Post-Treatment Assessment for Aquatic Plant Control ERDC Demonstration Project Wells College Bay, Cayuga Lake 2020

Contract No. W912P4-16-0002

February 2021

US Army Corps of Engineers®
Buffalo District
BUILDING STRONG®

Prepared for:

UNITED STATES ARMY CORPS OF ENGINEERS
Buffalo District

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List of Abbreviations and Acronyms

APCRP	Aquatic Plant Control Research Program
CSI	Community Science Institute
E & E	Ecology and Environment, Inc., member of WSP
ERDC	Engineer Research and Development Center
HPLC	high-performance liquid chromatography
Hydrilla	*Hydrilla verticillata*
µg/L	micrograms per liter
mL	milliliter
NYSDEC	New York State Department of Environmental Conservation
ppb	parts per billion
ppm	parts per million
Project	Wells College Bay, Cayuga Lake Hydrilla Demonstration Project
SePRO	SePRO Corporation
SLM	SOLitude Lake Management, LLC
TAT	turnaround time
USACE	United States Army Corps of Engineers (Buffalo District)

1 Introduction

The Wells College Bay, Cayuga Lake, Aurora, New York Hydrilla Demonstration Project (the Project) is a field-scale demonstration of a technology developed under the United States Army Corps of Engineers – Buffalo District's (USACE's) Aquatic Plant Control Research Program (APCRP) to manage monoecious hydrilla (*Hydrilla verticillata;* Hydrilla) in a high water exchange environment.

This report contributes to the Year 4 post-treatment monitoring and assessment of herbicide efficacy on Hydrilla by summarizing field conditions during the treatment; summarizing herbicide treatment methodology and contact time; and identifying lessons learned to benefit future work.

1.1 Background

Hydrilla is a very aggressive, submerged aquatic plant. The Cayuga Lake Floating Classroom first discovered this invasive plant in the Wells College Bay of Cayuga Lake in September 2016. In 2016, the only other Hydrilla infestation documented in Cayuga Lake was discovered in late summer 2011 near Ithaca, New York. Since then, a couple of other small infestations have been found at Don's Marina in Genoa, New York, and at the Finger Lakes Marine Service in Lansing, New York. The majority of the Hydrilla treated as a part of the first year of the Project was identified within a 30-acre portion of Wells College Bay with several small patches observed in the adjacent 29-plus acres. The monitoring area for the second year of this Project was extended from 59 acres to 120 acres to monitor for the spread of small patches of Hydrilla in areas adjacent to the areas treated during the first year at water depths ranging from 0 to 18 feet. For both the third and fourth years of the Project, the 30-acre treatment area remained largely the same, and 120 total acres were monitored.

Given the ease with which this plant spreads by fragments, proximity to the Erie Canal, and heavy use of the waterway, this infestation has caused urgent concern regarding spread to other areas of Cayuga Lake, the Finger Lakes, the Erie Canal system, and, potentially, the Great Lakes. These concerns provided the impetus for implementation of the Project.

During the fourth year of treatment to control and eradicate Hydrilla, treatment occurred within two general areas in the town of Aurora, totaling approximately 120 acres that focused on application of two aquatic herbicides: fluridone

(Sonar® H4C), and copper ethylene diamine complex (chelated copper; Harpoon®).

The following two areas were treated during the 2020 season (see Figure 1-1):

- **Fluridone treatment area**: an approximately 30-acre area in Wells College Bay along approximately 5,000 linear feet of Cayuga Lake's shoreline from just south of Paines Creek to the south and the southern extent of the Wells College campus to the north. The water depths in this treatment area range from approximately >0 to 18-plus feet with an average depth of 8 to 10 feet depending on location. This approximately 30-acre block was treated over 10 applications. The first two applications were applied at a rate of 20 parts per billion (ppb) and subsequent applications, three through ten, were applied at 13.75 ppb. Any Hydrilla beds that persisted later in the season (i.e., late July and August) and appeared unresponsive to the fluridone application were treated with chelated copper at a target concentration of 1 part per million (ppm) or 1,000 ppb.
- **Potential copper spot treatment blocks**: Areas outside of the main 30-acre treatment block were monitored for potential Hydrilla growth and spot treatment with chelated copper. The depth in these areas ranges from >0 to 18-plus feet with an assumed average depth of 10 feet. Within the 90-acre area, 3 acres, comprised of three separate blocks, were ultimately delineated for spot treatment. The third copper spot treatment block (no. 3) was added in mid-August, following point-intercept surveys.

These treatment blocks were delineated by the USACE to provide detailed maps for targeting Hydrilla beds in these blocks.

Between 2019 and 2020, the fluridone treatment area shifted slightly to the south, below Paines Creek to address flows from the creek and a problematic Hydrilla patch, approximately 3 to 4 acres, near the creek outlet.

Implementation of the Project was a collaborative effort between the Engineer Research and Development Center (ERDC); USACE; Ecology and Environment, Inc., member of WSP (E & E); New York State Department of Environmental Conservation (NYSDEC); the Village of Aurora; the Cayuga County Health Department; the Wells College water treatment plant; Finger Lakes Partnership for Regional Invasive Species Management; Cayuga Lake Watershed Network; and the applicator, SOLitude Lake Management (SLM). Although the USACE was not required to obtain an Article 15, New York Code of Rules and Regulations Part 327 aquatic pesticide permit for this Project, reasonable measures were taken to meet the intent and conditions that would be associated with such a permit.

1.2 Purpose and Scope

The purpose of the Project is to perform a field-scale demonstration of a technology developed under the APCRP to evaluate the effectiveness of aquatic herbicides to manage Hydrilla in high water exchange environments. The USACE is also funding a separate research project titled "Improving Chemical Control in High Water Exchange Environments in Northern Waters"; this line of research has been ongoing since 2010. This method and the underlying concepts are being tested against Hydrilla at the Tonawanda Creek/Erie Canal Demonstration Project in Western New York, the Stewart Park Demonstration Project in Ithaca, New York, as well as this Project.

The findings in this program will provide valuable information for developing future guidance on how to manage this invasive aquatic plant that is expanding in high water exchange systems throughout the northeastern United States. The sprouting dynamics of Hydrilla tubers and condition of plants were monitored by the USACE prior to and several weeks post-treatment to determine optimal timing of treatment, length of exposure, and concentration of herbicide required for effective control of Hydrilla.

This post-treatment report includes a summary of the herbicide treatment methodology, including quantity of herbicide used and total acreage treated; a discussion of herbicide contact time and dispersion through the system; and a discussion of the monitoring that accompanied the herbicide application. Lastly, conclusions are provided, in the form of lessons learned, to support in detailing future treatment projects.

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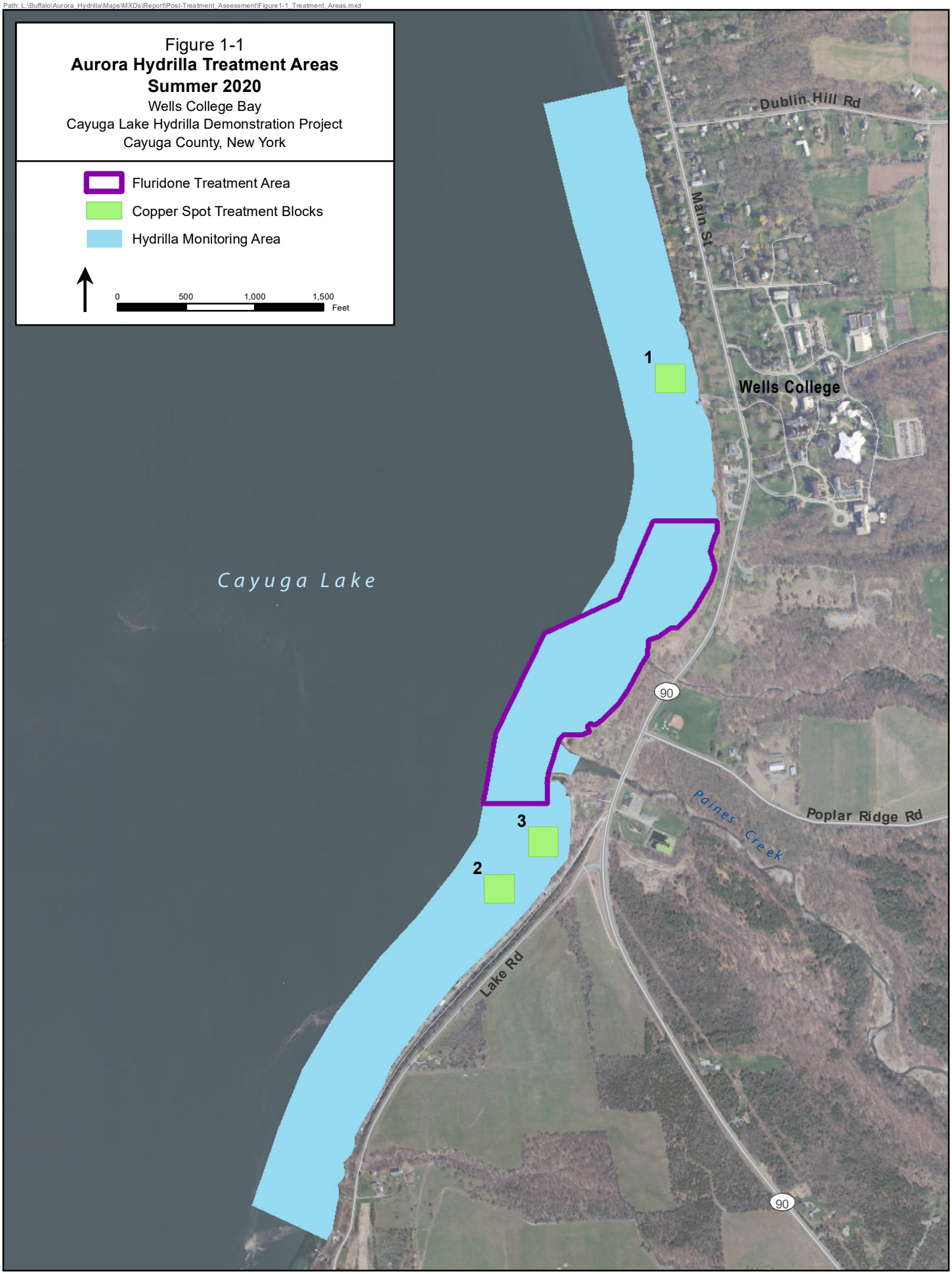

Source: ESRI 2018; Cayuga County 2015, USACE 2020.

2 Overview of Herbicide Treatment and Monitoring

Treatment of Hydrilla for this Project focused on the application of the aquatic herbicides fluridone (Sonar® 4HC) and chelated copper (Harpoon®) within Wells College Bay.

The following sections outline the public notification that preceded treatment; field conditions before, during, and after treatment; herbicide treatment methodology; and quantity of herbicide used.

