Post-Treatment Assessment for Aquatic Plant Control ERDC Demonstration Project

Wells College Bay, Cayuga Lake

2021

Prepared for:

United States Army Corps of Engineers
Buffalo District

US Army Corps of Engineers®
Buffalo District
BUILDING STRONG®

under
Contract No. W912P4-20-0001

January 2022

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ACRONYMS AND ABBREVIATIONS

APCRP	Aquatic Plant Control Research Program
ERDC	Engineer Research and Development Center
GPS	global positioning system
HPLC	high-performance liquid chromatography
Hydrilla	*Hydrilla verticillata*
JV	Environmental Assessment Services, LLC, and Ecology and Environment, Inc., (member of WSP) Joint Venture
µg/L	micrograms per liter
mL	milliliter
NYSDEC	New York State Department of Environmental Conservation
PIS	point intercept survey
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
USACE	United States Army Corps of Engineers (Buffalo District)

1. INTRODUCTION

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

This report contributes to the Year 5 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 Wells College Bay of Cayuga Lake in September 2016. In 2016, the only other Hydrilla infestation documented in Cayuga Lake was discovered in late summer 2011 near Ithaca, New York. Since then, a couple of other small infestations have been found at Don's Marina in Genoa, New York, and at the Finger Lakes Marine Service in Lansing, New York. The majority of the Hydrilla treated as a part of the first year (2017) of the Project was identified within a 30-acre portion of Wells College Bay, with several small patches observed in the adjacent 29-plus acres. The monitoring area for the second year (2018) of the Project was extended from 59 acres to 120 acres to monitor for the spread of small patches of Hydrilla in areas adjacent to the areas treated during the first year at water depths ranging from 0 to 18 feet. For the third and fourth years (2019 and 2020) of the Project, the 30-acre treatment area remained largely the same, and 120 total acres were monitored. However, in the fifth year, a total of approximately 49.7 acres was initially identified for treatment, and 125 total acres were monitored.

Given the ease with which this plant spreads by fragments, its proximity to the Erie Canal, and the 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 fifth year of treatment to control and eradicate Hydrilla, treatment occurred within three treatment blocks in the town of Aurora, totaling approximately 58.6 acres that focused on application of two aquatic herbicides: fluridone (Sonar® H4C) and copper ethylene diamine complex (chelated copper; Harpoon®).

The following three blocks were treated during the 2021 season (see Figure 1-1):

- **Northern Sonar® H4C treatment block – Wells College Dock North:** An approximately 9.7-acre area along approximately 1,500 linear feet of shoreline, between Wells College Dock and north of Wells Road. The water depths in this treatment area range from approximately 0 to more than 18 feet, with an average depth of approximately 10 feet, depending on location.
- **Southern Sonar® H4C treatment block – Wells College Bay South:** An approximately 40-acre area along approximately 3,700 linear feet of shoreline, between Wells the College Water Plant and south of the outlet of Paines Creek. The water depths in this treatment area range from approximately 0 to more than 18 feet, with an average depth of approximately 7 feet, depending on location.
- **Sonar® H4C and Harpoon® treatment block – Wells College Dock North 2:** An approximately 8.6-acre treatment area, between Wells Road to the south and Lafayette road to the north, was added to the Project as a result of monitoring efforts that identified the presence of a relatively narrow

band of Hydrilla in approximately 12 to 15 feet of water extending north of the Wells College Dock North treatment block, described above. The average water depth in this treatment area is 13.4 feet.

These treatment blocks were delineated by the USACE using aquatic plant survey data from 2020 and 2021.

Between 2019 and 2020, the fluridone treatment area shifted slightly to the south, below Paines Creek, to address disruptions in herbicide concentrations caused by flows from the creek and a problematic Hydrilla patch, approximately 3 to 4 acres in size, near the creek outlet. In 2021, instead of one large treatment area, three separate treatment blocks were identified, as described above, the southernmost of which extended further south of Paines Creek than in 2019 and 2020.

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

1.2. Purpose and Scope

The purpose of the Project is to perform a field-scale demonstration of a technology developed under the APCRP to evaluate the effectiveness of aquatic herbicides to manage 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 research has been ongoing since 2010. This method and the underlying concepts are being tested against monoecious Hydrilla for the Tonawanda Creek/Erie Canal Demonstration Project in Western New York and the Stewart Park Demonstration Project in Ithaca, New York, as well as the 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, the report provides conclusions, in the form of lessons learned, to help shape future treatment projects.

Figure 1-1 Aurora Hydrilla Treatment Areas- Summer 2021
Cayuga Lake, Cayuga County, New York

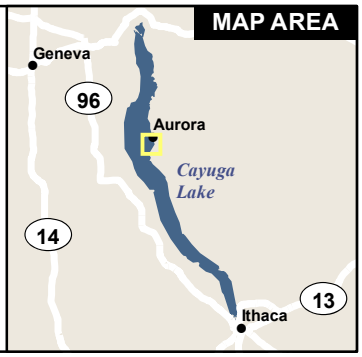
Fluridone Treatment Areas

- Wells College Bay South (39.8 acres)
- Wells College Dock North (9.6 acres)
- Wells College Dock North 2 (8.6 acres)

Monitoring Area

N

0 1,000 Feet



2. OVERVIEW OF HERBICIDE TREATMENT AND MONITORING

Treatment of Hydrilla for the Project focused on the application of the aquatic herbicides fluridone (Sonar® 4HC) and chelated copper (Harpoon®) within Wells College Bay. The following sections outline the public notification that preceded treatment; field conditions before, during, and after treatment; herbicide treatment methodology; and quantity of herbicide used.

2.1. Public Notification

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

- Collaboration with stakeholders was conducted regarding the development of treatment plans for 2021 by conference call and virtual meetings.
- Dates for the initial treatments were provided to NYSDEC, the Cayuga County Health Department, the Village of Aurora, and the Wells College water treatment plant, and email reminder notifications were sent out 24 hours prior to each treatment.
- Written notifications were sent by certified mail approximately 14 days prior to the first fluridone treatment to all riparian owners/users within the half-mile buffer (north and south) of the treatment areas, and all municipal water supply customers, including those that receive water delivery by truck.
- Agency notification letters were distributed via email approximately 12 days prior to the first fluridone treatment.
- Supplemental riparian notification letters were sent to affected landowners along the shoreline near the Wells College Dock North 2 treatment block, which was added later in the season and was thus not identified in the original riparian notification sent out in June.
- 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.

The JV posted and maintained 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 treatments (fluridone only or combined fluridone/chelated copper treatments in the Wells College Dock North 2 block). Newspaper notifications were not required for the treatments.

2.2. Herbicide Treatment Methodology

The aquatic herbicide fluridone was applied in designated sections of Cayuga Lake during 11 treatment events that occurred between June and September (see Table 2-1). Chelated copper was applied during one of the events, on August 18, 2021, and only in the Wells College Dock North 2 treatment block (see Table 2-2). The herbicide applications were completed by SLM in accordance with the *Performance Work Statement or Contract Aquatic Plant Control ERDC Demonstration Project Wells College Bay, Cayuga Lake, Aurora New York,* dated April 2021, and subsequently amended in August 2021 (USACE 2021a; 2021b).

