Post-Treatment Assessment for Aquatic Plant Control ERDC Demonstration Project Stewart Park, Cayuga Lake, Ithaca, New York 2020

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Buffalo District

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ACRONYMS AND ABBREVIATIONS

APCRP	Aquatic Plant Control Research Program
CSI	Community Science Institute
E & E	Ecology and Environment, Inc.
EAS E & E JV	Environmental Assessment Services, LLC and Ecology and Environment, Inc. Joint Venture
ERDC	Engineer Research and Development Center
GPS	Global Positioning System
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	Stewart Park, Cayuga Lake Hydrilla Demonstration Project
SePRO	SePRO Corporation
SLM	SOLitude Lake Management, LLC
SWCD	Soil and Water Conservation District
TAT	turnaround time
USACE	United States Army Corps of Engineers (Buffalo District)

1. INTRODUCTION

The Stewart Park, 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 3 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, invasive submerged aquatic plant. Treatment of Hydrilla at the southern end of Cayuga Lake began in 2013, and the USACE began leading herbicide application efforts in 2018, as discussed below. 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 implementing this Project.

The majority of the Hydrilla treated as a part of the first year of the Project was identified along the shoreline of Stewart Park. Two copper spot treatments were conducted in 2018. During the second year of treatment to control and eradicate Hydrilla, treatment occurred within a 70-acre treatment area that focused on application of fluridone (Sonar® H4C) along approximately 3,500 linear feet of shoreline at Stewart Park. Additionally, during the second year of treatment (2019), a 6.5-acre area near the Cornell Community Sailing Center, northeast of the 70-acre treatment area near Stewart Park, was treated with fluridone and chelated copper (Harpoon®).

Based on observations made in the fall of 2019, a treatment plan was developed with the Hydrilla Task Force to control monoecious Hydrilla beds in the southern end of Cayuga Lake offshore of Stewart Park, the Cornell Community Sailing Club, Treman State Park, and the Cayuga Inlet (see Figure 1-1). The Tompkins County Soil and Water Conservation District (SWCD) managed the treatment of two areas totaling approximately 13.6 acres that were located offshore of Treman State Marine Park west of the confluence with the Cayuga Inlet. The USACE was responsible for treating three areas with fluridone (Sonar® H4C): a reduced treatment area along the same 3,500 linear feet of shoreline at Stewart Park (approximately 40.5 acres), a 7.4-acre treatment area near the Cornell Community Sailing Center, and an approximately 3.1-acre area within Cayuga Lake Inlet along the shoreline east of Cass Park (see Figure 1-1). Additionally, spot treatment with copper ethylene diamine complex (chelated copper; Harpoon®) occurred in two plots in Cayuga Lake and in three plots in Fall Creek (see Figures 1-1 and 1-2).

These treatment areas 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; Environmental Assessment Services, LLC (EAS) and Ecology and Environment, Inc. (E & E) Joint Venture (EAS E & E JV); New York State Department of Environmental Conservation (NYSDEC); City of Ithaca; Tompkins County SWCD; Tompkins County Health Department; 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.

1.2. Purpose and Scope

The purpose of the Project is to perform a field-scale demonstration of a technology developed under the Aquatic Plant Control Research Program (APCRP) to evaluate the effectiveness of aquatic herbicides 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, Wells College Bay Demonstration Project, 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.

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.

Fluridone Treatment Areas

- Stewart Park (~40.5 Acres)
- Cayuga Inlet (~3 Acres)
- Cornell Community Sailing Center (~7.4 Acres)