2.1 Public Notification

Public awareness and understanding of the Project were important to its successful implementation. The USACE and its interagency partners conducted outreach activities to potentially affected users in advance of treatment. The outreach and notification activities associated with treatment near Aurora included the following:

- Dates for the initial treatments were provided to NYSDEC, the Cayuga County Health Department, the Village of Aurora, and the Wells College water treatment plant and email reminder notifications were sent out 24 hours prior to each treatment;
- Written notifications were sent certified mail approximately 21 days prior to the first fluridone treatment to all riparian owners/users within the half-mile buffer (north and south) of the treatment area and all municipal water supply customers including those that receive water delivery by truck;
- Agency notification letters were distributed approximately eight days prior to the first fluridone treatment;
- Supplemental riparian notification letters were sent to affected landowners along the shoreline near the third copper spot treatment area (no. 3) as that area was not originally scheduled to receive a copper treatment and was thus not identified in the original riparian notification sent out in June; and
- Yellow warning signs were deployed and maintained at public access points along the lakeshore at the commencement of each treatment. The signs indicated applicable water use restrictions regarding irrigation and drinking,

culinary, and food processing purposes. The signs also displayed water use restrictions that were in effect for the duration of the treatment and until the times listed were reached, or until testing determined that the threshold concentration had been met.

E & E posted and maintained the yellow warning signs (as described above) to meet the intent of permit requirements. Application dates and times were updated on the signs prior to each of the 10 fluridone treatments as well as the chelated copper spot treatments. Newspaper notifications were not required for the treatments.

2.2 Herbicide Treatment Methodology

The aquatic herbicide fluridone was applied in designated sections of Wells College Bay during 10 treatment events that occurred between June and August (see Table 2-1). Chelated copper was applied during three of the 10 events, on July 23, July 30, and August 20, 2020. The herbicide applications were completed by SLM in accordance with the *Architect-Engineer Scope of Work (SOW) Aquatic Plant Control ERDC Demonstration Project Wells College Bay, Cayuga Lake, Aurora, NY,* dated September 16, 2019, and subsequently amended in March 2020 (USACE 2019; 2020).

Table 2-1 In-lake Fluridone Herbicide Application Summary by Treatment Date for Wells College Bay, Cayuga Lake Hydrilla Demonstration Project

Date	Target Concentration (ppb)	Total Pounds of Sonar ®H4C
6/25/20	20	443
7/2/20	20	443
7/9/20	13.75	305
7/17/20*	13.75	305
7/23/20	13.75	305
7/30/20	13.75	305
8/6/20	13.75	305
8/13/20	13.75	305
8/20/20	13.75	305
8/27/20	13.75	305
	Total Pounds	**3,326**

*Treatment was delayed by one day (was originally scheduled for 7/16/20) due to weather.

Key:
ppb = parts per billion

2.2.1 Herbicide Transfer

A Vortex granular spreader was used for the fluridone and chelated copper treatments. Two models of boats were used for the treatments, including a 20-foot skiff, jon boat, and an airboat. Herbicide transfer occurred at the Long Point

State Park Boat Launch, where the chemical delivery truck was able to park so that other users maintained access to the boat launch during the herbicide transfer process. The fluridone was delivered in 40-pound buckets and the chelated copper was delivered in 40-pound bags. The empty buckets and bags were triple rinsed and recycled at the Montgomery-Otsego-Schoharie Counties' Solid Waste Management Authority Oneonta Transfer Station. Personal protective equipment was worn by SLM staff during the transfer from the truck to the treatment system.

2.2.2 Herbicide Application

Both the fluridone and chelated copper herbicides were poured into the Vortex granular spreader and evenly distributed over the surface at the bow of the boats. The injection rate was approximately 10 pounds per minute. The boats had a Global Positioning System navigation system with all of the treatment sectors preloaded. Treatment passes were made parallel to the shoreline. The quantity of herbicide needed for each section was determined by the total acreage and volume of the treatment areas. All of the product was applied to each section before moving to the next adjacent section.

SLM staff arrived at the Long Park State Park Boat Launch between 1:00 p.m. and 2:00 p.m. on each scheduled treatment day; launched the 20-foot skiff, jon boat, or airboat; and began assembling treatment systems. After the staff had their on-site meetings, the herbicide transfer began. The treatment crew on the boats consisted of a lead applicator and an assistant/technician. Treatment typically started around 2:30 p.m. each week, except for the treatment on July 17, 2020, which began around 1:30 p.m. In all cases, aside from brief breaks when the boats stopped to re-load herbicide, the treatments continued uninterrupted until the lake treatment areas were completed within 1 to 3 hours from the start time. There was one deviation from the treatment schedule due to weather conditions. The treatment originally scheduled for July 16 occurred on July 17, 2020, due to weather/lake conditions on the afternoon of July 16.

2.3 Quantity of Herbicide Used and Total Area Treated

Ten fluridone treatments were scheduled in the 30-acre treatment area during the summer of 2020. The treatment plan specified that the first two treatments would consist of application of fluridone to achieve a target concentration of 20 ppb, and the third through tenth treatments would achieve a target concentration of 13.75 ppb (see Table 2-1) for a total of 150 ppb. Treatments occurred approximately seven days apart.

In-lake copper spot treatment application occurred along with three of the fluridone treatment events, on July 23, July 30, and August 20, 2020, at concentrations not to exceed 1,000 ppb (1 ppm; see Table 2-2). Copper spot treatment areas consisted of three individual, predetermined treatment areas and totaled 3 acres (see Figure 1-1). Spot treatments were originally planned for two locations (plots no. 1 and no. 2) approximately 1 acre in size each based on observations from 2019. Due to product availability these were treated at two different times. The first (northern) plot was treated on July 23, 2020, and the

second (southern) plot was treated on July 30. A third location, south of the fluridone treatment area (site 3), was treated on August 20, 2020, after Hydrilla was collected during the vegetation monitoring conducted on August 5, 2020 (see Figure 1-1).

Table 2-2 In-lake Chelated Copper Herbicide Application Summary for Wells College Bay, Cayuga Lake Hydrilla Demonstration Project

Date	Plot Number/ Acres	Target Concentration (ppb)	Total Pounds of Harpoon®
7/23/20	#1 – 1	1,000	800
7/30/20	#2 – 1	1,000	480
8/20/20	#3 – 1	1,000	208
		Total Pounds	**1,488**

Key:
ppb = parts per billion

2.4 Water Quality Sampling

Fluridone was applied during 10 treatment events, between June 25 and August 27, 2020. E & E performed in-lake water quality sampling to determine the fluridone concentrations and dispersion of herbicide between June 29 and August 31, 2020. Refer to Appendix A for analytical results of the sampling. The USACE also performed water quality sampling at nine sites on three dates during the season. Additionally, the Cayuga County Health Department performed weekly drinking water sampling between June 29 and August 31, 2020.

2.4.1 Cayuga Lake In-Lake Sampling

2.4.1.1 E & E Sampling

E & E collected four in-lake water samples following each of the 10 fluridone treatment events (see Figure 2-1 and Table 2-3 for sample locations). The purpose of the sampling was to determine the fluridone concentrations just prior to the next planned treatment event so that herbicide application could be refined, if necessary, to maintain the proper concentrations throughout each event (i.e., to ensure follow-up applications would not exceed approved rates/concentrations). The sampling events were weather-dependent and scheduled so that results from each event were available for review by the Project team prior to the next application (i.e., there was a 48-hour turnaround time [TAT] for sample analyses that factored into planning each sampling event). Weekly sampling events occurred approximately four days following each application.

Table 2-3 In-Lake Water Fluridone Sample Collection Sites Wells College Bay, Cayuga Lake Hydrilla Demonstration Project

Sample Collection Site	Latitude[a]	Longitude[a]
TreatN	42.741494	-76.701644
LakeN	42.75116	-76.703304
LakeS	42.732135	-76.709815
TreatS	42.739172	-76.704476

Note:
[a] Latitude and longitude are provided in decimal degrees (WGS84).

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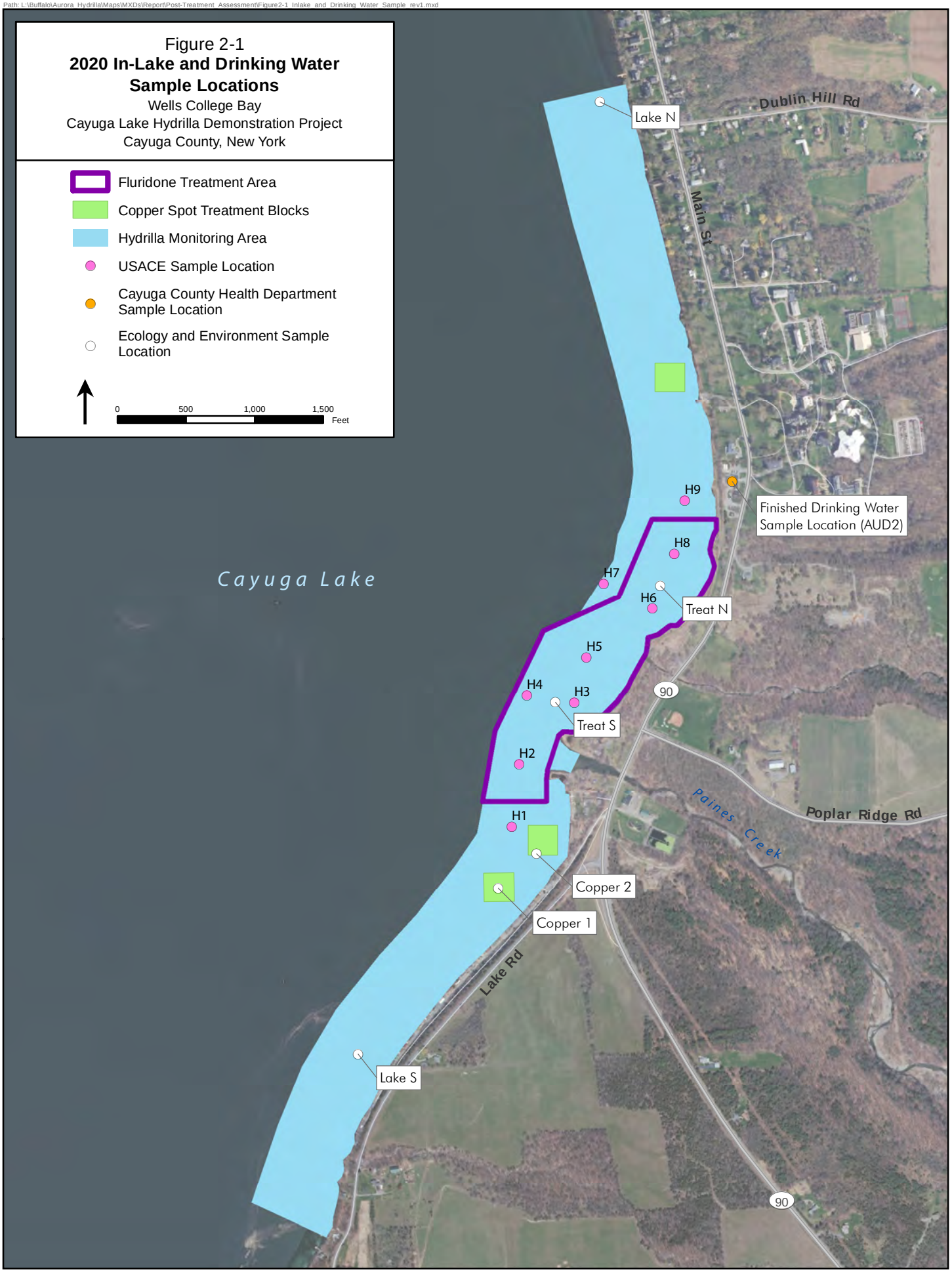
Figure 2-1
2020 In-Lake and Drinking Water Sample Locations
Wells College Bay
Cayuga Lake Hydrilla Demonstration Project
Cayuga County, New York



Source: ESRI 2018; Cayuga County 2015, USACE 2020.