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

Date	Treatment Area/Block	Application Rate (ppb)	Total Pounds of Sonar® H4C
June 30, 2021	Wells College Dock North	20.00	196
	Wells College Bay South		565
July 7, 2021	Wells College Dock North	20.00	196
	Wells College Bay South		565
July 14, 2021	Wells College Dock North	13.75	135
	Wells College Bay South		389
July 22, 2021[a]	Wells College Dock North	13.75	135
	Wells College Bay South		389
July 28, 2021	Wells College Dock North	13.75	135
	Wells College Bay South		389
August 6, 2021[b]	Wells College Dock North	13.75	135
	Wells College Bay South		389
August 11, 2021	Wells College Dock North	13.75	135
	Wells College Bay South		389
August 18, 2021	Wells College Dock North	13.75	135
	Wells College Bay South		389
	Wells College Dock North 2	15.00	172
August 25, 2021	Wells College Dock North	13.75	135
	Wells College Bay South		389
	Wells College Dock North 2	15.00	172
September 1, 2021	Wells College Dock North	13.75	135
	Wells College Bay South		389
	Wells College Dock North 2	15.00	172
September 8, 2021	Wells College Dock North 2	15.00	172
		Total Pounds	**6,402**

Notes:

[a] One-day delay of application due to inclement weather

[b] Two-day delay of application due to schedule conflicts and breakdown of airboat trailer

Key:

ppb = parts per billion

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

Date	Treatment Area/Block	Target Concentration (ppm)	Total Pounds of Harpoon® Granular
August 18, 2021	Wells College Dock North 2	0.44	3,989
		Total Pounds	**3,989**

Key:

ppm = parts per million

Herbicide Transfer

A Vortex granular spreader was used for the fluridone and chelated copper treatments. Two models of boats were used for the treatments, a 20-foot skiff and an airboat. Herbicide transfer occurred at the Long Point State Park Boat Launch, where the chemical delivery truck was able to park so that other users maintained access to the boat launch during the herbicide transfer process. The fluridone was delivered in 40-pound buckets, and the chelated copper was delivered in 40-pound bags. The empty buckets and bags were triple-rinsed on site and recycled at the SLM Cortland office location through Casellsa Waste Management. SLM staff wore personal protective equipment 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.

SLM staff arrived at the Long Point State Park Boat Launch between 8:00 a.m. and 9:00 a.m. on each scheduled treatment day, launched the boat, and began assembling treatment systems. After the staff had their on-site meetings, the herbicide transfer began. The treatment crew on the boats consisted of a lead applicator and an assistant/technician. Treatment typically started around 9:00 a.m. each week, except for the treatment on July 14, 2021, which was delayed by 2 hours because of weather (high winds), and on August 11, 2021, when the start of treatment was delayed slightly. Aside from brief breaks when the boats stopped to re-load herbicide, the treatments continued uninterrupted until the lake treatment areas were completed—within 2 to 3 hours from the start time. The only exception was the treatment on August 18, 2021, which took longer due to the combined fluridone and chelated copper treatment in the Wells College Dock North 2 treatment block. There was one deviation from the treatment schedule due to weather conditions and one due both to the need to schedule around the Tonawanda Creek/Erie Canal Demonstration Project and to airboat trailer failure. The treatment originally scheduled for July 21 occurred on July 22, 2021, due to high winds, and the treatment originally scheduled for August 4 occurred on August 6, 2021, due both to the Tonawanda Creek/Erie Canal Demonstration Project and to airboat trailer failure.

2.3. Quantity of Herbicide Used and Total Area Treated

As indicated in Section 1.1, the Project was divided into three treatment blocks: Wells College Dock North, Wells College Bay South, and Wells College Dock North 2 (see Figure 1-1). Each block is discussed separately below, with respect to the quantity of herbicide used and the total area treated. To develop the treatment plan for each treatment area, the sprouting dynamics of Hydrilla tubers and condition of plants were monitored by the USACE and partners prior to and several weeks after treatment to determine optimal timing of treatment, length of exposure, and concentration of herbicide required for effective control of Hydrilla.

2.3.1. Wells College Dock North

Ten fluridone treatments were scheduled for the approximately 9.7-acre treatment area along approximately 1,500 linear feet of Wells College Bay shoreline between Wells College Dock and north of Wells Road during summer 2021. The treatment plan specified that the first two treatments would consist of application of fluridone at the rate of 20 parts per billion (ppb), and the third through tenth treatments would achieve a target concentration of 13.75 ppb (see Table 2-1), for a total of 150 ppb. The goal was to maintain a concentration of 1 to 3 ppb over the course of the treatment, as the target concentration of

fluridone in the water column for effective control of hydrilla is 1 to 3 ppb. Sonar H4C is a slow-release, pellet formulation, of fluridone. Therefore, application rates are higher than the target concentration for the water column. All application rates are in accordance with approved herbicide product label. Treatments occurred approximately seven days apart.

2.3.2. Wells College Bay South

Ten fluridone treatments were scheduled for the approximately 40-acre treatment area along approximately 3,700 linear feet of Wells College Bay shoreline between the Wells College Water Plant and south of the outlet of Paines Creek during summer 2021. The treatment plan specified that the first two treatments would consist of fluridone applications at the rate of 20 ppb, and the third through tenth treatments at the rate of 13.75 ppb (see Table 2-1). As indicated in Section 2.3.1, the goal was to maintain a concentration of 1 to 3 ppb over the course of the treatment, as the target concentration of fluridone in the water column for effective control of hydrilla is 1 to 3 ppb. Sonar H4C is a slow-release, pellet formulation of fluridone. Therefore, application rates are higher than the target concentration for the water column. All application rates are in accordance with approved herbicide product label. Treatments occurred approximately seven days apart.

2.3.3. Wells College Dock North 2

Based on monitoring conducted at the end of July that identified Hydrilla patches north of the Wells College Dock North treatment block, an additional treatment block, approximately 8.6 acres in size, was established in early August. The treatment plan for that block specified a combined application of fluridone and chelated copper in this area, followed by three weeks of fluridone only. The application rate for fluridone was 15 ppb and 0.44 ppm for chelated copper (see Table 2-1).

2.4. Water Quality Sampling Methodology

For the Wells College Dock North and Wells College Bay South treatment blocks, fluridone was applied during 10 treatment events, between June 30 and September 1, 2021. The JV performed weekly in-lake water quality sampling to determine the fluridone concentrations and dispersion of herbicide between July 2 and September 3, 2021. Additionally, for the Wells College Dock North 2 treatment block, the JV performed sampling following the four fluridone treatments between August 20 and September 3, 2021. Refer to Appendix A for analytical results of the sampling. The USACE also performed water quality sampling to determine fluridone concentrations and herbicide dispersion at 15 sites on three dates during the season: July 13, August 10, and September 8, 2021; those results are also provided in Appendix A. The samples collected by the USACE are used to increase the understanding of the concentration of fluridone that was maintained during the course of the treatment.

Additionally, the Cayuga County Health Department performed weekly drinking water sampling between July 1 and September 9, 2021, and weekly sampling at the public bathing beach between July 1 and August 19, 2021.

