

**Post-Treatment Assessment
for Aquatic Plant Control
ERDC Demonstration Project
Wells College Bay, Cayuga Lake
2018**

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List of Abbreviations and Acronyms

APCRP	Aquatic Plant Control Research Program
CSI	Community Science Institute
DOH	Cayuga County Department of Health
E & E	Ecology and Environment, Inc.
ERDC	Engineer Research and Development Center
GPS	global positioning system
HPLC	high-performance liquid chromatography
Hydrilla	<i>Hydrilla verticillata</i>
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
SOW	scope of work
TAT	turnaround time
TCHD	Tompkins County Health Department
USACE	United States Army Corps of Engineers (Buffalo District)

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Introduction

The Wells College Bay, Cayuga Lake 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 to manage monoecious hydrilla (*Hydrilla verticillata*; Hydrilla) in a high water exchange environment.

This report contributes to the Year 2 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. The only other Hydrilla infestation documented in Cayuga Lake was discovered in late summer 2011 near Ithaca, 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 found 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.

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 second year of treatment to control and eradicate Hydrilla, treatment occurred within three general areas, totaling approximately 120 acres that focused on application of two aquatic herbicides: fluridone (Sonar® H4C), and copper ethylene diamine complex (copper; Komeen® Crystal). The following three areas were treated (see Figure 1-1 and Figure 1-2):

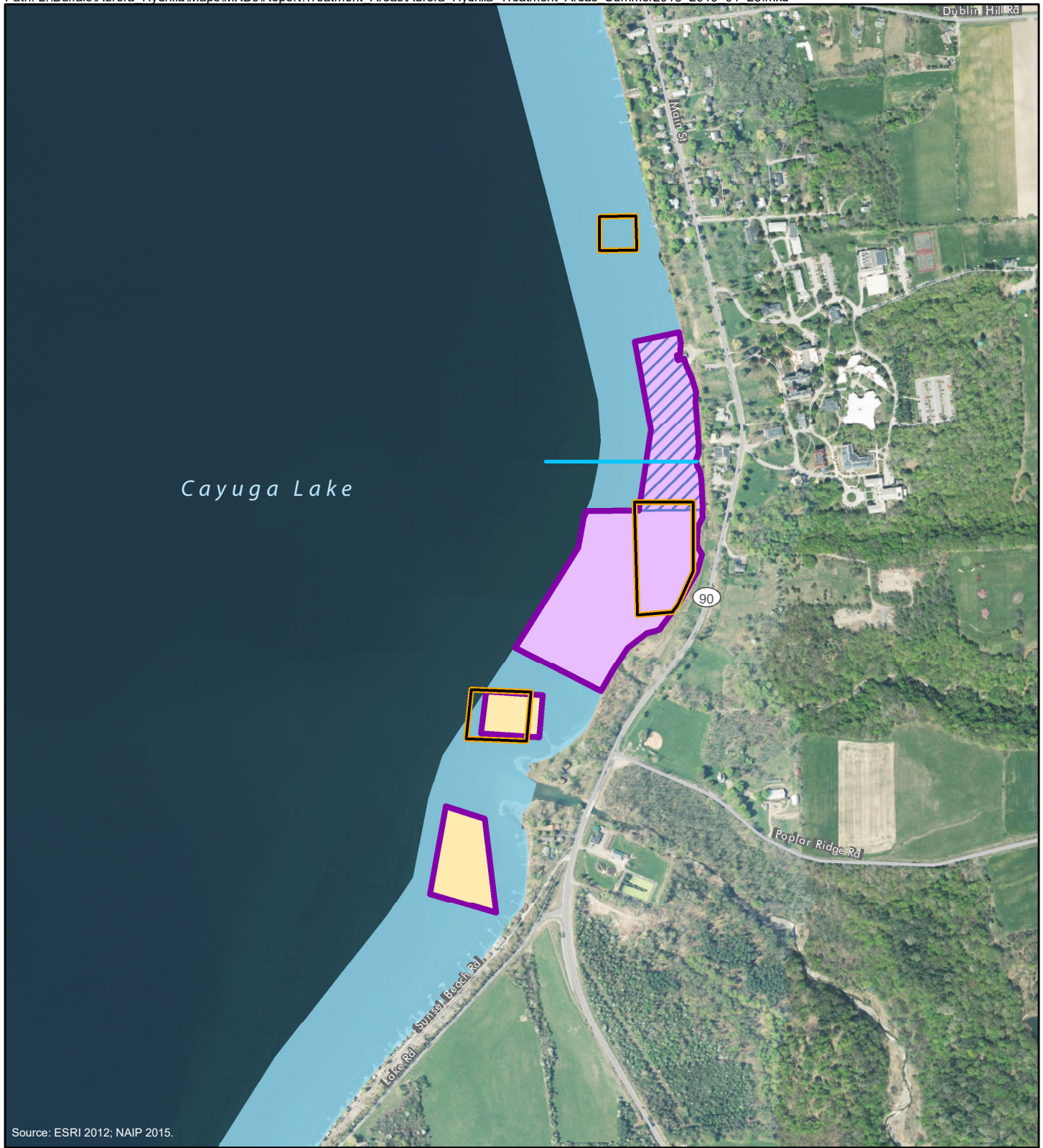
- **Lake treatment block:** an approximately 30-acre area in Wells College Bay along approximately 3,250 linear feet of Cayuga Lake’s shoreline between the

outlet of Paines Creek to the south and the Wells College dock to the north. This approximately 30-acre block was originally proposed to be subdivided into a partial fluridone treatment block (13.4 acres), a full fluridone treatment block (16.6 acres), to test whether a well-timed fluridone application early in the growing season at an overall lower concentration could be effective at controlling Hydrilla. During the planning phase, the partial block was reduced from 13.4 acres to 7.3 acres to treat the shallow areas where Hydrilla had been observed the previous year, and to enable the testing of two additional partial fluridone treatments on both a 2- and 4-acre Hydrilla plot. The plots included Hydrilla that was discovered at the end of the 2017 monitoring in areas south of this 30-acre block and within the 90-acre spot treatment area, discussed below. Any Hydrilla beds that persisted later in the season (i.e., August) and appeared to not respond to the fluridone application were treated with copper at a target concentration of 1 part per million (ppm) or 1,000 parts per billion (ppb). Any copper used in this treatment area was deducted from the annual limit of 30 acres of chelated copper for the two lake spot treatment zones. One area totaling approximately 5.0 acres was treated with copper within the 30-acre lake treatment block.

- **Potential spot treatment blocks:** two areas north and south of the lake treatment block that total approximately 90 acres. These blocks were monitored for Hydrilla throughout the Project. The depth in these areas ranges from 0 to 18+ feet with an assumed average depth of 10 feet. Within the 90-acre area, a total of 3.5 acres were ultimately delineated for treatment.
- **Ithaca area copper spot treatment blocks:** a 4-acre copper treatment plot was initially delineated along the shoreline of Stewart Park, and subsequently, a 7-acre treatment plot was delineated for the second spot treatment.








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

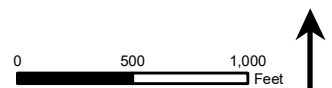
Implementation of the Project was a collaborative effort between the Engineer Research and Development Center (ERDC); USACE; Ecology and Environment, Inc. (E & E); New York State Department of Environmental Conservation (NYSDEC); the Village of Aurora; the Cayuga County Department of Health (DOH); the Wells College water treatment plant; Finger Lakes Partnership for Regional Invasive Species Management; Cayuga Lake Watershed Network; and the applicator, SOLitude Lake Management, LLC (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.



Source: ESRI 2012; NAIP 2015.