Tompkins County SWCD Treatment Areas

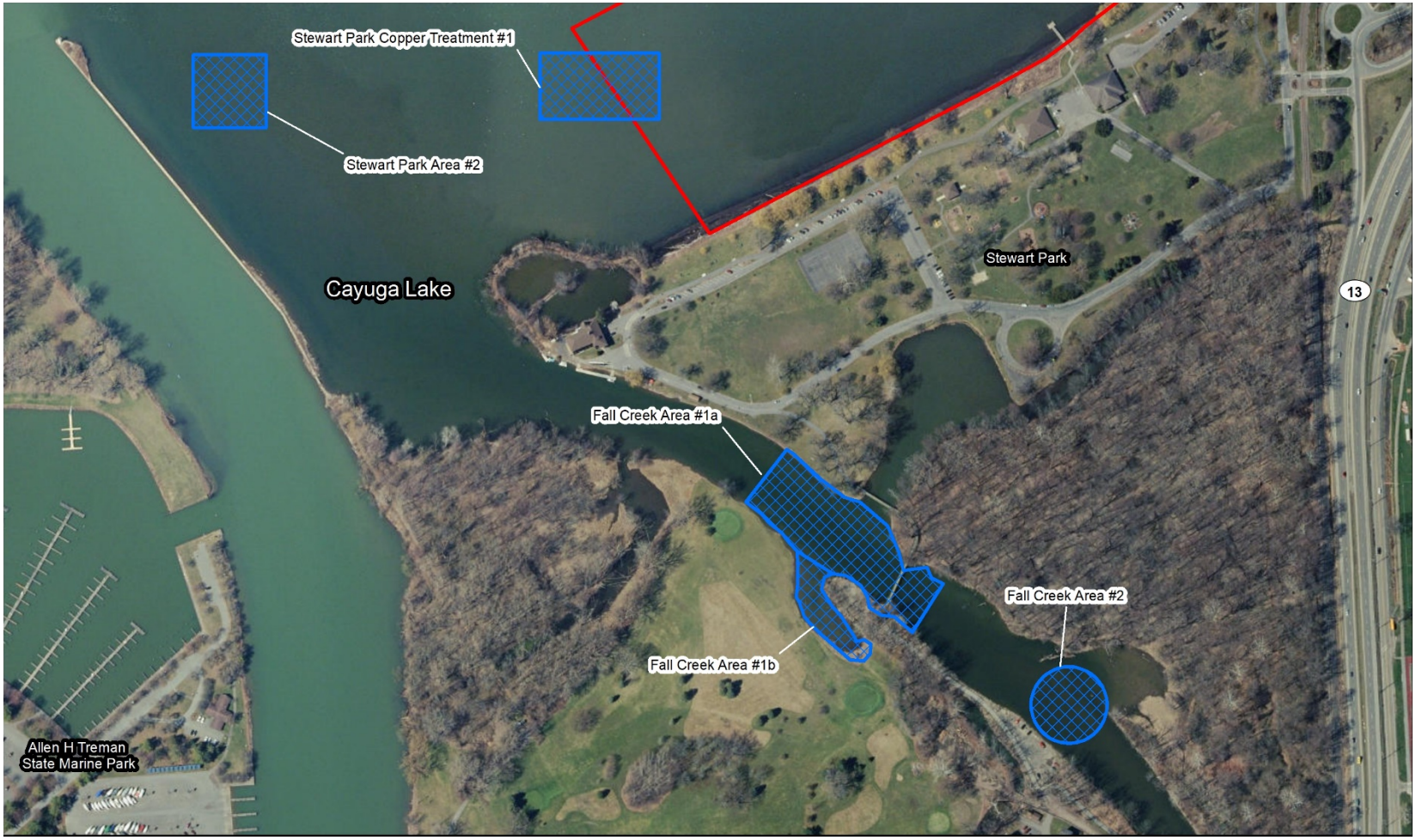
- Treman State Marine Park (~11.6 acres)
- Treman State Marine Park (~2.0 acres)

- Copper Spot Treatment Plots

Figure 1-1
Hydrilla Treatment Areas
Summer 2020
Cayuga Lake, Tompkins County, New York

0 0.5 1 Miles

N W E S



Copper Spot Treatment Plots

Fluridone Treatment Areas

Stewart Park (~40.5 Acres)

Figure 1-2
Copper Spot Treatment Areas
Summer 2020
Cayuga Lake, Tompkins County, New York

Miles
0 0.1 0.2

N
W E
S

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 Cayuga Lake near Stewart Park and the Cornell Community Sailing Center in Ithaca. Additionally, a portion of the Cayuga Inlet was also treated. 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 Ithaca included the following:

- Dates for the initial treatments were provided to NYSDEC, Tompkins County Health Department, City of Ithaca, Bolton Point Water Treatment Plant, and Cayuga Lake Watershed Network; 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 areas;
- Agency notification letters were distributed approximately eight days 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 or until testing determined that the threshold concentration had been met. Additionally, prior to the chelated copper spot treatment in Fall Creek, signage was posted along the creek.

Tompkins County SWCD 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 in the first year of the Project, NYSDEC did not require any newspaper notifications of the treatment activities.

2.2. Herbicide Treatment Methodology

The aquatic herbicide fluridone was applied in designated sections of Cayuga Lake during 10 treatment events that occurred between June and August (see Table 2-1). Chelated copper was applied during two of the 10 events, on July 23 and August 20, 2020. The herbicide applications were completed by SLM in accordance with the *Architect-Engineer Scope of Work Aquatic Plant Control ERDC Demonstration Project Stewart Park, Cayuga Lake, Ithaca, NY,* dated April 2020, and subsequently amended in August 2020 (USACE 2020a; 2020b).

Herbicide Transfer

A Vortex granular spreader was used for the fluridone and chelated copper treatments. The boats used for the treatments were either a jon boat or airboat. Herbicide transfer occurred at the Allen H. Treman State Park 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.

Herbicide Application

A Vortex granular spreader was used throughout the treatment season. 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. All of the product was applied to each section before moving to the next adjacent section. The herbicide used in each treatment area is detailed in Section 2.3.

For all 10 fluridone treatments, the boat was launched at the Allen H. Treman State Park launch. SLM staff arrived at the boat launch between 8:00 a.m. and 9:00 a.m. on each scheduled treatment day. The staff included a lead applicator and an assistant/technician that assembled the treatment systems before going out for treatment. Treatment started around 9:00 a.m.

2.3. Quantity of Herbicide Used and Total Area Treated

As indicated in Section 1.1, the Project was divided into three treatment areas: Stewart Park, Cornell Community Sailing Center, and Cayuga Inlet (see Figure 1-1). The Stewart Park treatment area was adjacent to the shoreline of Stewart Park. The Cornell Community Sailing Center treatment area was located along the eastern shore of Cayuga Lake between the Cornell Community Sailing Center and the Stewart Park treatment area. The third treatment area, Cayuga Inlet, was located upstream from Cayuga Lake, in the Cayuga Inlet adjacent to Cass Park. Each of these areas are discussed separately below, with respect to the quantity of herbicide used and the total area treated. To develop the treatment plan for each of these treatment areas, the sprouting dynamics of Hydrilla tubers and condition of plants were monitored by the USACE and partners 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.