2.4.1. JV Sampling

The JV collected seven in-lake water samples across the two initial treatment blocks following each of the initially scheduled 10 fluridone treatment events (see Figure 2-1 and Table 2-2 for sample locations). The JV collected three additional in-lake water samples following the establishment of the third treatment block; these samples were collected beginning with the eighth week of treatment (August 18, 2021) and following the four fluridone treatment events specific to that block (August 18, August 25, September 1, and September 9; see Table 2-2). The purpose of the overall 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 for sample analyses that factored into planning each sampling event). Weekly sampling events occurred approximately two days after each application. Seven collection sites were sampled during each sampling event, and the additional three collection sites were sampled starting the eighth week of treatment (August 18, 2021) continuing through to September 9, 2021, as indicated above.

The samples were collected with a stainless-steel Kemmerer bottle sampler. The 10 in-lake sampling locations were as follows (see Figure 2-1):

- Seven samples within the treatment areas – three within the Wells College Bay South treatment area, two within the Wells College Dock North treatment area, and two within the Wells College Dock North 2 treatment area;
- One sample approximately 3/4 mile north of the Wells College Dock North 2 treatment area (LakeN1);
- One sample approximately 1/4 mile north of the Wells College Dock North treatment area (LakeN); and
- One sample approximately 3/4 mile south of the Wells College Bay South treatment area (LakeS).

Samples from each sample location listed in Table 2-3 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.

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

Treatment Areas	Sample Location	Latitude[a]	Longitude[a]
N/A	LakeN	42.7567	-76.7057
N/A	LakeN1	42.7616	-76.7078
N/A	LakeS	42.7288	-76.7111
Wells College Dock North	TreatN1	42.7458	-76.7014
Wells College Dock North	TreatN2	42.7479	-76.7021
Wells College Dock North 2	TreatN3	42.7503	-76.7030
Wells College Dock North 2	TreatN4	42.7533	-76.7042
Wells College Bay South	TreatS1	42.7364	-76.7053
Wells College Bay South	Treat S2	42.7394	-76.7040
Wells College Bay South	TreatS3	42.7418	-76.7015
N/A	Finished Drinking Water Sampling Location	42.743587	-76.699700
N/A	Beach Sampling Location	42.745189	-76.700581

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

N/A = not applicable

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%.

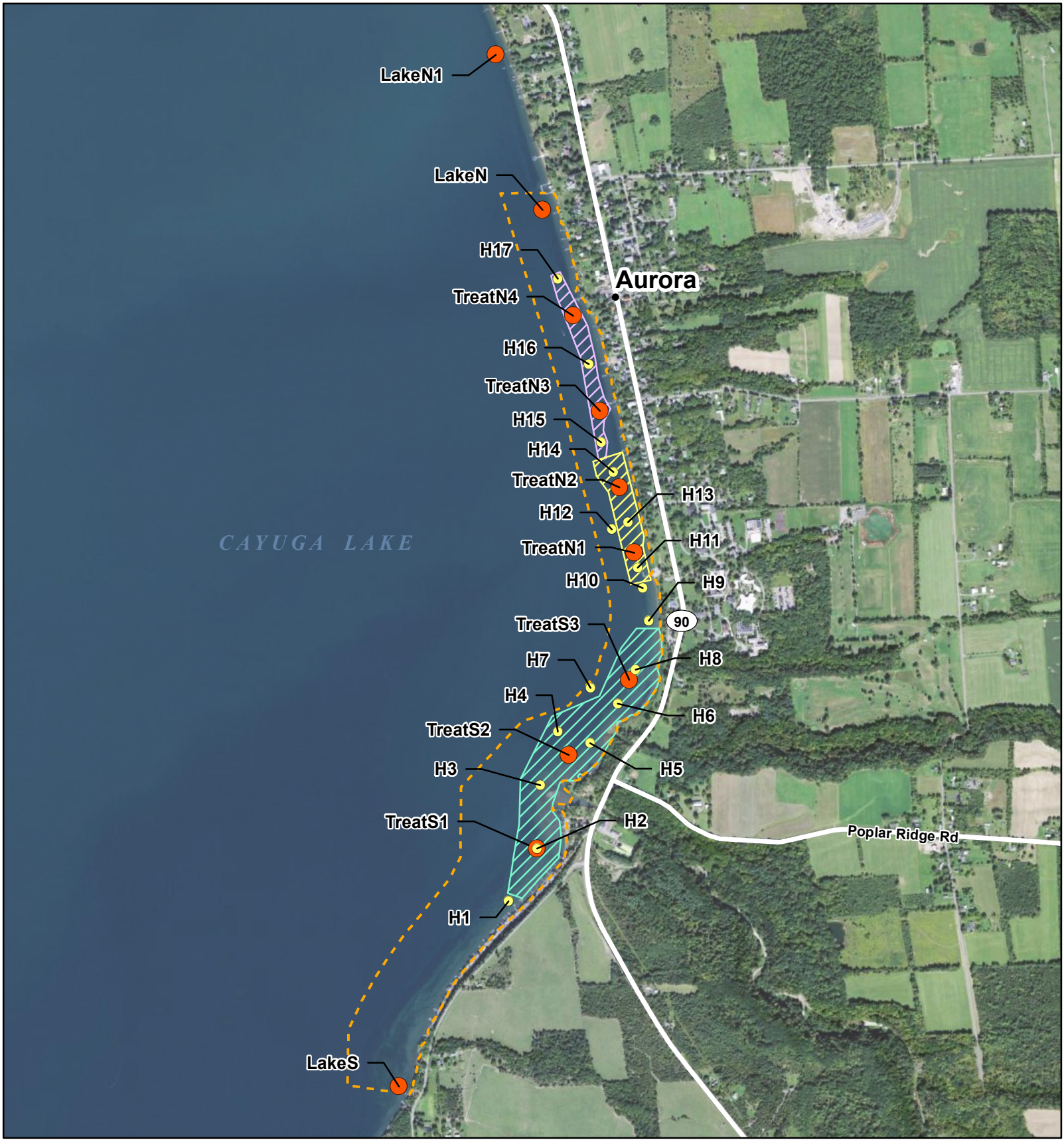


Figure 2-1 2021 In-Lake Water Sample Locations Cayuga Lake, Cayuga County, New York

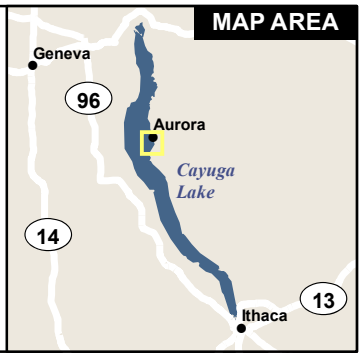
Fluridone Treatment Areas

- Wells College Bay South (39.8 acres)
- Wells College Dock North (9.6 acres)
- Wells College Dock North 2 (8.6 acres)

- Monitoring Area
- Fluridone Sample Sites- USACE
- Fluridone Sample Sites- EAS E&E JV

N

0 1,000 Feet



2.4.2. USACE Sampling

The USACE collected samples at 17 locations on three dates following the fluridone treatments. Sampling events occurred on July 13, August 10, and September 7, 2021. Samples were collected from within and adjacent to the three treatment blocks (see Figure 2-1). Two samples were collected at each location with a water pump lowered to appropriate depth in the water column. One sample was collected in the middle of the water column, and one was collected at the lake bottom to determine 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. SePRO completed analysis of the USACE samples using the HPLC method. The laboratory reported results for fluridone at a reporting limit of 1 ppb (µg/L).

