

December 23, 2024

Tahoe Regional Planning Agency
Attn: Emily Justice, Aquatic Invasive Species Projects Coordinator
128 Market Street
Stateline, NV 89410

UVC Light Aquatic Invasive Plant Control Pilot Project-Summary of Treatment Field Activities for the 2024 Treatment Season

Dear Emily:

Inventive Resources Inc. (IRI) is pleased to submit the following document summarizing treatment field activities for the 2024 treatment season. This document is for your review and records. The items that are being presented are as follows.

1. A summary schedule showing the two UV boats actual treatment schedules by site for all of 2024 and major maintenance.
2. The durations of treatment and frequency of retreatment for exposures at each of the treatment sites.
3. Problems or challenges that may have prevented full treatments at the sites. Chronicling experiences and potential improvements in treatment and monitoring that may be helpful for future iterations.
4. Changes in treatment procedures or duration may be more effective for future maintenance treatment.
5. General UV Vessel information (outside dimensions, treatment area dimensions, key design features, light array configuration and light wave range for each boat, and other specs/features such as maintenance).
6. Ongoing Improvements and Next Steps

Most components and parts of the UVC treatment vessel were mobilized and assembled between May 20th and June 9th, 2024. Operational testing commenced at Tahoe Keys just prior to the Memorial Day holiday on May 27th, 2024. The UVC treatment for the 2024 season began on May 30th, 2024, and concluded on October 25th, 2024.

Schedule

Scheduling of both the UV treatment vessels at each of the treatment sites is presented in Figure 1 below. The calendar references the treatment site location where vessel II and III conducted treatment respectively. For additional information on treatment boundaries and maps, see **Attachment A**.

Figure 1
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
Schedule of UV Treatment

Version 22

10/16/2024

Boat II Docked at West Garrison

May						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27 Holiday	28	29	30	31	

Boat III Docked at Christie

May						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27 Holiday	28	29	30 Mobilization Site 26	31 Site 26	

June

Sun	Mon	Tues	Weds	Thur	Fri	Sat
						1
2	3	4	5	6	7	8
9	10 Site 13	11 Site 13	12 Mobilization Site 14	13 Site 14	14 Site 14	15
16	17 Site 5	18 Site 5	19 Site 5	20 Site 3	21 Site 3	22
23	24 Site 11	25 Site 11	26 Site 11	27 Site 10	28 Site 10	29
30						

June

Sun	Mon	Tues	Weds	Thur	Fri	Sat
						1
2	3	4	5	6	7	8
9	10 Site 15	11 Site 15	12 Site 15	13 Site 15	14 Site 9	15 Site 9
16	17 Site 22	18 Site 22	19 Site 22	20 Site 22	21 Site 24	22 Site 24
23	24 Site 24	25 Site 24	26 Site 23	27 Site 23	28 Site 23	29 Site 23
30						

July

Sun	Mon	Tues	Weds	Thur	Fri	Sat
	1 Site 10	2 Site 10	3 Site 10	4 Holiday	5	6
7	8 Site 1	9 Site 1	10 Site 2	11 Site 2	12 Site 2	13
14	15 Site 2	16 Site 2	17 Site 13	18 Site 13	19 Site 14	20
21	22 Site 14	23 Site 14	24 Site 3	25 Site 3	26 Site 5	27
28	29 Site 5	30 Site 5	31 Site 5			

July

Sun	Mon	Tues	Weds	Thur	Fri	Sat
	1 Site 23	2 Site 26	3	4 Holiday	5	6
7	8	9 Site 26	10 Site 26	11 Site 26	12 Site 26	13 Site 26
14	15 Site 15	16 Site 15	17 Site 15	18 Site 15	19 Site 15	20 Site 9
21	22 Site 9	23 Site 9	24 Site 22	25 Site 22	26 Site 22	27 Site 22
28	29 Site 23	30 Site 23	31 Site 23			

