

**Livingston County Tributary Water Quality Monitoring:
North McMillan Stress Stream Analysis**

**A Revised Report Submitted to
Livingston County Planning Department
Geneseo, NY**

By

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Table of Contents

| | |
|------------------------------------|-----------|
| Summary and Recommendations | 3 |
| Introduction and Background | 4 |
| Methods | 5 |
| Results and Discussion | 6 |
| Total Suspended Solids | 6 |
| Total Phosphorus | 7 |
| Conclusions | 8 |
| References | 9 |
| Tables | 10 |
| Figures | 12 |
| Appendices | 17 |

Summary and Recommendations:

- Significant loadings of total suspended sediments (TSS) and total phosphorus (TP) occurred several times throughout summer and fall of 2021 during intense storm events, as a result of streambank erosion and potentially changes in land use occurring in the North McMillan subwatershed of Conesus Lake
- We also identified that stream bank restoration measures done previously near historical monitoring site NMDN were failing. Even more evidence of stream bank erosion issues, especially in the downstream sections of North McMillan Creek, was highlighted in a 2018 report by consulting firm, Barton and Loguidice.
- Given the importance of North McMillan Creek as a major tributary to Conesus Lake and its historical use as a reference watershed, segment analysis was used to identify potential sources of sediments and nutrients. North McMillan Creek has not had segment analysis completed in the past. District programs such as Agriculture Environmental Management (AEM) or best management practices (BMPs) may be suggested to surrounding landowners to improve the watershed after high sources of TSS and TP are determined.
- Several North McMillan Creek sites were sampled for water quality from March 2022 through early June 2022. Approximately bi-weekly baseflow samples were collected for TSS and TP. Three storm event samples were collected when precipitation amounts exceeded 0.50 inches in the previous 24 hour period. Storm event sampling was completed within approximately 0-12 hours of peak flows.
- TSS was low during baseflow and higher during storm event sampling at all sites. Baseflow TSS was highest at the furthest upstream headwater site NMCK1, but generally below 20 mg/L. At other sites during baseflow, TSS was generally under 5 mg/L. During storm events, average concentrations were lowest at sites NMCK2, 4 and 5, while average concentrations were high at headwater site NMCK1, midsection sites 6 and 7, and greatest overall at the downstream sites NMCK8 and NMDN. The furthest downstream site NMDN had the greatest overall storm event concentration of TSS (Figures 3 and 4).
- TP concentrations followed similar patterns as observed for TSS. TP concentrations were lowest during baseflow and greatest during storm events. During baseflow TP concentrations were highest at site NMCK1 and lower at all other sites. During storm events, TP concentrations were lowest at NMCK2, 4 and 5 and highest at NMCK1, 6, 8 and NMDN. Similar to TSS, average storm event TP concentrations were greatest at NMDN.
- Stream bank remediation should be a priority upstream of NMDN and downstream of site NMCK8. Past remediation efforts took place just upstream of site NMDN; however, it appears that additional remediation efforts are needed.
- This section between NMCK8 and NMDN was also observed to be an issue in the 2018 Barton and Loguidice consultant report, and it was recommended that future remediation efforts take place in this section of stream.

Introduction and Background:

Nutrient and sediment pollution can have a myriad of impacts on aquatic ecosystem health and function. Nutrient and sediment pollution can also affect human use of water resources including drinking water, recreation, and aesthetics. Turbidity is a measure of water cloudiness and is often caused from soil runoff and is associated with total suspended solids (USEPA 2022). There is no national standard of turbidity or TSS in streams; however, high turbidity and TSS can have impacts on aquatic ecosystem health. TSS can affect water clarity and light attenuation in the water column, which can have direct impacts on submerged aquatic vegetation and phytoplankton production. TSS can also affect what organisms can survive in the system. Fine soil particles can clog gills in aquatic invertebrates and affect fish inhabitance. TSS includes soil particulates and organic particles including algae and leaves. TSS can be impacted by runoff, erosion, pollution, and disruptions of bottom sediment.

Phosphorus is a critical nutrient required for life and is considered a limiting nutrient in aquatic ecosystems. Orthophosphate is a dissolved form of phosphorus and is readily available to plants and algae for uptake. Total phosphorus is the total of all dissolved and particulate forms of phosphorus. Excessive phosphorus can occur from poor agricultural practices, urban runoff, sewage treatment plant discharges, and leaking septic systems (USEPA 2021). Excessive phosphorus in aquatic ecosystems can cause increased algal and plant growth and can lead to decreased dissolved oxygen and eutrophication. Algal blooms caused by excessive phosphorus can produce toxins harmful to aquatic and human health (USEPA 2021). There is no national standard set by the EPA; however, in NYS, phosphorus guidelines for most lakes and reservoirs is 20 µg/L (NYSDEC N.D.).

Consistent long-term monitoring is critical to differentiate trends from short-term fluctuations and to evaluate current watershed strategies. Intensive short-term monitoring, or segment analysis, is critical to locate specific areas of pollution and their sources to a degree in which targeted best management practices can be most efficiently implemented. The data collected through the project will provide a scientific basis for making decisions on the management of the tributaries and watersheds.

Significant loadings of total suspended sediments (TSS) and total phosphorus (TP) occurred several times throughout summer and fall of 2021 during intense storm events, as a result of streambank erosion and potentially changes in land use occurring in the North McMillan Creek subwatershed of Conesus Lake (Beers and Chislock 2022). We also previously identified that stream bank restoration measures near historical monitoring site NMDN were failing (Bosch *et al.* 2020; Beers and Chislock 2021). Even more evidence of stream bank erosion issues, especially in the downstream sections of North McMillan Creek, was highlighted in a 2018 report by consulting firm, Barton and Loguidice. Given the importance of North McMillan Creek as a major tributary to Conesus Lake, and its historical use as a reference watershed, segment analysis was used to identify potential sources of sediments and nutrients. North McMillan Creek has not had segment analysis completed in the past. District programs such as Agriculture Environmental Management (AEM) or best management practices (BMPs) may be suggested to surrounding landowners to improve the watershed after high sources of TSS and TP are determined.