2.4.3. Cayuga County Health Department Sampling

The Wells College water treatment plant shut down operations during each treatment application until each application was complete. The Cayuga County Health Department collected finished drinking water samples at the Wells College treatment plant (see Figure 2-1); the finished drinking water samples denote samples that went through the water treatment plant for processing prior to sampling. The Cayuga County Health Department collected finished drinking water samples one day after each treatment to determine if the treatment had an impact on drinking water. Additionally, the Cayuga County Health Department collected lake water at the Wells College Dock at the bathing beach one day following the first eight herbicide applications, and no samples were taken after the ninth, 10th, and 11th treatments due to the closure of the beach for the season.

Finished drinking water samples were collected from a sink tap within the Wells College maintenance building by a Cayuga County Health Department staff member. The staff member collected the sample by filling a clean high-density polyethylene container with tap water and then transferring the tap water into separate brown high-density polyethylene 30-mL sample bottles (including split samples). The Cayuga County Health Department hand delivered their sample to the Community Science Institute in Ithaca, New York, for fluridone analysis using the RaPID assay (enzyme-linked immunosorbent assay) method (RaPID Assay Fluridone Test Kit). As noted above, the laboratory reported results for fluridone to a lower reporting limit of 0.5 ppb and an upper reporting limit of 10.0 ppb. The JV collected one finished drinking water split sample of the Cayuga County Health Department samples at a rate of 10 percent (i.e., one sample). The split sample was stored, protected from light, and shipped via FedEx Priority Overnight in coolers to SePRO for analysis. SePRO utilized a proprietary HPLC to determine fluridone concentrations to a method detection limit of 1 ppb. The purpose of the split sample was to compare the fluridone concentrations in samples collected using the two different test methods (i.e., the RaPID assay method, and the SePRO proprietary HPLC method). The RaPID assay is considered a screening method, whereas the HPLC method is considered a definitive method. Any significant detection by RaPID assay would require confirmation by HPLC. There were no significant differences in detections between the Cayuga County Health Department finished drinking water sample and the JV split sample taken on August 19, 2021 (see Table 2-6).

2.5. Results

The results for the JV in-lake fluridone water samples are presented in Table 2-4. Non-treatment block samples are also included for comparison. Results from the USACE in-lake sampling are provided in Table 2-5. The following subsections provide additional analysis of the results.

2.5.1. JV Sampling

Fluridone concentrations at locations approximately 0.5 mile outside of treatment areas (LakeN, LakeN1, Lake S) remained below the reporting limit (<1 ppb) for all samples taken for the duration of the monitoring period between July 2 and September 10, 2021, with one exception. On July 30, the concentration for Lake S was 1.4 ppb. This value may have been due to potential sample contamination resulting from ice melt in packaging during shipping of the samples. For samples taken within the treatment areas, fluridone concentrations ranged from < 1.0 ppb to 2.4 ppb, with the highest concentration, 2.4 ppb, occurring within the Wells College Dock North treatment area (TreatN1) on August 9, 2021. Within treatment areas, herbicide concentrations generally did not vary. For the Wells College Dock North treatment area, the two sampling locations (TreatN1 and TreatN2) varied less than 0.5 ppb throughout the season, with the exception of August 9, when concentrations within the treatment area varied by 1.4 ppb. For herbicide concentrations at sampling locations within this treatment area (TreatS1, TreatS2, and TreatS3), the greatest variance was 1.1 ppb. Lastly, for the Wells College Dock North 2 treatment area, the two sampling locations (TreatN3 and TreatN4) had consistent herbicide concentrations for three of the four sampling events; on August 27, the concentrations varied by 1.3 ppb. Sampling results from September 3, 2021, in Wells College Dock North and Wells College Bay South, two days after the final treatment in those two areas, which occurred on September 1, 2021, indicate that concentrations were below the detection limit for Wells College Dock North and that concentrations in Wells College Bay South ranged from 1.0 to 1.4 ppb. Sampling results from September 10, 2021, in Wells College Dock North 2, two days after the final treatment, which occurred on September 8, 2021, indicate that concentrations were below the detection limit.

Table 2-4 JV In-Lake Water Sampling Results for Fluridone (ppb)

Date	Sample Location	Sample Depth (feet and inches)	Fluridone Concentration (ppb)[a]
07/02/2021	LakeN	8′9″	<1
	LakeS	4′3″	<1
	TreatN1	9′9″	**1.1**
	TreatN2	13′8″	<1
	TreatS1	4′6″	**1.0**
	TreatS2	5′0″	**1.6**
	TreatS3	7′6″	**2.1**
07/09/2021	LakeN	8′7″	<1, <1
	LakeS	3′9″	<1
	TreatN1	10′0″	<1, <1
	TreatN2	11′2″	<1
	TreatS1	5′9″	<1
	TreatS2	6′0″	<1
	TreatS3	5′3″	<1

Date	Sample Location	Sample Depth (feet and inches)	Fluridone Concentration (ppb)[a]
07/16/2021	LakeN	9′9″	<1
	LakeS	4′6″	<1
	TreatN1	8′9″	<1
	TreatN2	12′5″	<1
	TreatS1	5′3″	<1
	TreatS2	6′4″	<1, <1
	TreatS3	5′3″	**1.5**
07/26/2021	LakeN	8′11″	<1
	LakeS	4′0″	<1
	TreatN1	9′10″	**1.6**
	TreatN2	10′6″	**1.4**
	TreatS1	4′7″	**1.8**
	TreatS2	5′10″	<1, <1
	TreatS3	5′2″	<1
07/30/2021	LakeN	9′6″	<1
	LakeS	5′0″	**1.4, 1.4**
	TreatN1	13′6″	<1
	TreatN2	10′0″	<1
	TreatS1	6′3″	**1.5**
	TreatS2	10′0″	**1.9**
	TreatS3	8′0″	**1.8**
08/09/2021	LakeN	9′9″	<1
	LakeS	4′3″	<1
	TreatN1	11′0″	**2.4**
	TreatN2	9′10″	<1, <1
	TreatS1	4′8″	<1
	TreatS2	6′2″	<1
	TreatS3	5′1″	**1.0**
08/13/2021	LakeN	9′11″	<1
	LakeS	4′4″	<1
	TreatN1	9′9″	<1
	TreatN2	11′0″	**1.2**
	TreatS1	4′10″	**1.4**
	TreatS2	6′0″	**1.1**
	TreatS3	6′2″	**1.1**

Date	Sample Location	Sample Depth (feet and inches)	Fluridone Concentration (ppb)[a]
08/20/2021	LakeN1	10′9″	<1
	LakeN	11′0″	<1
	LakeS	5′6″	<1
	TreatN1	11′3″	**1.4**
	TreatN2	12′7″	<1
	TreatN3	13′8″	<1
	TreatN4	12′10″	<1, <1
	TreatS1	6′0″	**1.2**
	TreatS2	7′9″	<1
	TreatS3	7′4″	<1
08/27/2021	LakeN1	11′3″	<1
	LakeN	10′0″	<1
	LakeS	5′0″	<1
	TreatN1	10′6″	**1.2**
	TreatN2	11′8″	**1.0**
	TreatN3	14′6″	<1
	TreatN4	12′0″	**1.3**
	TreatS1	6′0″	<1
	TreatS2	6′6″	**1.0**
	TreatS3	5′9″	<1
09/03/2021	LakeN1	10′0″	<1
	LakeN	9′5″	<1
	LakeS	3′4″	<1
	TreatN1	10′3″	<1
	TreatN2	11′2″	<1
	TreatN3	11′3″	<1
	TreatN4	11′1″	<1
	TreatS1	5′6″	**1.1**
	TreatS2	7′3″	**1.4**
	TreatS3	5′5″	**1.0**
09/10/2021	LakeN1	9′0″	<1
	TreatN3	10′6″	<1
	TreatN4	10′6″	<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

2.5.2. 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. Bottom samples were higher than middle samples, where concentrations were greater than the detection limit, in all cases but at H10 on September 7, 2021. That is in keeping with where concentrations would be expected to be highest, given the granular nature of the herbicide.