August

Sun	Mon	Tues	Weds	Thur	Fri	Sat
				1 Site 11	2 Site 11	3
4	5 Site 11	6 Site 10	7 Site 10	8 Site 10	9 Site 10	10
11	12 Site 10	13 Site 1	14 Site 1	15	16	17
18	19 Site 2	20 Site 2	21 Site 2	22 Site 2	23 Site 14	24
25	26 Site 14	27 Site 13	28 Site 13	29 Site 13	30 Site 3	31

August

Sun	Mon	Tues	Weds	Thur	Fri	Sat
				1 Site 23	2 Site 23	3 Site 24
4	5 Site 24	6 Site 24	7 Site 24	8 Site 24	9 Site 26	10 Site 26
11	12 Site 26	13 Site 26	14 Site 26	15 Site 26	16 Site 26	17
18	19 Site 15	20 Site 15	21 Site 15	22 Site 9	23	24 Site 9
25	26 Site 22	27 Site 22	28 Site 22	29	30	31

September

Sun	Mon	Tues	Weds	Thur	Fri	Sat
1	2 Holiday	3 Site 3	4 Site 5	5 Site 5	6 Site 5	7
8	9 Site 5	10 Site 11	11 Site 11	12 Site 11	13 Site 10	14
15	16 Site 10	17 Site 10	18 Site 10	19 Site 1	20 Site 1	21
22	23 Site 2	24 Site 2	25 Site 2	26 Site 2	27 Site 13	28
29	30 Site 13					

September

Sun	Mon	Tues	Weds	Thur	Fri	Sat
1	2 Holiday	3	4	5	6 Site 23	7 Site 23
8	9 Site 23	10 Site 23	11 Site 23	12 Site 24	13 Site 24	14 Site 24
15	16 Site 24	17 Site 26	18 Site 26	19 Site 26	20 Site 26	21 Site 26
22	23 Site 26	24 Site 26	25 Site 26	26 Site 15	27 Site 15	28 Site 15
29	30 Site 15					

October

Sun	Mon	Tues	Weds	Thur	Fri	Sat
		1 Site 13	2 Site 14	3 Site 14	4 Site 14	5
6	7 Site 3	8 Site 3	9 Site 5	10 Site 5	11 Site 5	12
13	14 Site 5	15 Site 11	16 Site 11	17 Site 11	18 Site 10	19
20	21 Site 10	22 Site 10	23 Site 10	24 Site 10	25 Site 1	26
27	28 Site 1	29	30	31 Holiday		

October

Sun	Mon	Tues	Weds	Thur	Fri	Sat
		1 Site 15	2 Site 9	3 Site 9	4 Site 22	5
6	7 Site 22	8 Site 22	9 Site 22	10 Site 23	11 Site 23	12 Site 23
13	14 Site 23	15 Site 23	16 Site 23	17 Site 24	18 Site 24	19
20	21 Site 24	22 Site 2	23 Site 2	24 Site 2	25 Site 8	26
27	28	29	30	31 Holiday		

Summary of Treatment

The sitemap depicted in Figure 2 highlights the locations that underwent UV treatment. There are three docking sites: one at West Garmish Court, another near Site 5 off Alpine Drive, and the third at Christie Drive. This detailed illustration aids in understanding the distribution and logistical planning of the treatment areas.

Figure 2
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
Treatment Site Map



At the commencement of each day, operators perform comprehensive inspections of boats and safety equipment, ensuring all systems are operational and review the schedule and treatment plan. They document the required information on field forms, such as the lake level and air temperature. For accurate measurements, operators utilize data from the National Oceanic and Atmospheric Administration (NOAA) website to monitor lake levels and air temperatures relevant to the project site. After departing the docking location, they navigate to the designated treatment area and initiate treatment operations.

The treatment duration at each site varies, typically lasting around 10 minutes per each set up with approximately 50% overlap. Each site receives a total of four treatment passes. Additionally, Sites 8 and 10 were subject to a single spot treatment at the end of the season, following the removal of bottom barriers.

