

Memo

To: Julie VanderWiere, Charter Township of Texas
From: Thomas Clement, Aquatic/Wetland Biologist GEI Consultants of Michigan, P.C.
cc: Thomas Wheat, P.E., Prein & Newhof
Date: May 10, 2019
Re: Lake Monitoring Plan for Charter Township of Texas
MDEQ Permit No: WRP015489 v. 1, Site Name: 39-7244 Bentwood Trail-Kalamazoo

Introduction: This water quality monitoring plan will be used to monitor the water chemistry and zooplankton diversity of Bass Lake, Crooked Lake, and Eagle Lake in the Charter Township of Texas, Kalamazoo County, Michigan. This plan and work is being completed to satisfy Permit Condition No. 10 of the above-referenced permit.

Sample Collection Methods: Sampling will be conducted on each lake in July or August of 2019. Each lake will have three sampling locations (Table 1, Figures 1, 2 & 3). Depth profiles will be collected at each sampling location where in-situ parameters will be collected using a Yellow Springs Instrument Professional Plus Sonde (YSI). In-situ parameters to be collected at every two feet of depth are: specific conductance (SpCond), dissolved oxygen (DO), temperature (°C) and pH. At these locations, secchi disk transparency will also be recorded. In addition, at the sampling locations, sub-surface grab samples will be collected for the analysis of total phosphorous (TP), soluble reactive phosphorous (SRP), ammonia (NH₃), nitrate-nitrite (NO³⁻-NO²⁻), total Kjeldahl nitrogen (TKN), and total suspended solids (TSS). Grab samples will be collected at a depth of one to two feet below the water's surface. Samples for the analysis of Chlorophyll a (Chlor a) will be a composite of water from the photic zone collected using a VanDorn or Kemmerer sampler.

At one sampling location per lake, a zooplankton net will be used to gather zooplankton samples for identification. The net will be "towed" vertically through the water column to capture zooplankton. The amount of water sampled in this way will be recorded so zooplankton densities can be reported.

Aquatic invasive species will be assessed by reviewing the plankton samples for invasive species and visually assessing the lakes for aquatic invasive plants. Aquatic invasive plants will be assessed and reported using the MISIN method and reporting application.

Sample Analysis Methods: All water chemistry samples will be analyzed using EPA-approved protocols. These analytes are listed in Table 2 along with detection limits. The zooplankton sample will be stained, filtered (to remove particulates), and mounted with HPMA resin. These slides will be used to identify and enumerate species.