The samples were collected with a stainless-steel Kemmerer bottle sampler. The four in-lake sampling locations consisted of the following (see Figure 2-1):

- Two sample locations in the lake treatment block (TreatN and TreatS);
- One sample approximately a half mile north of the lake treatment block (LakeN); and
- One sample approximately a half mile south of the lake treatment block (LakeS).

Samples from each sample location listed above were collected approximately 1 foot from the lake bottom to be representative of the fluridone concentrations where the plants were actively growing. The depth at each sample location was determined from the boat using a sounding tape, to confirm the depth at each location.

Prior to sample collection, the Kemmerer sampler was locked in the "open" position and completely submerged and rinsed in the surface water at each sample location. The Kemmerer was lowered so that the bottom edge of the cylinder was approximately 1 foot above the lake bottom for sample collection. After the messenger was sent down to "close" the Kemmerer sampler, each sample was retrieved and transferred into brown high-density polyethylene 30 milliliter (mL) sample bottles provided by the laboratory. Samples were stored protected from light and shipped in coolers to SePRO Corporation (SePRO) in Whitakers, North Carolina, for analysis.

In-lake water samples were analyzed using a high-performance liquid chromatography (HPLC) method specific for fluridone. The standard operating procedure for measuring fluridone is a proprietary HPLC method developed by SePRO. The laboratory reported results for fluridone at a reporting limit of 1 ppb (micrograms per liter [µg/L]). Quality control samples were collected in the field during the post-application sampling period and consisted of field duplicate sample pairs collected at the same location at the rate of 5 percent.

For the majority of the sampling period, samples collected a half mile to the north and south of the lake treatment block were not substantially different from samples collected within the lake treatment block (see Table 2-4). One exception to this is evident in the results for the first sampling effort (June 29, 2020), where the concentration of fluridone at TreatS was 2.6 ppb compared with less than 1.0 ppb for the remainder of the sample sites – both within and outside of the treatment block. Based on the data in Table 2-4, fluridone concentrations were slightly higher at sample location TreatS for the first two sampling events, and for the next three sampling efforts in mid- to late July, fluridone concentrations were virtually the same for TreatS and TreatN. The northern portion of the treatment area (sample location TreatN) evidenced slightly higher fluridone concentrations than the southern portion of the treatment area for the first three sampling events in August.

Table 2-4 E & E In-Lake Water Sampling Results for Fluridone

Date	Sample Location	Time	Sample Depth (feet)	Fluridone Concentration (ppb)[a]
6/29/2020	TreatN	1750	13.0	<1/<1
	LakeN	1727	14.0	<1
	LakeS	1810	11.0	<1
	TreatS	1820	10.0	**2.6**
7/6/2020	TreatN	1345	9.4	<1/<1
	LakeN	1334	13.3	<1
	LakeS	1405	8.8	<1
	TreatS	1355	8.2	**1.1**
7/13/2020	TreatN	1001	4.7	**1.0**
	LakeN	0948	12.3	<1
	LakeS	1026	7.2	<1/<1
	TreatS	1012	8.1	<1
7/20/2020	TreatN	0955	4.2	**1.0**
	LakeN	0945	12.5	<1
	LakeS	1015	7.9	<1
	TreatS	1005	6.1	<1/<1
7/27/2020	TreatN	1021	5.1	<1
	LakeN	1009	11.3	<1
	LakeS	1038	8.6	<1
	TreatS	1027	8.3	<1
8/3/2020	TreatN	1145	5.0	**1.7**
	LakeN	1120	12.5	<1
	LakeS	1216	7.0	<1
	TreatS	1155	5.5	<1
8/10/2020	TreatN	1110	4.6	**1.4**
	LakeN	1055	11.9	<1
	LakeS	1130	7	**1.1**
	TreatS	1120	5.5	<1
8/17/2020	TreatN	1135	4.5	**1.2**
	LakeN	1120	11.2	<1
	LakeS	1155	5.6	<1
	TreatS	1145	6.5	<1
8/24/2020	TreatN	1135	5.3	<1
	LakeN	1120	11.7	<1
	LakeS	1210	6.6	<1
	TreatS	1150	5.7	<1

Table 2-4 E & E In-Lake Water Sampling Results for Fluridone

Date	Sample Location	Time	Sample Depth (feet)	Fluridone Concentration (ppb)[a]
8/31/2020	TreatN	1259	7	<1
	LakeN	1243	10.8	<1
	LakeS	1310	5.9	<1
	TreatS	1320	7.5	<1

Notes:
[a] Two reported results in a single cell indicate an instance where a field duplicate sample was collected.

Bold values denote positive detections.

Key:
ppb = parts per billion

In addition to the fluridone samples, two chelated copper samples were taken – one on August 3 and one on August 24 (see Table 2-5). Note: Copper samples were taken at two of the three copper spot treatment blocks (no. 2 and no. 3); a sample was not taken for the northernmost copper plot (no. 1) due to its location away from private beach intake structures and, therefore, the 200 ppb drinking water restriction for copper would not be exceeded.

Table 2-5 E & E In-Lake Water Sampling Results for Chelated Copper (ppb)

Date	Sample Location	Time	Sample Depth	Copper Concentration (ppb)
8/3/2020	Copper1	1208	4 feet 5 inches	Non-detect
8/24/2020	Copper2	1200	3 feet 6inches	Non-detect

Key:
ppb = parts per billion

2.4.1.2 USACE Sampling

The USACE collected two samples at nine sampling locations on three dates – July 15, 2020, August 5, 2020, and August 31, 2020 – following the fluridone treatments (see Figure 2-1 and Table 2-6). One sample was collected in the middle of the water column, and one was collected at the lake bottom to address dilution and spread of herbicide. Due to the granular nature of fluridone, sampling at the bottom and in the middle of the water column is more likely to capture herbicide residues than sampling at the water's surface. The Community Science Institute (CSI) in Ithaca, New York, completed the analysis of the USACE samples using the RaPID assay (enzyme-linked immunosorbent assay) method (RaPID Assay Fluridone Test Kit). The laboratory reported results for fluridone to a lower reporting limit of 0.5 ppb (µg/L) and an upper reporting limit of 10.0 ppb (µg/L).

Table 2-6 USACE In-Lake Water Sampling Results for Fluridone (ppb)

Sampling Location	Fluridone Concentration (ppb)		
	7/15/2020	8/5/2020	8/31/2020
H1 MID	<0.5	0.6	<0.5
H1 BOT	<0.5	<0.5	0.9
H2 MID	**<0.5**	**<0.5**	**<0.5**
H2 BOT	**<0.5**	**<0.5**	**<0.5**
H3 MID	**<0.5**	**0.5**	**<0.5**
H3 BOT	**<0.5**	**0.5**	**<0.5**
H4 MID	**0.7**	**<0.5**	**<0.5**
H4 BOT	**0.6**	**0.5**	**<0.5**
H5 MID	**0.5**	**<0.5**	**<0.5**
H5 BOT	**0.7**	**<0.5**	**<0.5**
H6 MID	**<0.5**	**1.2**	**3.8**
H6 BOT	**0.6**	**0.5**	**<0.5**
H7 MID	<0.5	<0.5	**<0.5**
H7 BOT	<0.5	0.6	**<0.5**
H8 MID	**<0.5**	**0.7**	**<0.5**
H8 BOT	**1.0**	**0.7**	**<0.5**
H9 MID	<0.5	<0.5	**<0.5**
H9 BOT	<0.5	<0.5	**<0.5**

Notes:
Bold denotes sample location within application area.
<0.5 ppb equates to non-detect

Key:
BOT = bottom of water column
MID = middle of water column

Fluridone concentrations were measured near or below the lower reporting limit for mid and bottom sample depths at both in-treatment and out-treatment locations for the majority of sampling locations Concentrations within the treatment area tended to be variable week to week depending on wind and rain and varied among sampling points. As indicated in Table 2-6, variations in herbicide residues were detected within the water column at locations where fluridone concentrations were detectable. Sampling results from August 31, 2020, four days after the final treatment that occurred on August 27, 2020, indicate that fluridone was near or below the lower reporting limit at all locations, except for H6 MID (3.8 ppb) and H1 BOT (0.9 ppb). The fluridone concentration at sample location H6 MID on August 31, 2020 (3.8 ppb) was the highest concentration observed during the sampling period.

2.4.2 Cayuga County Health Department Finished Drinking Water

The Wells College water treatment plant shut down operations during each treatment application until each application was complete. The Cayuga County

Health Department collected finished drinking water samples at the Wells College treatment plant (see Figure 2-1); the finished drinking water samples denote samples that went through the water treatment plant for processing prior to sampling. No beach water samples were taken during 2020 due to cancellation of the swimming season because of COVID-19. The Cayuga County Health Department collected finished drinking water samples four days after each treatment to determine if the treatment had an impact on drinking water (see Table 2-7).

Table 2-7 Drinking Water Sampling Results for Fluridone

		Fluridone Concentration (ppb)	
Date	Sample Site	Cayuga County Health Department	E & E
6/29/2020	AUD2	<0.5	NS
7/6/2020	AUD2	<0.5	NS
7/13/2020	AUD2	<0.5	<1.0
7/20/2020	AUD2	<0.5	NS
7/27/2020	AUD2	<0.5	NS
8/3/2020	AUD2	<0.5	NS
8/10/2020	AUD2	<0.5	NS
8/17/2020	AUD2	<0.5	NS
8/24/2020	AUD2	<0.5	NS
8/31/2020	AUD2	<0.5	NS

Key:

AUD2 = Wells College Maintenance Building Finished Drinking Water
E & E = Ecology and Environment, Inc., member of WSP
NS = Not Sampled
ppb = parts per billion

Finished drinking water samples were collected from a sink tap within the Wells College maintenance building by a Cayuga County Health Department staff member. The staff member collected the sample by filling a clean high-density polyethylene container with the tap water and transferring the tap water into separate brown high-density polyethylene 30-mL sample bottles (including split samples). The Cayuga County Health Department hand delivered their sample to the CSI in Ithaca, New York, for fluridone analysis using the RaPID assay (enzyme-linked immunosorbent assay) method (RaPID Assay Fluridone Test Kit). As noted above, the laboratory reported results for fluridone to a lower reporting limit of 0.5 ppb (µg/L) and an upper reporting limit of 10.0 ppb (µg/L). E & E collected finished drinking water split samples of the Cayuga County Health Department samples at a rate of 10 percent (i.e., one sample). The split sample was stored, protected from light, and shipped via FedEx Priority Overnight in coolers to SePRO for analysis. SePRO utilized a propriety HPLC to determine fluridone concentrations to a method detection limit of 1 µg/L. The purpose of the split sample was to compare the fluridone concentrations in samples collected using the two different test methods (e.g., the RaPID Assay method, and the SePRO proprietary HPLC method). The RaPID assay is

considered a screening method whereas the HPLC method is considered a definitive method. Any significant detection by RaPID assay would require confirmation by HPLC. There were no significant differences in detections between the Cayuga County Health Department finished drinking water sample and the E & E split sample taken on July 13, 2020 (see Table 2-7).