For samples taken outside the treatment areas, two of the three sample locations (H1 and H10) had concentrations at or near the detection limit on the September 7, 2021, sampling date. Concentrations at sample location H12, located immediately west of the Wells College Dock North treatment area, taken on August 10, 2021, and September 1, 2021 were higher than the closest point inside the treatment area (H13) (see Table 2-5). This may indicate that currents were moving herbicide offshore in this area. For samples taken within the treatment areas, fluridone concentrations ranged from < 1.0 ppb to 6.0 ppb, with the highest concentration, 6.0 ppb, occurring within the Wells College Dock North 2 treatment area (H16 BOTTOM) on September 7, 2021, which demonstrates retention of effective concentrations within the central portion of this area. Sampling results from September 7, 2021, in Wells College Dock North and Wells College Bay South, six days after the final treatment in those two areas indicate that most of the concentrations were below the detection limit for both treatment areas and that the area in the center of the Wells College Dock North treatment area maintained effective concentrations longer after final treatment. Despite most locations showing concentrations less than those needed for effective control, results of vegetation monitoring only detected two hydrilla points within the fluridone treatment areas this fall, and both of those were along the edges. Thus, it appears there was still an effective treatment in this area. The effects of fluridone application are limited to the treatment areas, and no adverse effects were observed outside of the treatment plots. This is substantiated by the fact that water samples taken at points located ½ mile from the treatment area and those taken at the water plant were at non-detect levels for fluridone (<1.0 ppb), with the exception of one, as explained above.

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

	Fluridone Concentration (ppb)		
Sample Location	**7/13/2021**	**8/10/2021**	**9/7/2021**
H1 Bottom	<1	<1	<1
H1 Mid	<1	<1	**1.1**
H2 Bottom	<1	<1	**1.4**
H2 Mid	<1	<1	**1.4**
H3 Bottom	<1	<1	<1
H3 Mid	<1	<1	<1
H4 Bottom	<1	**4.0**	<1
H4 Mid	<1	<1	<1
H5 Bottom	<1	**1.1**	<1
H5 Mid	<1	<1	<1
H6 Bottom	<1	<1	**1.3**
H6 Mid	<1	<1	<1
H7 Bottom	<1	<1	<1

Sample Location	Fluridone Concentration (ppb)		
	7/13/2021	8/10/2021	9/7/2021
H7 Mid	<1	<1	<1
H8 Bottom	<1	<1	<1
H8 Mid	<1	<1	<1
H9 Bottom	<1	<1	<1
H9 Mid	<1	<1	<1
H10 Bottom	<1	<1	<1
H10 Mid	<1	<1	**1.0**
H11 Bottom	<1	**2.0**	<1
H11 Mid	<1	<1	<1
H12 Bottom	<1	**4.7**	**1.1**
H12 Mid	<1	**1.3**	<1
H13 Bottom	**3.6**	<1	**3.9**
H13 Mid	<1	<1	<1
H14 Bottom	**1.1**	<1	<1
H14 Mid	<1	<1	<1
H15 Bottom	<1	<1	<1
H15 Mid	<1	<1	<1
H16 Bottom	--	--	**6.0**
H16 Mid	--	--	<1
H17 Bottom	--	--	<1
H17 Mid	--	--	<1

Notes:

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

Key:

-- no sample taken
MID = middle of water column
ppb = parts per billion
USACE = United States Army Corps of Engineers

2.5.3. Cayuga County Department of Health Sampling

All finished drinking water samples were below the reporting limit of 0.5 ppb (see Table 2-6). As previously noted, there were no significant differences in detections between the Cayuga County Health Department finished drinking water sample and the JV split sample taken on August 19, 2021. Concentrations at the bathing beach ranged from less than 0.5 ppb to 0.9 ppb.

Table 2-6 Drinking Water and Beach Sampling Results for Fluridone (ppb)

Date	Sample Site	Fluridone Concentration (ppb)	
		Cayuga County Health Department	JV
7/1/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	<0.5	NS
7/8/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	<0.5	NS
7/15/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	NS	NS
7/23/20201	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	0.9	NS
7/29/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	<0.5	NS
8/9/2021	Wells College Maintenance Building	<0.5	<1
	Wells College Dock	0.6	NS
8/12/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	<0.5	NS
8/19/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	0.6	NS
8/26/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	NS	NS

Date	Sample Site	Fluridone Concentration (ppb)	
		Cayuga County Health Department	JV
9/2/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	NS	NS
9/9/2021	Wells College Maintenance Building	<0.5	NS
	Wells College Dock	NS	NS

Key:
NS = not sampled

2.6. Vegetative Monitoring and Treatment Summary

Based on observations in fall 2020, a treatment plan was developed to control monoecious Hydrilla beds in two areas totaling approximately 50 acres in Cayuga Lake at Wells College Bay in Aurora, New York (see Figure 1-1). An area surrounding these areas totaling approximately 145 acres was monitored for the presence/absence of Hydrilla patches that may develop and to monitor submerged aquatic vegetation health and composition. As indicated in Section 2.3.3, observations of Hydrilla patches in an area of 10- to 15-foot water depth north of the original Wells College Dock North treatment area in late July resulted in an additional 8.6-acre treatment area being established in early August and treated with a combination of fluridone and chelated copper.

The USACE conducted point intercept surveys (PIS) within all fluridone treatment areas and the monitoring area on five dates (June 28 [pre-treatment], July 12 and August 10 [during treatment], and September 7 and October 4, 2021 [post-treatment]) throughout the growing season to determine Hydrilla distribution and treatment efficacy. The USACE found Hydrilla at approximately 20 separate locations within the first three PISs. Approximately 15 of the Hydrilla patches detected in the PIS were within the three treatment areas conducted this year (see Figure 2-2). Comparing pre- and post-treatment PISs demonstrates that treatment was largely successful at eliminating known patches of Hydrilla within targeted treatment plots (see Figure 2-3). Overall, Hydrilla increased in percent occurrence from 0.5% in 2019 and 2020 to 1.6% in 2021. Hydrilla patches were also found in areas that the USACE has not found previously, except for the areas near the Well College beach area.