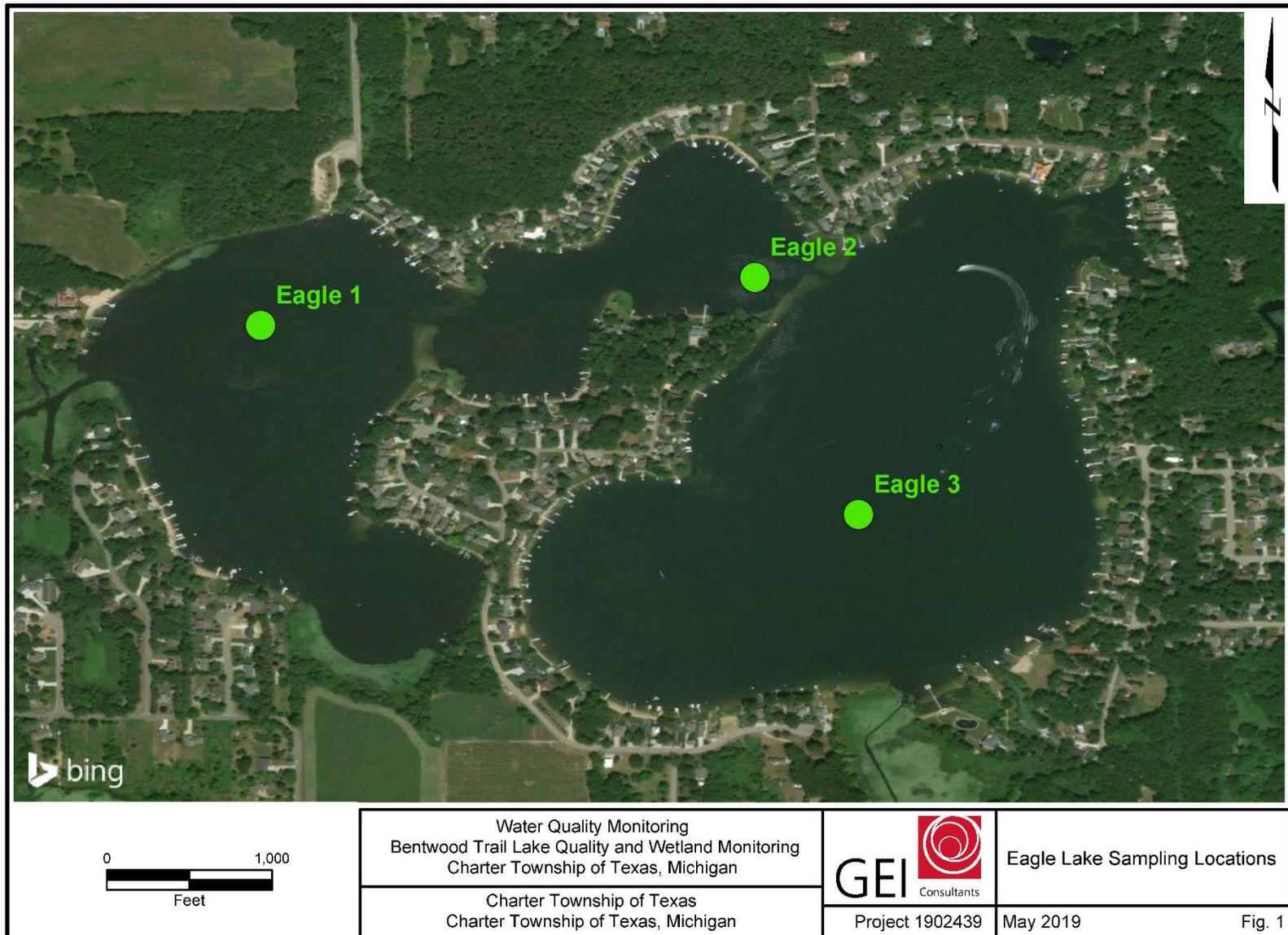
Reporting: GEI will provide a final report that discusses the findings of the water chemistry analysis, zooplankton community, and invasive species along with figures and tables of selected data.

Table 1. Site name and approximate coordinates of sampling locations for each site.

Site Name	Latitude	Longitude
Eagle 1	42.217	-85.726
Eagle 2	42.218	-85.718
Eagle 3	42.214	-85.717
Crooked 1	42.204	-85.709
Crooked 2	42.208	-85.701
Crooked 3	42.209	-85.695
Bass 1	42.213	-85.684
Bass 2	42.214	-85.681
Bass 3	42.215	-85.679

Table 2. Methods used to analyze each analyte along with RL (reporting limit) and MDL (method detection limit).

