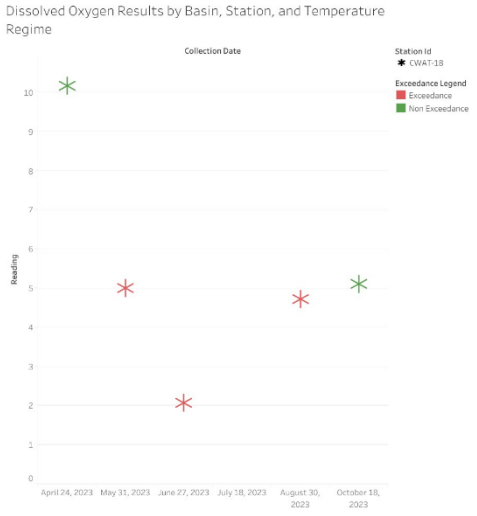
Site Characteristics		Adjacent Landuse Category			Dominant Upstream Landuse		
Drainage size	1.1	x		Wooded			Urban – high density
Ecoregion	Huron-Lake Erie Plains			Non-wooded			Urban – low density
				Agricultural- row crop			Commercial/Industrial
Aq. Habitat Type	Warm			Agricultural - pasture			Agriculture – row crop
Geology/Bedrock	Dolomite			Residential			Agriculture – pasture lands
Buffer width	>50 m			Commercial/Industrial	x		Natural - woods, wetlands, etc
Buffer Type	Wooded						

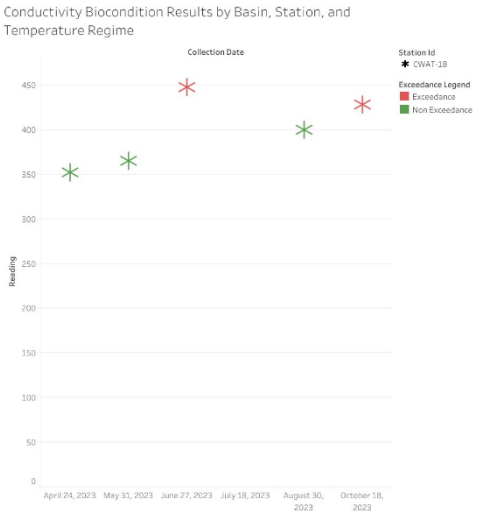
CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-18	Oak Openings: Evergreen Lake	Chloride	19.64	19.69	17.35	22.08	6.00	0.00
		Conductivity Bioconditi..	398.50	399.60	352.00	448.00	6.00	2.00
		Conductivity TDS	182.65	210.32	0.00	246.40	6.00	0.00
		Dissolved Oxygen	5.41	5.00	2.07	10.17	6.00	3.00
		pH	7.43	7.36	7.13	8.02	6.00	0.00
		Salinity	314.61	315.43	274.78	357.20	6.00	0.00
		Water Temperature	17.90	20.10	11.10	23.30	6.00	0.00

Graphs of Current Year





OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Concerning	Excellent, healthy	Concerning	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/Biocondition, 30% exceedance; DO, 50% exceedance

Dates exceedances occurred: Dissolved Oxygen: 5/31/23, 6/27/23, 8/30/23. Conductivity/biocondition: 6/27/23, 10/18/23,

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. DO exceeded benchmarks at a 50% rate. This indicates that based on the collected data as a whole, DO may degrade this stream at this station during the summer and fall. Conductivity/Biocondition exceeded the benchmarks, with 30% exceedance rate, indicating this could be an area of concern for stress on aquatic life in this stream. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring. Investigate low water, sources of eutrophication (Evergreen lake) and collaborate with other groups to aggregate more data.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