2.3.1. Stewart Park

Ten fluridone treatments were scheduled for the approximately 40.5-acre treatment area along 3,500 linear feet of shoreline at Stewart Park during the summer of 2020. During 2019, treatments demonstrated that the fluridone concentrations remained at intended concentrations near the Stewart Park treatment area longer than other areas. For that reason, the 2020 treatment plan specified that the first two treatments consist of applications of fluridone to achieve a target concentration of 20 parts per billion (ppb), and the third through tenth treatments achieve a target concentration of 10 ppb (see Table 2-1), which was slightly less than the 13.75 ppb used in 2019. Treatments occurred approximately seven days apart.

In-lake chelated copper spot treatment application occurred along with two of the fluridone treatment events, on July 23 and August 27, 2020, at concentrations not to exceed 1,000 ppb (1 part per million [ppm]; see Table 2-2). Spot treatment areas consisted of five individual, predetermined treatment areas and totaled 6.5 acres (see Figure 1-1). Stewart Park Area No. 1 was treated on July 23, and the remaining four plots were treated on August 27, 2020.

The Stewart Park chelated copper spot treatment in Area No. 1 on July 23, 2020, was a result of discovering Hydrilla during point-intercept sampling during the week of July 16, 2020. Hydrilla was observed on the western edge of the treatment area, and to ensure that those plants would be exposed to enough herbicide to cause damage, the following was performed: (1) chelated copper spot treatment of Stewart Park Area No. 1, and (2) the fluridone plot in front of Stewart Park was adjusted westward to include the new Hydrilla finds and the herbicide rate was increased slightly in the northwest corner of the plot. The adjustments to

the fluridone plot continued through the end of the treatment season (for the five remaining applications).

Table 2-1 In-lake Fluridone Herbicide Application Summary by Treatment Date for Stewart Park

Date	Target Concentration (ppb)	Total Pounds of Sonar® H4C
6/25/20	20	286
7/2/20	20	286
7/9/20	10	143
7/1620	10	143
7/23/20	10	143
7/30/20	10	143
8/6/20	10	143
8/13/20	10	143
8/20/20	10	143
8/27/20	10	143
	Total Pounds	**1,716**

Key:
ppb = parts per billion

Table 2-2 In-lake Chelated Copper Herbicide Application Summary for Stewart Park

Date	Plot Number/Acres	Target Concentration (ppb)	Total Pounds of Harpoon® Granular
7/23/20	Stewart Park Area No. 1 – 1.5	1,000	480
8/27/2020	Stewart Park Area No. 2 – 1.0	1,000	354.48
8/27/2020	Fall Creek Area No. 1A – 2.5	1,000	1,620.83
8/27/2020	Fall Creek Area No. 1b – 0.6	1,000	115.66
8/27/2020	Fall Creek Area No. 2 – 0.9	1,000	208.19
		Total Pounds	**2,779.16**

Key:
ppb = parts per billion

2.3.2. Cornell Community Sailing Center

Ten fluridone treatments were scheduled for the approximately 7.4-acre treatment area along 1,350 linear feet of shoreline at Cornell Community Sailing Center during the summer of 2020. The treatment plan specified that the first two treatments would consist of fluridone applications to achieve a target concentration of 20 ppb, and the third through tenth treatments would achieve and maintain a target concentration of 10 ppb (see Table 2-3). Treatments occurred approximately seven days apart.

Table 2-3 In-lake Fluridone Herbicide Application Summary by Treatment Date for Cornell Community Sailing Center

Date	Target Concentration (ppb)	Total Pounds of Sonar® H4C
6/25/20	20	112
7/2/20	20	112
7/9/20	10	56
7/1620	10	56
7/23/20	10	56
7/30/20	10	56
8/6/20	10	56
8/13/20	10	56
8/20/20	10	56
8/27/20	10	56
	Total Pounds	**672**

Key:
ppb = parts per billion

2.3.3. Cayuga Inlet

Ten fluridone treatments were scheduled for the approximately 3.1-acre treatment area along 700 linear feet of shoreline at Cayuga Inlet 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 and maintain a target concentration of 13.75 ppb (see Table 2-4). Treatments occurred approximately seven days apart.

Table 2-4 In-lake Fluridone Herbicide Application Summary by Treatment Date for the Cayuga Inlet

Date	Target Concentration (ppb)	Total Pounds of Sonar® H4C*
6/25/20	20	62
7/2/20	20	46.2
7/9/20	13.75	27.5
7/1620	13.75	27.5
7/23/20	13.75	27.5
7/30/20	13.75	27.5
8/6/20	13.75	27.5
8/13/20	13.75	27.5
8/20/20	13.75	27.5
8/27/20	13.75	27.5
	Total Pounds	**328.2**

Notes:
*The first application at the inlet site was based on an incorrect average depth. Following the first inlet treatment, the application rate was adjusted to correctly reflect the average depth at the Cayuga Inlet site. Additionally, treatments 3 through 10 were reduced from the originally planned 42 pounds to a reduced total of 27.5 pounds to compensate for the overapplication during week 1.