2.5 Vegetative Monitoring (2017 through 2020) and Treatment Summary

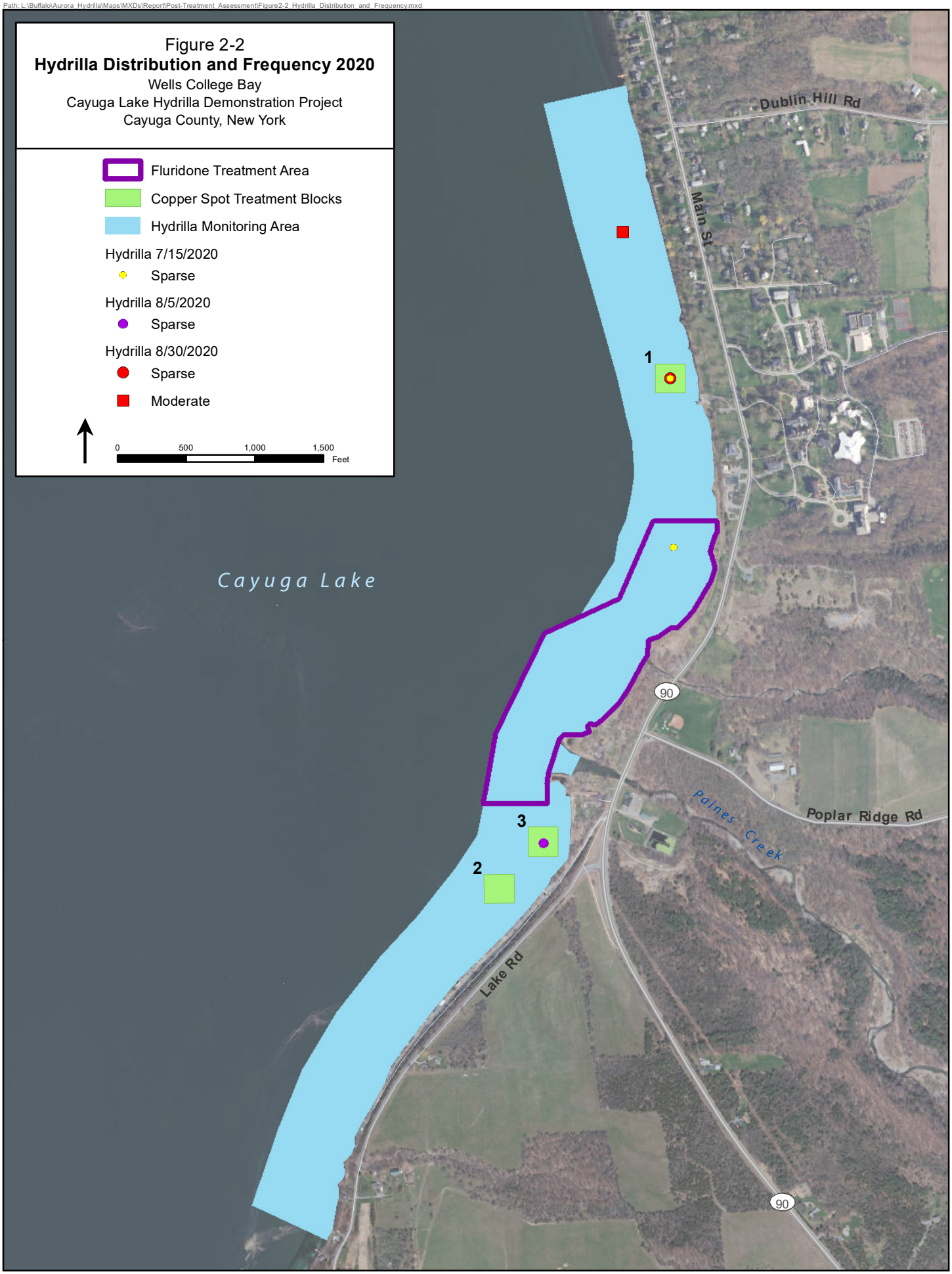
As discussed in Section 2.4, Water Quality Sampling, E & E collected samples weekly throughout the treatment period. Fluridone concentrations within the treatment area tended to be variable week to week, depending on wind and rain, and varied among sampling points. The highest concentrations were detected in the northern portion of the fluridone treatment area. These results were substantiated by additional water samples taken by the USACE on three dates during the treatment period (June 15, August 5, September 1; see Tables 2-4 and 2-6). Despite concentrations at levels that were less than what is necessary for effective control at most locations, results of vegetation monitoring did not detect any Hydrilla within the fluridone treatment area this fall. Thus, it appears that the overall 10-week treatment was effective in this area. The effects of fluridone application are limited to the treatment areas and no adverse effects were observed outside of the treatment area. This is substantiated by the fact that all water samples taken at the points located 0.5 mile from the treatment area, with the exception of one (on August 10, 2020) and those taken at the water plant were at non-detect levels for fluridone (<1.0 ppb and <0.5 ppb, respectively).

The USACE conducted point-intercept surveys within the fluridone treatment area on five dates (June 24, July 15, August 5, August 31, and October 6) throughout the growing season to determine Hydrilla distribution and treatment efficacy (see Figure 2-2). The USACE only detected Hydrilla at four separate locations. Two of the Hydrilla patches detected in the point-intercept surveys were within the primary treatment area or to the south and occurred earlier in the season prior to completion of treatment. These two Hydrilla patches were not observed in later samples, thus it is assumed that these treatments were successful. The other two Hydrilla locations were observed north of the primary treatment area. One of these Hydrilla locations was treated with chelated copper, however, Hydrilla at this location was sampled later in the season and still appeared healthy. Thus, this chelated copper spot treatment did not appear to be as effective and the treatments applied at south of the primary treatment area. In addition, representatives from SePRO performed a site visit in early October and observed several patches of Hydrilla north of the Wells College Dock within proximity to the points where the USACE observed Hydrilla in late August. This approximately 11-acre area has been identified as an additional area that may need treatment in the coming years to maintain control of Hydrilla (see Figure 2-3).

In summary, this year's treatment was still very effective based on the monitoring and the fact that in 2016 prior to the initial treatment, the percent occurrence of

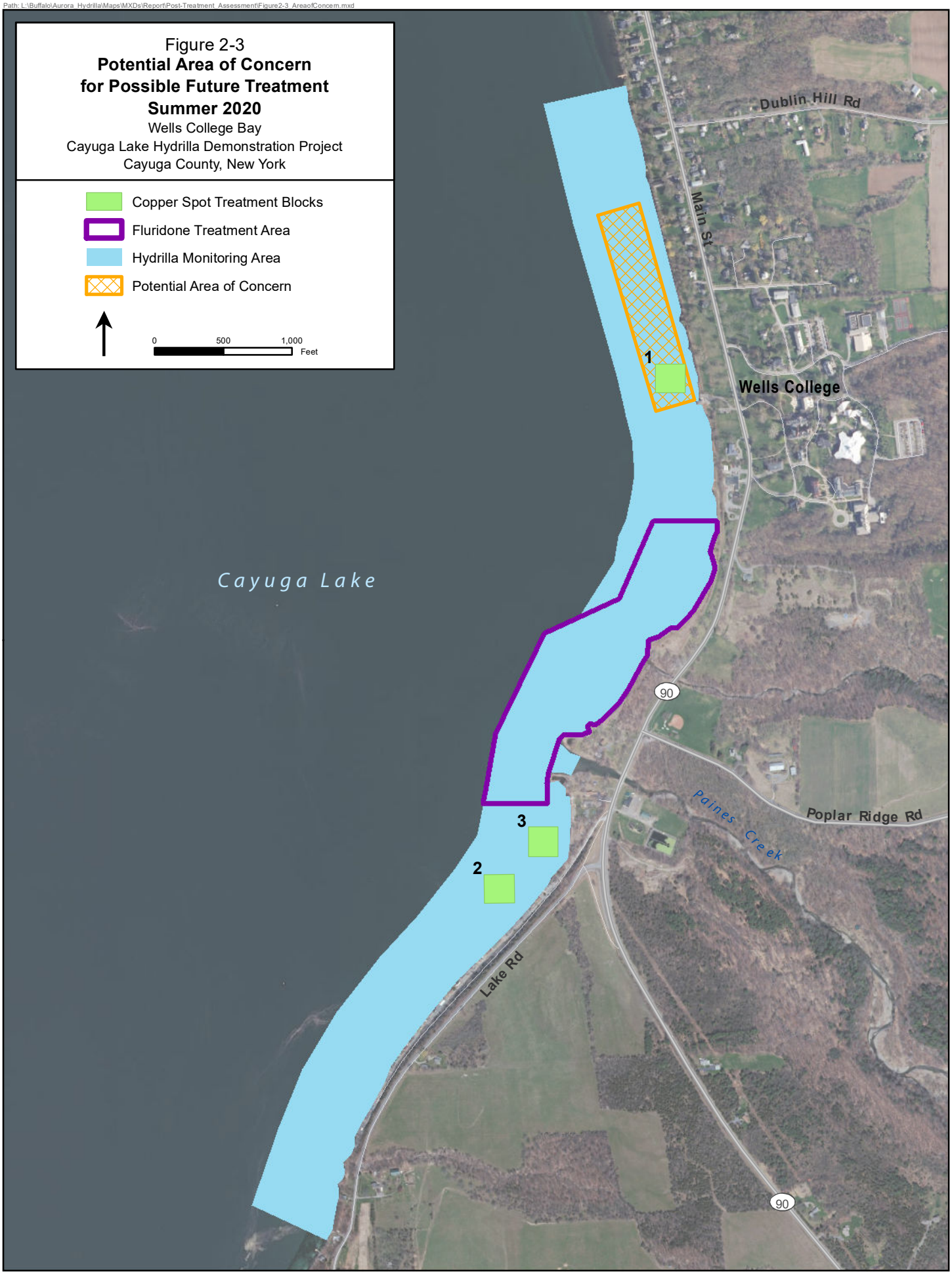
Hydrilla in Wells College Bay was 57 percent. In each successive year, the percent occurrence of Hydrilla in the fall has dropped to a current level of 0.5 percent (see Figure 2-4). In addition, despite an observed drop in abundance of plants within these treatment areas, diversity of native plants was maintained and, in fact, improved over the previous year because five of the seven dominant species in the point-intercept survey were native plants. The percent occurrence of native plants increased, while the invasive species stayed the same or decreased slightly.

Path: L:\Buffalo\Aurora_Hydrilla\Maps\MXDs\Report\Post-Treatment_Assessment\Figure2-2_Hydrilla_Distribution_and_Frequency.mxd



Source: ESRI 2018; Cayuga County 2015, USACE 2020.

Path: L:\Buffalo\Aurora_Hydrilla\Maps\MXDs\Report\Post-Treatment_Assessment\Figure2-3_AreaofConcern.mxd



Source: ESRI 2018; Cayuga County 2015, USACE 2020.

Path: L:\Buffalo\Aurora_Hydrilla\Maps\MXDs\Report\Post-Treatment_Assessment\Figure2-4_Hydrilla_2016_to_2020.mxd

Figure 2-4
Hydrilla Locations in Cayuga Lake At Aurora, NY from 2016 to 2020
Wells College Bay
Cayuga Lake Hydrilla Demonstration Project
Cayuga County, New York

- 2016 Hydrilla Locations
- 2017 Hydrilla Locations
- 2018 Hydrilla Locations
- 2019 Hydrilla Locations
- 2020 Hydrilla Locations
- Hydrilla Monitoring Area

0 500 1,000 Feet

Cayuga Lake
Main St
Lake Rd
90

Source: ESRI 2018; Cayuga County 2015, USACE 2020.

3 Recommended Study Improvements

The study improvements, summarized in this section, were based on lessons learned from the fourth year of the herbicide application effort, coordination with the study partners work plan development, and activities conducted during the 2020 herbicide application.