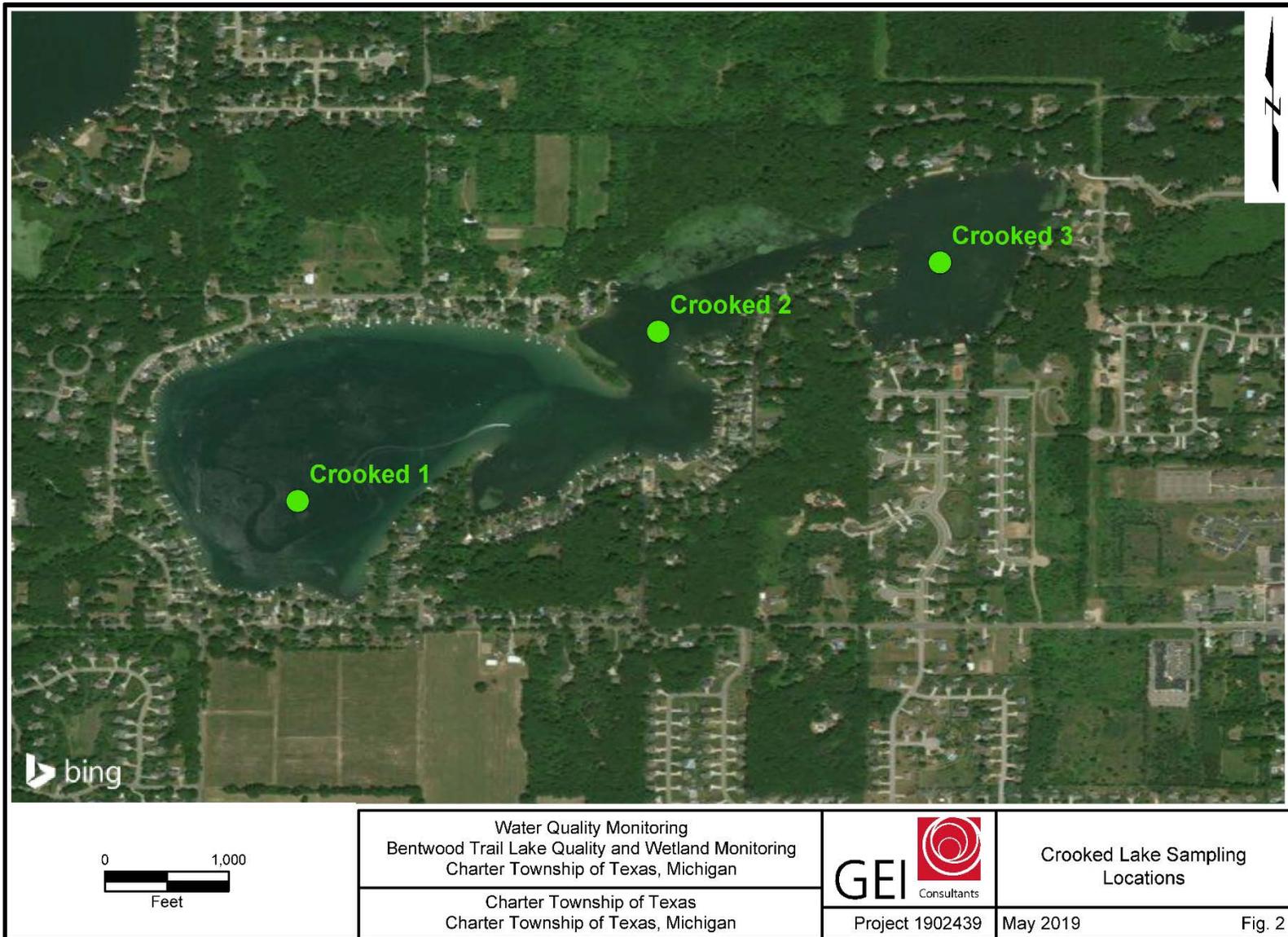
Analyte	Method	RL (mg/L)	MDL (mg/L)
Total Phosphorous	EPA 365.4	0.4	0.0516
Ortho-Phosphate	EPA 365.1	0.4	0.0516
Ammonia	EPA 350.1	0.5	0.25
Nitrate+Nitrite	EPA 353.2	0.25	0.095
Total Kjeldahl Nitrogen	EPA 351.2	0.73	0.22
Total Suspended Solids	SM 2540D	10	4.75
Chlorophyll A	SM 10200-H	N/A	N/A