Figure 1-1
**Aurora Hydrilla Treatment Areas -
Summer 2018**
Wells College Bay
Cayuga Lake Hydrilla Demonstration Project
Cayuga County, New York

-  Potable Water Intake
-  Lake Treatment Block
-  Full Sonar H4C Plot
-  Partial Sonar H4C Plot
-  Sonar H4C Treatment Plots
- Copper Spot Treatment Blocks
 -  August 30, 2018 Spot Treatment
 -  Area Monitored for Spot Treatments







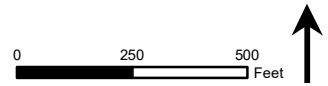
-  Ithaca Copper Plot September 2018
-  Ithaca Copper Plot August 2018

Figure 1-2
**Ithaca Hydrilla Treatment Areas -
Summer 2018**
Wells College Bay
Cayuga Lake Hydrilla
Demonstration Project
Cayuga County, New York



1.2 Purpose and Scope

The purpose of the Project is to perform a five-year field-scale demonstration of a technology developed under the Aquatic Plant Control Research Program (APCRP) to evaluate the effectiveness of an aquatic herbicide to manage monoecious 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 monoecious Hydrilla at the Tonawanda Creek/Erie Canal demonstration project in Western 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 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 help shape future treatment projects.

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Overview of Herbicide Treatment and Monitoring

Treatment of Hydrilla for this Project focused on the application of the aquatic herbicides fluridone (Sonar 4HC) and copper (Komeen Crystal) within Wells College Bay, and copper within Cayuga Lake near Ithaca. 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 DOH, 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 more than 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 two weeks prior to the first fluridone treatment; 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, or 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 (see photolog in Appendix A).

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

2 Overview of Herbicide Treatment and Monitoring

on the signs prior to each of the seven treatments. Similar to the first year of the project, NYSDEC did not require any newspaper notifications of the treatment activities.

Public notification efforts for the two spot treatments in Ithaca near Stewart Park were conducted by the local Hydrilla Task Force. E & E coordinated with the task force and developed UV-resistant yellow stickers for the task force to place over top of warning signs used during the first year of treatment. Additionally, E & E developed a chelated copper factsheet for Ithaca stakeholders.

2.2 Herbicide Treatment Methodology

The aquatic herbicide fluridone was applied in designated sections of Wells College Bay during seven treatment events that occurred between June and August 2018 (see Table 2-1). Copper was applied during one of the seven events, on August 31, 2018. 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 14 May 2018 and subsequently amended (USACE 2018).

Two boats were used for the herbicide applications. A work skiff powered by conventional outboard motor was used for the treatment effort in all areas in Aurora, with the exception of the final treatment on August 31, 2018; that was completed by airboat. The skiff was an 18-foot aluminum boat powered by a 40-horsepower four-stroke outboard engine. Additionally, an aluminum airboat was used for the two spot treatments in Ithaca.

2.2.1 Herbicide Transfer

An in-line herbicide injection system and an SR 430 Stihl backpack blower was used for the fluridone treatments. An SR 430 Stihl backpack blower or an Agri-Fab granular spreader was used for the copper treatments. A 17-foot skiff and airboat were utilized during the treatments and were outfitted with a polyethylene tank, venturi adaptation, and granular spreaders. 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 44-pound buckets and the copper was delivered in 20-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

Aurora

The work skiff and airboat were outfitted with 2-inch gasoline-powered water pumps. The tanks and lines were fitted with ball valves used to meter the rate of flow. The fluridone herbicide was mixed with clean water from the lake and then

2 Overview of Herbicide Treatment and Monitoring

distributed into the lake subsurface through hoses located at the stern of the skiff. The injection rate was approximately 10 pounds per minute. The copper herbicide was poured into the backpack blower or granular spreader and evenly distributed over the surface at the bow of the boats. The boats had a global positioning system (GPS) 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 and was modified by the USACE prior to the start of each application. 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 at 9:00 AM and 10:00 AM of each scheduled treatment day, launched the 17-foot skiff 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 started between 10:00 AM and 11:30 AM and, aside from brief breaks when the boats stopped to re-load herbicide, the treatments continued uninterrupted until the lake treatment areas were completed at approximately 12:30 PM. Treatment efforts deviated from schedule only once. The seventh treatment scheduled for August 30 was postponed a day due to poor weather conditions (i.e., high wind). All necessary parties (USACE, Cayuga County DOH, Village of Aurora, and Wells College water treatment plant) were notified of the delay.

Ithaca – Stewart Park

For both applications, the boat was launched at the Coss Park boat launch. The boat was outfitted with calibrated granular spreaders. The copper herbicide was poured into the granular spreader and evenly distributed over the surface at the bow of the boat. The boat had a GPS navigation system with all the treatment sectors preloaded. Treatment passes were made parallel to the shoreline. The quantity of herbicide needed for each treatment was determined by the total acreage and volume of the treatment areas and was modified by the USACE prior to the start of each application.

SLM staff arrived at Coss Park boat launch between 9:00 AM and 10:00 AM of each scheduled treatment day. The staff included a lead applicator and an assistant/technician that assembled the treatment systems before going out for treatment. The treatment then started between 10:00 AM and 10:30 AM, then ended between 11:30 AM and 12:00 PM. Treatment did not deviate from the scheduled time. The last treatment, however, was made during a heavy rainstorm that may affect some of the results due to the flows of the inlets near the treatment area.

2.3 Quantity of Herbicide Used and Total Area Treated

Seven fluridone treatments were scheduled during the summer of 2018. The initial treatment plan called for an application of 40 ppb (0.04 ppm) in the 2-acre and 4-acre plots during the first treatment, followed by a treatment at 20 ppb (0.02

2 Overview of Herbicide Treatment and Monitoring

ppm) during the second treatment. However, during one of the Project planning calls, Cayuga County DOH indicated that several property owners along Sunset Beach Drive draw water from the lake for use as drinking water. These intakes were within the 0.25-mile buffer for fluridone application near a potable water intake for one or both of the treatment plots scheduled to receive a 40 ppb (0.04 ppm) application. Therefore, the treatment schedule was revised to three, 20 ppb (0.02 ppm) applications approximately one week apart to be compliant with the use restrictions (see Table 2-1). Per the fluridone supplemental label, in lakes and reservoirs or other sources of potable water, fluridone cannot be applied at rates greater than 20 ppb (0.02 ppm) within 0.25 mile (1,320 feet) of any functioning water intake.

In-lake fluridone applications were split into treatments not to exceed 20 ppb (0.02 ppm), over seven treatment dates in the various treatment blocks (see Table 2-1). The first four treatment dates occurred seven days apart, and the final three treatments were spread 14 days apart.

Table 2-1 In-lake Fluridone Herbicide Application Summary by Treatment

Date	Treatment	Acres	Target Concentration (ppb)	Total Pounds of Sonar H4C
6/28/18	1: Partial, full, 2-acre plot, 4-acre plot ¹	26.9	20	570
7/5/18	2: Partial, full, 2-acre plot, 4-acre plot ¹	26.9	20	570
7/12/18	3: Partial, full, 2-acre plot, 4-acre plot ²	26.9	20	570
7/19/18	4: Partial and full	23.9	20	450
8/2/18	5: Full	16.6	20	332
8/16/18	6: Full	16.6	20	332
8/31/18 ³	7: Full	16.6	20	332
Total Pounds				3,156

Note:

¹ The initial treatment plan called for an application of 40 ppb in the 2-acre and 4-acre plots during the first treatment. However, several property owners along Sunset Beach Drive draw water from the lake for use as drinking water and were within the 0.25-mile buffer for Sonar H4C application near a potable water intake for one or both of the treatment plots scheduled to receive a 40 ppb application. Therefore, the application was revised to two, 20 ppb applications approximately one week apart to be compliant with the use restrictions. Per the Sonar H4C supplemental label, in lakes and reservoirs or other sources of potable water, Sonar H4C cannot be applied at rates greater than 20 ppb within 0.25 mile (1,320 feet) of any functioning water intake.