Key:
ppb = parts per billion

2.4. Water Quality Sampling Methodology

For each of the three treatment areas – Stewart Park, Cornell Community Sailing Center, and the Cayuga

Inlet — 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 15 sites on three dates during the season: July 15, August 4, and September 1, 2020.

2.4.1. E & E Sampling

E & E collected nine in-lake water samples across the three treatment areas following each of the 10 fluridone treatment events (see Figure 2-1 and Table 2-5 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. All nine collection sites were sampled during each sampling event.

In addition to the weekly fluridone samples, two chelated copper samples, CP1 and CP2, were collected on August 31, 2020 (see Figure 2-1 and Table 2-6).

Table 2-5 In-Lake Water Fluridone Sample Collection Sites Stewart Park, Cayuga Lake Hydrilla Demonstration Project

Treatment Areas	Sample Location	Latitude[a]	Longitude[a]
N/A	OutN	42.4763	-76.5076
N/A	OutW	42.4704	-76.5269
N/A	OutS	42.4464	-76.5125
Stewart Park	SP1	42.4624	-76.5061
Stewart Park	SP2	42.4647	-76.5016
Stewart Park	SP3	42.4635	-76.5038
Cornell Community Sailing Center	CS1	42.4666	-76.501
Cornell Community Sailing Center	CS2	42.4688	-76.5019
Cayuga Inlet	CI	42.4535	-76.5115

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

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

- Six samples within the treatment areas – three within the Stewart Park treatment area; two within the Cornell Community Sailing Center treatment area; and one within the Cayuga Lake treatment area;

- One sample approximately a half mile north of the Cornell Community Sailing Center treatment block (OutN);
- One sample approximately a half a mile west of the Stewart Park treatment area along the western shoreline (OutW); and
- One sample approximately a half mile south of the Cayuga Inlet treatment area (OutS).

Table 2-6 In-Lake Water Chelated Copper Sample Collection Sites Stewart Park, Cayuga Lake Hydrilla Demonstration Project

Date	Chelated Copper Treatment Areas	Sample Location	Latitude[a]	Longitude[a]
8/31/2020	Stewart Park	CP1	42.2743	-76.3044
8/31/2020	Fall Creek	CP2	42.2733	-76.3025

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

Samples from each sample location listed in Tables 2-5 and 2-6 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 a brown high-density polyethylene 30 milliliter (mL) sample bottle provided by the laboratory. Samples were stored to avoid light exposure and shipped in coolers to SePRO Corporation (SePRO) in Whitakers, North Carolina, for analysis.

In-lake fluridone 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%.

The in-lake chelated copper water samples were transferred into a clear 200 mL HDPE bottle with nitric acid (HNO_3) as a preservative. The samples were shipped in a cooler to ALS Environmental in Rochester, New York, and analyzed using United States Environmental Protection Agency Method SW-846 6010C.

Fluridone Treatment Areas

- Stewart Park (~40.5 Acres)
- Cayuga Inlet (~3 Acres)
- Cornell Community Sailing Center (~7.4 Acres)

Tompkins County SWCD Treatment Areas

- Treman State Marine Park (~11.6 acres)
- Treman State Marine Park (~2.0 acres)

- Copper Spot Treatment Plots
- USACE Fluridone Sample Sites
- E & E Copper Sample Sites
- E & E Fluridone Sample Sites

Figure 2-1
In-Lake Water Sample Locations
Cayuga Lake, Tompkins County, New York

0 0.5 1 Miles

N W E S

2.4.2. USACE Sampling

The USACE collected at 15 sampling locations on three dates following the fluridone treatments. Sampling events occurred on July 15, August 4, and September 1, 2020. Samples were collected from within and adjacent to the three treatment areas: Stewart Park, Cornell Community Sailing Center, and Cayuga Inlet (see Figure 2-1 and Table 2-10). Two samples were collected at each location. 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 and bottom of the water column is more likely to pick up 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).

2.5. Results

The results for the E & E in-lake fluridone water samples are presented in three separate tables, one for each treatment area. Table 2-7 lists the sample locations associated with each treatment area. Non-treatment area samples are also included for comparison. The non-treatment sample locations OutN and OutW are included with both the Stewart Park and Cornell Community Sailing Center results due to the proximity to the two treatment areas. The Stewart Park results are shown in Table 2-8, the Cornell Community Sailing Center results and Cayuga Inlet results are presented in Table 2-9 and Table 2-10, respectively. In general, the highest concentrations of fluridone were detected in the areas off Stewart Park, despite the lower concentration of fluridone applied there in the latter weeks of the treatment season (10 ppb versus 13.75 ppb at Cayuga Inlet).