The North McMillan Creek watershed spans over the Town of Conesus with a watershed area of approximately 1,778 hectares. Major land uses within this watershed from 2019 National Land Cover Data are predominantly forested (deciduous, evergreen, or mixed forests, 66%), developed (11%), and agriculture (pasture/hay ~17% and cultivated crops ~ 3.5%) (Figure 1).

Methods:

Several North McMillan Creek sites were sampled for water quality from March 2022 through early June 2022. (Table 1, Figure 2, Appendix 7). Approximately bi-weekly baseflow samples were collected for TSS and TP. Three storm sampling events were also completed when precipitation amounts exceeded 0.50 inches in 24 hours or less. Storm event sampling was completed within approximately 0-12 hours of peak flows.

Each water quality sampling event consisted of (1) collecting water samples for laboratory analyses, including total suspended solids (TSS) and total phosphorus (TP); and (2) *in-situ* water chemistry measurements, including temperature, pH, conductivity, turbidity and dissolved oxygen, with a calibrated YSI ProDSS (Tables 2a and 2b). Water chemistry samples were collected from flowing water using a grab sampler and bucket that was rinsed with deionized water and respective stream water at each site prior to sample collection. Water was

not collected from sites that contained stagnant water or were dry. Samples were appropriately processed and placed into pre-cleaned and labeled bottles according to standard methods and stored on ice while in the field (Table 2a). One field duplicate and field blank were collected during each sampling event for all analytes. All water chemistry samples were analyzed by the SUNY-Brockport Limnology Laboratory (ELAP ID #12116) within standard hold times.

Concentration data from each site are presented as averages on bar graphs with standard error of the mean bars to compare the data between the sites and by sample type (non-event or event). Concentration ranges for each analyte are also displayed on site maps to highlight potential sources of sediments and phosphorus. TP and TSS data were analyzed via ANOVA to determine if site and sample type statistically differed from other sites using Tukey's post hoc tests. All dates and sites were included in graphs and analyses except for site 3 data on March 22nd baseflow as this site and date is an outlier (see below for observations and explanation).

Results and Discussion:

TSS:

TSS was low during baseflow and higher during storm event sampling at all sites (Figure 3, Appendix 1, 2, and 7). Baseflow TSS was highest at the furthest upstream headwater site NMCK1, but generally below 20 mg/L. At other sites during baseflow, TSS was generally under 5 mg/L (Appendix 7). During storm events, average concentrations were lowest at sites NMCK2, 4 and 5, while average concentrations were high at headwater site NMCK1, midsection sites 6 and 7, and greatest overall at the downstream sites NMCK8 and NMDN (Figures 3 and 4). Furthest downstream site NMDN had the greatest overall storm event concentration of TSS (Figures 3 and 4). Statistically, TSS significantly differed between sites by sample type ($P = 0.012$; d.f. 17, $F = 2.223$), with the furthest downstream sites (8 and NMDN) having the greatest TSS concentrations during storm events. Visual observations at sites indicated stream bank erosion occurring heavily between sites NMCK8 and NMDN (see appendix for photos of streambank erosion). Evidence of sediment deposition, undercutting of tree roots along stream banks, and streambank erosion were all present. We also observed some streambank erosion occurring upstream of site NMCK8, but not to the degree as between NMCK8 and NMDN. This section between NMCK8 and NMDN was also observed to be an issue in the 2018 Barton and

Loguidice consultant report and was recommended that remediation efforts take place in this section of stream. Stream bank remediation should be a priority upstream of NMDN and downstream of site NMCK8. Past remediation efforts took place just upstream of site NMDN; however, additional remediation is necessary.

Total Phosphorus:

TP concentrations followed similar patterns to TSS. TP concentrations were lowest during baseflow and greatest during storm events. During baseflow TP concentrations were highest at site NMCK1 around 30 to 40 µg/L and lower at all other sites, usually less than 25 µg/L (Figures 3 and 5). During storm events, TP concentrations were lowest at NMCK2, 4 and 5 and highest at NMCK1, 6, 8 and NMDN (Figures 3 and 5). Average storm event concentrations were greatest at NMDN, similarly to TSS. Statistically, TP significantly differed between sites by sample type ($P < 0.001$; d.f. 17, $F = 3.099$), with the furthest downstream sites (8 and NMDN) having the greatest TP concentrations during storm events. TP concentrations usually increase in areas of heavy erosion, as phosphorus can be high in sediments. Stream plumes of rich in sediments and nutrients are often observed after heavy storm events in the North McMillan watershed (see appendix 3 for stream plume observed in Conesus Lake near the mouth of North McMillan Creek). These storm events are known to transport large amounts of TP and TSS into Conesus Lake and impact short- and long-term water quality of the lake.

Outlier site NMCK3 in March baseflow:

During our routine baseflow monitoring sampling on March 22, 2022, site NMCK3 had significantly higher turbidity, TSS and TP compared to all other sites sampled on that date (appendix 6). These concentrations were much higher than during other sampling events at this site. These high concentrations were not due to streambank erosion. Upstream of this site, we noticed what appeared to be a logging operation occurring while we were sampling. Evidence of heavy equipment present was observed just upstream of this site. Potentially the machinery was crossing the creek, or potentially they were digging in the creek in some form. Nonetheless, turbidity (435 NTUs) and concentrations of TSS (576 mg/L) and TP (895 µg/L) were extremely high compared to all other sites (appendix 7). These values were the highest observed across the sampling period. Because of this, we determined the site to be an outlier on this date, and these

data were excluded from analyses. We did not observe this level of disturbance again over the course of our sampling period; however, it is important to note, as there is potentially more development occurring in the watershed.

Seasonal drying of headwater sites was also observed towards the end of the sampling period in early June (see appendix).