Table 1 presents UVC treatment dates of each site and when first, second, third and fourth treatment occurred. Total treatment times for each site is noted for each site. **Attachment B** provides detailed maps for each treatment location, clearly outlining the treated areas along with the total treatment days for each site.

Table 1
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
Treatment Dates and Sampling Comments

Site	First Treatment	Second Treatment	Third Treatment	Fourth Treatment	Total Treatment Days
1	7/8/2024 - 7/9/2024	8/13/2024 - 8/14/2024	9/19/2024 - 9/20/2024	10/25/2024 - 10/28/2024	8
2	7/10/2024 - 7/16/2024	8/19/2024 - 8/22/2024	9/23/2024 - 9/26/2024	10/21/2024 - 10/25/2024	17
3	6/20/2024 - 6/21/2024	7/24/2024 - 7/24/2024	8/30/2024 - 9/3/2024	10/7/2024 - 10/8/2024	8
5	6/17/2024 - 6/19/2024	7/26/2024 - 7/31/2024	9/4/2024 - 9/9/2024	10/9/2024 - 10/14/2024	15
8s	10/25/2024				1
9	6/14/2024 - 6/15/2024	7/20/2024 - 7/23/2024	8/22/2024 - 8/24/2024	10/2/2024 - 10/3/2024	9
10	6/27/2024 - 7/3/2024	8/6/2024 - 8/12/2024	9/13/2024 - 9/18/2024	10/18/2024 - 10/24/2024	18
10s	10/21/2024 - 10/23/2024				3
11	6/24/2024 - 6/28/2024	8/1/2024 - 8/5/2024	9/10/2024 - 9/12/2024	10/15/2024 - 10/17/2024	13
13	6/10/2024 - 6/12/2024	7/17/2024 - 7/18/2024	8/27/2024 - 8/29/2024	9/27/2024 - 10/1/2024	11
14	6/12/2024 - 6/14/2024	7/19/2024 - 7/23/2024	8/23/2024 - 8/26/2024	10/2/2024 - 10/4/2024	11
15	6/6/2024 - 6/13/2024	7/15/2024 - 7/19/2024	8/18/2024 - 8/21/2024	9/26/2024 - 10/1/2024	19
22	6/17/2024 - 6/20/2024	7/24/2024 - 7/27/2024	8/25/2024 - 8/28/2024	10/4/2024 - 10/9/2024	16
23	6/26/2024 - 7/1/2024	7/29/2024 - 8/2/2024	9/6/2024 - 9/11/2024	10/10/2024 - 10/15/2024	20
24	6/21/2024 - 6/25/2024	8/3/2024 - 8/8/2024	9/12/2024 - 9/16/2024	10/16/2024 - 10/19/2024	17
26	5/30/2024 - 6/5/2024	7/1/2024 - 7/13/2024	8/9/2024 - 8/16/2024	9/17/2024 - 9/25/2024	28

After the second treatment, a significant reduction in plant presence was observed across all sites. However, sites 15 and 26 showed some regrowth of vegetation. To address this, IRI carried out a UVC light cleaning/change-out and conducted additional treatments at these locations. By the fourth treatment, minimal vegetation was present at both sites. The video links attached at the end of this report illustrate the density differences of invasive vegetation between the UVC-treated areas and the untreated areas. The untreated areas may have been harvested by the TKPOA harvesters several times; a harvesting schedule is kept by TKPOA for the sites it completes.

Site 1 was treated for two days from 7/8/2024 to 7/9/2024, covering 0.31 acres. The second treatment spanned from 8/13/2024 to 8/14/2024, covering 0.29 acres. The third treatment was from 9/19/2024 to 9/20/2024, treating 0.33 acres. The fourth treatment was conducted from 10/25/2024 to 10/28/2024, covering 0.34 acres.

Site 2 received treatment for five days from 7/10/2024 to 7/16/2024, treating 0.88 acres. The second treatment was conducted over four days from 8/19/2024 to 8/22/2024, treating 0.96 acres. The third treatment spanned four days from 9/23/2024 to 9/26/2024, covering 0.97 acres. The fourth treatment, carried out by Boat III (unlike previous treatments by Boat II), took place from 10/21/2024 to 10/25/2024, treating 0.81 acres.