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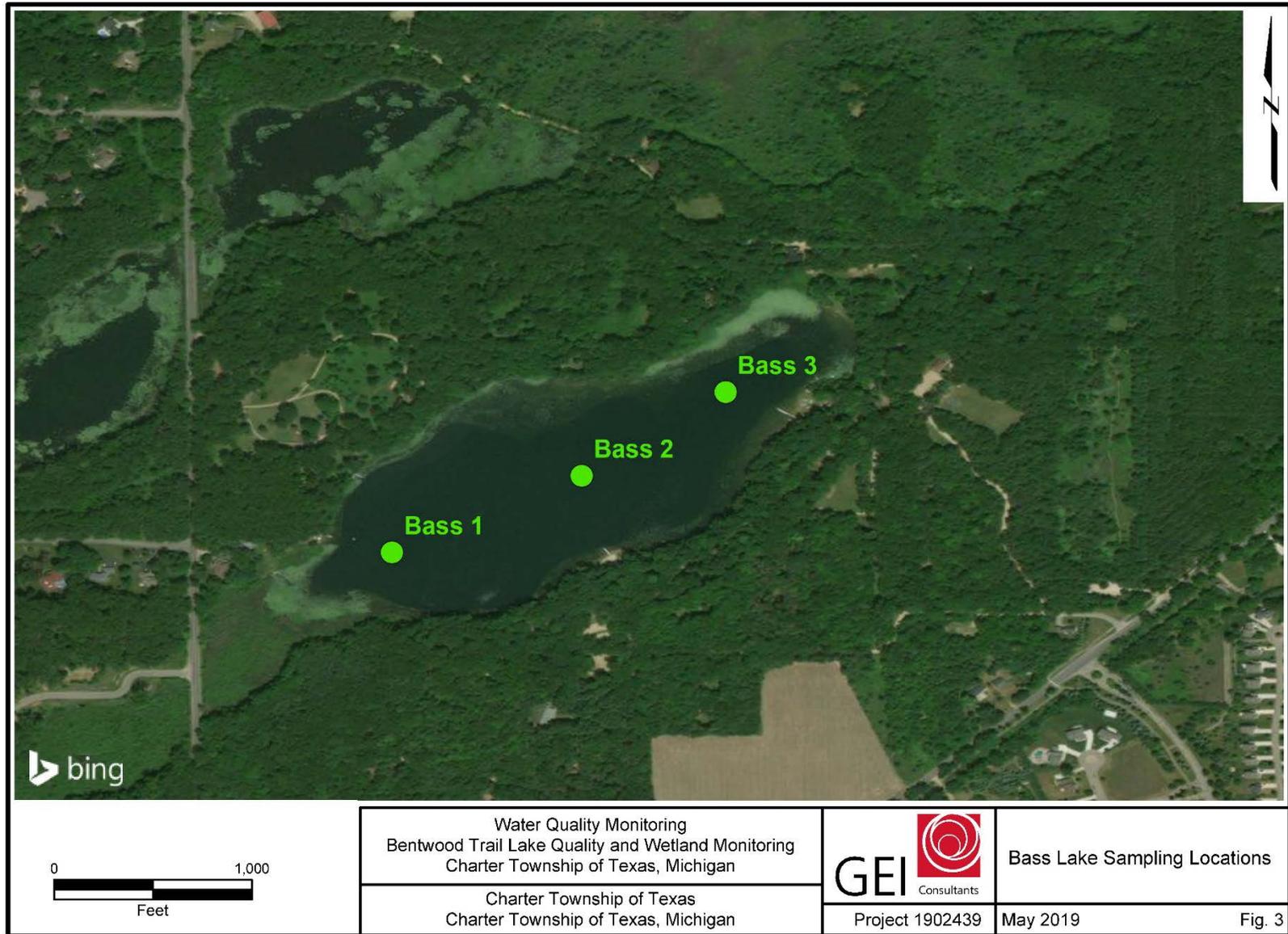
Figure 1. Approximate sampling locations for Eagle Lake, Charter Township of Texas, Kalamazoo County, Michigan



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Figure 2. Approximate sampling locations of Crooked Lake, Charter Township of Texas, Kalamazoo County, Michigan.



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Figure 3. Approximate sampling locations of Bass Lake, Charter Township of Texas, Kalamazoo County, Michigan.