Table 2-7 In-Lake Water Fluridone Sample Collection Sites Grouped by Treatment Area, Stewart Park, Cayuga Lake Hydrilla Demonstration Project

Treatment Areas	Sample Location
Stewart Park	OutN
	OutW
	SP1
	SP2
	SP3
Cornell Community Sailing Center	OutN
	OutW
	CS1
	CS2
Cayuga Inlet	OutS
	CI

2.5.1. Stewart Park In-Lake Sampling

E & E Sampling

Fluridone concentrations at locations outside of treatment areas (OutW and OutN) remained near or below the reporting limit for the duration of the monitoring period between June 29 and August 31, 2020. For samples taken within the treatment areas, fluridone concentrations ranged from 1.0 to 7.2 ppb, with the highest concentration, 7.2 ppb, occurring within the Stewart Park treatment area (SP2) on July 13, 2020. The sample locations SP2 and SP3 consistently exhibited higher fluridone concentrations than SP1 for most of the treatment period, potentially due to the fact that they were located farther away from the outlet of Fall Creek into Stewart Lake (see Figure 2-1).

Table 2-8 Stewart Park – E & E In-Lake Water Sampling Results for Fluridone (ppb)

Date	Sample Location	Time	Sample Depth (feet)	Fluridone Concentration (ppb)[a]
6/29/2020	OutN	1240	10.0	<1/<1
	OutW	1215	9.5	<1
	SP1	1325	2.6	**1.0**
	SP2	1320	2.5	<1
	SP3	1315	2.3	**1.7**
7/6/2020	OutN	1045	9.0	<1
	OutW	1037	8.6	<1/<1
	SP1	1115	2.6	**5.2**
	SP2	1111	2.2	**7.2**
	SP3	1107	2.2	**5.2**
7/13/2020	OutN	1320	10.4	<1
	OutW	1330	9.2	<1
	SP1	1245	2.5	**1.8**
	SP2	1250	2.4	**3.1**
	SP3	1255	2.3	**3.0**
7/20/2020	OutN	1312	9.8	<1
	OutW	1324	7.9	<1
	SP1	1239	1.8	**1.4/1.2**
	SP2	1243	1.9	**2.1**
	SP3	1248	2.1	**4.8**
7/27/2020	OutN	1345	9.2	<1
	OutW	1355	8.1	<1
	SP1	1310	2.1	**1.7**
	SP2	1315	1.8	**4.7/4.9**
	SP3	1320	1.8	**5.6**
8/3/2020	OutN	1607	9.2	<1

Date	Sample Location	Time	Sample Depth (feet)	Fluridone Concentration (ppb)[a]
	OutW	1615	8.5	<1
	SP1	1520	2.0	**2.8**
	SP2	1532	2.0	**6**
	SP3	1540	2.0	**7.1**
8/10/2020	OutN	1510	6.8	<1
	OutW	1520	8.4	<1
	SP1	1435	2.2	**3.5**
	SP2	1445	1.9	**4.6**
	SP3	1450	1.9	**5.3**
8/17/2020	OutN	1501	10.3	<1
	OutW	1515	9.2	<1
	SP1	1414	1.9	**3.7**
	SP2	1427	1.8	**5.1**
	SP3	1434	1.7	**6.1**
8/24/2020	OutN	1536	9.1	<1
	OutW	1546	7.8	<1
	SP1	1457	1.3	**4.0**
	SP2	1503	1.3	**4.4**
	SP3	1511	1.0	**5.1**
8/31/2020	OutN	1700	11.4	<1
	OutW	1713	7.9	<1
	SP1	1620	1.7	**2**
	SP2	1625	1.8	**4.8**
	SP3	1630	1.7	**3.2**

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

Two chelated copper samples (CP1 and CP2) were taken on August 31 (see Table 2-6). Note: Chelated copper samples were taken for two of the three chelated copper plots; a sample was not taken for the northernmost chelated copper plot due to its location away from private beach intake structures.

Table 2-9 Stewart Park, E & E In-Lake Water Sampling Results for Chelated Copper (ppb)

Date	Sample Location	Time	Sample Depth (feet)	Chelated Copper Concentration (ppb)
8/31/2020	CP1	1555	2.8	Non-detect
8/31/2020	CP2	1605	5.9	14

Key:
ppb = parts per billion

USACE Sampling

Slight variation in herbicide residues was detected within the water column as evidenced by differences in fluridone concentration between middle and bottom samples taken at the same collection location. Additionally, samples taken within the treatment area (IFS1 through IFS3) evidenced higher concentrations than those taken outside the treatment area, as expected. Sampling results from September 1, 2020, four days after the final treatment, which occurred on August 27, 2020, indicate that concentrations were 2.00 ppb or below at all locations but IFS13 BOT, which was 2.6 ppb.

Table 2-10 Stewart Park - USACE In-Lake Water Sampling Results for Fluridone (ppb)

	Fluridone Concentration (ppb)		
Sample Location	**7/15/2020**	**8/4/2020**	**9/1/2020**
IFS1 MID	**2.2**	**4.3**	**1.7**
IFS1 BOT	**2**	**3.7**	**2**
IFS2 MID	**4.5**	**5**	**1.7**
IFS2 BOT	**4.5**	**5.3**	**1.7**
IFS3 MID	**2.1**	**5**	**1.5**
IFS3 BOT	**2.2**	**5**	**1.4**
IFS12 MID	0.7	0.7	<0.5
IFS12 BOT	<0.5	0.7	<0.5
IFS13 MID	<0.5	0.9	**1.3**
IFS13 BOT	<0.5	<0.5	**2.6**
IFS14 MID	0.6	**2.3**	**1.6**
IFS14 BOT	0.6	**2.2**	**1.8**

Notes:
Bold denotes sample location within application area as well as positive sample detections.