Conclusion:

In conclusion, TSS was low during baseflow and higher during storm event sampling at all sites. Baseflow TSS was highest at the furthest upstream headwater site NMCK1, but generally below 20 mg/L. At other sites during baseflow, TSS was generally under 5 mg/L. During storm events, average concentrations were lowest at sites NMCK2, 4 and 5, while average concentrations were high at headwater site NMCK1, midsection sites 6 and 7, and greatest overall at the downstream sites NMCK8 and NMDN. Furthest downstream site NMDN had the greatest overall storm event concentration of TSS. TP concentrations followed similar patterns as what was observed for TSS. TP concentrations were lowest during baseflow and greatest during storm events. During baseflow, TP concentrations were highest at site NMCK1 and lower at all other sites. During storm events, TP concentrations were lowest at NMCK2, 4 and 5 and highest at NMCK1, 6, 8 and NMDN. Stream bank remediation should be a priority upstream of NMDN and downstream of site NMCK8. While past remediation efforts took place just upstream of site NMDN, it appears that additional remediation is necessary.

References:

- Barton and Loguidice. 2018. Analysis of recommended short-term streambank stabilization options North McMillan Creek – Town of Conesus. Report submitted to Livingston County Planning Department.
- Beers, D. and M. Chislock. 2021. Livingston County Water Quality Monitoring – 2020 Tributary Program. Report submitted to Livingston County Planning Department.
- Beers, D and M. Chislock. 2022. Livingston County Water Quality Monitoring – 2021 Tributary Program. Report Submitted to Livingston County Planning Department.
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- NYSDEC. N.D. Nutrient Criteria. Available at: <https://www.dec.ny.gov/chemical/77704.html>
- USEPA 2021. Indicators: Phosphorus. Available at: <https://www.epa.gov/national-aquatic-resource-surveys/indicators-phosphorus> July 17 2021.
- USEPA. 2022. National primary drinking water standards. Available at <https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations>. January 26 2022.

Tables:

Table 1: Site table with sample locations.

| Site Code | Sampling Location | GPS Coordinates | |
|-----------|--|-----------------|------------|
| | | North | West |
| NMCK1 | Partridge Corners Road | 42.722267 | -77.651586 |
| NMCK2 | North Railroad Ave | 42.721741 | -77.661892 |
| NMCK3 | NYS RT 15, South Livonia Rd near Ricky Green Memorial Park | 42.725070 | -77.674131 |
| NMCK4 | NYS RT 15, South Livonia Rd near intersection of Footes Corners Rd | 42.745866 | -77.676804 |
| NMCK5 | Footes Corners Rd near Clark Rd intersection | 42.744662 | -77.681966 |
| NMCK6 | McGinty Rd near Clark Rd | 42.732004 | -77.686447 |
| NMCK7 | McGinty Rd near NYS RT 15 | 42.730355 | -77.678391 |
| NMCK8 | East Lake Rd, near Henderson Hill Rd | 42.723317 | -77.702333 |
| NMDN | 6101 Dacula Shores Rd | 42.725611 | -77.707056 |

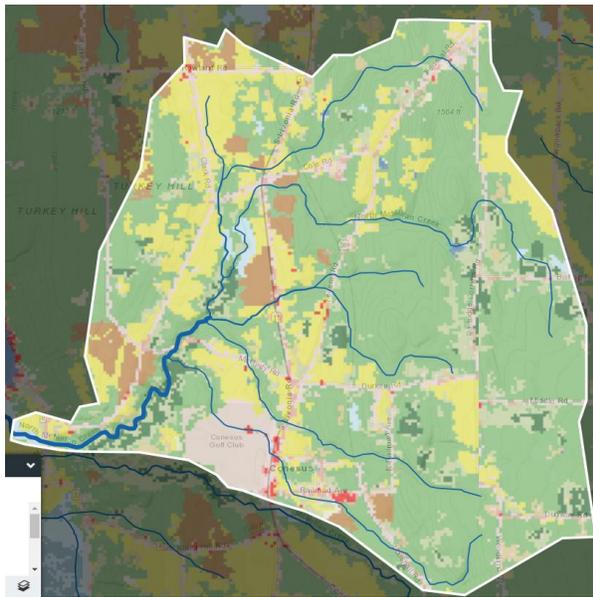
Table 2a: Parameters, analytical specifications, QA/QC requirements, and laboratories processing samples.

| <i>Lab Measurements Analyte</i> | Method | Minimum Volume/ Container | Preservative | QC Sample | Frequency | QC Acceptance Limits | Corrective Action | Holding Time | Method Detection Limit | Report Limit |
|---------------------------------|------------------|---------------------------|-------------------------|----------------------------|-----------|--|---|--------------|----------------------------------|----------------------------------|
| Total phosphorus | SM 4500-P H-2011 | 125 ml plastic | H2SO4 to pH<2, cool 4°C | Method Blank | 10% | < 0.002 mg P/L | Reanalyze or Qualify data | 28 days | 0.002 mg/l | 0.003 mg/l |
| | | | | ICC/LCS | 10% | % Recovery between 90% to 110% | Reanalyze or Qualify data | | | |
| | | | | Lab Duplicate | 10% | RPD within ± 10% | Reanalyze or Qualify data | | | |
| | | | | Matrix spike duplicate set | 10% | Between 90% to 110% | Qualify data Reanalyze or Qualify data | | | |
| Total suspended solids | SM 2540 D-2011 | 1000 ml plastic | Cool 4°C | Method Blank | 10% | < 0.3 mg/L | Reanalyze or Qualify data | 7 days | *0.3 mg/L *For 1000 mL sample | *0.3 mg/L *For 1000 mL sample |
| | | | | ICC/LCS | 10% | % Recovery between 90% to 110% | Reanalyze or Qualify data | | | |
| | | | | Lab Duplicate | 10% | RPD within ± 10%, ±50% for values < 5 mg/L | Reanalyze or Qualify data | | | |
| | | | | Matrix spike duplicate set | NA | NA | NA | | | |

Table 2b: Parameters, analytical specifications, QA/QC requirements, and laboratories processing samples.