² The initial treatment plan called for two Sonar H4C applications of the 2- and 4-acre plots – one at 40 ppb during the first treatment and one at 20 ppb during the second treatment. However, due to the revisions in treatment discussed above in Note 1, three 20 ppb treatments occurred – during the first, second, and third treatments.

³ The August 30 treatment was postponed by one day due to high winds.

Key

ppb = parts per billion

2 Overview of Herbicide Treatment and Monitoring

In-lake copper spot treatment application occurred along with one of the fluridone treatment events, on August 31, 2018, at concentrations not to exceed 1,000 ppb (1 ppm) (see Table 2-2). Spot treatment areas consisted of three individual, predetermined treatment areas and totaled 8.5 acres (see Figure 1-1).

Table 2-2 In-lake Copper Herbicide Application Summary for Aurora

Date	Acres	Target Concentration (ppb)	Total Pounds of Komeen Crystal
8/31/18	8.5	1,000	854

Key:
ppm = parts per million

In addition to the spot treatment of copper in Aurora, two spot treatment applications occurred in Cayuga Lake in Ithaca, along the shoreline of Stewart Park (see Figure 1-2). The first occurred on August 13 and focused on a 4-acre treatment plot, and the second occurred on September 10, 2018, which targeted a 7-acre treatment plot (see Table 2-3).

Table 2-3 In-lake Copper Herbicide Application Summary for Ithaca

Date	Acres	Target Concentration (ppb)	Total Pounds of Komeen Crystal
8/13/18	4.0	1,000	145.7
9/10/18	7.0	1,000	260.4

Key:
ppm = parts per million

2.4 Water Quality Sampling

Fluridone was applied during seven treatment events, between June 28, 2018, and August 31, 2018. Cayuga County DOH and E & E performed drinking water quality sampling and in-lake water quality sampling to determine the fluridone concentrations and dispersion of herbicide between June 29, 2018, and September 6, 2018. Refer to Appendix B for analytical results of the sampling. The USACE performed water quality sampling at 10 sites throughout the season, beginning on July 3, 2018, and ending on September 20, 2018.

Additionally, though not included in this project, Tompkins County Health Department (TCHD) conducted water sampling following the August 13, 2018, spot treatment in Ithaca to determine copper concentrations and the results of that sampling are included in this report.

2.4.1 In-Lake Sampling

2.4.1.1 E & E Sampling

E & E collected four in-lake water samples following each of the seven treatment events (see Figure 2-1 and Table 2-4 for sample locations; see Photolog in

2 Overview of Herbicide Treatment and Monitoring

Appendix A). 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, with the exception of the first sampling event which had a 24-hour TAT). The initial sampling event occurred one day after the first application to determine if the initial application concentrations were adequate and as planned. The next three sampling events occurred four days following each application when the applications were spaced seven days apart (applications 2 through 4). When the applications were spaced 14 days apart (applications 5 through 7), the sampling occurred seven days following the application.

**Table 2-4 In-Lake Water Sample Collection Sites
Wells College Bay, Cayuga Lake Hydrilla
Demonstration Project**

Sample Collection Site ^b	Latitude ^a	Longitude ^a
TreatN	42.744199	-76.700801
TreatS	42.741354	-76.702073
LakeS	42.730489	-76.711867
LakeN	42.75253	-76.703613

Note:

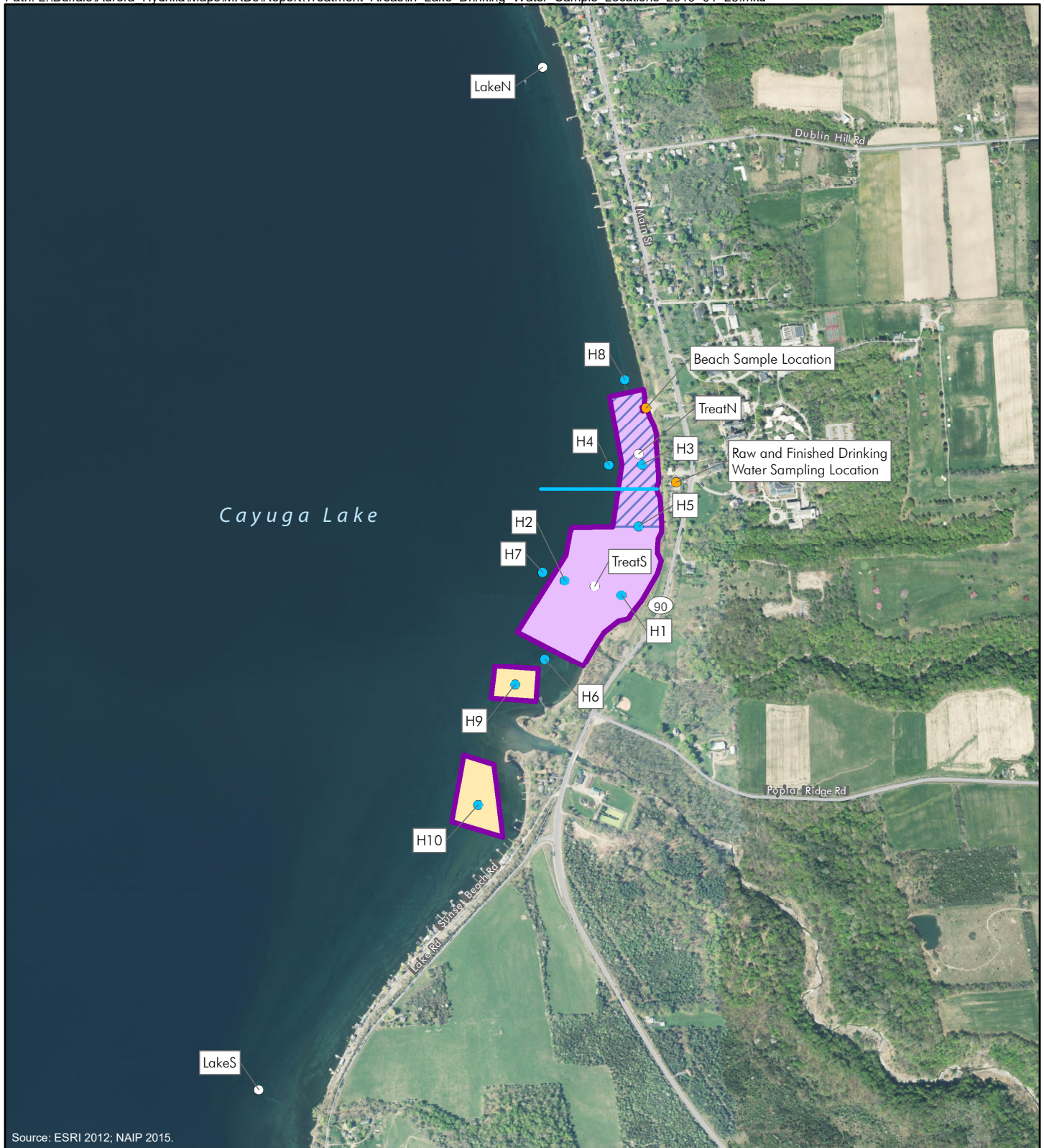
^a Latitude and Longitude are provided in decimal degrees (WGS84).

^b A change in sampling collection site naming conventions was made to more accurately describe the locations of the sampling sites. This change was made after sampling was completed for the season.

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;
- One sample approximately a half mile north of the lake treatment block; and
- One sample approximately a half mile south of the lake treatment block.









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. This represented a change from the first year of the Project in which samples were collected approximately 2 feet from the lake bottom. This change was implemented at the suggestion of SLM, as a way of providing a more accurate picture of what is happening with respect to herbicide concentrations. The depth at each sample location was determined from the boat using a sounding tape, to confirm the depth at each location.