Key:
BOT = bottom of water column, MID = middle of water column
ppb = parts per billion

2.5.2. Cornell Community Sailing Center In-Lake Sampling

E & E Sampling

Fluridone concentrations at the two sampling locations (OutN and OutW) outside the treatment area remained near or below detection limits for the duration of the monitoring period between June 29 and August 31, 2020 (see Table 2-11). The fluridone concentration at location CS1 was consistently higher than location CS2 for the majority of the treatment period, with the exception of August 3, 2020, when CS2 had a higher concentration. The fact that concentrations at CS1 were consistently higher is likely due to the proximity of that site to the Stewart Park treatment area and the influence from fluridone applications there. The highest fluridone concentrations during the monitoring period were observed on August 3, 2020, at CS1 and CS2, at 6.1 and 6.4 ppb, respectively.

Table 2-11 **Cornell Community Sailing Center — E & E In-Lake Water Sampling Results for Fluridone (ppb)**

Date	Sample Location	Time	Sample Depth (feet)	Fluridone Concentration (ppb)[a]
6/29/2020	OutN	1240	10.0	<1/<1
	OutW	1215	9.5	<1
	CS1	1310	3.7	<1
	CS2	1300	5.3	<1
7/6/2020	OutN	1045	9.0	<1
	OutW	1037	8.6	<1/<1
	CS1	1103	3.4	**2.4**
	CS2	1055	5.5	**1.3**
7/13/2020	OutN	1320	10.4	<1
	OutW	1330	9.2	<1
	CS1	1305	3.2	**2.2**
	CS2	1310	4.7	**1.1**
7/20/2020	OutN	1312	9.8	<1
	OutW	1324	7.9	<1
	CS1	1253	3.0	**3.1**
	CS2	1259	5.6	**1.7**
7/27/2020	OutN	1345	9.2	<1
	OutW	1355	8.1	<1
	CS1	1325	2.9	**4.7**
	CS2	1335	4.7	**1.3**
8/3/2020	OutN	1607	9.2	<1
	OutW	1615	8.5	<1
	CS1	1545	2.1	**6.1**
	CS2	1554	3.9	**6.4**
8/10/2020	OutN	1510	6.8	<1
	OutW	1520	8.4	<1
	CS1	1455	2.7	**4.9**
	CS2	1500	3.5	**4.7**
8/17/2020	OutN	1501	10.3	<1
	OutW	1515	9.2	<1
	CS1	1440	2.9	<1
	CS2	1447	4.8	**1.2**
8/24/2020	OutN	1536	9.1	<1
	OutW	1546	7.8	<1

Date	Sample Location	Time	Sample Depth (feet)	Fluridone Concentration (ppb)[a]
	CS1	1517	2.3	**3.2**
	CS2	1524	3.4	**2.3**
8/31/2020	OutN	1700	11.4	<1
	OutW	1713	7.9	<1
	CS1	1640	2.9	**3.1**
	CS2	1650	4.6	**2.5**

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

USACE Sampling

Variations in fluridone concentrations were not observed for the first sampling event; however, for sampling events two and three, variation was observed at two of the three sampled locations and at one of the sampling locations, respectively. Samples taken within the treatment area evidenced higher concentrations than samples taken outside, as expected. Sampling results from September 1, 2020, four days after the final treatment, which occurred on August 27, 2020, indicate that concentrations were 1.7 ppb or below at all locations.

Table 2-12 Cornell Community Sailing Center — USACE In-Lake Water Sampling Results for Fluridone (ppb)

	Fluridone Concentration (ppb)		
Sample Location	7/15/2020	8/4/2020	9/1/2020
IFS4 MID	**1.5**	**3.9**	**1.2**
IFS4 BOT	**1.5**	**2.7**	**1.2**
IFS5 MID	0.8	0.6	**1.7**
IFS5 BOT	0.8	**1.5**	**1.7**
IFS15 MID	<0.5	<0.5	0.8
IFS15 BOT	<0.5	<0.5	<0.5

Notes:

Bold denotes sample location within application area as well as positive sample detections.

Key:

BOT = bottom of water column, MID = middle of water column

2.5.3. Cayuga Inlet Sampling

E & E Sampling

Fluridone concentrations at the sampling location one-half mile south of the treatment area (OutS) were near or below detection limits for the duration of the monitoring period between period between June 29 and August 31, 2020 (see Table 2-13). Fluridone concentrations in the treatment area remained near or

below those taken at the sampling location one-half mile south of the treatment area for the majority of the treatment period; there were only two exceptions – one on August 10 and one on August 17, 2020, when fluridone concentrations were 1.5 ppb and 4.6 ppb, respectively.