| <i>Field Measurements Parameter</i> | Method | Calibration/ Verification | Precision | Range |
|-------------------------------------|---------------------|---|----------------------|--------------|
| Temperature | YSI, <i>in situ</i> | Factory set annual check with NIST-reference thermometer | ±0.2 C | -5 to 70°C |
| Luminescent Dissolved oxygen | YSI, <i>in situ</i> | Daily | ±0.1 mg/L or 1% | 0 to 50 mg/L |
| pH | YSI, <i>in situ</i> | Daily | ±0.2 | 0 to 14 |
| Specific Conductivity (SPC) | YSI, <i>in situ</i> | Daily | ±0.001 mS/cm or 0.5% | 0-200 mS/cm |
| Turbidity | YSI, <i>in situ</i> | Daily | ±0.3 FNU or 2% | 0-4000 FNU |

Figures:



Land Use/Cover 2019 (NLCD19)

Related Layer: Land Use/Cover 2019 (NLCD19) Turn off

Source: National Land Cover Database (NLCD 2019) ⓘ

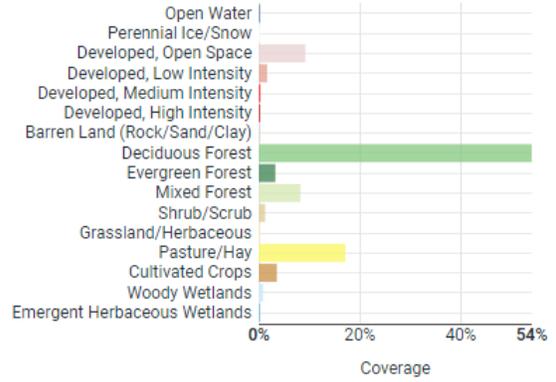


Figure 1: North McMillan land use map with watershed land-use proportions.

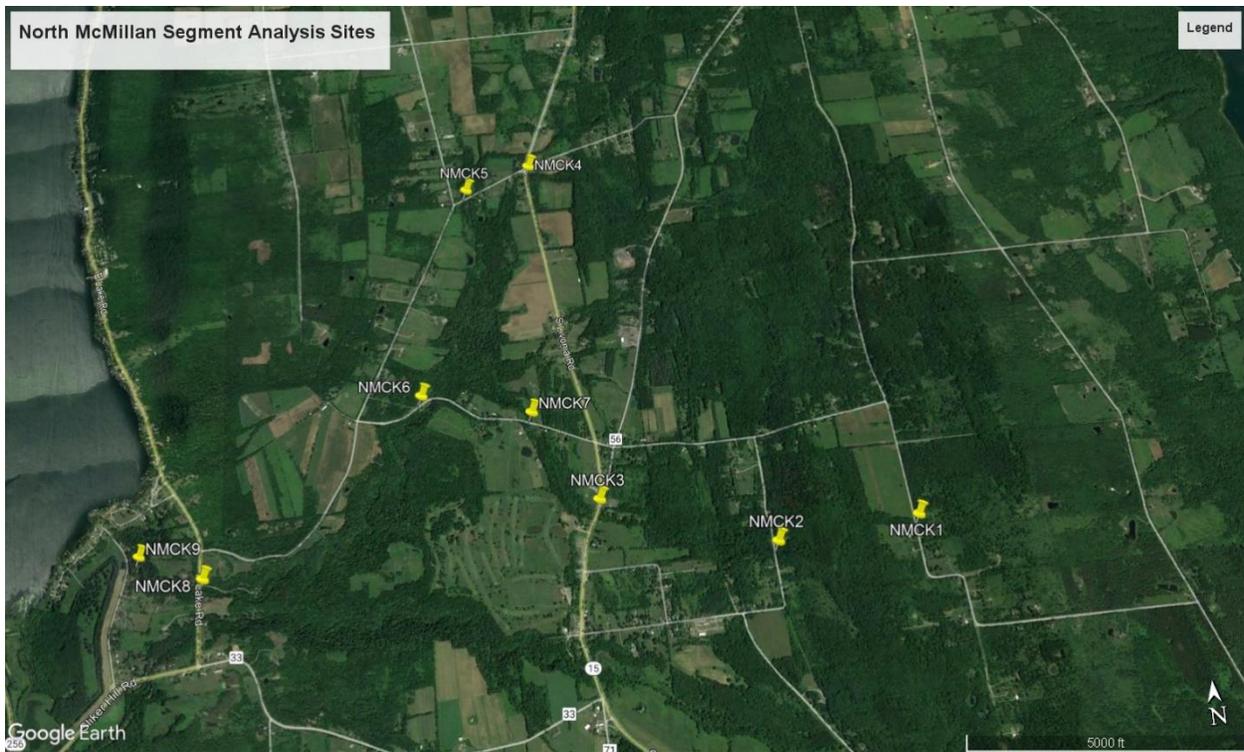


Figure 2: Study system map with locations sampled. “NMCK9” on the map is the same site as NMDN (Table 1).