Source: ESRI 2012; NAIP 2015.

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



-  Ecology and Environment Sample Location
-  Cayuga County Department of Health (DOH) Sample Location
-  USACE Sampling Location
-  Potable Water Intake
-  Lake Treatment Block
-  Full Sonar H4C Plot
-  Partial Sonar H4C Plot
-  Sonar H4C Treatment Plots

2 Overview of Herbicide Treatment and Monitoring

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 part per billion (micrograms per liter [$\mu\text{g/L}$]). 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%.

Samples collected a half mile to the north and south of the lake treatment block were not significantly different from samples collected within the lake treatment block (see Table 2-5). This indicated that the fluridone did not remain concentrated at the application site at the end of a week.

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

Date	Sample Location ^a	Time	Sample Depth	Fluridone Concentration (ppb)
6/29/2018	LakeN	1151	5 ft 6 in	1.5
6/29/2018	TreatN	1205	5 ft 4 in	<1.0
6/29/2018	TreatS	1215	11 ft 0 in	<1.0
6/29/2018	LakeS	1237	9 ft 0 in	<1.0
7/10/2018 ^b	LakeN	1237	5 ft 8 in	<1.0
7/10/2018 ^b	TreatN	1249	7 ft 10 in	<1.0
7/10/2018 ^b	TreatS	1254	10 ft 0 in	<1.0
7/10/2018 ^b	LakeS	1310	8 ft 7 in	<1.0
7/16/2018	LakeN	1125	7 ft 5 in	<1.0
7/16/2018	TreatN	1136	6 ft 4 in	<1.0
7/16/2018	TreatS	1145	9 ft 10 in	<1.0
7/16/2018	LakeS	1200	11 ft 6 in	<1.0
7/23/2018	LakeN	1211	9 ft 0 in	<1.0
7/23/2018	TreatN	1218	5 ft 10 in	<1.0
7/23/2018	TreatS	1224	9 ft 0 in	<1.0/<1.0 ^c
7/23/2018	LakeS	1236	10 ft 0 in	<1.0
8/9/2018	LakeN	1159	6 ft 10 in	<1.0
8/9/2018	TreatN	1213	4 ft 3 in	<1.0
8/9/2018	TreatS	1219	12 ft 6 in	See note ^d
8/9/2018	LakeS	1237	9 ft 0 in	See note ^d

2 Overview of Herbicide Treatment and Monitoring

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

Date	Sample Location ^a	Time	Sample Depth	Fluridone Concentration (ppb)
8/23/2018	LakeN	1251	5 ft 0 in	<1.0
8/23/2018	TreatN	1259	3 ft 4 in	<1.0/<1.0 ^c
8/23/2018	TreatS	1306	9 ft 0 in	<1.0
8/23/2018	LakeS	1315	8 ft 9 in	<1.0
9/6/2018	LakeN	1100	3 ft 6 in	<1.0
9/6/2018	TreatN	1107	4 ft 6 in	<1.0
9/6/2018	TreatS	1113	10 ft 0 in	<1.0
9/6/2018	LakeS	1121	10 ft 0 in	<1.0

Notes

- ^a A change in sampling collection site naming conventions was made to more accurately describe the locations of the sampling sites. This change was made after sampling was completed for the season.
- ^b Sampling was to occur on July 9, 2018, per the Sampling and Analysis Plan. However, due to issues with the boat motor, sampling was delayed by one day.
- ^c Two reported results in a single cell indicate an instance where a field duplicate sample was collected.
- ^d The “LakeS” sample collected on August 9, 2018, was mislabeled “TreatS.” Because of this labeling error, the results listed for the TreatS and LakeS samples cannot be definitively reported. The results were < 1.0 and 2 for the two samples labeled LakeS.

Key:

- ft = feet
- in = inches
- ppb = parts per billion

2.4.1.2 USACE Sampling

The USACE collected two samples at 10 sampling locations at varying frequencies 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 in the middle of the water column is more likely to pick up herbicide residues than sampling at the water’s surface. Samples were analyzed using the RaPID assay (enzyme-linked immunosorbent assay) method (RaPID Assay Fluridone Test Kit).

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

Sampling Location	Fluridone Concentration (ppb)					
	7/3/18	7/9/18	7/19/18	7/31/18	8/22/18	9/20/18
H1 MID	0.28	0.31	0.62	2.05	8.66	0.16
H1 BOT	ND	0.44	1.14	0.91	7.84	0.37
H2 MID	0.05	0.05	0.07	0.13	0.82	0.32
H2 BOT	1.88	5.06	0.29	0.54	1.17	0.22
H3 MID	1.23	1.97	0.49	0.47	0.07	0.06
H3 BOT	0.88	0.02	4.16	0.81	0.23	0.08
H4 MID	0.13	0.08	0.10	0.06	0.30	0.29
H4 BOT	0.13	0.40	0.09	0.14	0.27	0.32

2 Overview of Herbicide Treatment and Monitoring

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

Sampling Location	Fluridone Concentration (ppb)					
	7/3/18	7/9/18	7/19/18	7/31/18	8/22/18	9/20/18
H5 MID	0.57	0.88	0.35	0.14	0.22	0.24
H5 BOT	ND	0.13	0.29	0.54	3.73	0.08
H6 MID	ND	ND	0.73	0.52	0.01	0.30
H6 BOT	0.05	0.04	0.96	0.39	0.18	0.04
H7 MID	ND	0.06	0.23	ND	0.14	0.25
H7 BOT	0.05	2.67	0.07	1.78	0.97	0.12
H8 MID	ND	ND	0.01	0.70	0.12	0.13
H8 BOT	0.13	0.17	0.30	0.45	0.09	0.08
H9 MID	ND	0.09	0.69	0.17	0.14	0.34
H9 BOT	0.07	0.31	0.73	ND	0.09	0.29
H10 MID	0.07	0.69	0.43	0.25	0.04	0.43
H10 BOT	0.07	ND	0.32	0.16	0.02	0.12

Note:

Bold denotes sample location within application area.

Key:

BOT = bottom of water column

MID = middle of water column

ND = Non-detect

As indicated in Table 2-6, variation in herbicide residues was detected within the water column, indicating that the herbicide did not remain at the bottom of the lake.

Herbicide concentrations generally corresponded to the treatment areas. For example, the highest concentrations were detected at sampling sites (H1, H2, and H7) within or directly adjacent to the full fluridone treatment block which was treated during each of the seven treatment events. Fluridone concentrations were generally lowest at sampling sites outside of directly treated areas (H4, H6, and H8).

Sampling results from September 20, 2018, nearly three weeks after the final treatment, which occurred on August 31, 2018, indicate that concentrations were below 0.5 ppb at all sampling locations.

2.4.2 Drinking/Beach Water Sampling

The Wells College water treatment plant shut down operations during each treatment application until each application was complete. The Cayuga County DOH collected raw and finished drinking water samples at the Wells College treatment plant, as well as lake water at the Wells College dock at the bathing beach (see Figure 2-1). The Cayuga County DOH collected finished drinking water samples four days after each treatment and again at seven days following each herbicide application to determine if the treatment had an impact on drinking water (see Table 2-7). The DOH eliminated the raw water sample after the first

2 Overview of Herbicide Treatment and Monitoring

two treatment applications, as the data indicated no difference in fluridone results between the raw and finished water. With respect to the bathing beach samples, they were taken four days following the first four herbicide applications, five days after the fifth treatment, and no samples were taken after the sixth and seventh treatment. Since the 2017 field efforts, the Wells College treatment facility installed a tap to access the raw drinking water; this tap was used by the DOH for the 2018 sampling efforts.