3.1 Herbicide Application and Analysis

Herbicide Application

Transfer of the herbicide from the shore-based areas to the skiff and airboat and application of the herbicide in 2020 was smooth and efficient and occurred without incident. The staging areas in Aurora adequately supported operations for the in-lake treatments. Public access to the boat ramps during use by the applicators was uninterrupted. Although inclement weather can significantly affect the application and subsequent in-lake sampling schedule, weather delayed application by one day for only one event. The Project team needs to continue to look at long-range weather forecasts when planning future applications/sampling and build in schedule flexibility for each event.

Analysis

As with 2017 through 2019 efforts, two different types of analytical tests were performed to determine fluridone concentrations during the study. SePRO's proprietary HPLC method was used to analyze fluridone in the in-lake samples and the finished drinking water split samples, and the Abraxis RaPID assay was used to analyze the finished drinking water samples to determine fluridone concentrations. The RaPID assay is considered a screening method whereas the HPLC method is considered a definitive method. The split sample did not show any discernible differences between the results; therefore, both methods met the goal of quantifying fluridone concentrations. For future work, either method could be employed; however, elevated detections using the RaPID assay would require confirmation via a definitive method.

3.2 2020 Lessons Learned

Treatment Areas

Due to the consistency with scheduling and the fluridone treatment, the application operations proceeded smoothly. When working on waterbodies of this scale, it is critical for the broader Project Team (referring to those entities defined in Section 1.2) to continue to maintain proper contact through E & E or the USACE to communicate needs, especially concerning the water intake facility adjacent to the treatment area.

Herbicide Application and Volumes

Application using the Vortex blower has been beneficial, as it allows for greater precision than spreaders and greater volume than the backpack blower. Use of Harpoon® requires a large volume of material to achieve target concentrations of chelated copper, so the feasibility of returning to the use of Komeen® Crystal (or other lower volume granular copper herbicide) should be assessed annually.

Communication

Twenty-four-hour email notification of herbicide treatments, including changes in treatment schedule was effective and no issues were raised by the Cayuga County Health Department or Wells College. This type of communication needs to continue in future treatment programs.

Drinking Water/Beach Sampling

Frequency of Drinking Water/Beach Sampling and Logistics. For a fourth year, the Cayuga County Health Department performed finished drinking water sampling at Wells College to ensure the treatments did not have an impact on drinking water; drinking water samples were taken once following each fluridone application.

Looking forward to Year 5, the Cayuga County Health Department plans to continue the same sampling protocol followed in Year 4 (2020).

Analytical Turnaround Times. Samples were analyzed with a 24-hour TAT. Similar to 2019 findings and suggestions in the post-treatment assessment report, since it was determined that the treatments did not have an impact on drinking water quality, the TAT is not as critical as it was prior to the commencement of this Project. If all parties agree that the TAT is not critical, then drinking water samples could be sent to SePRO along with the in-lake samples. SePRO can analyze the samples at a much reduced cost (approximately 32 percent with a 48-hour TAT) than CSI.

In-Lake Sampling

Frequency of In-Lake Sampling and Logistics. Samples should continue to be collected between day four and day seven of each application so that results can

be obtained before the next treatment (assuming a 48-hour TAT). During the 2020 treatments, back-calculating the dosage was not performed as it was in the initial year of the project (2017) to maintain the target fluridone concentration. However, to ensure that target concentrations are achieved and not exceeded, in-lake sampling should continue to be performed between days four and seven following fluridone application.

Analytical Turnaround Times. Samples are analyzed on a 48-hour TAT. There are no apparent reasons to change this TAT at this time. If weather significantly affects sampling, it may be necessary to implement a 24-hour TAT, if deemed necessary.

Point Intercept Surveys. The USACE employs the point intercept survey method to monitor the presence, absence, relative abundance, and condition of Hydrilla in treatment plots and immediately adjacent to treatment plots. This is an efficient way to monitor for Hydrilla and can help inform the potential need for changes to treatments if plants are observed to be in "healthy" condition. The following should be further evaluated for implementation in 2021: (1) the distance between points may be reduced in areas where Hydrilla has been discovered in the past couple of seasons to increase ability to detect extent of Hydrilla patches; and (2) increase the length of rope on rake samplers from 30 feet to 50 feet and ensure rakes are hitting bottom prior to retrieval.

4 References

United States Army Corps of Engineers (USACE). 2019. *Architect-Engineer Scope of Work Aquatic Plant Control ERDC Demonstration Project Wells College Bay, Cayuga Lake, Aurora, NY.* September 16, 2019.

USACE. 2020. *Revised Architect-Engineer Scope of Work Aquatic Plant Control ERDC Demonstration Project Wells College Bay, Cayuga Lake, Aurora, NY.* March 4, 2020.

A Analytical Data

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC7570 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM22427-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22428-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22429-1	Out W-Q	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22430-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22431-1	SP1	Sonar/fluridone (ug/L)	FAST 10	1.0	06/29/2020
CTM22432-1	SP2	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22433-1	SP3	Sonar/fluridone (ug/L)	FAST 10	1.7	06/29/2020
CTM22434-1	CS1	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22435-1	CS2	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22436-1	CI	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22437-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22438-1	Treat N-Q	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22439-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020

CTM22440-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	06/29/2020
CTM22441-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	2.6	06/29/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 07/02/20 11:00 AM
Date Results Sent: Tuesday, July 7, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC7605 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM22523-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22524-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22525-1	Out W-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22526-1	SP1	Sonar/fluridone (ug/L)	FAST 10	5.2	07/06/2020
CTM22527-1	SP2	Sonar/fluridone (ug/L)	FAST 10	7.2	07/06/2020
CTM22528-1	SP3	Sonar/fluridone (ug/L)	FAST 10	5.2	07/06/2020
CTM22532-1	CS1	Sonar/fluridone (ug/L)	FAST 10	2.4	07/06/2020
CTM22533-1	CS2	Sonar/fluridone (ug/L)	FAST 10	1.3	07/06/2020
CTM22534-1	CI	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22535-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22536-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22537-1	Treat N-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22538-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020

CTM22539-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	07/06/2020
CTM22540-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	1.1	07/06/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 07/07/20 11:00 AM
Date Results Sent: Wednesday, July 8, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

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FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC7714 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM22782-1	OutN	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22783-1	OutW	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22784-1	OutS	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22785-1	OutS-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22786-1	SP1	Sonar/fluridone (ug/L)	FAST 10	1.8	07/13/2020
CTM22787-1	SP2	Sonar/fluridone (ug/L)	FAST 10	3.1	07/13/2020
CTM22788-1	SP3	Sonar/fluridone (ug/L)	FAST 10	3.0	07/13/2020
CTM22789-1	CS1	Sonar/fluridone (ug/L)	FAST 10	2.2	07/13/2020
CTM22790-1	CS2	Sonar/fluridone (ug/L)	FAST 10	1.1	07/13/2020
CTM22791-1	CI	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22792-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	1.0	07/13/2020
CTM22793-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22794-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020

CTM22795-1	Lake S-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22796-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020
CTM22797-1	DW	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
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QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 07/14/20 11:00 AM
Date Results Sent: Wednesday, July 15, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

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FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC7783 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM22937-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020
CTM22938-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020
CTM22939-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020
CTM22940-1	SP1	Sonar/fluridone (ug/L)	FAST 10	1.4	07/20/2020
CTM22941-1	SP1-Q	Sonar/fluridone (ug/L)	FAST 10	1.2	07/20/2020
CTM22942-1	SP2	Sonar/fluridone (ug/L)	FAST 10	2.1	07/20/2020
CTM22943-1	SP3	Sonar/fluridone (ug/L)	FAST 10	4.8	07/20/2020
CTM22944-1	CS1	Sonar/fluridone (ug/L)	FAST 10	3.1	07/20/2020
CTM22945-1	CS2	Sonar/fluridone (ug/L)	FAST 10	1.7	07/20/2020
CTM22946-1	CI	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020
CTM22947-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	1.0	07/20/2020
CTM22948-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020
CTM22949-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020

CTM22950-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020
CTM22951-1	Treat S Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/20/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
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in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 07/21/20 11:00 AM
Date Results Sent: Wednesday, July 22, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

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FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC7862 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM23102-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020
CTM23103-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020
CTM23104-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020
CTM23105-1	SP1	Sonar/fluridone (ug/L)	FAST 10	1.7	07/27/2020
CTM23106-1	SP2	Sonar/fluridone (ug/L)	FAST 10	4.7	07/27/2020
CTM23107-1	SP2 Q	Sonar/fluridone (ug/L)	FAST 10	4.9	07/27/2020
CTM23108-1	SP3	Sonar/fluridone (ug/L)	FAST 10	5.6	07/27/2020
CTM23109-1	CS1	Sonar/fluridone (ug/L)	FAST 10	4.7	07/27/2020
CTM23110-1	CS2	Sonar/fluridone (ug/L)	FAST 10	1.3	07/27/2020
CTM23111-1	CI	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020
CTM23112-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020
CTM23113-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020
CTM23114-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020

CTM23115-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	<1	07/27/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 07/28/20 11:00 AM
Date Results Sent: Wednesday, July 29, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC7953 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM23294-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	1.7	08/03/2020
CTM23295-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	08/03/2020
CTM23296-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	08/03/2020
CTM23297-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	<1	08/03/2020
CTM23298-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	08/03/2020
CTM23299-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	08/03/2020
CTM23300-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	08/03/2020
CTM23301-1	SP1	Sonar/fluridone (ug/L)	FAST 10	2.8	08/03/2020
CTM23302-1	SP2	Sonar/fluridone (ug/L)	FAST 10	6.0	08/03/2020
CTM23303-1	SP3	Sonar/fluridone (ug/L)	FAST 10	7.1	08/03/2020
CTM23304-1	CS1	Sonar/fluridone (ug/L)	FAST 10	6.1	08/03/2020
CTM23305-1	CS2	Sonar/fluridone (ug/L)	FAST 10	6.4	08/03/2020
CTM23306-1	C1	Sonar/fluridone (ug/L)	FAST 10	<1	08/03/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
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QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 08/04/20 11:00 AM
Date Results Sent: Thursday, August 6, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC8119 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM23676-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	1.2	08/17/2020
CTM23677-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	08/17/2020
CTM23678-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	08/17/2020
CTM23679-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	<1	08/17/2020
CTM23680-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	08/17/2020
CTM23681-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	08/17/2020
CTM23682-1	SP1	Sonar/fluridone (ug/L)	FAST 10	3.7	08/17/2020
CTM23683-1	SP2	Sonar/fluridone (ug/L)	FAST 10	5.1	08/17/2020
CTM23684-1	SP3	Sonar/fluridone (ug/L)	FAST 10	6.1	08/17/2020
CTM23685-1	CS1	Sonar/fluridone (ug/L)	FAST 10	<1	08/17/2020
CTM23686-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	08/17/2020
CTM23687-1	CS2	Sonar/fluridone (ug/L)	FAST 10	1.2	08/17/2020
CTM23688-1	C1	Sonar/fluridone (ug/L)	FAST 10	4.6	08/17/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 08/18/20 11:00 AM
Date Results Sent: Wednesday, August 19, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC8206 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM23942-1	OUTN08242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020
CTM23943-1	OUTW08242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020
CTM23944-1	OUTS08242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020
CTM23945-1	SP108242020	Sonar/fluridone (ug/L)	FAST 10	4.0	08/24/2020
CTM23946-1	SP208242020	Sonar/fluridone (ug/L)	FAST 10	4.4	08/24/2020
CTM23947-1	SP308242020	Sonar/fluridone (ug/L)	FAST 10	5.1	08/24/2020
CTM23948-1	CS108242020	Sonar/fluridone (ug/L)	FAST 10	3.2	08/24/2020
CTM23949-1	CS208242020	Sonar/fluridone (ug/L)	FAST 10	2.3	08/24/2020
CTM23950-1	C108242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020
CTM23951-1	TREATN08242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020
CTM23952-1	LAKEN08242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020
CTM23953-1	LAKES08242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020
CTM23954-1	TREATS08242020	Sonar/fluridone (ug/L)	FAST 10	<1	08/24/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 08/25/20 12:00 PM
Date Results Sent: Wednesday, August 26, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC8053 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name Ecology and Enviornment Inc	Contact Person: Katie Evans
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: Kevans@ene.com
	Phone: 716-684-8060

