
February 3, 2021

Norma Somers
Special Assessment District
Watervliet Charter Township
4959 N M 140, PO Box 384
Watervliet, MI 49098

RE: 2021 Paw Paw Lake Water Quality Monitoring
Scope of Services

Dear Norma,

At your request we have compiled a cost estimate for 2021 water quality monitoring activities on Paw Paw Lake. In total, three sample events are proposed to take place between May and October 2021, where sample events capture the early-, mid- and late-season water quality characteristics of Paw Paw Lake. The following paragraphs describe the proposed scope of services provided by Spicer Group and GEI for the upcoming summer season.

TASK 1 – Sample Collection and Analysis

Task 1A. Nutrient and Chlorophyll-a Analysis

In previous years, twelve sample sites were monitored within Paw Paw Lake, however, in 2021, it is proposed that the number of sample sites be reduced from twelve to eight. There are four monitoring sites in the northern lobe (NL 1, NL 2, NL 4, NL 6) of Paw Paw Lake, and four sites in the main body of the lake (ML 2, ML 4, ML 5, ML 7), see Figure 1 for a map depicting sample sites. At each of the 8 sites, an epilimnion (upper level) and a hypolimnion (lower level) sample will be taken for chemical analysis. The suite of water quality tests proposed for the samples include:

- Nitrate,
- Ammonia,
- Soluble reactive phosphorus,
- Total phosphorus, and
- Chlorophyll-a.

Chlorophyll-a and total suspended solids will be collected in the photic zone of the epilimnion. Samples collected in the hypolimnion will be analyzed for soluble reactive phosphorus, total phosphorus, nitrate, ammonia, and total suspended solids. Fibertec, a NELAC and USEPA accredited laboratory, will be providing the laboratory analytical services. Great Lakes Environmental Center (GLEC) in Traverse City, also a NELAC accredited laboratory, will be analyzing the chlorophyll-a samples. Both labs have been used for monitoring Paw Paw Lake samples in previous years to run the respective water quality tests.

Task 1B. General Water Quality Chemistry Analysis

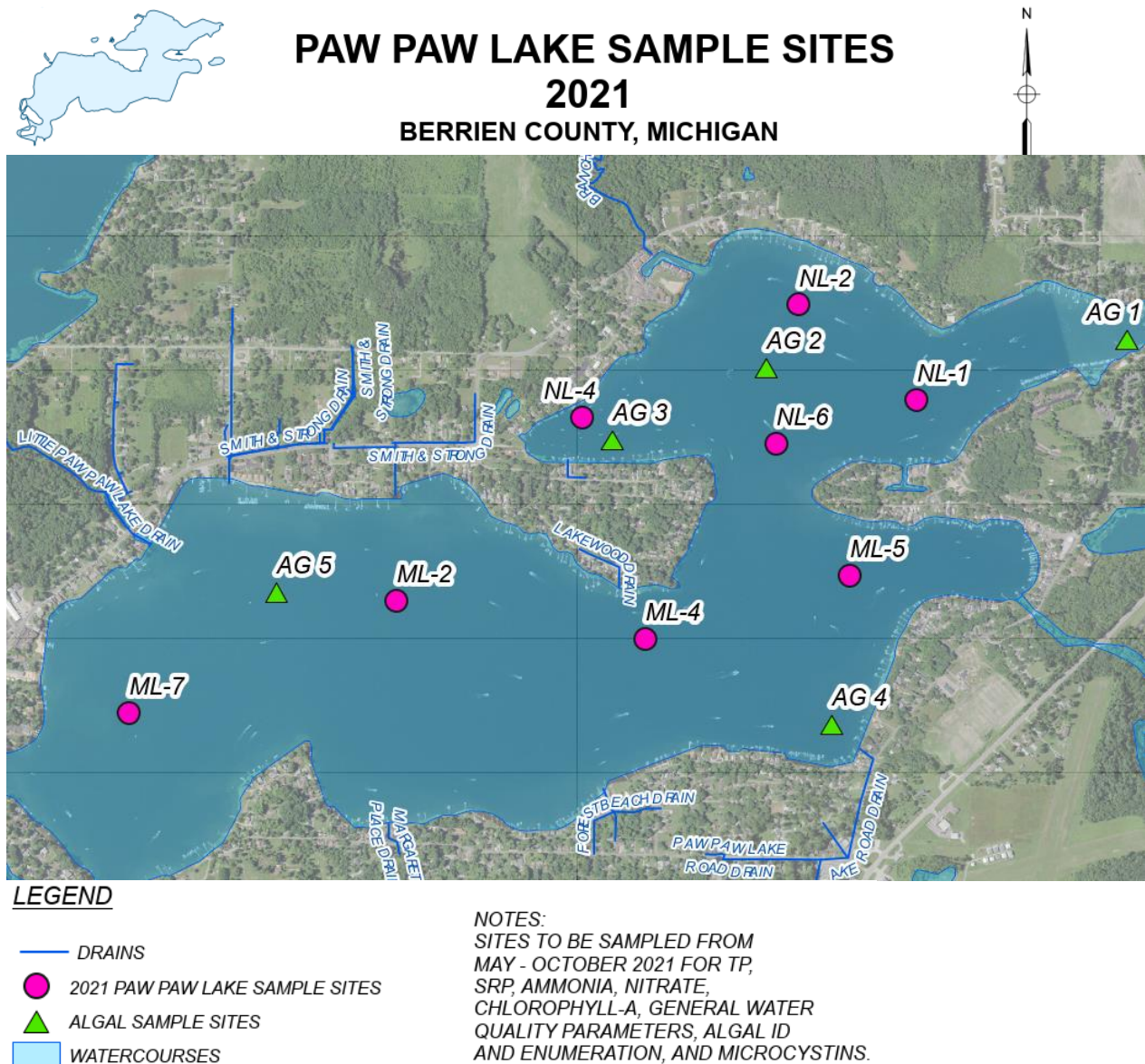
Other general chemistry water quality parameters such as dissolved oxygen, specific conductivity, pH, temperature, visibility, and depth will be monitored with a Quanta Hydrolab multi-parameter probe. At each site (NL 1, NL 2, NL 4, NL 6, ML 2, ML 4, ML 5, ML 7) all general water quality parameters listed are measured at one foot in depth, and at one foot off the lake's bottom in order to profile the epilimnion and hypolimnion, respectively. In between the top and the bottom measurements, dissolved oxygen in mg/L, temperature (°F), and depth (ft) are recorded in two-foot increments in order to make a depth profile for each site.