Table 2-7 Drinking Water/Beach Sampling Results for Fluridone (ppb)

Date	Sample Site	Fluridone Concentration (ppb)	
		DOH	E & E
7/2/2018	Wells College Boat House Bathroom ^a	<0.5	<1
7/2/2018	AUD1	NS	NS
7/2/2018	AUD2	NS	NS
7/2/2018	AUB	<0.5	NS
7/5/2018	AUD1	<0.5	NS
7/5/2018	AUD2	<0.5	NS
7/5/2018	AUB	NS	NS
7/9/2018	AUD1	<0.5	NS
7/9/2018	AUD2	<0.5	<1
7/9/2018	AUB	<0.5	NS
7/12/2018	AUD1	NS	NS
7/12/2018	AUD2	<0.5	NS
7/12/2018	AUB	NS	NS
7/16/2018	AUD1	NS	NS
7/16/2018	AUD2	<0.5	NS
7/16/2018	AUB	<0.5	NS
7/19/2018	AUD1	NS	NS
7/19/2018	AUD2	<0.5	NS
7/19/2018	AUB	NS	NS
7/23/2018	AUD1	NS	NS
7/23/2018	AUD2	<0.5	NS
7/23/2018	AUB	1.83	NS
7/26/2018	AUD1	NS	NS
7/26/2018	AUD2	<0.5	NS
7/26/2018	AUB	NS	NS
8/6/2018	AUD1	NS	NS
8/6/2018	AUD2	<0.5	<1
8/6/2018	AUB	NS	NS
8/9/2018	AUD1	NS	NS
8/9/2018	AUD2	<0.5	NS
8/9/2018	AUB	<0.5	NS
8/20/2018	AUD1	NS	NS

2 Overview of Herbicide Treatment and Monitoring

Table 2-7 Drinking Water/Beach Sampling Results for Fluridone (ppb)

Date	Sample Site	Fluridone Concentration (ppb)	
		DOH	E & E
8/20/2018	AUD2	<0.5	NS
8/20/2018	AUB	NS	NS
8/23/2018	AUD1	NS	NS
8/23/2018	AUD2	<0.5	NS
8/23/2018	AUB	NS	NS
9/4/2018	AUD1	NS	NS
9/4/2018	AUD2	<0.5	NS
9/4/2018	AUB	NS	NS

Notes:

^a Wells College was closed due to the heat index. Finished water drinking sample was instead collected from the Wells College Boat House bathroom. No raw drinking water sample was collected.

Bold values denote positive detections.

Key

AUD1 = Water treatment plant finished water
 AUD2 = Wells College dock bathroom
 AUB = Wells College dock at the bathing beach
 DOH = Cayuga County Department of Health
 E & E = Ecology and Environment, Inc.
 µg/L = micrograms per liter
 NS = Not Sampled

As indicated in Table 2-7, there was one elevated value – 1.83 ppb on July 23, 2018 – recorded at the Wells College dock at the bathing beach.

Sampling frequency for 2018 efforts was reduced in response to one of the recommendations included in the 2017 post-treatment assessment report. Because the treatments did not have an impact on drinking water quality, coupled with the fact that concentrations in the lake water were also very low, a reduction of the number of finished water samples was recommended for consideration to reduce Project costs. Thus, sampling was reduced from 17 events in 2017 to 12 sampling events in 2018. Additionally, as recommended in the 2017 report, the sampling event on the day of treatment was eliminated as it was actually representative of the tail end of the previous treatment, not the current treatment due to the fact that the treatment plant storage tanks were filled prior to sampling. As a result, 2018 sampling occurred several days following herbicide application.

Finished drinking water samples were collected from a sink tap within the Wells College treatment facility by a Cayuga County DOH staff member. The staff member collected the sample by filling a clean high-density polyethylene container with the tap water, then the tap water was transferred into separate brown high-density polyethylene 30-mL sample bottles (including split samples). The Cayuga County DOH hand delivered their sample to the Community Science Institute (CSI) in Ithaca, New York, for fluridone analysis using the RaPID assay (enzyme-linked immunosorbent assay) method (RaPID Assay Fluridone Test

2 Overview of Herbicide Treatment and Monitoring

Kit). The laboratory reported results for fluridone to a lower reporting limit of 0.5 part per billion ($\mu\text{g/L}$) and an upper reporting limit of 10.0 ppb ($\mu\text{g/L}$). E & E collected finished drinking water split samples of the Cayuga County DOH samples at a rate of 10% (i.e., one sample during the week of treatment 1, treatment 2, and treatment 5). The split samples were 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 $\mu\text{g/L}$. The purpose of the split samples was to compare the fluridone concentrations in samples collected using the two different test methods (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 DOH finished drinking water samples and the E & E split samples (see Table 2-7).

2.4.3 Ithaca In-Lake Water Sampling

Outside of the scope of this Project, TCHD conducted 24-hour, 48-hour, 72-hour, and one-week post-treatment water sampling following the August 13, 2018, spot treatment at six sampling sites (see Table 2-8 and Figure 2-2).

Table 2-8 Copper Water Quality Monitoring Results (in ppb) – Ithaca

Sampling Site	Location	24-hour (8/14/18)	48-hour (8/15/18)	72-hour (8/16/18)	Week of 8/20/18
SE-1	Shoreline 0.5 mile upstream of treatment area in Fall Creek	ND	ND	ND	ND
SE-2	Shoreline 0.5 mile from east edge of treatment area on east lakeshore, Cornell Sailing Center	ND	ND	ND	ND
SE-3	Stewart Park – west edge of treatment area	28	87	42	ND
SE-4	Stewart Park – east edge of treatment area	38	44	ND	ND
SE-5	Stewart Park – off end of pier in treatment area	48	18	26	ND
SE-6	Lighthouse shoreline 0.5 mile from west edge of treatment area	ND	ND	ND	ND

Source: TCHD 2018

Note:

Bold denotes sample location within application area.

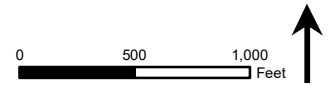
Key:

ND = non-detect



- Tompkins County Department of Health Sample Locations
- ▬ Ithaca Copper Plot September 2018
- ▬ Ithaca Copper Plot August 2018

Figure 2-2
**Ithaca In-lake Komeen®
Crystal Sampling Sites**
Wells College Bay
Cayuga Lake Hydrilla
Demonstration Project
Cayuga County, New York



2 Overview of Herbicide Treatment and Monitoring

As indicated in Table 2-8, all sample results were well below the New York State Department of Health’s action level for copper in drinking water, which is 1,300 ppb (1.3 ppm). The results also indicate that the copper remained concentrated within the direct application area, as was intended. One week after application, there was no trace of the herbicide in the water.

2.5 Tuber Monitoring (2017 and 2018)

A total of 1,360 sediment cores were collected at four sites on Cayuga Lake in Aurora, New York, in 2017 and 2018 to monitor tuber densities pre- and post-treatment and determine tuber sprouting dynamics (see Figure 2-3). Sample sites were established in areas where dense beds of Hydrilla were delineated in 2016 within the 30-acre area of Wells College Bay that received fluridone treatments over the past two years. Based on sampling, tubers begin sprouting in late May to early June and most sprouting occurs by the end of June to early July depending on water temperature. These sprouting rates are comparable to what has been documented on the Erie Canal/Tonawanda Creek in Western New York (see Table 2-9). In 2017, the majority of sprouted tubers had produced shoots above the sediment surface by late June, whereas in 2018, this did not occur until the second week of July. This is likely due to warmer water temperatures in 2017. The water temperatures in mid- to late June 2017 were approximately 4°C (39.2°F) warmer than in June 2018.

A tuber attrition rate of approximately 88% (due to synchronous sprouting) was calculated following the 2017 treatment; the USACE considers this rate to be very encouraging. Tuber samples were not collected in the fall of 2018 due to high wave conditions during scheduled sampling events in September and October. It is anticipated that tuber densities will be reduced even further when they are sampled in spring 2019 due to a second year of treatment.