Waterbody Information

Waterbody:	Cayuga Lake - NY
Waterbody size:	42956
Depth Average:	0

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM23506-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	1.4	08/10/2020
CTM23507-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2020
CTM23508-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2020
CTM23509-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2020
CTM23510-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2020
CTM23511-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2020
CTM23512-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2020
CTM23513-1	SP1	Sonar/fluridone (ug/L)	FAST 10	3.5	08/10/2020
CTM23514-1	SP2	Sonar/fluridone (ug/L)	FAST 10	4.6	08/10/2020
CTM23515-1	CS1	Sonar/fluridone (ug/L)	FAST 10	4.9	08/10/2020
CTM23516-1	CS2	Sonar/fluridone (ug/L)	FAST 10	4.7	08/10/2020
CTM23517-1	SP3	Sonar/fluridone (ug/L)	FAST 10	5.3	08/10/2020
CTM23518-1	CI	Sonar/fluridone (ug/L)	FAST 10	1.5	08/10/2020

ANALYSIS STATEMENTS:
SAMPLE RECEIPT /HOLDING TIMES: All samples arrived in an acceptable condition and were analyzed within prescribed holding times in accordance with the SRTC Laboratory Sample Receipt Policy unless otherwise noted in the report.
PRESERVATION: Samples requiring preservation were verified prior to sample analysis and any qualifiers will be noted
in the report.
QA/QC CRITERIA: All analyses met method criteria, except as noted in the report with data qualifiers.
COMMENTS: No significant observations were made unless noted in the report.
MEASUREMENT UNCERTAINTY: Uncertainty of measurement has been determined and is available upon request.

Laboratory Information
Date / Time Received: 08/11/20 12:15 PM
Date Results Sent: Friday, August 14, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

Co nit Science Instit te Inc

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F ri one onitorin Re ort

Client: US Army Corps of Engineers 1776 Niagara St Buffalo, NY 14207	Sampling Date(s): 8/4/20, 8/5/20 Test Date(s): 8/6/20, 8/10/20, 8/11/20

Report ID: USACE 080420 Number of Samples: 48

Test Methods: Eurofins Abraxis, Fluridone Magnetic Particle ELISA, Product No. 500511

Sa e Co e	Sa in Date	Location	F ri one b	Test Date
IFS1 MID	8/4/20	Ithaca	4.3	8/6/20
IFS1 BOTTOM	8/4/20	Ithaca	3.7	8/6/20
IFS2 MID	8/4/20	Ithaca	5.0	8/6/20
IFS2 BOTTOM	8/4/20	Ithaca	5.3	8/6/20
IFS3 MID	8/4/20	Ithaca	5.0	8/6/20
IFS3 BOTTOM	8/4/20	Ithaca	5.0	8/6/20
IFS4 MID	8/4/20	Ithaca	3.9	8/6/20
IFS4 BOTTOM	8/4/20	Ithaca	2.7	8/6/20
IFS5 MID	8/4/20	Ithaca	0.6	8/6/20
IFS5 BOTTOM	8/4/20	Ithaca	1.5	8/6/20
IFS6 MID	8/4/20	Ithaca	0.9	8/6/20
IFS6 BOTTOM	8/4/20	Ithaca	0.7	8/6/20
IFS7 MID	8/4/20	Ithaca	<0.5	8/6/20
IFS7 BOTTOM	8/4/20	Ithaca	<0.5	8/6/20
IFS11 MID	8/4/20	Ithaca	1.1	8/6/20
IFS11 BOTTOM	8/4/20	Ithaca	1.1	8/6/20
IFS12 MID	8/4/20	Ithaca	0.7	8/6/20
IFS12 BOTTOM	8/4/20	Ithaca	0.7	8/6/20
IFS13 MID	8/4/20	Ithaca	0.9	8/10/20
IFS13 BOTTOM	8/4/20	Ithaca	<0.5	8/10/20
IFS14 MID	8/4/20	Ithaca	2.3	8/10/20
IFS14 BOTTOM	8/4/20	Ithaca	2.2	8/10/20
IFS15 MID	8/4/20	Ithaca	<0.5	8/10/20
IFS15 BOTTOM	8/4/20	Ithaca	<0.5	8/10/20
IFS16 MID	8/4/20	Ithaca	<0.5	8/10/20
IFS16 BOTTOM	8/4/20	Ithaca	<0.5	8/10/20
IFS17 MID	8/4/20	Ithaca	1.1	8/10/20
IFS17 BOTTOM	8/4/20	Ithaca	0.6	8/10/20
IFS18 MID	8/4/20	Ithaca	<0.5	8/10/20

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IFS18 BOTTOM	8/4/20	Ithaca	<0.5	8/10/20
H1 MID	8/5/20	Aurora	0.6	8/10/20
H1 BOTTOM	8/5/20	Aurora	<0.5	8/10/20
H2 MID	8/5/20	Aurora	<0.5	8/10/20
H2 BOTTOM	8/5/20	Aurora	<0.5	8/10/20
H3 MID	8/5/20	Aurora	0.5	8/10/20
H3 BOTTOM	8/5/20	Aurora	0.5	8/10/20
H4 MID	8/5/20	Aurora	<0.5	8/11/20
H4 BOTTOM	8/5/20	Aurora	0.5	8/11/20
H5 MID	8/5/20	Aurora	<0.5	8/11/20
H5 BOTTOM	8/5/20	Aurora	<0.5	8/11/20
H6 MID	8/5/20	Aurora	1.2	8/11/20
H6 BOTTOM	8/5/20	Aurora	0.5	8/11/20
H7 MID	8/5/20	Aurora	<0.5	8/11/20
H7 BOTTOM	8/5/20	Aurora	0.6	8/11/20
H8 MID	8/5/20	Aurora	0.7	8/11/20
H8 BOTTOM	8/5/20	Aurora	0.7	8/11/20
H9 MID	8/5/20	Aurora	<0.5	8/11/20
H9 BOTTOM	8/5/20	Aurora	<0.5	8/11/20

Results apply only to samples listed above and not to any other samples.
The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 8/11/2020

Stephen M. Penningroth, Lead Technical Director

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F ri one onitorin Re ort

Client: US Army Corps of Engineers 1776 Niagara St Buffalo, NY 14207	Sampling Date(s): 7/15/20 Test Date(s): 7/31/20, 7/28/20, 7/27/20, 7/21/20

Report ID: USACE 071520 Number of Samples: 48
Test Methods: Eurofins Abraxis, Fluridone Magnetic Particle ELISA, Product No. 500511

Sa e Co e	Sa in Date	Location	F ri one b	Test Date
IFS1 MID	7/15/20	Ithaca	2.2	7/21/20
IFS1 BOTTOM	7/15/20	Ithaca	2.0	7/21/20
IFS2 MID	7/15/20	Ithaca	4.5	7/21/20
IFS2 BOTTOM	7/15/20	Ithaca	4.5	7/21/20
IFS3 MID	7/15/20	Ithaca	2.1	7/21/20
IFS3 BOTTOM	7/15/20	Ithaca	2.2	7/21/20
IFS4 MID	7/15/20	Ithaca	1.5	7/21/20
IFS4 BOTTOM	7/15/20	Ithaca	1.5	7/21/20
IFS5 MID	7/15/20	Ithaca	0.8	7/21/20
IFS5 BOTTOM	7/15/20	Ithaca	0.8	7/21/20
IFS6 MID	7/15/20	Ithaca	0.3	7/21/20
IFS6 BOTTOM	7/15/20	Ithaca	0.6	7/21/20
IFS7 MID	7/15/20	Ithaca	<0.5	7/21/20
IFS7 BOTTOM	7/15/20	Ithaca	<0.5	7/21/20
IFS11 MID	7/15/20	Ithaca	<0.5	7/27/20
IFS11 BOTTOM	7/15/20	Ithaca	<0.5	7/27/20
IFS12 MID	7/15/20	Ithaca	0.7	7/27/20
IFS12 BOTTOM	7/15/20	Ithaca	<0.5	7/27/20
IFS13 MID	7/15/20	Ithaca	<0.5	7/27/20
IFS13 BOTTOM	7/15/20	Ithaca	<0.5	7/27/20
IFS14 MID	7/15/20	Ithaca	0.6	7/27/20
IFS14 BOTTOM	7/15/20	Ithaca	0.6	7/27/20
IFS15 MID	7/15/20	Ithaca	<0.5	7/27/20
IFS15 BOTTOM	7/15/20	Ithaca	<0.5	7/27/20
IFS16 MID	7/15/20	Ithaca	<0.5	7/27/20
IFS16 BOTTOM	7/15/20	Ithaca	<0.5	7/27/20
IFS17 MID	7/15/20	Ithaca	<0.5	7/27/20
IFS17 BOTTOM	7/15/20	Ithaca	<0.5	7/27/20
IFS18 MID	7/15/20	Ithaca	<0.5	7/27/20

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IFS18 BOTTOM	7/15/20	Ithaca	<0.5	7/27/20
H1 MID	7/15/20	Aurora	<0.5	7/27/20
H1 BOTTOM	7/15/20	Aurora	<0.5	7/27/20
H2 MID	7/15/20	Aurora	<0.5	7/28/20
H2 BOTTOM	7/15/20	Aurora	<0.5	7/28/20
H3 MID	7/15/20	Aurora	<0.5	7/28/20
H3 BOTTOM	7/15/20	Aurora	<0.5	7/28/20
H4 MID	7/15/20	Aurora	0.7	7/28/20
H4 BOTTOM	7/15/20	Aurora	0.6	7/28/20
H5 MID	7/15/20	Aurora	0.5	7/28/20
H5 BOTTOM	7/15/20	Aurora	0.7	7/28/20
H6 MID	7/15/20	Aurora	<0.5	7/28/20
H6 BOTTOM	7/15/20	Aurora	0.6	7/28/20
H7 MID	7/15/20	Aurora	<0.5	7/28/20
H7 BOTTOM	7/15/20	Aurora	<0.5	7/28/20
H8 MID	7/15/20	Aurora	<0.5	7/31/20
H8 BOTTOM	7/15/20	Aurora	1.0	7/31/20
H9 MID	7/15/20	Aurora	<0.5	7/31/20
H9 BOTTOM	7/15/20	Aurora	<0.5	7/31/20

Results apply only to samples listed above and not to any other samples.
The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 8/4/2020

Stephen M. Penningroth, Lead Technical Director

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F ri one onitorin Re ort

Client: US Army Corps of Engineers 1776 Niagara St Buffalo, NY 14207	Sampling Date(s): 8/31/20, 9/1/20 Test Date(s): 9/2/20, 9/4/20