Swan Creek: Oak Openings Beach Ridge, CWAT- 19 **Monitoring Since: 2023**

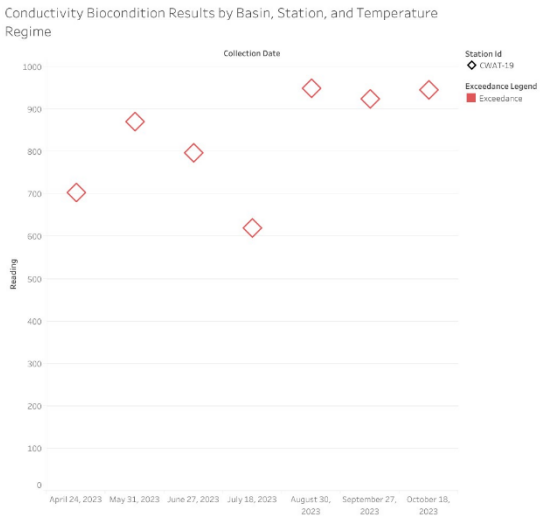
Site Characteristics		Adjacent Landuse Category		Dominant Upstream Landuse		
Drainage size	4.84	x	Wooded			Urban – high density
Ecoregion	Huron-Lake Erie Plains		Non-wooded			Urban – low density
			Agricultural- row crop			Commercial/Industrial
Aq. Habitat Type	Warm		Agricultural - pasture	x		Agriculture – row crop
Geology/Bedrock	Dolomite		Residential			Agriculture – pasture lands
Buffer width	10-50 m		Commercial/Industrial			Natural - woods, wetlands, etc
Buffer Type	Wooded					

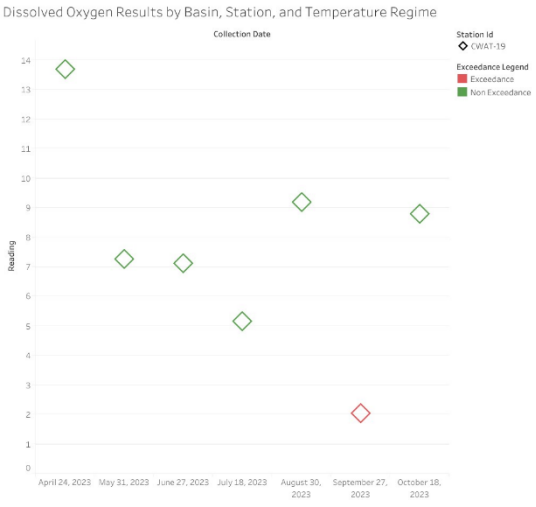
CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-19	Oak Openings: Beach Ridge	Chloride	40.89	42.87	30.55	46.77	7.00	0.00
		Conductivity Bioconditi..	829.86	870.00	620.00	949.00	7.00	7.00
		Conductivity TDS	456.42	478.50	341.00	521.95	7.00	0.00
		Dissolved Oxygen	7.61	7.26	2.04	13.69	7.00	1.00
		pH	7.81	7.75	7.49	8.23	7.00	0.00
		Salinity	699.17	735.29	508.65	808.21	7.00	0.00
		Water Temperature	16.23	18.70	7.80	20.50	7.00	0.00

Graphs of Current Year





OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Acceptable	Concern for Biota	Concerning	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/Biocondition, 100% exceedance; DO, 14% exceedance

Dates exceedances occurred: Conductivity/biocondition: 4/24/23, 5/31/23, 6/27/23, 7/18/23, 8/30/23, 9/27/23, 10/18/23. Dissolved Oxygen: 9/27/23

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. Conductivity/Biocondition exceeded the benchmarks, with Conductivity/Biocondition at 100% exceedance This indicates that based on the collected data as whole, conductivity may degrade this stream at this station during the summer and fall. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able, investigate sources of contamination and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	

Swan Creek: Oak Openings Gale Run Blue Trail, CWAT- 21 **Monitoring Since: 2023**