Table 2-13 Cayuga Inlet — E & E In-Lake Water Sampling Results for Fluridone (ppb)

Date	Sample Location	Time	Sample Depth (feet)	Fluridone Concentration (ppb)[a]
6/29/2020	OutS	1400	5.1	<1
	CI	1345	2.7	<1
7/6/2020	OutS	1015	4.9	<1
	CI	1020	2.0	<1
7/13/2020	OutS	1225	4.6	<1/<1
	CI	1220	3.1	<1
7/20/2020	OutS	1216	4.5	<1
	CI	1225	3.5	<1
7/27/2020	OutS	1255	4.2	<1
	CI	1245	3.2	<1
8/3/2020	OutS	1453	4.5	<1
	CI	CI	3.0	<1
8/10/2020	OutS	1405	3.3	<1
	CI	14:15	2.3	**1.5**
8/17/2020	OutS	1353	3.7	<1
	CI	1403	1.4	**4.6**
8/24/2020	OutS	1429	4.1	<1
	CI	1441	1.4	<1
8/31/2020	OutS	1530	4.1	<1
	CI	1540	1.8	<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

USACE Sampling

Fluridone concentrations were measured at the lower reporting limit for all samples taken for the Cayuga Inlet treatment area on all three dates sampled (see Table 2-14). Additionally, there was no difference between samples taken within the treatment area versus those taken just north of the treatment area.

Table 2-14 Cayuga Inlet - USACE In-Lake Water Sampling Results for Fluridone (ppb)

	Fluridone Concentration (ppb)		
Sample Code	7/15/2020	8/4/2020	9/1/2020
IFS7 MID	**<0.5**	**<0.5**	**<0.5**
IFS7 BOT	**<0.5**	**<0.5**	**<0.5**
IFS18 MID	<0.5	<0.5	<0.5
IFS18 BOT	<0.5	<0.5	<0.5

Notes:
Bold denotes sample location within application area.
Key:
BOT = bottom of water column, MID = middle of water column

2.6. Vegetative Monitoring and Treatment Summary

The USACE conducted point intercept surveys within the fluridone treatment areas on four dates (June 23, August 4, September 1, and October 7, 2020) throughout the growing season to determine Hydrilla distribution. Point intercept survey locations are illustrated on Figure 2-2. Hydrilla was not found at any survey locations during any of the four monitoring events.

Racine-Johnson Aquatic Ecologists conducted surveys throughout the southern end of Cayuga Lake, Cayuga Inlet, and the tributaries in the spring, early summer, and again in the fall. These surveys overlapped with the fluridone treatment areas. Racine-Johnson Aquatic Ecologists did find a couple of Hydrilla patches along the western edge of the fluridone treatment area at Stewart Park in July, which resulted in the fluridone treatment area being adjusted slightly to the west for the remaining weekly fluridone treatments, as previously discussed in Section 2.3.1. In addition, a 1.0 ppm chelated copper (Harpoon®) spot treatment was applied to a 1.5-acre area that surrounded these points. No additional points were found in this area in future sampling. Thus, based on this monitoring, the fluridone treatments and initial chelated copper spot treatments were effective at controlling Hydrilla in these areas. The effectiveness of Hydrilla control was also observed in reduced abundance of Hydrilla 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: sago pondweed (*Stuckenia pectina*; 42.9%), starry stonewort (*Nitellopsis obtusa*; 35.9%), coontail (*Ceratophyllum demersum*; 25.0%), elodea (*Elodea* sp.; 18.4%), eelgrass (*Valisneria americana*; 8.6%), water stargrass (*Heteranthera demersum*; 8.6%), and Eurasian watermilfoil (*Myriophyllum spicatum*; 8.1%).

In early August, Racine-Johnson Aquatic Ecologists found additional small patches of Hydrilla in Fall Creek and the nearshore area at the outlet of Fall Creek, located to the west of the weekly fluridone treatments at Stewart Park. Additional 1.0 ppm chelated copper spot treatments (Harpoon®) were applied to one location off Stewart Park (1.0 acre) and three within Fall Creek (for a total of 4.0 acres) on August 27 (see Figure 1-2). Based on additional surveys conducted by Racine-Johnson Aquatic Ecologists in the fall, these late chelated copper treatments in Fall Creek and the outlet of Fall Creek at Stewart Park were not as effective and there are additional areas in the Fall Creek and the Cayuga Inlet where fragments of Hydrilla plants and Hydrilla plants were detected that may require treatment in the coming years to maintain control of Hydrilla in this area (see Figure 2-3).

As discussed in Section 2.4, Water Quality Sampling Methodology, E & E took weekly samples throughout the treatment period. Fluridone concentrations within treatment areas tended to be variable week to week depending on wind and rain and varied among sampling points. The highest concentrations were observed in the areas off Stewart Park despite using a lower fluridone concentration than the Cayuga

Inlet (10 ppb versus 13.75 ppb). These results were substantiated by additional water samples taken by the USACE on three dates during the treatment period (July 15, August 4, and September 1). Despite multiple locations showing concentrations at levels that were less than what is necessary for effective control, results of vegetation monitoring did not detect any Hydrilla within the fluridone treatment areas this fall. Thus, it appears that the overall 10-week treatment was effective. However, as discussed above, additional Hydrilla occurrences outside of the 2020 fluridone treatment areas were detected in fall 2020. These Hydrilla finds were identified in Fall Creek and Cayuga Inlet where chelated copper spot treatments occurred. The effects of fluridone application are limited to the treatment areas and no adverse effects were observed outside of the treatment areas. This is substantiated by the fact that all water samples collected at locations 0.5 mile from the treatment areas were at non-detect levels for fluridone (less than 1.0 ppb).