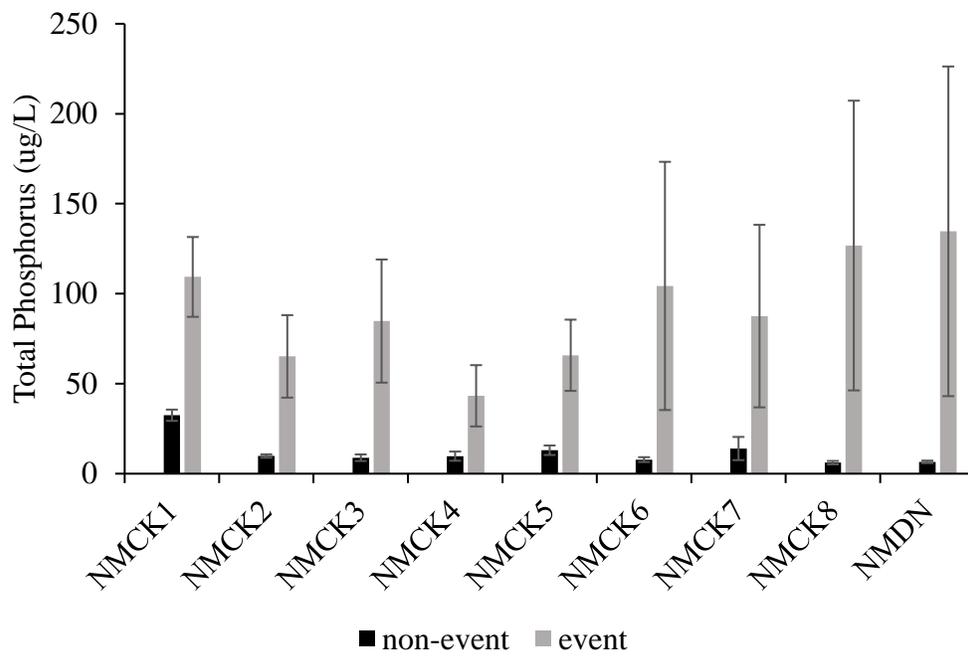
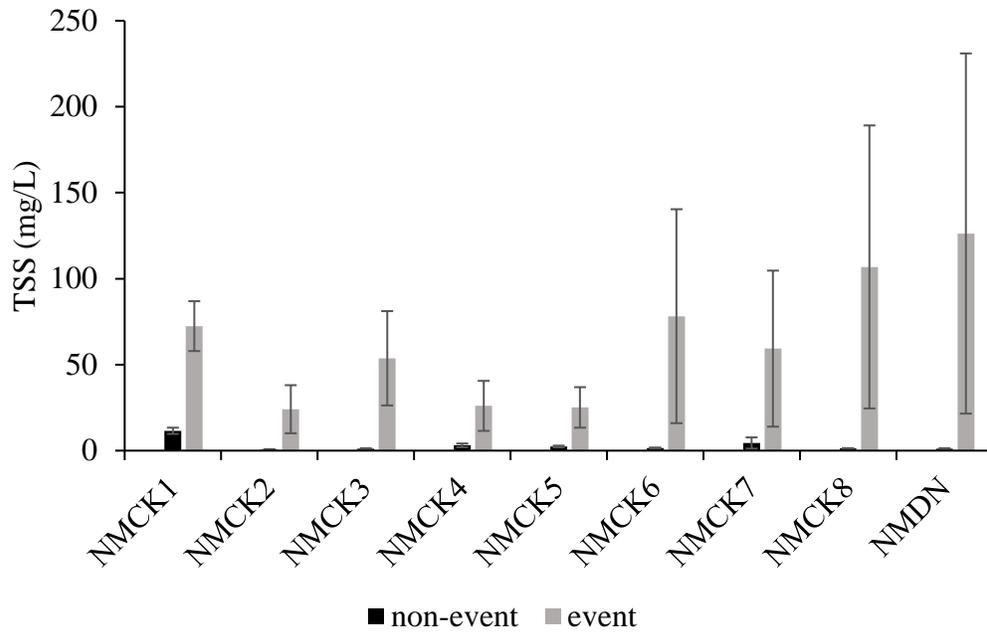


Figure 3: Average concentrations of TSS and TP across study period by sample type (event vs non-event).

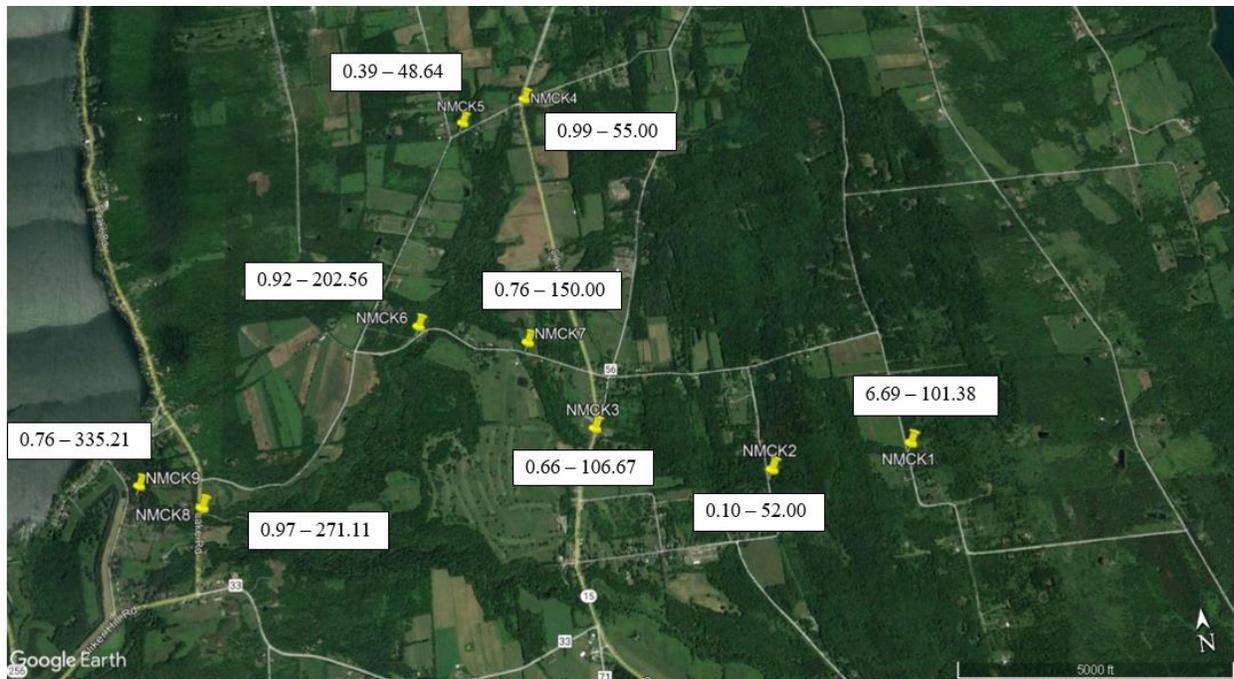


Figure 4: TSS (mg/L) ranges throughout study period for each sampled site. “NMCK9” on the map is the same site as NMDN (Table 1). Site 3 outlier date not included.