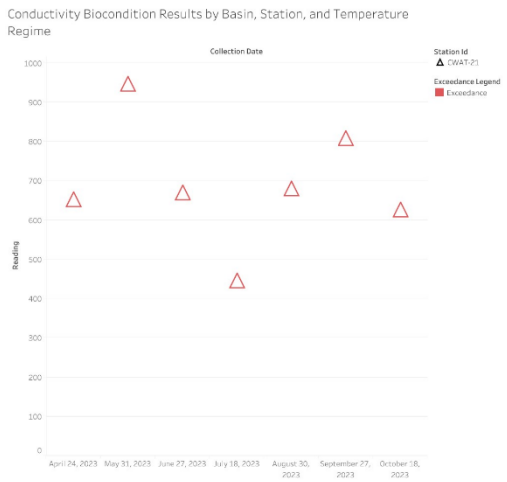
Site Characteristics		Adjacent Landuse Category		Dominant Upstream Landuse		
Drainage size	2.85	x	Wooded			Urban – high density
Ecoregion	Huron-Lake Erie Plains		Non-wooded			Urban – low density
			Agricultural- row crop			Commercial/Industrial
Aq. Habitat Type	Warm		Agricultural - pasture	x		Agriculture – row crop
Geology/Bedrock	Dolomite		Residential			Agriculture – pasture lands
Buffer width	>50 m		Commercial/Industrial			Natural - woods, wetlands, etc
Buffer Type	Wooded					

CURRENT Water Quality Data Summary

Summary Statistics and Exceedances Basin - Swan Creek

Station Id	Station Na..	Parameter	Mean Reading	Median Reading	Min. Reading	Max. Reading	Sample Count	N. Exceedance
CWAT-21	Oak Openings: Gale Run Blue Trail	Chloride	34.00	33.02	21.92	46.67	7.00	0.00
		Conductivity Bioconditi..	689.83	670.00	444.80	947.00	7.00	7.00
		Conductivity TDS	379.41	368.50	244.64	520.85	7.00	0.00
		Dissolved Oxygen	8.61	8.38	6.88	11.43	7.00	0.00
		pH	7.93	7.93	7.66	8.26	7.00	0.00
		Salinity	572.46	553.42	354.43	806.35	7.00	0.00
		Water Temperature	17.31	19.10	8.10	22.50	7.00	1.00

Graphs of Current Year



OVERALL WATER QUALITY SCREENING STATEMENT

support for aquatic life equals - Acceptable (<20%) Concerning (20-50%) Degrading (>50%) based on the percent exceedance of each parameter, based on 2023 data, *Avg Conductivity has 4 different bins

Temp	pH	DO	Avg Conductivity*	Biocondition Gradient	TDS AQ Life
Acceptable	Acceptable	Acceptable	Concern for Biota	Degrading	Acceptable

Chloride	Salinity
Acceptable	Acceptable

Parameter Exceedance/Metadata Interpretation

Exceeded parameter & percentage: Conductivity/Biocondition, 100% exceedance; Water Temperature, 14% exceedance

Dates exceedances occurred: Conductivity/biocondition: 4/24/23, 5/31/23, 6/27/23, 7/18/23, 8/30/23, 9/27/23, 10/18/23. Water temperature: 5/31/23

Metadata reviewed for interpretation: Upstream and adjacent landuse, OEPA reports for Swan Creek, LEBAF parameter thresholds and metadata tables.

Analysis statement: For the purposes of screening most of the measured LEBAF parameters indicate acceptable or healthy stream conditions. Conductivity/Biocondition exceeded the benchmarks, with Conductivity/Biocondition at 100% exceedance This indicates that based on the collected data as whole, conductivity may degrade this stream at this station during the summer and fall. Overall, all other collected data indicates a heathy waterway.

Recommendations & Conclusions

Parameter	Recommended Action(s)
Temperature	Continue monitoring.
pH	Continue monitoring.
DO	Continue monitoring.
Conductivity TDS AQL, Biocondition	Continue monitoring; add macroinvertebrate monitoring if/when able, investigate sources of contamination and collaborate with other groups to aggregate more data.
Salinity	Continue monitoring.
Chloride	Continue monitoring.
TDS	Continue monitoring.
Additional Comments	