Additional effort was performed this summer and fall to delineate the extent of new Hydrilla patches outside of the 145-acre monitoring area; methods included PIS, visual observations where possible, and diver-assisted surveys (see Figure 2-4). The extent of the area where Hydrilla patches are found, as of fall 2021, is approximately 195 acres in size, which includes all of the areas that were treated this year (approximately 60 acres). This 195-acre area extends north along an additional 1.5 miles of shoreline from the northernmost extent identified last year and an additional 1.6 miles of shoreline from the southernmost extent identified last year. These areas will be studied further to determine an appropriate treatment plan to stop spread from this area to other areas within Cayuga Lake.

Despite there being an observed drop in abundance of plants within treatment areas, diversity of native plants was maintained from the previous year, with five of the seven dominant species in the PIS being native plants (see Table 2-7). Coontail (*Ceratophyllum demersum*) and eelgrass (*Vallisneria americana*)

significantly increased in percent occurrence and the invasive species Eurasian watermilfoil (*Myriophyllum spicatum*) decreased in percent occurrence. Starry stonewort (*Nitellopsis obtuse*) increased significantly from last year (2020), extending its range into shallower water than where it has been found in previous years and becoming the most frequently found species within the PIS this year.

Table 2-7 Summary of Dominant Species Percent Occurrence in PIS

Species	Native/Invasive	Percent Occurrence
Starry stonewort (*Nitellopsis obtuse*)	Invasive	30.6
Coontail (*Ceratophyllum demersum*)	Native	27.2
Sago pondweed (*Vallisneria americana*)	Native	22.7
Eelgrass (*Zostera*)	Native	17.6
White-stem pondweed (*Potamogeton praelongus*)	Native	15.9
Eurasian waterfmilfoil (*Myriophyllum spicatum*)	Invasive	11.6
Elodea (*Elodea* sp.)	Native	10.8

Figure 2-2 Hydrilla Locations from Point Intercept Surveys, June through August 2021
Cayuga Lake, Cayuga County, New York

Fluridone Treatment Areas

- Wells College Bay South (39.8 acres)
- Wells College Dock North (9.6 acres)
- Wells College Dock North 2 (8.6 acres)
- Monitoring Area

Point Intercept Surveys

- 6/28/21
- 7/12/21
- 8/10/21

N

0 1,000 Feet

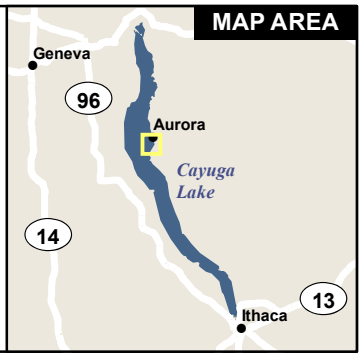


Figure 2-3 Hydrilla Locations from Point Intercept Surveys, September through October 2021
Cayuga Lake, Cayuga County, New York

Fluridone Treatment Areas

- Wells College Bay South (39.8 acres)
- Wells College Dock North (9.6 acres)
- Wells College Dock North 2 (8.6 acres)
- Monitoring Area

Point Intercept Surveys

- 9/7/21
- 10/4/21

N

0 1,000 Feet

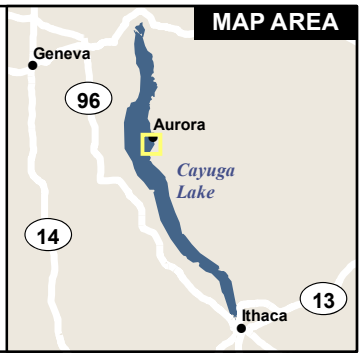


Figure 2-4 Hydrilla Locations from All Point Intercept Surveys Cayuga Lake, Cayuga County, New York

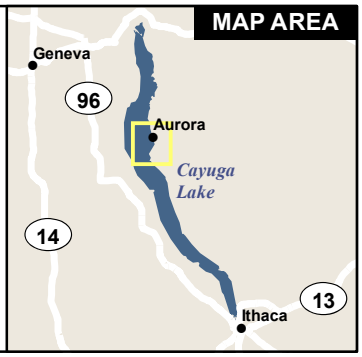
Fluridone Treatment Areas

- Wells College Bay South (39.8 acres)
- Wells College Dock North (9.6 acres)
- Wells College Dock North 2 (8.6 acres)

- Monitoring Area
- 2021 Hydrilla Points

N

0 ½ Mile



3. STUDY IMPROVEMENTS

The study improvements summarized in this section are based on lessons learned from the fourth year of the herbicide application effort, coordination with the study partners on work plan development, and activities conducted during the 2021 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 2021, was smooth and efficient. SLM's 20-foot skiff was transferred from the Catskill office to the Cortland office during the season to be used for the Project. In high wind conditions, which occur regularly on Cayuga Lake's east shoreline, the skiff is a safer and more stable work boat than the airboat. For 2022, the 20-foot skiff will be permanently stationed at the Cortland office and used for the Aurora treatments. The staging areas in Aurora adequately supported operations. 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

SePRO's proprietary HPLC method was used for analysis of fluridone in the in-lake samples. Additionally, SePRO analyzed the in-lake samples taken by the USACE using the same methodology. This allowed for an assessment of both sets of results with a low detection limit (1 ppb) to understand herbicide contact time and efficacy.

3.2. 2021 Lessons Learned

Communication

Twenty-four-hour email notification prior to herbicide treatments, including changes in treatment schedule, was effective, and no issues were raised by the Cayuga County Health Department or other stakeholders. This type of communication needs to continue in future treatment programs. There were several instances where a change in treatment date and/or delay in start time was necessary, and these were communicated with and approved by the Wells College water treatment plant.

In-Lake Sampling

Frequency of In-Lake Sampling and Logistics. In-lake samples should continue to be collected between day four and day seven after each fluridone application so that results can be obtained before the next treatment (assuming a 48-hour turnaround time). That way, the results can be used to ensure that target concentrations are achieved and not exceeded.

Point Intercept Surveys. The USACE employs the PIS 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. Based on recommendations in the 2020 report, the PIS survey area was expanded to cover areas where Hydrilla was observed in 2020, as well as adjacent areas where these known locations may expand.

4. REFERENCES

United States Army Corps of Engineers (USACE). 2021a. *Architect-Engineer Scope of Work Aquatic Plant Control ERDC Demonstration Project Stewart Park, Cayuga Lake, Ithaca, NY*. May 5, 2021.

USACE. 2021b. Change Request for Additional Hydrilla Treatment. August 9, 2021.