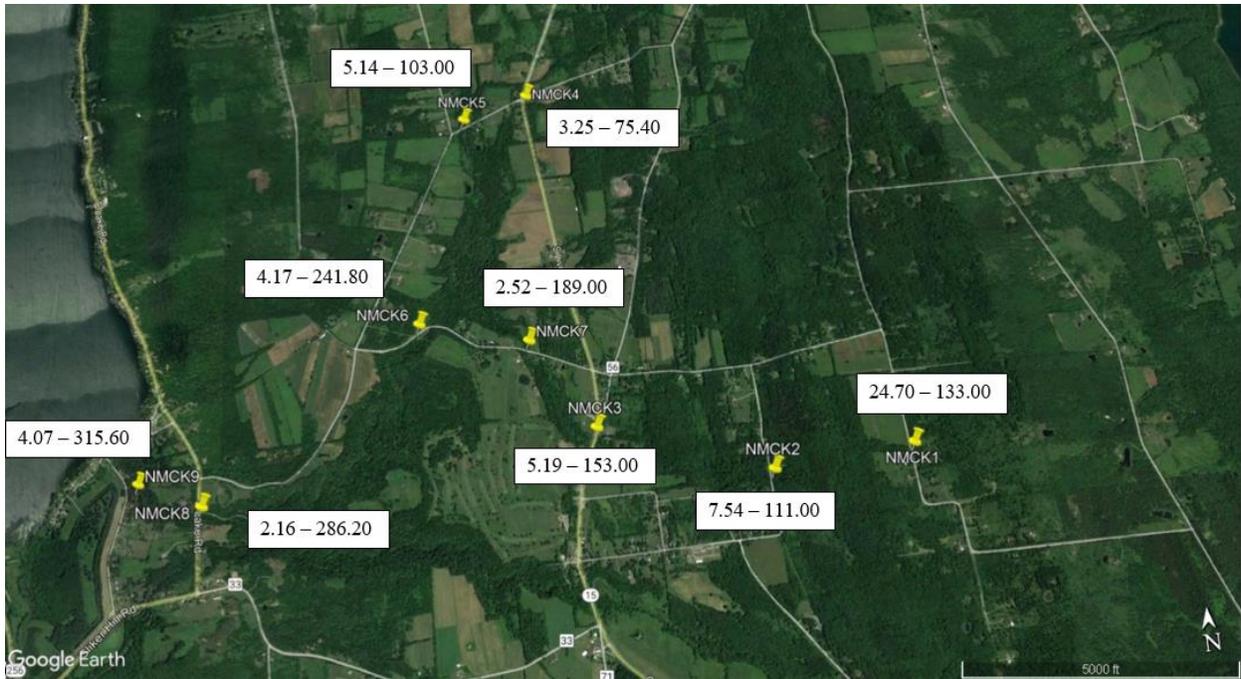


Figure 5: Total Phosphorus range for each site throughout sampling period. “NMCK9” on the map is the same site as NMDN (Table 1). Site 3 outlier date not included.

Appendix:

Appendix 1: Baseflow (left) vs storm event runoff (right) at site NMDN showing turbid water.



Appendix 2: General pictures of storm event runoff in the North McMillan watershed



Appendix 3: Stream Plume into Conesus Lake during storm event sampling



Appendix 4: Stream bank erosion, sediment deposition, and undercutting of tree roots along downstream sections of North McMillan Creek. Photos taken near site NMDN.



Appendix 5: Seasonal drying of North McMillan headwaters.



Appendix 6: Outlier date at site NMCK3 in March 2022 showing heavy sediment concentrations in water likely due to logging and stream disturbance just upstream from this site



Appendix 7: 2021-2022 field and lab data for North McMillan Creek sites.

ND = concentration below limit of quantification (LOQ).