Site 3 was treated for two days from 6/20/2024 to 6/21/2024, covering 0.39 acres. The second treatment occurred on 7/24/2024, covering 0.41 acres. The third treatment spanned from 8/30/2024 to 9/3/2024, treating 0.37 acres. The fourth treatment took place from 10/7/2024 to 10/8/2024, covering 0.4 acres.

Site 5 was treated for three days from 6/17/2024 to 6/19/2024, covering 0.69 acres. The second treatment took place over four days from 7/26/2024 to 7/31/2024, covering 0.75 acres. The third treatment spanned from 9/4/2024 to 9/9/2024, covering 0.77 acres. The fourth treatment was conducted over four days from 10/9/2024 to 10/14/2024, treating 0.7 acres.

Site 8s received a one-day spot treatment on 10/25/2024, covering 0.09 acres. This was the final treatment of the season. Bottom barriers were removed by others on 10/9/2024. Dr. Lars Anderson requested this spot treatment to monitor plant growth after the removal of the mats.

Site 9 was treated for two days from 6/14/2024 to 6/15/2024, covering 0.43 acres. The second treatment spanned three days from 7/20/2024 to 7/23/2024, treating 0.49 acres. The third treatment took place over two days from 8/22/2024 to 8/24/2024, covering 0.46 acres. The fourth treatment was conducted from 10/2/2024 to 10/3/2024, treating 0.45 acres.

Site 10 was treated for four days from 6/27/2024 to 7/3/2024, covering 0.94 acres. The second treatment spanned five days from 8/6/2024 to 8/12/2024, treating 0.93 acres. The third treatment took place over four days from 9/13/2024 to 9/18/2024, covering 0.98 acres. The fourth treatment spanned five days from 10/18/2024 to 10/24/2024, treating 1.17 acres. The site was expanded (separately labeled as Site 10s) on request from Dr. Lars Anderson, during the fourth treatment to include the southern section previously treated with bottom barriers.

Site 10s received treatment for three days from 10/21/2024 to 10/23/2024, covering 0.16 acres. This site is an extension of Site 10 and was treated only once during the fourth treatment.

Site 11 underwent its initial treatment over a period of three days, covering 0.42 acres. Initially, IRI was instructed to maintain a 20-foot distance from bottom barriers and suction, which significantly reduced the UV treatment area, giving a very narrow site. Following this, we recommended additional treatment closer to the docks, which was approved by Dr. Lars Anderson, and the UV vessel returned the next day. The initial site area was expanded the day after the first treatment was completed, necessitating an additional day of treatment. This modified footprint was due to clearance considerations discussed with Dr. Anderson. After further discussions, it was agreed to treat from dock to dock. The final treated area increased to 0.69 acres, with the treatment spanning from June 24, 2024, to June 28, 2024.

A second treatment was conducted over three days, from August 1, 2024, to August 5, 2024, covering 0.65 acres. The third treatment took place from September 10, 2024, to September 12, 2024, covering

0.67 acres. The fourth treatment occurred from October 15, 2024, to October 17, 2024, covering 0.68 acres.

Site 13 was treated for three days from 6/10/2024 to 6/12/2024, covering 0.39 acres. The second treatment took place over two days from 7/17/2024 to 7/18/2024, treating 0.47 acres. The third treatment spanned three days from 8/27/2024 to 8/29/2024, covering 0.5 acres. The fourth treatment took place over three days from 9/27/2024 to 10/1/2024, treating 0.5 acres. The site area was expanded after the first treatment, allowing for closer treatment to the bottom barriers on the south side of the site.

Site 14 was treated for three days from 6/12/2024 to 6/14/2024, covering 0.47 acres. The second treatment spanned three days from 7/19/2024 to 7/23/2024, treating 0.57 acres. The third treatment took place over two days from 8/23/2024 to 8/26/2024, covering 0.59 acres. The fourth treatment was conducted from 10/2/2024 to 10/4/2024, treating 0.59 acres. The site area was expanded after the first treatment, enabling closer treatment to the bottom barriers and DASH area on the south side of the site.