Legend

- Racine-Johnson Aquatic Ecologists Hydrilla Finds (7/15/20)
- 2020 USACE Point Intercept Survey Locations

Figure 2-2
2020 Point Intercept Survey Locations
Cayuga Lake, Tompkins County, New York

0 0.5 1 Miles

N W E S

Fluridone Treatment Areas

- Stewart Park (~40.5 Acres)
- Cayuga Inlet (~3 Acres)
- Cornell Community Sailing Center (~7.4 Acres)

Tompkins County SWCD Treatment Areas

- Treman State Marine Park (~11.6 acres)
- Treman State Marine Park (~2.0 acres)

- Copper Spot Treatment Plots
- Potential Area of Concern for Future Treatment

Figure 2-3
Potential Areas of Concern for Possible Future Treatment
Cayuga Lake, Tompkins County, New York

0 0.5 1 Miles

N W E S

3. STUDY IMPROVEMENTS

The study improvements, summarized in this section, were based on lessons learned from the third year of the herbicide application effort, coordination with the study partners on 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 jon boat and airboat, and application of the herbicide in 2020 was smooth and efficient. The staging area at the Allen H. Treman State Park launch adequately supported operations for the in-lake treatments. Public access to the boat ramps during use by the applicators was uninterrupted. To avoid sailing activities, the treatments usually started at the Cornell Community Sailing Center first thing in the morning, followed by the other sites. The Project team needs to continue to consider long-range weather forecasts when planning future applications/sampling and build in schedule flexibility for each event.

Analysis

SePRO's proprietary HPLC method was used for analysis of fluridone in the in-lake samples. Additionally, the Community Science Institute analyzed the in-lake samples taken by the USACE using the RaPID assay method to determine fluridone concentrations. The RaPID assay method is considered a screening method whereas the HPLC method is considered a definitive method. While USACE and E & E sampling sites overlapped, sampling dates did not. Therefore, a comparison of the results of the two analyses is not practical.

3.2. 2020 Lessons Learned

Treatment Areas

Due to the consistency of 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 the EAS E & E JV or the USACE to communicate needs, especially concerning the water intake facility adjacent to the treatment area.

Communication

Twenty-four-hour email notification of herbicide treatments, including changes in treatment schedule was effective and no issues were raised by the Tompkins County Health Department or other stakeholders. 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. There were no such delays during the 2020 season, but the importance of communicating when delays arise has been acknowledged by all team members.

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). That way, the results can be used 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 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.

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 Hydrilla plants are observed to be in "healthy" condition.

Additional point intercept surveys have traditionally been conducted by Racine-Johnson Aquatic Ecologists at a larger scale at the south end of Cayuga Lake. Those additional surveys have been instrumental in the identification of spread/recurrence outside of the areas routinely monitored by the USACE.

The following should be evaluated for implementation in 2021: (1) the point-intercept survey area may need to be expanded to cover the areas where Hydrilla was observed this past year as well as adjacent areas where these known locations may expand; (2) 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 the extent of Hydrilla patches; and (3) 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). 2020a. *Architect-Engineer Scope of Work Aquatic Plant Control ERDC Demonstration Project Stewart Park, Cayuga Lake, Ithaca, NY.* April 2020.

USACE. 2020b. Personal communication. Email from Jeffrey Ernest of EAS to Ecology and Environment, Inc. staff regarding Ithaca Hydrilla Option on August 17, 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.

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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
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	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.

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Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

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
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	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.
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.

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Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

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
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	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.
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: 07/21/20 11:00 AM
Date Results Sent: Wednesday, July 22, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

SePRO Research & Technology Campus

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
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: 08/04/20 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: 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

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: COC8286 **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
CTM24206-1	Out N	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020
CTM24207-1	Out W	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020
CTM24208-1	Out S	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020
CTM24209-1	SP1	Sonar/fluridone (ug/L)	FAST 10	2.0	08/31/2020
CTM24210-1	Sp2	Sonar/fluridone (ug/L)	FAST 10	4.8	08/31/2020
CTM24211-1	SP3	Sonar/fluridone (ug/L)	FAST 10	3.2	08/31/2020
CTM24212-1	CS1	Sonar/fluridone (ug/L)	FAST 10	3.1	08/31/2020
CTM24213-1	CS2	Sonar/fluridone (ug/L)	FAST 10	2.5	08/31/2020
CTM24214-1	Cl	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020
CTM24215-1	Treat N	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020
CTM24216-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020
CTM24217-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020
CTM24218-1	Treat S	Sonar/fluridone (ug/L)	FAST 10	<1	08/31/2020

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.
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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: 09/01/20 11:00 AM
Date Results Sent: Wednesday, September 2, 2020

This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

Community Science Institute, Inc.
NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Fluridone Monitoring Report

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

Sample Code	Sampling Date	Location	Fluridone, ppb	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

283 Langmuir Lab/Box 1044 95 Brown Road Ithaca NY 14850 Voice/Fax 607 257 6606
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

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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Community Science Institute, Inc.
NYSDOH ELAP #11790 www.communityscience.org EPA Lab Code NY01518

Fluridone Monitoring Report

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

Sample Code	Sampling Date	Location	Fluridone, ppb	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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Fluridone Monitoring Report

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

Sample Code	Sampling Date	Location	Fluridone, ppb	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.
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Report prepared by: Stephen M. Penningroth Date: 9/4/2020

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