| Site | Date | Sample type (Event or non-event) | Water Temperature (°C) | Dissolved oxygen (mg/L) | Dissolved oxygen (%) | pH | SPC (µS/cm) | Turbidity (NTU's) | TSS (mg/L) | Total Phosphorus (µg/L) |
|-------|-----------|-------------------------------------|---------------------------|----------------------------|-------------------------|------|----------------|----------------------|---------------|----------------------------|
| NMCK1 | 3/22/2022 | non-event | 7.6 | 11.2 | 98.1 | 8.19 | 50.7 | 15.2 | 13.2 | 32.8 |
| NMCK2 | 3/22/2022 | non-event | 4.7 | 12.39 | 99.8 | 7.96 | 287.4 | 1.27 | ND | 7.5 |
| NMCK3 | 3/22/2022 | non-event | 6 | 12.22 | 101.2 | 7.82 | 428 | 435 | 576.4 | 895.0 |
| NMCK4 | 3/22/2022 | non-event | 6 | 12.61 | 104.4 | 7.78 | 390.1 | 3.16 | 3.5 | 10.1 |
| NMCK5 | 3/22/2022 | non-event | 7.8 | 12.31 | 106.4 | 8 | 550 | 1.08 | 1.8 | 11.0 |
| NMCK6 | 3/22/2022 | non-event | 5 | 12.81 | 102.4 | 8.22 | 546 | 1.88 | 2.6 | 7.9 |
| NMCK7 | 3/22/2022 | non-event | 6.3 | 12.49 | 104.1 | 8.17 | 520 | 24.2 | 17.4 | 38.7 |
| NMCK8 | 3/22/2022 | non-event | 4.2 | 13.2 | 103.2 | 8.32 | 532 | 0.91 | 1.8 | 6.6 |
| NMDN | 3/22/2022 | non-event | 4.1 | 13.12 | 102.2 | 8.16 | 533 | 0.8 | ND | 6.8 |
| NMCK1 | 4/5/2022 | non-event | 11.5 | 10.17 | 99.2 | 8.49 | 50.5 | 12.51 | 10.3 | 28.8 |
| NMCK2 | 4/5/2022 | non-event | 7.7 | 11.82 | 104.2 | 8.26 | 328.5 | 0.87 | ND | 9.4 |
| NMCK3 | 4/5/2022 | non-event | 9.5 | 11.76 | 107.6 | 8.38 | 442.7 | 1.6 | 0.9 | 6.3 |
| NMCK4 | 4/5/2022 | non-event | 9.3 | 11.85 | 107.8 | 8.23 | 401.5 | 1.33 | 1.0 | 6.6 |
| NMCK5 | 4/5/2022 | non-event | 11.2 | 11.07 | 105.3 | 8.22 | 566 | 1.94 | 3.0 | 10.6 |
| NMCK6 | 4/5/2022 | non-event | 9.1 | 11.88 | 107.2 | 8.51 | 562 | 0.55 | 1.1 | 7.7 |
| NMCK7 | 4/5/2022 | non-event | 10.2 | 11.85 | 110.3 | 8.6 | 532 | 0.71 | 1.8 | 6.0 |
| NMCK8 | 4/5/2022 | non-event | 9 | 11.96 | 106.9 | 8.59 | 549 | 0.51 | 1.5 | 5.2 |
| NMDN | 4/5/2022 | non-event | 8.7 | 12.13 | 107.5 | 8.57 | 550 | 0.31 | 1.1 | 8.9 |
| NMCK1 | 4/7/2022 | event | 8.4 | 11.15 | 101.4 | 8.19 | 42 | 37.92 | 56.7 | 65.0 |
| NMCK2 | 4/7/2022 | event | 8.3 | 11.25 | 101.3 | 7.89 | 299.5 | 16.83 | 11.9 | 41.0 |
| NMCK3 | 4/7/2022 | event | 8.3 | 11.32 | 101.6 | 7.97 | 390 | 22.8 | 39.7 | 55.7 |
| NMCK4 | 4/7/2022 | event | 8.6 | 11.43 | 102.9 | 7.89 | 358.3 | 8.27 | 9.4 | 17.4 |
| NMCK5 | 4/7/2022 | event | 9 | 10.82 | 98.5 | 7.91 | 538 | 7.72 | 11.9 | 35.5 |
| NMCK6 | 4/7/2022 | event | 8.6 | 11.47 | 103 | 8.21 | 560 | 8.21 | 12.8 | 25.6 |
| NMCK7 | 4/7/2022 | event | 8.5 | 11.47 | 102.9 | 8.11 | 444.9 | 14.85 | 17.2 | 37.2 |
| NMCK8 | 4/7/2022 | event | 8.8 | 11.49 | 102.9 | 8.32 | 524 | 6.38 | 15.9 | 27.6 |
| NMDN | 4/7/2022 | event | 8.7 | 11.52 | 102.9 | 8.37 | 531 | 5.96 | 8.6 | 19.3 |
| NMCK1 | 4/12/2022 | event | 7.5 | 11.38 | 99.9 | 7.58 | 37 | 68 | 101.4 | 130.0 |
| NMCK2 | 4/12/2022 | event | 7.4 | 11.56 | 100.3 | 7.73 | 162.3 | 48.2 | 52.0 | 111.0 |
| NMCK3 | 4/12/2022 | event | 7.5 | 11.54 | 99.9 | 7.74 | 262.5 | 77 | 106.7 | 153.0 |
| NMCK4 | 4/12/2022 | event | 7.5 | 11.66 | 100.4 | 7.5 | 338.7 | 45.1 | 55.0 | 75.4 |
| NMCK5 | 4/12/2022 | event | 8 | 11.22 | 98.3 | 7.75 | 438.7 | 41.9 | 48.6 | 103.0 |
| NMCK6 | 4/12/2022 | event | 7.6 | 11.55 | 99.9 | 7.89 | 378 | 118.5 | 202.6 | 241.8 |
| NMCK7 | 4/12/2022 | event | 7.5 | 11.58 | 100.1 | 7.87 | 252.8 | 107 | 150.0 | 189.0 |
| NMCK8 | 4/12/2022 | event | 7.9 | 11.59 | 100.3 | 7.94 | 393 | 146.5 | 271.1 | 286.2 |
| NMDN | 4/12/2022 | event | 8 | 11.51 | 99.6 | 8.19 | 399 | 175.7 | 335.2 | 315.6 |
| NMCK1 | 4/22/2022 | non-event | 7.3 | 11.45 | 98.7 | 8.46 | 59.8 | 10.9 | 6.7 | 24.7 |
| NMCK2 | 4/22/2022 | non-event | 6 | 12.49 | 103.2 | 8.22 | 240.4 | 0.43 | ND | 9.1 |