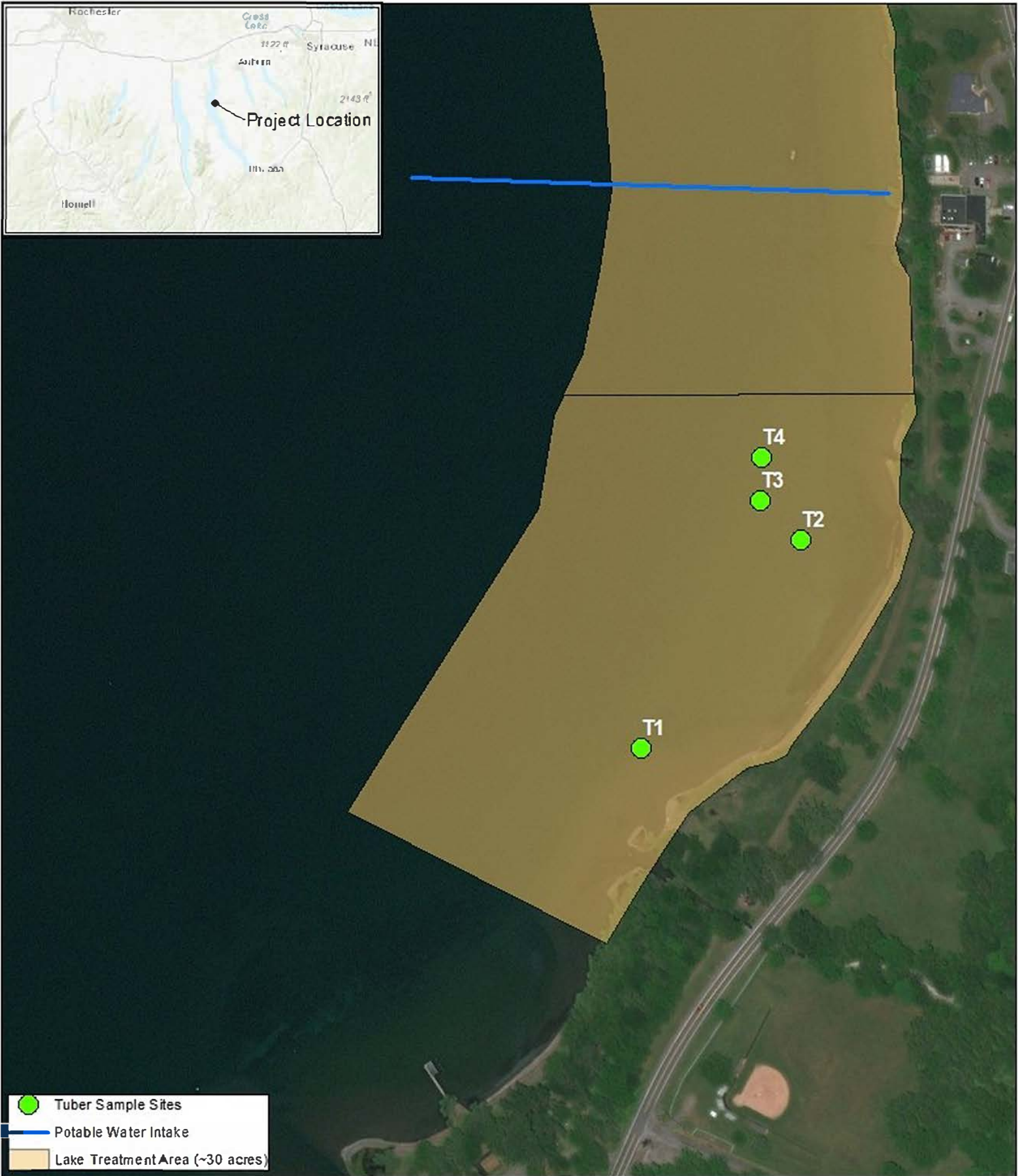
Table 2-9 Combined Tuber Data from Four Sites on Cayuga Lake at Aurora, New York, Sampled from May of 2017 to July of 2018

Four Sites at Aurora ^{1,2}	Temperature (°C)	Total Tubers	Number Sprouting	Percent Sprouting	Number of tubers/core
24 May 17	13.2	97	8	8.1	0.99
8 Jun 17	12.6	120	16	13.3	0.75
28 Jun 17	22.2	319	264	82.8	1.99
8 Aug 17	23.2	30	14	46.7	0.19
18 Sep 17	21.5	22	14	63.6	0.14
12 Oct 17	18.3	34	18	52.9	0.21
6 Jun 18	13.1	15	2	13.3	0.09
27 June 18	18.7	7	4	57.1	0.04
10 Jul 18	23.6	41	38	92.7	0.26

Notes:

¹ 20 cores per site were collected on 24 May 2017, 40 cores per site were collected for rest of 2017 and 2018.

² Sample sites were established in areas where dense beds of Hydrilla were delineated in 2016.






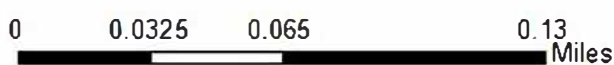
-  Tuber Sample Sites
-  Potable Water Intake
-  Lake Treatment Area (~30 acres)



Figure 2-3 Hydrilla Tuber Monitoring Areas



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 Buffalo District
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3

Recommended Study Improvements

The study improvements, summarized below, were based on lessons learned from the second year of herbicide application effort, coordination with the study partners work plan development, and activities conducted during the 2018 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 2018 was smooth and efficient. The staging areas in Aurora and Ithaca adequately supported operations for the in-lake treatments. Public access to the boat ramps during used 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 efforts, two different types of analytical tests were performed to determine fluridone concentrations during the study. SePRO's proprietary HPLC method was used for analysis of fluridone in the in-lake samples and the finished drinking water split samples, and CSI analyzed the finished drinking water samples using the RaPID assay to determine fluridone concentrations. The RaPID assay is considered a screening method whereas the HPLC method is considered a definitive method. The split samples did not show any discernible differences between the results; therefore, both methods met the project goals. For future work, either method could be employed; however, elevated detections using the RaPID assay would require confirmation via a definitive method.

3.2 2018 Lessons Learned

Treatment Areas

Due to the consistency with scheduling and the fluridone treatment, the application operations proceeded smoothly. When working on waterbodies of

3 Recommended Study Improvements

this scale, it is critical 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

To improve the efficacy of the treatments, isolation techniques such as limnocorrals and bubble curtains may be employed at the smaller treatment zones as a possible method to extend exposure times. The efficacy of bubble curtains is still being evaluated by the USACE; however, they may allow for longer residence time in the area, regardless of some of the weather conditions on the lake. It is also recommended to mark the Hydrilla plants in the treatment zones nearest Wells College. SLM was able to see some of the plants from the surface; however, markers would not only increase plant visibility but would also allow other boaters that come into the area to avoid the areas containing Hydrilla.

As future years of the program will include more reactive smaller-scale spot-treatments, the applicator will need to have greater flexibility to accommodate last minute changes to the SOW. The applicator will need to have enough herbicide on-hand to be able to target all areas that require treatment, but have the flexibility to return unused product to inventory. Improvements with preliminary estimates of the anticipated and potential maximum quantities of herbicide to be applied will be needed, to arrange for product delivery.

Communication

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

Due to unpredictable weather conditions and the open nature of the lake, inclement weather can stir up on short notice and cause delays or cancellations in applications or sampling events. One such delay occurred on August 30, resulting in a one-day delay in application of the seventh fluridone treatment. Due to high winds, the treatment was initially postponed to the afternoon of August 30, but was further postponed to the following day. The postponements were communicated to the Wells College water treatment plant to ensure that the change in plans would not impact plant operations. Since the water treatment plant was instructed by the Cayuga County DOH to shut down operations just prior to each treatment, the plant filled their reserve tanks the day/night before each application. Thus, any delays in schedule directly affects the treatment plant, as they need to have sufficient volumes in storage to accommodate community needs. The change in treatment schedule was acceptable to the water treatment plant and did not adversely impact plant operations.