Report ID: USACE 090120 Number of Samples: 48
Test Methods: Eurofins Abraxis, Fluridone Magnetic Particle ELISA, Product No. 500511

Sa e Co e	Sa in Date	Location	F ri one b	Test Date
IFS1 MID	9/1/20	Ithaca	1.7	9/2/20
IFS1 BOTTOM	9/1/20	Ithaca	2.0	9/2/20
IFS2 MID	9/1/20	Ithaca	1.7	9/2/20
IFS2 BOTTOM	9/1/20	Ithaca	1.7	9/2/20
IFS3 MID	9/1/20	Ithaca	1.5	9/2/20
IFS3 BOTTOM	9/1/20	Ithaca	1.4	9/2/20
IFS4 MID	9/1/20	Ithaca	1.2	9/2/20
IFS4 BOTTOM	9/1/20	Ithaca	1.2	9/2/20
IFS5 MID	9/1/20	Ithaca	1.7	9/2/20
IFS5 BOTTOM	9/1/20	Ithaca	1.7	9/2/20
IFS6 MID	9/1/20	Ithaca	<0.5	9/2/20
IFS6 BOTTOM	9/1/20	Ithaca	<0.5	9/2/20
IFS7 MID	9/1/20	Ithaca	<0.5	9/2/20
IFS7 BOTTOM	9/1/20	Ithaca	<0.5	9/2/20
IFS11 MID	9/1/20	Ithaca	0.7	9/2/20
IFS11 BOTTOM	9/1/20	Ithaca	0.5	9/2/20
IFS12 MID	9/1/20	Ithaca	<0.5	9/2/20
IFS12 BOTTOM	9/1/20	Ithaca	<0.5	9/2/20
IFS13 MID	9/1/20	Ithaca	1.3	9/4/20
IFS13 BOTTOM	9/1/20	Ithaca	2.6	9/4/20
IFS14 MID	9/1/20	Ithaca	1.6	9/4/20
IFS14 BOTTOM	9/1/20	Ithaca	1.8	9/4/20
IFS15 MID	9/1/20	Ithaca	0.8	9/4/20
IFS15 BOTTOM	9/1/20	Ithaca	<0.5	9/4/20
IFS16 MID	9/1/20	Ithaca	<0.5	9/4/20
IFS16 BOTTOM	9/1/20	Ithaca	<0.5	9/4/20
IFS17 MID	9/1/20	Ithaca	<0.5	9/4/20
IFS17 BOTTOM	9/1/20	Ithaca	<0.5	9/4/20
IFS18 MID	9/1/20	Ithaca	<0.5	9/4/20

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IFS18 BOTTOM	9/1/20	Ithaca	<0.5	9/4/20
H1 MID	8/31/20	Aurora	<0.5	9/4/20
H1 BOTTOM	8/31/20	Aurora	0.9	9/4/20
H2 MID	8/31/20	Aurora	<0.5	9/4/20
H2 BOTTOM	8/31/20	Aurora	<0.5	9/4/20
H3 MID	8/31/20	Aurora	<0.5	9/4/20
H3 BOTTOM	8/31/20	Aurora	<0.5	9/4/20
H4 MID	8/31/20	Aurora	<0.5	9/4/20
H4 BOTTOM	8/31/20	Aurora	<0.5	9/4/20
H5 MID	8/31/20	Aurora	<0.5	9/4/20
H5 BOTTOM	8/31/20	Aurora	<0.5	9/4/20
H6 MID	8/31/20	Aurora	3.8	9/4/20
H6 BOTTOM	8/31/20	Aurora	<0.5	9/4/20
H7 MID	8/31/20	Aurora	<0.5	9/4/20
H7 BOTTOM	8/31/20	Aurora	<0.5	9/4/20
H8 MID	8/31/20	Aurora	<0.5	9/4/20
H8 BOTTOM	8/31/20	Aurora	<0.5	9/4/20
H9 MID	8/31/20	Aurora	<0.5	9/4/20
H9 BOTTOM	8/31/20	Aurora	<0.5	9/4/20

Results apply only to samples listed above and not to any other samples.
The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 9/4/2020

Stephen M. Penningroth, Lead Technical Director

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August 06, 2020 Service Request No:R2006858

Lynne Parker
Ecology And Environment, Incorporated
368 Pleasantview Drive
Lancaster, NY 14086

Laboratory Results for: Aurora Hydrilla

Dear Lynne,

Enclosed are the results of the sample(s) submitted to our laboratory August 03, 2020
For your reference, these analyses have been assigned our service request number **R2006858.**

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7472. You may also contact me via email at Janice.Jaeger@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Brady Kalkman
For
Janice Jaeger
Project Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Ecology And Environment, Inc. - Lancaster
Project: Aurora Hydrilla
Sample Matrix: Water

Service Request: R2006858
Date Received: 08/03/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

One water sample was received for analysis at ALS Environmental on 08/03/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by _____ Date 08/06/2020

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R2006858-001	Copper / 08032020	8/3/2020	1208

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

003294

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name: Aurora Hydrilla	Project Number: 1009540.0012.03
Project Manager: Katie Evans	Report CC:
Company/Address: 368 Pleasant View Dr, Lancaster, NY 14086	
Phone: 440-823-1677	Email: kevans@ene.com
Sampler's Signature: Justin I Miceli	Sampler's Printed Name: Justin Miceli

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	PRESERVATIVE	NUMBER OF CONTAINERS	GC/MS VOAs ○ 8260 ○ 624 ○ CLP	GC/MS SVOAs ○ 8270 ○ 625	GC VOAs ○ 8021 ○ 601/602	PESTICIDES ○ 8081 ○ 608	PCBs ○ 8082 ○ 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	Copper	REMARKS/ ALTERNATE DESCRIPTION
Copper10803200		8/3/2020	1208	water		1								X	HNO_3 preservative

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

SPECIAL INSTRUCTIONS/COMMENTS
Metals

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED: New York

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day __X__ 2 day _____ 3 day
_____ 4 day _____ 5 day
_____ Standard (10 business days-No Surcharge)
REQUESTED REPORT DATE: _____

REPORT REQUIREMENTS
__X__ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
____ IV. Data Validation Report with Raw Data
Edata ____Yes ____No

INVOICE INFORMATION
PO #
BILL TO:

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Justin I Miceli	Signature:	Signature	Signature	Signature	
Printed Name: Justin Miceli	Printed Name: Daniel Fabic	Printed Name	Printed Name	Printed Name	
Firm: Ecology + Environment	Firm: ~~ALS~~ ALS	Firm	Firm	Firm	
Date/Time: 8/3/2020, 1917	Date/Time: 8/4/2020 1414	Date/Time	Date/Time	Date/Time	

R2006858 5
Ecology And Environment, Incorporated
Aurora Hydrilla

Distribution: White - Lab Copy; Yellow - Return to Originator

Cooler Receipt and Preservation Check Form

Project/Client E+E Folder Number

Cooler received on 8/3/2020 by: dlw

COURIER: ALS UPS FEDEX VELOCITY ~~CLIENT~~

1	Were **Custody seals** on outside of cooler?	Y N	5a	**Perchlorate** samples have required headspace?	Y N ~~NA~~
2	**Custody papers** properly completed (ink, signed)?	Y N	5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y N ~~NA~~
3	Did all bottles arrive in good **condition** (unbroken)?	Y N	6	Where did the bottles originate?	ALS/ROC ~~CLIENT~~ dlw 8/3/2020
4	Circle: ~~Wet~~ Ice **Dry Ice Gel packs** present?	Y N	7	Soil VOA received as: Bulk Encore 5035set	~~NA~~

3. Temperature Readings Date: 8/3/2020 Time: 1940 ID: IR#7 ~~IR#10~~ From: Temp Blank ~~Sample Bottle~~

Observed Temp (°C)	11.6C						
Within 0-6°C?	Y ~~N~~	Y N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) ~~Same Day Rule~~

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R002 by dlw on 8/3/20 at 1940
5035 samples placed in storage location: _____ by _____ on _____ at _____ within 48 hours of sampling? Y N

Cooler Breakdown/Preservation Check**: Date: 8/4/2020 Time: 1242 by: AM

9. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? YES NO
10. Did all bottle labels and tags agree with custody papers? YES NO
11. Were correct containers used for the tests indicated? YES NO
12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO ~~N/A~~
13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated ~~N/A~~

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2	223419	HNO_3	✓		1119112					
≤2		H_2SO_4								
<4		$NaHSO_4$								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add $Na_2S_2O_3$ (625, 608, CN), ascorbic (phenol).					
		$Na_2S_2O_3$								
		ZnAcetate	-	-			**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).			
		HCl	**	**						

Bottle lot numbers: 20-05-28
Explain all Discrepancies/ Other Comments:

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: ~~AM~~
PC Secondary Review: _____

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.

J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).

B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.

E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.

E Organics- Concentration has exceeded the calibration range for that specific analysis.

D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.

* Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.

H Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.

Spike was diluted out.

\+ Correlation coefficient for MSA is <0.995.

N Inorganics- Matrix spike recovery was outside laboratory limits.

N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.

S Concentration has been determined using Method of Standard Additions (MSA).

W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.

P Concentration >40% difference between the two GC columns.

C Confirmed by GC/MS

Q DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).

X See Case Narrative for discussion.

MRL Method Reporting Limit. Also known as:
LOQ Limit of Quantitation (LOQ)
The lowest concentration at which the method analyte may be reliably quantified under the method conditions.

MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).

LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.

ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Client:	Ecology And Environment, Inc. - Lancaster	**Service Request:**	R2006858
Project:	Aurora Hydrilla/1009540.0012.03		

Sample Name:	Copper / 08032020	**Date Collected:**	08/3/20
Lab Code:	R2006858-001	**Date Received:**	08/3/20
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	AKONZEL	KMCLAEN

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9034 Sulfide Acid Soluble	9030B
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7199	3060A
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction
For analytical methods not listed, the preparation method is the same as the analytical method reference.	

Sample Results

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Metals

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Analytical Report

Client:	Ecology And Environment, Inc. - Lancaster	**Service Request:**	R2006858
Project:	Aurora Hydrilla/1009540.0012.03	**Date Collected:**	08/03/20 12:08
Sample Matrix:	Water	**Date Received:**	08/03/20 19:17
Sample Name:	Copper / 08032020	**Basis:**	NA
Lab Code:	R2006858-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Copper, Total	6010C	ND U	ug/L	20	4	1	08/06/20 13:36	08/05/20	

QC Summary Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Metals

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Analytical Report

Client:	Ecology And Environment, Inc. - Lancaster	**Service Request:**	R2006858
Project:	Aurora Hydrilla/1009540.0012.03	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	R2006858-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Copper, Total	6010C	ND U	ug/L	20	4	1	08/06/20 12:05	08/05/20	

Client: Ecology And Environment, Inc. - Lancaster
Project: Aurora Hydrilla/1009540.0012.03
Sample Matrix: Water

Service Request: R2006858
Date Analyzed: 08/06/20

Lab Control Sample Summary
Inorganic Parameters

Units:ug/L
Basis:NA

Lab Control Sample
R2006858-LCS

Analyte Name	Analytical Method	Result	Spike Amount	% Rec	% Rec Limits
Copper, Total	6010C	252	250	101	80-120

August 27, 2020 Service Request No:R2007735

Lynne Parker
Ecology And Environment, Incorporated
368 Pleasantview Drive
Lancaster, NY 14086

Laboratory Results for: Aurora Hydrilla

Dear Lynne,

Enclosed are the results of the sample(s) submitted to our laboratory August 25, 2020
For your reference, these analyses have been assigned our service request number **R2007735.**

All testing was performed according to our laboratory's quality assurance program and met the requirements of the TNI standards except as noted in the case narrative report. Any testing not included in the lab's accreditation is identified on a Non-Certified Analytes report. All results are intended to be considered in their entirety. ALS Environmental is not responsible for use of less than the complete report. Results apply only to the individual samples submitted to the lab for analysis, as listed in the report. The measurement uncertainty of the results included in this report is within that expected when using the prescribed method(s), and represented by Laboratory Control Sample control limits. Any events, such as QC failures or Holding Time exceedances, which may add to the uncertainty are explained in the report narrative or are flagged with qualifiers. The flags are explained in the Report Qualifiers and Definitions page of this report.