A. ANALYTICAL DATA

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC10168 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM28554-1	Lake N-07022021	Sonar/fluridone (ug/L)	FAST 10	<1	07/02/2021
CTM28555-1	Lake S-07022021	Sonar/fluridone (ug/L)	FAST 10	<1	07/02/2021
CTM28556-1	Treat N1-07022021	Sonar/fluridone (ug/L)	FAST 10	1.1	07/02/2021
CTM28557-1	Treat N2-07022021	Sonar/fluridone (ug/L)	FAST 10	<1	07/02/2021
CTM28558-1	Treat S1-07022021	Sonar/fluridone (ug/L)	FAST 10	1.0	07/02/2021
CTM28559-1	Treat S2-07022021	Sonar/fluridone (ug/L)	FAST 10	1.6	07/02/2021
CTM28560-1	Treat S3-07022021	Sonar/fluridone (ug/L)	FAST 10	2.1	07/02/2021

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: 07/06/21 10:00 AM
Date Results Sent: Tuesday, July 6, 2021

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

SePRO Research & Technology Campus

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16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC10261 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM28822-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28823-1	Lake N-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28824-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28825-1	Treat N1	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28826-1	Treat N1-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28827-1	Treat N2	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28828-1	Treat S1	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28829-1	Treat S2	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021
CTM28830-1	Treat S3	Sonar/fluridone (ug/L)	FAST 10	<1	07/09/2021

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: 07/12/21 10:00 AM
Date Results Sent: Tuesday, July 13, 2021

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: COC10342 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM29018-1	Lake N-07162021	Sonar/fluridone (ug/L)	FAST 10	<1	07/16/2021
CTM29019-1	Lake S-07162021	Sonar/fluridone (ug/L)	FAST 10	<1	07/16/2021
CTM29020-1	Treat N1-07162021	Sonar/fluridone (ug/L)	FAST 10	<1	07/16/2021
CTM29021-1	Treat N2-07162021	Sonar/fluridone (ug/L)	FAST 10	<1	07/16/2021
CTM29022-1	Treat S1-07162021	Sonar/fluridone (ug/L)	FAST 10	<1	07/16/2021
CTM29023-1	Treat S2-07162021	Sonar/fluridone (ug/L)	FAST 10	<1	07/16/2021
CTM29024-1	Treat S2-07162021-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/16/2021
CTM29025-1	Treat S3-07162021	Sonar/fluridone (ug/L)	FAST 10	1.5	07/16/2021

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: 07/19/21 11:00 AM
Date Results Sent: Monday, July 19, 2021

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: COC10470 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

Waterbody:	Cayuga-Aurora - NY
Waterbody size:	42956
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM29433-1	Lake N - 072621	Sonar/fluridone (ug/L)	FAST 10	<1	07/26/2021
CTM29434-1	Lake S - 072621	Sonar/fluridone (ug/L)	FAST 10	<1	07/26/2021
CTM29435-1	Treat N1 - 072621	Sonar/fluridone (ug/L)	FAST 10	1.6	07/26/2021
CTM29436-1	Treat N2 - 072621	Sonar/fluridone (ug/L)	FAST 10	1.4	07/26/2021
CTM29437-1	Treat S1 - 072621	Sonar/fluridone (ug/L)	FAST 10	1.8	07/26/2021
CTM29438-1	Treat S2 - 072621	Sonar/fluridone (ug/L)	FAST 10	<1	07/26/2021
CTM29439-1	Treat S2 - 072621-Q	Sonar/fluridone (ug/L)	FAST 10	<1	07/26/2021
CTM29440-1	Treat S3 - 072621	Sonar/fluridone (ug/L)	FAST 10	<1	07/26/2021

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: 07/27/21 10:30 AM
Date Results Sent: Tuesday, July 27, 2021

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This entire report was reviewed and approved for release.

Reviewed By: Laboratory Supervisor

MISSING 7/30

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC10650 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

Waterbody:	Cayuga-Aurora - NY
Waterbody size:	42956
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM29848-1	Lake N-080921	Sonar/fluridone (ug/L)	FAST 10	<1	08/09/2021
CTM29849-1	Lake S-080921	Sonar/fluridone (ug/L)	FAST 10	<1	08/09/2021
CTM29850-1	Treat N1-080921	Sonar/fluridone (ug/L)	FAST 10	2.4	08/09/2021
CTM29851-1	Treat N2-080921	Sonar/fluridone (ug/L)	FAST 10	<1	08/09/2021
CTM29852-1	Treat N2-080921-Q	Sonar/fluridone (ug/L)	FAST 10	<1	08/09/2021
CTM29853-1	Treat S1-080921	Sonar/fluridone (ug/L)	FAST 10	<1	08/09/2021
CTM29854-1	Treat S2-080921	Sonar/fluridone (ug/L)	FAST 10	<1	08/09/2021
CTM29855-1	Treat S3-080921	Sonar/fluridone (ug/L)	FAST 10	1.0	08/09/2021

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: 08/10/21 11:40 AM
Date Results Sent: Tuesday, August 10, 2021

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

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC10737 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM30179-1	Lake N-081321	Sonar/fluridone (ug/L)	FAST 10	<1	08/13/2021
CTM30180-1	Lake S-081321	Sonar/fluridone (ug/L)	FAST 10	<1	08/13/2021
CTM30181-1	Treat N1-081321	Sonar/fluridone (ug/L)	FAST 10	<1	08/13/2021
CTM30182-1	Treat N2-081321	Sonar/fluridone (ug/L)	FAST 10	1.2	08/13/2021
CTM30183-1	Treat S1-081321	Sonar/fluridone (ug/L)	FAST 10	1.4	08/13/2021
CTM30184-1	Treat S2-081321	Sonar/fluridone (ug/L)	FAST 10	1.1	08/13/2021
CTM30185-1	Treat S3-081321	Sonar/fluridone (ug/L)	FAST 10	1.1	08/13/2021

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: 08/16/21 11:00 AM
Date Results Sent: Tuesday, August 17, 2021

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

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC10799 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM30566-1	Lake N1	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30567-1	Lake N	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30568-1	Treat N4	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30569-1	Treat N4-Q	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30570-1	Treat N3	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30571-1	Treat N2	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30572-1	Treat N1	Sonar/fluridone (ug/L)	FAST 10	1.4	08/20/2021
CTM30573-1	Treat S3	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30574-1	Treat S2	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30575-1	Treat S1	Sonar/fluridone (ug/L)	FAST 10	1.2	08/20/2021
CTM30576-1	Lake S	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021
CTM30577-1	Split	Sonar/fluridone (ug/L)	FAST 10	<1	08/20/2021

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: 08/23/21 10:30 AM
Date Results Sent: Tuesday, August 24, 2021

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: COC10872 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM30804-1	LakeN1-082721	Sonar/fluridone (ug/L)	FAST 10	<1	08/27/2021
CTM30805-1	LakeN-082721	Sonar/fluridone (ug/L)	FAST 10	<1	08/27/2021
CTM30806-1	LakeS-082721	Sonar/fluridone (ug/L)	FAST 10	<1	08/27/2021
CTM30807-1	TreatN1-082721	Sonar/fluridone (ug/L)	FAST 10	1.2	08/27/2021
CTM30808-1	TreatN2-082721	Sonar/fluridone (ug/L)	FAST 10	1.0	08/27/2021
CTM30809-1	TreatN3-082721	Sonar/fluridone (ug/L)	FAST 10	<1	08/27/2021
CTM30810-1	TreatN4-082721	Sonar/fluridone (ug/L)	FAST 10	1.3	08/27/2021
CTM30811-1	TreatS1-082721	Sonar/fluridone (ug/L)	FAST 10	<1	08/27/2021
CTM30812-1	TreatS2-082721	Sonar/fluridone (ug/L)	FAST 10	1.0	08/27/2021
CTM30813-1	TreatS3-082721	Sonar/fluridone (ug/L)	FAST 10	<1	08/27/2021

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: 08/30/21 10:15 AM
Date Results Sent: Tuesday, August 31, 2021