Site 15 received treatment for five days from 6/6/2024 to 6/13/2024, covering 0.65 acres. The second treatment spanned five days from 7/15/2024 to 7/19/2024, treating 0.59 acres. The third treatment took place over four days from 8/18/2024 to 8/21/2024, covering 0.58 acres. The fourth treatment was conducted from 9/26/2024 to 10/1/2024, treating 0.62 acres.

Site 22 was treated for four days from 6/17/2024 to 6/20/2024, covering 0.73 acres. The second treatment spanned four days from 7/24/2024 to 7/27/2024, treating 0.75 acres. The third treatment took place over four days from 8/25/2024 to 8/28/2024, covering 0.74 acres. The fourth treatment was conducted from 10/4/2024 to 10/9/2024, treating 0.79 acres.

Site 23 received treatment for five days from 6/26/2024 to 7/1/2024, covering 0.77 acres. The second treatment spanned five days from 7/29/2024 to 8/2/2024, treating 0.79 acres. The third treatment took place over five days from 9/6/2024 to 9/11/2024, covering 0.77 acres. The fourth treatment was conducted from 10/10/2024 to 10/15/2024, treating 0.83 acres.

Site 24 was treated for four days from 6/21/2024 to 6/25/2024, covering 0.74 acres. The second treatment spanned five days from 8/3/2024 to 8/8/2024, treating 0.82 acres. The third treatment took place over four days from 9/12/2024 to 9/16/2024, covering 0.8 acres. The fourth treatment was conducted from 10/16/2024 to 10/19/2024, treating 0.82 acres.

Site 26 received treatment for six days from 5/30/2024 to 6/5/2024, covering 1.15 acres. The second treatment spanned seven days from 7/1/2024 to 7/13/2024, treating 1.18 acres. The third treatment took place over seven days from 8/9/2024 to 8/16/2024, covering 1.18 acres. The fourth treatment was conducted from 9/17/2024 to 9/25/2024, treating 1.16 acres.

IRI documented treatment observations and results following each treatment. After the second treatment, it was observed that most plants in the treatment sites were no longer present, with only a few small patches remaining, as shown in the collected video footage. Further details can be found in the video footage taken in August, which is included in the project site video links at the end of this report.

Vessel Equipment Inspections, Maintenance, and Calibration of Equipment

Daily Maintenance and Checklist

Daily maintenance and inspection activities were conducted each day during treatment operations, including fueling and inspection of all operating systems. Maintenance requiring the treatment vessel to remain stationary or off was reserved for non-treatment hours, primarily weekends, to minimize downtime. General maintenance performed during these times included, but was not limited to, the following:

1. Inspection of winch cables and replacement if needed.
2. Generator maintenance service.
3. Bulb cleaning, as needed.
4. Underwater inspections.
5. Dock maintenance and inspections.
6. Calibration and/or inspection of equipment as needed.

Each operator completes a daily checklist and submits the requisite forms to the designated filing system. Copies of the daily checklist, daily monitoring and observation logs, pre-field checklists, and associated maps are included in **Attachment C**. Furthermore, the daily calibration of meter reading equipment by each operator is documented within the pre-field checklist. The inspection of operational equipment is conducted daily, as noted on the pre-field checklist.

Generator Maintenance

Both vessels are equipped with 99kw Kohler generators (Model 99EOZDJ), serviced per the manufacturer's recommendations approximately every 300 service hours. Maintenance activities include oil servicing, inspection, and replacement of all gaskets and fittings, as well as replacement of oil and air filters. Vessel II has a total of 898.7 hours of service, while Vessel III has a total of 1,094 hours of service. Our maintenance technician serviced these generators on the following dates:

1. July 17th
2. July 20th
3. August 14th
4. August 22nd

Monitoring Instruments

The devices listed in Table 2 are installed in the treatment vessels as noted. Calibration of these devices was performed daily according to the manufacturers' recommendations, as noted in the field notes. The calibration of pH meters was performed using a three-point calibration process and buffers. The calibration of the EC meter was performed using 12,84mS of calibration liquid. The turbidity meter uses two NTU standard solutions for calibration.