| | | | | | | | | | | |
|-------|-----------|-----------|-----------------------------|-------|-------|------|-------|-------|------|-------|
| NMCK3 | 4/22/2022 | non-event | 6.4 | 12.82 | 106.6 | 8.2 | 395.4 | 0.4 | 0.8 | 5.2 |
| NMCK4 | 4/22/2022 | non-event | 6.7 | 12.48 | 104.2 | 8.12 | 402.9 | 1.05 | 1.3 | 3.3 |
| NMCK5 | 4/22/2022 | non-event | 7.2 | 12.35 | 104.5 | 8.1 | 588 | 0.69 | ND | 5.1 |
| NMCK6 | 4/22/2022 | non-event | 6 | 12.77 | 104.5 | 8.27 | 561 | 0.42 | 0.9 | 4.2 |
| NMCK7 | 4/22/2022 | non-event | 6.1 | 12.91 | 106.1 | 8.3 | 495.6 | 0.37 | 0.8 | ND |
| NMCK8 | 4/22/2022 | non-event | 6 | 12.87 | 104.6 | 8.3 | 546 | 3.31 | 1.0 | ND |
| NMDN | 4/22/2022 | non-event | 5.9 | 12.28 | 99.6 | 8.25 | 546 | 0.55 | 1.1 | 4.1 |
| NMCK1 | 5/3/2022 | non-event | 10.1 | 10.28 | 96.2 | 8.23 | 75.7 | 11.8 | 10.1 | 32.5 |
| NMCK2 | 5/3/2022 | non-event | 8.7 | 10.93 | 97.9 | 8.2 | 220.7 | 0.63 | 0.9 | 9.6 |
| NMCK3 | 5/3/2022 | non-event | 8.9 | 11.48 | 102.7 | 8.24 | 411.9 | 0.67 | 0.7 | 6.7 |
| NMCK4 | 5/3/2022 | non-event | 9.6 | 11.51 | 104.6 | 7.98 | 395 | 1.28 | 2.0 | 6.4 |
| NMCK5 | 5/3/2022 | non-event | 9 | 11.51 | 103 | 8.15 | 587 | 1.26 | 2.2 | 9.6 |
| NMCK6 | 5/3/2022 | non-event | 8.5 | 11.78 | 103.8 | 8.31 | 560 | 0.48 | 1.3 | 4.2 |
| NMCK7 | 5/3/2022 | non-event | Not sampled, access blocked | | | | | | | |
| NMCK8 | 5/3/2022 | non-event | 8.5 | 11.92 | 104.7 | 8.4 | 544 | 0.39 | 1.0 | 5.9 |
| NMDN | 5/3/2022 | non-event | 8.3 | 11.25 | 98.1 | 8.3 | 542 | 0.21 | 1.4 | 5.3 |
| NMCK1 | 5/22/2022 | event | 17.8 | 8.95 | 99.4 | 7.71 | 48.6 | 51.2 | 59.2 | 133.0 |
| NMCK2 | 5/22/2022 | event | 16.5 | 9.08 | 97.2 | 7.67 | 170.5 | 11.13 | 8.4 | 43.5 |
| NMCK3 | 5/22/2022 | event | 16.2 | 9.29 | 98.4 | 7.71 | 327.7 | 14.35 | 14.8 | 45.7 |
| NMCK4 | 5/22/2022 | event | 16.9 | 9.49 | 101.8 | 7.76 | 329.2 | 12.13 | 13.7 | 37.0 |
| NMCK5 | 5/22/2022 | event | 16.2 | 9.03 | 95.4 | 7.77 | 514 | 9.05 | 14.9 | 58.9 |
| NMCK6 | 5/22/2022 | event | 16 | 9.63 | 101 | 7.81 | 459.7 | 13.45 | 19.2 | 45.6 |
| NMCK7 | 5/22/2022 | event | 16.3 | 9.49 | 100.6 | 7.79 | 381.2 | 9.55 | 10.8 | 36.5 |
| NMCK8 | 5/22/2022 | event | 16.5 | 9.61 | 101.2 | 7.89 | 434.9 | 22.28 | 33.5 | 66.5 |
| NMDN | 5/22/2022 | event | 16.3 | 9.22 | 96.7 | 7.75 | 438.1 | 25.58 | 35.0 | 69.1 |
| NMCK1 | 5/25/2022 | non-event | 15.4 | 8.51 | 88.8 | 7.36 | 91.6 | 19.15 | 17.5 | 43.5 |
| NMCK2 | 5/25/2022 | non-event | 12.4 | 9.45 | 91.6 | 7.55 | 228.1 | 0.53 | 1.5 | 13.3 |
| NMCK3 | 5/25/2022 | non-event | 13.2 | 9.92 | 97.4 | 7.71 | 447.1 | 0.81 | 1.6 | 11.3 |
| NMCK4 | 5/25/2022 | non-event | 13.4 | 10.4 | 102.4 | 7.69 | 416.4 | 0.86 | 2.4 | 10.7 |
| NMCK5 | 5/25/2022 | non-event | 11.8 | 9.69 | 94.2 | 7.4 | 630 | 0.96 | 3.7 | 21.1 |
| NMCK6 | 5/25/2022 | non-event | 12.7 | 10.47 | 101 | 7.8 | 615 | 0.64 | 2.0 | 10.6 |
| NMCK7 | 5/25/2022 | non-event | 13.5 | 10.28 | 101.3 | 7.53 | 577 | 0.25 | 1.2 | 8.9 |
| NMCK8 | 5/25/2022 | non-event | 12.6 | 10.55 | 100.4 | 8 | 596 | 0.44 | 1.4 | 8.2 |
| NMDN | 5/25/2022 | non-event | 12.4 | 8.84 | 84.2 | 8.2 | 594 | 0.04 | 1.0 | 7.6 |
| NMCK1 | 6/6/2022 | non-event | Not sampled, dry | | | | | | | |
| NMCK2 | 6/6/2022 | non-event | Not sampled, dry | | | | | | | |
| NMCK3 | 6/6/2022 | non-event | 15.2 | 8.79 | 91.4 | 7.52 | 484.5 | 0.28 | 1.6 | 14.9 |
| NMCK4 | 6/6/2022 | non-event | 15.6 | 9.37 | 98.2 | 8.03 | 506 | 0.91 | 8.2 | 21.3 |
| NMCK5 | 6/6/2022 | non-event | 14.6 | 8.45 | 86.5 | 7.62 | 699 | 0.71 | 3.4 | 20.7 |
| NMCK6 | 6/6/2022 | non-event | 15.1 | 10.3 | 106.3 | 8.2 | 695 | -0.03 | 1.5 | 12.3 |
| NMCK7 | 6/6/2022 | non-event | 16.2 | 9.5 | 100.6 | 8.04 | 688 | -0.11 | 1.0 | 13.7 |
| NMCK8 | 6/6/2022 | non-event | 15.6 | 10.4 | 106.3 | 8.33 | 663 | 0.32 | 1.0 | 8.65 |
| NMDN | 6/6/2022 | non-event | 13 | 6.45 | 63.2 | 7.58 | 606 | -0.43 | 0.8 | 6.77 |