Drinking Water/Beach Sampling

Frequency of Drinking Water/Beach Sampling and Logistics. For a second year, the Cayuga County DOH performed drinking water sampling at the Wells College water treatment plant to ensure the treatments did not have an impact on drinking water; drinking water samples were taken twice following each fluridone application. The DOH also took raw water samples; however, as indicated in Section 2.4.2, DOH eliminated the raw water sample after two treatment applications, as the data indicated no difference in fluridone results between the raw and finished water. Additionally, they performed sampling at the Wells College dock at the bathing beach once following fluridone treatments 1 through 5.

Looking forward to Year 3, the Cayuga County DOH plans to continue the same sampling protocol followed in Year 2 (2018), with one exception: the raw water samples will be eliminated outright. As indicated above, due to the lack of difference in the raw and finished water samples, the raw water sample represents a redundancy that can be removed moving forward.

As discussed in Section 2.4.2, sampling frequency for 2018 efforts was reduced in response to one of the suggestions included in the 2017 post-treatment assessment report. The number of finished water samples was reduced from 17 events in 2017 to 12 sampling events in 2018. This resulted in efficiencies for the Project and the same frequency will be implemented in 2019.

Analytical Turnaround Times. Samples were analyzed with a 24-hour TAT. Similar to 2017 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 44% 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 2018 treatments, back-calculating the dosage was not done as it was in 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 4 and 7 following fluridone application.

3 Recommended Study Improvements

Analytical Turnaround Times. Samples are analyzed on a 48-hour TAT. There are no apparent needs 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.

4

References

Tompkins County Health Department. 2018. “Hydrilla Monitoring 2018.” Available online at: <http://tompkinscountyny.gov/health/eh/water/hydrilla/2018>. Accessed on October 4, 2018.

United States Army Corps of Engineers (USACE). 2018. *Architect-Engineer Scope of Work Aquatic Plant Control ERDC Demonstration Project Wells College Bay, Cayuga Lake, Aurora, NY and Revision 01*. May 2018.

A

Photolog



Photo 1 Sample collection site LakeN, August 24, 2018.



Photo 2 Sample collection site TreatN, approximately 0.5 mile north of the partial Sonar H4C treatment plot, August 24, 2018.



Photo 3 Sample collection site LakeS, August 24, 2018.



Photo 4 Sample collection site TreatS, approximately 0.5 mile south of the spot treatment plots, August 24, 2018.



Photo 5 E & E biologist collecting an in-lake water sample at sampling site TreatN, September 6, 2018.



Photo 6 Warning sign near Wells College dock at the bathing beach, September 6, 2018.

B

Analytical Data



Community Science Institute, Inc.

NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/2/18 <u>Test Date:</u> 7/3/18
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Report ID: Aurora 070218

Number of Samples: 2

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD	Water treatment plant entry point	<0.5	7/3/18
AUB	Wells College dock bathing beach	<0.5	7/3/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/3/18
 Stephen M. Penningroth, Technical Director

The Community Science Institute, Inc., warrants that analytical results are accurate and representative of samples received for analysis. Clients frequently collect samples and submit them for analysis. When that is the case, client acknowledges that sample representativeness depends on his or her adhering to sampling instructions provided by CSI. If a test result is shown to be inaccurate, CSI agrees to repeat the test free of charge but accepts no further liability. CSI treats this Test Report as confidential. Client may reproduce Test Report in its entirety. Partial duplication is not allowed except with written approval from CSI.

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Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/5/18 <u>Test Date:</u> 7/6/18
---	--

Report ID: Aurora 070518

Number of Samples: 2

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD1	Raw drinking water intake	<0.5	7/6/18
AUD2	Finished drinking water, Wells college, Maintenance building, Break room, CKWT	<0.5	7/6/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/6/18
 Stephen M. Penningroth, Technical Director

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 director@communityscience.org



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Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/9/18 <u>Test Date:</u> 7/10/18
---	---

Report ID: Aurora 070918

Number of Samples: 3

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD1	Raw drinking water intake	<0.5	7/10/18
AUD2	Finished drinking water, Wells college, Maintenance building, Break room, CKWT	<0.5	7/10/18
AUB	Bathing beach -Wells college, Dock	<0.5	7/10/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/10/18
 Stephen M. Penningroth, Technical Director

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Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/12/18 <u>Test Date:</u> 7/13/18
---	--

Report ID: Aurora 071218

Number of Samples: 1

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water, Wells college, Maintenance building, Break room, CKWT	<0.5	7/13/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/13/18
 Stephen M. Penningroth, Technical Director

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Community Science Institute, Inc.

NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/16/18 <u>Test Date:</u> 7/17/18
---	--

Report ID: Aurora 071618

Number of Samples: 2

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water-Wells College Maintenance Building-Break	<0.5	7/17/18
AUB	Beach	<0.5	7/17/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/17/18
 Stephen M. Penningroth, Technical Director

The Community Science Institute, Inc., warrants that analytical results are accurate and representative of samples received for analysis. Clients frequently collect samples and submit them for analysis. When that is the case, client acknowledges that sample representativeness depends on his or her adhering to sampling instructions provided by CSI. If a test result is shown to be inaccurate, CSI agrees to repeat the test free of charge but accepts no further liability. CSI treats this Test Report as confidential. Client may reproduce Test Report in its entirety. Partial duplication is not allowed except with written approval from CSI.

Copy to: Tompkins County Health Department

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 2080 Cayuga View Road Trumansburg NY 14886 Voice/Fax 607 387 3820
 director@communityscience.org



Community Science Institute, Inc.

NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/19/18, 9:53 AM <u>Test Date:</u> 7/20/18
---	---

Report ID: Aurora 071918

Number of Samples: 1

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water, Wells college, Maintenance building, Break room, CKWT	<0.5	7/20/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/20/18
 Stephen M. Penningroth, Technical Director

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Community Science Institute, Inc.

NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/23/18 <u>Test Date:</u> 7/24/18
---	--

Report ID: Aurora 071618

Number of Samples: 2

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water-Wells College Maintenance Building-Break	<0.5	7/24/18
AUB	Beach	1.83	7/24/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/24/18
 Stephen M. Penningroth, Technical Director

The Community Science Institute, Inc., warrants that analytical results are accurate and representative of samples received for analysis. Clients frequently collect samples and submit them for analysis. When that is the case, client acknowledges that sample representativeness depends on his or her adhering to sampling instructions provided by CSI. If a test result is shown to be inaccurate, CSI agrees to repeat the test free of charge but accepts no further liability. CSI treats this Test Report as confidential. Client may reproduce Test Report in its entirety. Partial duplication is not allowed except with written approval from CSI.

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NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 7/26/18, 10:53 AM <u>Test Date:</u> 7/27/18
---	--

Report ID: Aurora 071918

Number of Samples: 1

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water, Wells college, Maintenance building, Break room, CKWT	<0.5	7/27/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 7/27/18
 Stephen M. Penningroth, Technical Director

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Community Science Institute, Inc.

NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 8/6/18 <u>Test Date:</u> 8/7/18
---	--

Report ID: Aurora 080618

Number of Samples: 1

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water, Wells college, Maintenance building, Break room, CKWT	<0.5	8/7/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 8/7/18
 Stephen M. Penningroth, Technical Director

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Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 8/9/18 <u>Test Date:</u> 8/10/18
---	---

Report ID: Aurora 071618

Number of Samples: 2

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water-Wells College Maintenance Building-Break	<0.5	8/10/18
AUB	Beach	<0.5	8/10/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 8/10/18
 Stephen M. Penningroth, Technical Director

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Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 8/20/18 <u>Test Date:</u> 8/21/18
---	--

Report ID: Aurora 082018

Number of Samples: 1

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water-Wells College Maintenance Building-Break	<0.5	8/21/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 8/21/18
 Stephen M. Penningroth, Technical Director

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Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 8/23/18 <u>Test Date:</u> 8/24/18
---	--

Report ID: Aurora 082318

Number of Samples: 1

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water-Wells College Maintenance Building-Break	<0.5	8/24/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 8/24/18
 Stephen M. Penningroth, Technical Director

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Cayuga Inlet and Fall Creek Fluridone Monitoring Report

<u>Client:</u> Cayuga County Health Department 8 Dill St. Auburn, NY 13021	<u>Sampling Date:</u> 9/4/18 <u>Test Date:</u> 9/5/18
---	--

Report ID: Aurora 090418

Number of Samples: 1

Test Methods: Modern Water, RaPID Assay® Fluridone Test Kit A00250 (ELISA)

Site	Location	Fluridone, ppb	Test Date
AUD2	Finished drinking water-Wells College Maintenance Building-Break	<0.5	9/5/18

Results apply only to samples listed above and not to any other samples.

Samples were not acidified unless otherwise stated.

The analytical method is based on ELISA technology and is not certifiable by NYSDOH.

Report prepared by: Stephen M. Penningroth Date: 9/5/18
 Stephen M. Penningroth, Technical Director

The Community Science Institute, Inc., warrants that analytical results are accurate and representative of samples received for analysis. Clients frequently collect samples and submit them for analysis. When that is the case, client acknowledges that sample representativeness depends on his or her adhering to sampling instructions provided by CSI. If a test result is shown to be inaccurate, CSI agrees to repeat the test free of charge but accepts no further liability. CSI treats this Test Report as confidential. Client may reproduce Test Report in its entirety. Partial duplication is not allowed except with written approval from CSI.

Copy to: Tompkins County Health Department

***Note: A change in sampling collection site naming conventions was made to more accurately describe the locations of the sampling sites. This change was made after sampling was completed for the season. New site names are noted below.**



SePRO Research
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FASTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3431 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM10642-1	Lake N Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	06/29/2018
CTM10643-1	Lake S Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	06/29/2018
CTM10644-1	Treat-N Lake	Sonar/Fluridone (ug/L)	FAST 10	1.5	06/29/2018
CTM10645-1	Treat-S Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	06/29/2018

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: 07/02/18 12:00 PM
Date Results Sent: Tuesday, July 3, 2018

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.

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Reviewed By: Laboratory Supervisor

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***Note: A change in sampling collection site naming conventions was made to more accurately describe the locations of the sampling sites. This change was made after sampling was completed for the season. New site names are noted below.**



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FASTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3535 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM10949-1	TREAT N Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	07/10/2018
CTM10950-1	LAKE N Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	07/10/2018
CTM10951-1	LAKE S Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	07/10/2018
CTM10952-1	TREAT S Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	07/10/2018

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: 07/11/18 12:00 PM

Date Results Sent: Thursday, July 12, 2018

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.

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Reviewed By: Laboratory Supervisor

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FASTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3617 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM11184-1	LAKE N Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	07/16/2018
CTM11185-1	LAKE S Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	07/16/2018
CTM11186-1	TREAT N Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	07/16/2018
CTM11187-1	TREAT S Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	07/16/2018

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: 07/17/18 12:00 PM
Date Results Sent: Wednesday, July 18, 2018

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.

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Reviewed By: Laboratory Supervisor

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FASTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3682 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM11432-1	Lake N Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	07/23/2018
CTM11433-1	Treat N Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	07/23/2018
CTM11434-1	Treat S Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	07/23/2018
CTM11435-1	Lake S Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	07/23/2018
CTM11436-1	Lake S DupeQ Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	07/23/2018

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: 07/24/18 11:00 AM

Date Results Sent: Wednesday, July 25, 2018

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

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: COC3866 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM11911-1	Lake N Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	08/09/2018
CTM11912-1	Lake S Treat	Sonar/Fluridone (ug/L)	FAST 10	<1	08/09/2018
CTM11913-1	Treat N Lake	Sonar/Fluridone (ug/L)	FAST 10	<1	08/09/2018
CTM11914-1	Lake S Treat	Sonar/Fluridone (ug/L)	FAST 10	2	08/09/2018

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: 08/10/18 11:00 AM

Date Results Sent: Monday, August 13, 2018

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.

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Reviewed By: Laboratory Supervisor

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16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3987 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM12412-1	Lake N Dupe Treat	Sonar/fluridone (ug/L)	FAST 10	<1	08/23/2018
CTM12413-1	Treat N Lake	Sonar/fluridone (ug/L)	FAST 10	<1	08/23/2018
CTM12414-1	Lake S Treat	Sonar/fluridone (ug/L)	FAST 10	<1	08/23/2018
CTM12415-1	Lake N Treat	Sonar/fluridone (ug/L)	FAST 10	<1	08/23/2018
CTM12416-1	Treat S Lake	Sonar/fluridone (ug/L)	FAST 10	<1	08/23/2018

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: 08/24/18 11:00 AM

Date Results Sent: Monday, August 27, 2018

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.



Reviewed By: Laboratory Supervisor

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***Note: A change in sampling collection site naming conventions was made to more accurately describe the locations of the sampling sites. This change was made after sampling was completed for the season. New site names are noted below.**



SePRO Research
& Technology Campus

FASTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC4070 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM12689-1	Lake N Treat	Sonar/fluridone (ug/L)	FAST 10	<1	09/06/2018
CTM12690-1	Lake S Treat	Sonar/fluridone (ug/L)	FAST 10	<1	09/06/2018
CTM12691-1	Treat N Lake	Sonar/fluridone (ug/L)	FAST 10	<1	09/06/2018
CTM12692-1	Treat S Lake	Sonar/fluridone (ug/L)	FAST 10	<1	09/06/2018

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: 09/07/18 11:00 AM
Date Results Sent: Monday, September 10, 2018

Disclaimer: The results listed within this Laboratory Report relate only to the samples tested in the laboratory. The analyses contained in this report were performed in accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.



Reviewed By: Laboratory Supervisor

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SePRO Research
& Technology Campus

FASTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3435 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM10659-1	DRINK	Sonar/Fluridone (ug/L)	FAST 10	<1	07/02/2018

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: 07/03/18 12:00 PM

Date Results Sent: Tuesday, July 3, 2018

accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.

A handwritten signature in blue ink, consisting of a stylized initial 'S' followed by a series of connected loops and a long horizontal stroke.

Reviewed By: Laboratory Supervisor

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***Note: A change in sampling collection site naming conventions was made to more accurately describe the locations of the sampling sites. This change was made after sampling was completed for the season. New site names are noted below.**



SePRO Research
& Technology Campus

FASTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC3825 **LABORATORY REPORT**

Customer Company Customer Contact

Company Name Ecology and Environment Inc	Contact Person: Lynne Parker
Address: 368 Pleasant View Dr. Lancaster NY 14086	E-mail Address: lparker@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
CTM11786-1		Sonar/Fluridone (ug/L)	FAST 10	<1	08/06/2018

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: 08/07/18 11:00 AM

Date Results Sent: Wednesday, August 8, 2018

accordance with the applicable certifications as noted. All soil samples are reported on a dry weight basis unless otherwise noted in the report. This Laboratory Report is confidential and is intended for the exclusive use of SRTC Laboratory and its client. This report shall not be reproduced, except in full, without written permission from SRTC Laboratory. The Chain of Custody is included and is an essential component of this report.

This entire report was reviewed and approved for release.

A handwritten signature in blue ink, consisting of a stylized 'S' followed by a series of connected loops and a long horizontal stroke.

Reviewed By: Laboratory Supervisor

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