Table 2
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
Monitoring Instruments Installed in UVC Treatment Vessels

Instrument Description	Vessel II	Vessel III
Kunhewuhua Anemometer Wind Speed Control Instrument (M# B07P5M7XZW)	✓	
Pegau Anemometer Tower Meter (M# Pegauh926xcg5sp)		✓
Sper Scientific Turbidity Instrument (M# 860040)	✓	✓
Tawiliysy pH, EC, and TDS meter (5 in 1) (M#BOD1R4RRCL7)	✓	✓

UVC Light Maintenance

UVC lights can become fouled over time. While in situ scrubbing helps maintain functionality, a major overhaul is recommended at least once during the treatment season, especially if UV transmittance decreases.

For each vessel, a major overhaul of UVC lights was conducted once during the season. Between September 4 and September 7, 2024, a small team of technicians replaced the UVC lights. This process involved removing each skid and installing clean, new, or refurbished lights to ensure optimal operation. The removed lights were transported back to the IRI facility, where they were scrubbed, sanitized, and stored for emergency replacement during the treatment season.

During the off-season (November through May), all vessels and associated equipment are removed from the project site and taken apart for long-term storage. During this time, electrical connections are inspected, and all lamps are cleaned and stored at our maintenance facility.

IRI anticipates converting Vessel III to match the configuration and size of the newer Vessel II. This will allow both vessels to have the same arrays and number of lamps, making them easily interchangeable and more efficiently maintained.

Assessment of UV Treatment Effectiveness Using Hydroacoustic Scans Reefmaster and Biobase

The Reefmaster and Biobase hydroacoustic scans were meticulously analyzed by IRI to monitor the impact of our UV treatment. The side-by-side comparison provided by these technologies is exemplified in Image A, below. TKPOA has captured side scans for all sites throughout the season, and the results are compelling.

In the images, the left panel highlights the starting point of the scan (indicated by the grey dot), while the right panel displays the side scan results. Notably, there is a significant reduction in dense plant populations as the vessel navigates into the UV-treated area. This is particularly evident in the scan dated August 12, 2024, demonstrating the treatment's efficacy in Image B. A total of 16 hydroacoustic scans were conducted, each reinforcing the positive impact of the UV treatment on aquatic plant density. The data clearly illustrates the transformation of densely populated areas into more manageable, less vegetated zones.