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: COC10946 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM31015-1	LakeN1-090321	Sonar/fluridone (ug/L)	FAST 10	<1	09/03/2021
CTM31016-1	LakeN-090321	Sonar/fluridone (ug/L)	FAST 10	<1	09/03/2021
CTM31017-1	TreatN4-090321	Sonar/fluridone (ug/L)	FAST 10	<1	09/03/2021
CTM31018-1	TreatN3-090321	Sonar/fluridone (ug/L)	FAST 10	<1	09/03/2021
CTM31019-1	TreatN2-090321	Sonar/fluridone (ug/L)	FAST 10	<1	09/03/2021
CTM31020-1	TreatN1-090321	Sonar/fluridone (ug/L)	FAST 10	<1	09/03/2021
CTM31021-1	TreatS3-090321	Sonar/fluridone (ug/L)	FAST 10	1.0	09/03/2021
CTM31022-1	TreatS2-090321	Sonar/fluridone (ug/L)	FAST 10	1.4	09/03/2021
CTM31023-1	TreatS1-090321	Sonar/fluridone (ug/L)	FAST 10	1.1	09/03/2021
CTM31024-1	LakeS-090321	Sonar/fluridone (ug/L)	FAST 10	<1	09/03/2021

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: 09/07/21 10:30 AM
Date Results Sent: Wednesday, September 8, 2021

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: COC11017 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name WSP USA	Contact Person: Katie Evans
Address: 50 Lakefront Blvd. Ste. 111 Buffalo, NY 14202	E-mail Address: katie.evans@wsp.com
	Phone: 440-823-1677

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM31225-1	TreatN3-091021	Sonar/fluridone (ug/L)	FAST 10	<1	09/10/2021
CTM31226-1	TreatN4-091021	Sonar/fluridone (ug/L)	FAST 10	<1	09/10/2021
CTM31227-1	LakeN1-091021	Sonar/fluridone (ug/L)	FAST 10	<1	09/10/2021

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: 09/13/21 10:00 AM
Date Results Sent: Tuesday, September 14, 2021

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

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC10453 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name US Army Corps of Engineers	Contact Person: Richard Ruby
Address: 1105 North HWY T15 Knoxville, IA 50138	E-mail Address: richard.j.ruby@usace.army.mil
	Phone: 641-828-7522

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM29339-1	H1 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29340-1	H1 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29341-1	H2 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29342-1	H2 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29343-1	H3 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29344-1	H3 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29345-1	H4 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29346-1	H4 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29347-1	H5 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29348-1	H5 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29349-1	H6 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29350-1	H6 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29351-1	H7 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021

CTM29352-1	H7 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29353-1	H8 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29354-1	H8 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29355-1	H9 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29356-1	H9 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29357-1	H10 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29358-1	H10 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29359-1	H11 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29360-1	H11 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29361-1	H12 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29362-1	H12 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29363-1	H13 Bottom	Sonar/fluridone (ug/L)	FAST 10	3.6	07/13/2021
CTM29364-1	H13 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29365-1	H14 Bottom	Sonar/fluridone (ug/L)	FAST 10	1.1	07/13/2021
CTM29366-1	H14 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29367-1	H15 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021
CTM29368-1	H15 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	07/13/2021

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: 07/26/21 10:00 AM
Date Results Sent: Tuesday, July 27, 2021

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

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC10725 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name US Army Corps of Engineers	Contact Person: Richard Ruby
Address: 1105 North HWY T15 Knoxville, IA 50138	E-mail Address: richard.j.ruby@usace.army.mil
	Phone: 641-828-7522

Waterbody Information

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

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM30089-1	Bottom H1	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30090-1	Mid H1	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30091-1	Bottom H2	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30092-1	Mid H2	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30093-1	Bottom H3	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30094-1	Mid H3	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30095-1	Bottom H4	Sonar/fluridone (ug/L)	FAST 10	4.0	08/10/2021
CTM30096-1	Mid H4	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30097-1	Bottom H5	Sonar/fluridone (ug/L)	FAST 10	1.1	08/10/2021
CTM30098-1	Mid H5	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30099-1	Bottom H6	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30100-1	Mid H6	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30101-1	Bottom H7	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021

CTM30102-1	Mid H7	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30103-1	Bottom H8	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30104-1	Mid H8	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30105-1	Bottom H9	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30106-1	Mid H9	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30107-1	Bottom H10	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30108-1	Mid H10	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30109-1	Bottom H11	Sonar/fluridone (ug/L)	FAST 10	2.0	08/10/2021
CTM30110-1	Mid H11	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30111-1	Bottom H12	Sonar/fluridone (ug/L)	FAST 10	4.7	08/10/2021
CTM30112-1	Mid H12	Sonar/fluridone (ug/L)	FAST 10	1.3	08/10/2021
CTM30113-1	Bottom H13	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30114-1	Mid H13	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30115-1	Bottom H14	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30116-1	Mid H14	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30117-1	Bottom H15	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021
CTM30118-1	Mid H15	Sonar/fluridone (ug/L)	FAST 10	<1	08/10/2021

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: 08/13/21 10:45 AM
Date Results Sent: Monday, August 16, 2021

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

SePRO Research & Technology Campus

FasTEST*

16013 Watson Seed Farm Road, Whitakers, NC 27891

Chain of Custody: COC11019 **LABORATORY REPORT**

Customer Company **Customer Contact**

Company Name US Army Corps of Engineers	Contact Person: Richard Ruby
Address: 1105 North HWY T15 Knoxville, IA 50138	E-mail Address: richard.j.ruby@usace.army.mil
	Phone: 641-828-7522

Waterbody Information

Waterbody:	Cayuga-Aurora - NY
Waterbody size:	42956
Depth Average:	

Sample ID	Sample Location	Test	Method	Results	Sampling Date / Time
CTM31280-1	H1 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31281-1	H1 Mid	Sonar/fluridone (ug/L)	FAST 10	1.1	09/07/2021
CTM31282-1	H2 Bottom	Sonar/fluridone (ug/L)	FAST 10	1.4	09/07/2021
CTM31283-1	H2 Mid	Sonar/fluridone (ug/L)	FAST 10	1.4	09/07/2021
CTM31284-1	H3 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31285-1	H3 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31286-1	H4 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31287-1	H4 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31288-1	H5 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31289-1	H5 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31290-1	H6 Bottom	Sonar/fluridone (ug/L)	FAST 10	1.3	09/07/2021
CTM31291-1	H6 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31292-1	H7 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021

CTM31293-1	H7 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31294-1	H8 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31295-1	H8 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31296-1	H9 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31297-1	H9 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31298-1	H10 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31299-1	H10 Mid	Sonar/fluridone (ug/L)	FAST 10	1.0	09/07/2021
CTM31300-1	H11 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31301-1	H11 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31302-1	H12 Bottom	Sonar/fluridone (ug/L)	FAST 10	1.1	09/07/2021
CTM31303-1	H12 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31304-1	H13 Bottom	Sonar/fluridone (ug/L)	FAST 10	3.9	09/07/2021
CTM31305-1	H13 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31306-1	H14 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31307-1	H14 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31308-1	H15 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31309-1	H15 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31310-1	H16 Bottom	Sonar/fluridone (ug/L)	FAST 10	6.0	09/07/2021
CTM31311-1	H16 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31312-1	H17 Bottom	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021
CTM31313-1	H17 Mid	Sonar/fluridone (ug/L)	FAST 10	<1	09/07/2021

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: 09/13/21 10:00 AM
Date Results Sent: Tuesday, September 14, 2021

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