Please contact me if you have any questions. My extension is 7475. You may also contact me via email at Meghan.Pedro@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Meghan Pedro
Project Manager

ADDRESS 1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
PHONE +1 585 288 5380 | FAX +1 585 288 8475
ALS Group USA, Corp.
dba ALS Environmental

Narrative Documents

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
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www.alsglobal.com

ALS Environmental

Client: Ecology And Environment, Inc. - Lancaster
Project: Aurora Hydrilla
Sample Matrix: Water

Service Request: R2007735
Date Received: 08/25/2020

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples for the Tier II level requested by the client.

Sample Receipt:

One water sample was received for analysis at ALS Environmental on 08/25/2020. Any discrepancies upon initial sample inspection are annotated on the sample receipt and preservation form included within this report. The samples were stored at minimum in accordance with the analytical method requirements.

Metals:

No significant anomalies were noted with this analysis.

Approved by _____ Date 08/27/2020

Sample Receipt Information

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

Client: Ecology And Environment, Inc. - Lancaster **Service Request:**R2007735
Project: Aurora Hydrilla/1009540.0012.03

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
R2007735-001	Copper208242020	8/24/2020	1200

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

003490

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name: Aurora Hydrilla	Project Number: 1009540.0012.03
Project Manager: Katie Evans	Report CC:
Company/Address: 368 Pleasantview Dr. Lancaster, NY 14086	
Phone #: 440-823-1677	Email: Kevans@ene.com
Sampler's Signature: Justin Micali	Sampler's Printed Name: Justin Micali

ANALYSIS REQUESTED *(Include Method Number and Container Preservative)*

PRESERVATIVE

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs ○ 8260 ○ 624 ○ CLP	GC/MS SVOAs ○ 8270 ○ 625	GC VOAs ○ 8021 ○ 601/602	PESTICIDES ○ 8081 ○ 608	PCBs ○ 8082 ○ 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	Copper	
Copper20824 2020		8/24/20	1200	Water	1								X	HNO_3 preservative

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other _____

REMARKS/ ALTERNATE DESCRIPTION

Justin Micali 8/24/2020

SPECIAL INSTRUCTIONS/COMMENTS
Metals

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED: New York

TURNAROUND REQUIREMENTS
_____ RUSH (SURCHARGES APPLY)
_____ 1 day __X__ 2 day _____ 3 day
_____ 4 day _____ 5 day
_____ Standard (10 business days-No Surcharge)

REQUESTED REPORT DATE
_____

REPORT REQUIREMENTS
__X__ I. Results Only
_____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
_____ III. Results + QC and Calibration Summaries
_____ IV. Data Validation Report with Raw Data

Edata _____Yes _____No

INVOICE INFORMATION
PO #
BILL TO:

RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature: Justin Micali	Signature: Gregory D. Esmerian	Signature	Signature	Signature	Signature
Printed Name: Justin L Micali	Printed Name: Gregory D. Esmerian	Printed Name	Printed Name	Printed Name	Printed Name
Firm: Ecology + Environment	Firm: ALS	Firm	Firm	Firm	
Date/Time: 8/24/20 1730	Date/Time: 8-25-2020 12:15	Date/Time	Date/Time	Date/Time	

Distribution: White - Lab Copy; Yellow - Return to Originator

Cooler Receipt and Preservation Check Form

R2007735 5
Ecology And Environment, Incorporated
Aurora Hydrilla

Project/Client E+E Folder Number

Cooler received on 8-25-2020 by: IE

COURIER: ALS UPS (FEDEX) VELOCITY CLIENT

1	Were **Custody seals** on outside of cooler?	(Y) N	5a	**Perchlorate** samples have required headspace?	Y N (NA)
2	**Custody papers** properly completed (ink, signed)?	(Y) N	5b	Did VOA vials, Alk,or Sulfide have sig* **bubbles**?	Y N (NA)
3	Did all bottles arrive in good **condition** (unbroken)?	(Y) N	6	Where did the bottles originate?	(ALS/ROC) CLIENT
4	Circle: (Wet Ice) **Dry Ice Gel packs** present?	(Y) N	7	Soil VOA received as: Bulk Encore 5035set	(NA)

8. Temperature Readings Date: 8-25-2020 Time: 12:14 ID: IR#7 (IR#10) From: (Temp Blank) Sample Bottle

Observed Temp (°C)	21						
Within 0-6°C?	(Y) N	Y N	Y N	Y N	Y N	Y N	Y N
If <0°C, were samples frozen?	Y N	Y N	Y N	Y N	Y N	Y N	Y N

If out of Temperature, note packing/ice condition: _____ Ice melted Poorly Packed (described below) Same Day Rule

&Client Approval to Run Samples: _____ Standing Approval Client aware at drop-off Client notified by: _____

All samples held in storage location: R-002 by IE on 8-25-20 at 12:16
5035 samples placed in storage location: _____ by _____ on _____ at _____ within 48 hours of sampling? Y N
8/25/20

Cooler Breakdown/Preservation Check**: Date: 8/26/20 Time: 1630 by: dw

9. Were all bottle labels complete (*i.e.* analysis, preservation, etc.)? (YES) NO
10. Did all bottle labels and tags agree with custody papers? (YES) NO
11. Were correct containers used for the tests indicated? (YES) NO
12. Were 5035 vials acceptable (no extra labels, not leaking)? YES NO N/A
13. Air Samples: Cassettes / Tubes Intact with MS? Canisters Pressurized Tedlar® Bags Inflated N/A

pH	Lot of test paper	Reagent	Preserved? Yes	Preserved? No	Lot Received	Exp	Sample ID Adjusted	Vol. Added	Lot Added	Final pH
≥12		NaOH								
≤2	223419	HNO_3	✓		Client					
≤2		H_2SO_4								
<4		$NaHSO_4$								
5-9		For 608pest			No=Notify for 3day					
Residual Chlorine (-)		For CN, Phenol, 625, 608pest, 522			If +, contact PM to add $Na_2S_2O_3$ (625, 608, CN), ascorbic (phenol).					
		$Na_2S_2O_3$								
		ZnAcetate	-	-						
		HCl	**	**						

**VOAs and 1664 Not to be tested before analysis. Otherwise, all bottles of all samples with chemical preservatives are checked (not just representatives).

Bottle lot numbers: Client

Explain all Discrepancies/ Other Comments:

HPROD	BULK
HTR	FLDT
SUB	HGFB
ALS	LL3541

Labels secondary reviewed by: JA

PC Secondary Review: JW

*significant air bubbles: VOA > 5-6 mm : WC >1 in. diameter

Miscellaneous Forms

ALS Environmental—Rochester Laboratory
1565 Jefferson Road, Building 300, Suite 360, Rochester, NY 14623
Phone (585) 288-5380 Fax (585) 288-8475
www.alsglobal.com

REPORT QUALIFIERS AND DEFINITIONS

U Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.

J Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).

B Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.

E Inorganics- Concentration is estimated due to the serial dilution was outside control limits.

E Organics- Concentration has exceeded the calibration range for that specific analysis.

D Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.

* Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.

H Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.

Spike was diluted out.

\+ Correlation coefficient for MSA is <0.995.

N Inorganics- Matrix spike recovery was outside laboratory limits.

N Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.

S Concentration has been determined using Method of Standard Additions (MSA).

W Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.

P Concentration >40% difference between the two GC columns.

C Confirmed by GC/MS

Q DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).

X See Case Narrative for discussion.

MRL Method Reporting Limit. Also known as:
LOQ Limit of Quantitation (LOQ)
The lowest concentration at which the method analyte may be reliably quantified under the method conditions.

MDL Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).

LOD Limit of Detection. A value at or above the MDL which has been verified to be detectable.

ND Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

[1] Analyses were performed according to our laboratoryôs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental

ALS Laboratory Group

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Analyst Summary report

Client:	Ecology And Environment, Inc. - Lancaster	**Service Request:**	R2007735
Project:	Aurora Hydrilla/1009540.0012.03		

Sample Name:	Copper208242020	**Date Collected:**	08/24/20
Lab Code:	R2007735-001	**Date Received:**	08/25/20
Sample Matrix:	Water		

Analysis Method	Extracted/Digested By	Analyzed By
6010C	KMCLAEN	KMCLAEN

The preparation methods associated with this report are found in these tables unless discussed in the case narrative.

Water/Liquid Matrix

Analytical Method	Preparation Method
200.7	200.2
200.8	200.2
6010C	3005A/3010A
6020A	ILM05.3
9034 Sulfide Acid Soluble	9030B
SM 4500-CN-E Residual Cyanide	SM 4500-CN-G
SM 4500-CN-E WAD Cyanide	SM 4500-CN-I

Solid/Soil/Non-Aqueous Matrix

Analytical Method	Preparation Method
6010C	3050B
6020A	3050B
6010C TCLP (1311) extract	3005A/3010A
6010 SPLP (1312) extract	3005A/3010A
7199	3060A
300.0 Anions/ 350.1/ 353.2/ SM 2320B/ SM 5210B/ 9056A Anions	DI extraction
For analytical methods not listed, the preparation method is the same as the analytical method reference.	

Sample Results

ALS Environmental—Rochester Laboratory
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Metals

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Analytical Report

Client:	Ecology And Environment, Inc. - Lancaster	**Service Request:**	R2007735
Project:	Aurora Hydrilla/1009540.0012.03	**Date Collected:**	08/24/20 12:00
Sample Matrix:	Water	**Date Received:**	08/25/20 12:05
Sample Name:	Copper208242020	**Basis:**	NA
Lab Code:	R2007735-001		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Copper, Total	6010C	ND U	ug/L	20	4	1	08/26/20 11:18	08/25/20	

QC Summary Forms

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Analytical Report

Client:	Ecology And Environment, Inc. - Lancaster	**Service Request:**	R2007735
Project:	Aurora Hydrilla/1009540.0012.03	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Basis:**	NA
Lab Code:	R2007735-MB		

Inorganic Parameters

Analyte Name	Analysis Method	Result	Units	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
Copper, Total	6010C	ND U	ug/L	20	4	1	08/26/20 11:09	08/25/20	

Client: Ecology And Environment, Inc. - Lancaster
Project: Aurora Hydrilla/1009540.0012.03
Sample Matrix: Water

Service Request: R2007735
Date Analyzed: 08/26/20

Duplicate Lab Control Sample Summary
Inorganic Parameters

Units:ug/L
Basis:NA

			Lab Control Sample		Duplicate Lab Control Sample					
			R2007735-LCS		R2007735-DLCS					
Analyte Name	**Analytical Method**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Copper, Total	6010C	248	250	99	245	250	98	80-120	1	20