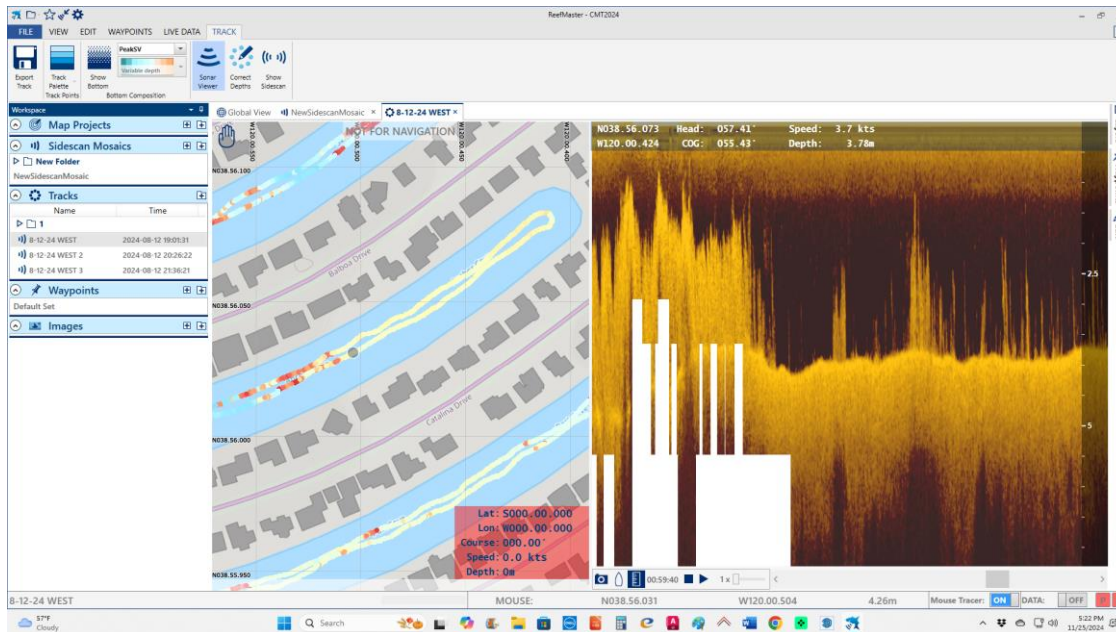


Image A - The area noted on the left center of the scan. The right side of the image shows the vessel entering a treated site notice the drop of vegetation once you enter the treated site.

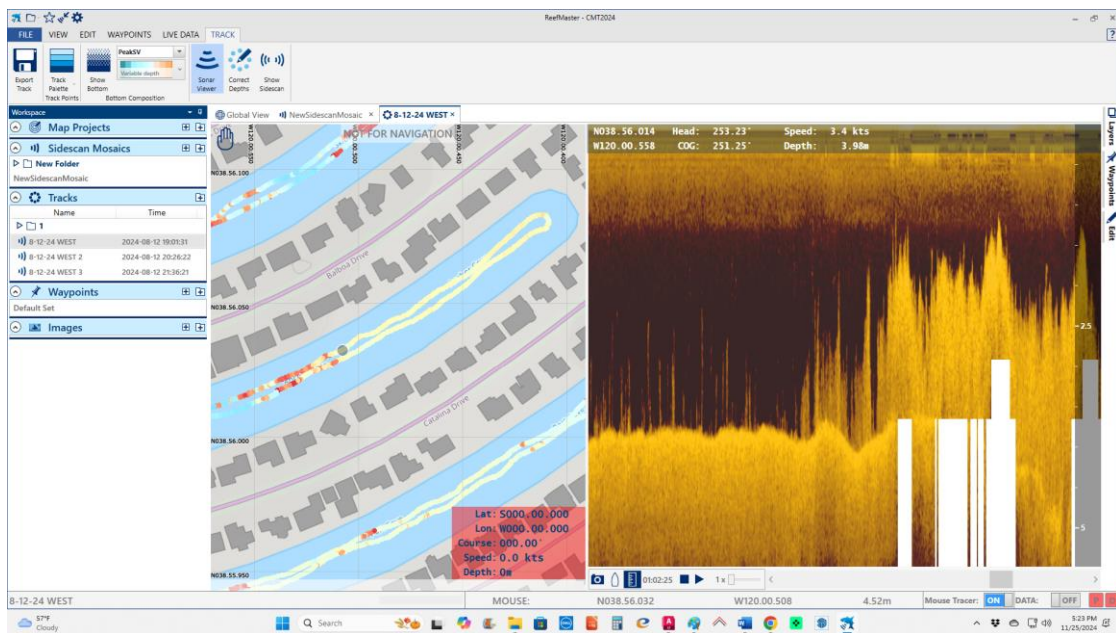


Image B – This image shows the vessel leaving the UV treated area entering the harvested section again. Note the height and density of vegetation difference between the two zones.

In previous CMT meetings, it was explained that side scans were thought to cover only the area directly beneath the boat. However, a BioBase™ representative, experienced in hydroacoustic mapping, clarified that the width of side scans is a function of height, as demonstrated by the acoustical footprint equation in Image C.

$$\text{Acoustic Footprint} = (\text{Depth} * \tan \theta) * 2$$

For a 20° cone ($\theta = 10$), at 5 ft depth, the acoustic cone covers 3.5 ft of bottom.