Task 1C. Algal ID and Enumeration and Microcystin Analysis

Algal samples were first collected on Paw Paw Lake in late 2016, with sample collection continuing in subsequent monitoring seasons from 2017 – 2020. Samples were analyzed for Algal Identification and Enumeration and microcystin (toxins produced by blue-green algae) concentration. Initially, there were five algal sample sites on the lake, however, most seasons only three of the five sample sites were utilized for sample collection.

It is proposed that during the 2021 monitoring season, three of the five sample sites (AG1, AG2, AG3, AG4, AG5) will be analyzed for Algal ID and Enumeration and microcystin analysis during one of the three sample events. If results show a high concentration of microcystins and lead to major concern, experts in algal control may be called upon in order to address algae concerns and remediation efforts in Paw Paw Lake, only if the lake board approves.

The map below shows both the general sample sites and algae sample sites proposed for 2021 monitoring:



Task 2 – Reporting and Meetings

Task 2A. Reports

For water quality analysis, it is crucial to keep up-to-date and organized on parameters measured, weather, and comparison of data to previous monitoring events in order to have the best understanding of the environmental health of the waterway. Each monitoring event in 2021 on Paw Paw Lake will be documented in a Field Activity Summary, which is essentially a mini report that includes the weather conditions of the monitoring date, observations and notes regarding the lake, and general water quality measurements. The Field Activity Summaries are included in an appendix of the final summary report at the end of the year.

An updated 2021 water quality summary report (originally produced in 2017) will be provided at the end of 2021. Other reporting methods, including a digital water quality dashboard, will be explored and potentially utilized.

Task 2B. Meetings

The following meetings are budgeted for the 2021 season, with location dependent on developments related to COVID-19:

- **1 meeting in Watervliet or Coloma** with one Spicer and one GEI representative
- **3 virtual Zoom meetings** with one Spicer and one GEI representative
- **1 meeting in St. Johns or Lansing** with the entire Spicer/GEI project team

At the meetings, representatives will be present to answer questions, provide recommendations, and to present information and data to the Lake Board.

Deliverables:

- A. **1 Water Quality Summary Sheet**, in hard copy (multiple) and electronic forms

Reimbursable Expenses:

Reimbursable expenses will be billed when they are incurred or invoiced on an hourly basis. Reimbursable expenses such as laboratory fees, equipment fees, travel, and meetings have been accounted for in this cost estimate. Examples of reimbursable fees include:

- A. Equipment rental fees
- B. Equipment shipping fees
- C. Laboratory fees
- D. Deliverables beyond those included above
- E. Travel
- F. Meetings

Additional Services:

Services not specifically listed in our scope of services are excluded from this letter agreement. We will perform additional services only after you authorize the work. Our fee for those additional services will be determined at the time they are rendered.

Fee Schedule:

Our proposed fee schedule follows. We will submit monthly invoices to you for our basic professional services, additional authorized services, and any reimbursable expenses. Where the fee is a lump sum, the invoice amount will be based on the proportion of work actually completed during the billing period. Where

the fee is hourly, the invoice amount will be based on the actual hours spent by our staff on your project billed at the hourly rate of each staff member.

The scope of work outlined in this letter agreement is estimated to be \$35,900.00 and is based on hourly fees. Again, the general task outline for the scope of work is listed below:

Task 1 – Sample Collection and Analysis

- Task 1A – Nutrient and Chlorophyll-a Analysis
- Task 1B – General Water Quality Chemistry Analysis
- Task 1C – Algal ID, Enumeration and Microcystin Analysis

Task 2 – Reporting and Meetings

Task 2A – Reports

- 1 Water Quality Summary Report
- Other Reporting Tools, as needed

Task 2B – Meetings

- 1 meeting in Watervliet or Coloma with one Spicer and one GEI representative
- 3 virtual Zoom meetings with one Spicer and one GEI representative
- 1 meeting in St. Johns or Lansing with the entire Spicer/GEI project team

2021 Paw Lake Water Quality Monitoring Project Estimated Total.....\$35,900.00

We deeply appreciate your confidence in our firm and we are looking forward to the continuation of our work with you on this project.

Sincerely,



Emily Short
Project Manager



Larry J. Protasiewicz, P.E.
Principal

SPICER GROUP, INC.
1400 Zeeb Dr.
St. Johns, MI 48879
Phone: (989) 224-2355

Above proposal accepted and approved by Owner:

PAW LAKE IMPROVEMENT PROJECT

By: _____

Norma Somers

Date: _____

Enclosures:

Spicer Group General Conditions

cc: SGI File # 123724SG2016
SMC, Accounting

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