Most 200kHz transducers have a 20-degree beam angle

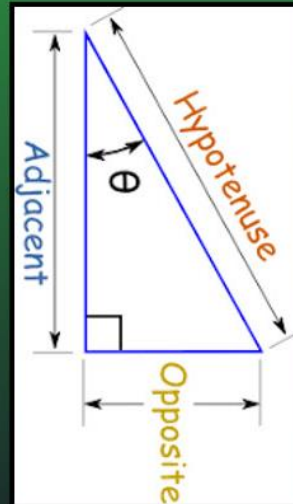


Image C – Hydroacoustic scan acoustical footprint calculation. At a 5ft water depth, the scan will show a 3.5 ft bottom. In most of the area, depths ranged from 5 to 12 feet. So, if an area is 10 ft (Site 24) then the width of the scan is 7ft.

Typically, transducers have a 20° beam angle. This means if the sonar is positioned 5 feet above the lake bottom, the scan width is approximately 3.5 feet. In a case with the sonar positioned about 10 feet above the sediment bottom, the side scan covers approximately 7 feet. Side scans offer comprehensive representations of plant height and volume. Unlike rake pulls, which only sample specific spots, side scans provide a broader perspective. Utilizing both scans and rake data together yields a more accurate understanding of aquatic vegetation beneath the water surface.

Treatment Regimen Changes

Throughout the course of the project, there were several adjustments to the treatment regimen. The most significant change was moving from half treatments to full treatments.

Year 1 (2022): IRI initiated a UVC treatment project using a vessel developed for Lakeside Marina. This smaller vessel was specifically designed to treat areas under docks and could easily reach nearshore areas. However, IRI faced challenges during low water levels and was unable to adequately treat areas with less than 3 feet of water clearance.

Year 2 (2023): To address these low water level challenges, IRI built a larger vessel focused on mid-channel treatment. This new 16 ft x 40 ft array effectively treated dock-to-dock areas. As a result, fewer plants were left for the smaller cantilever vessel, leading us to speed up its treatment in the nearshore areas, applying two to four half treatments to project sites. However, IRI learned that faster treatments were not as successful in these dense regions.

Year 3 (2024): This project year, IRI's goal was to significantly expand our UV treatment capabilities. To achieve this, IRI constructed a third vessel, also sized at 16 ft x 40 ft. IRI aimed to treat larger areas to prevent the fragments floating into the treated zones. Unfortunately, permit constraints prevented IRI from expanding the UV treatment areas to the requested larger size. IRI opted to treat all sites a fourth time and increasing from half treatments to full treatments in lieu of increasing the treatment acreage.

Problems, Challenges and Proposed Improvements for the 2025 UV Treatment Season and Beyond

As with all treatment control strategies, continuous improvements and modifications are necessary to enhance effectiveness and optimize time utilization. Challenges and, if applicable, suggested improvements are summarized in this section below.

Vessel Speed

- **Challenge:** In previous years, the distance between treatment sites and the docking station dedicated to UV treatment caused significant travel time for operators, reducing overall efficiency.
- **Improvement:** This issue was mitigated by establishing multiple dedicated docking stations at three different site locations and installing onboard motors to increase travel speed.

Maintenance

- **Challenge:** Maintaining UV lights has been a recurring task.
- **Improvement:** Maintenance processes have been streamlined each year, with the current setup highlighting the advantages of UV lights with side access, facilitating easier inspections, switch-outs, and general maintenance.

Timing of UV Treatments

- **Challenge:** Plants that are tall and heavily dense.
- **Recommendation:** The first UV treatment should occur between May and July, as early treatment is critical. UV light is most effective when plants are tender, and turions are in the early stages of development. All sites should complete their first treatment by mid-July. The second UV treatment should occur between August and October. Supplemental treatment sessions should be followed by a survey of all treated sites, coordinating spot treatments for denser areas first. Reviewing hydroacoustic scans is beneficial to coordinated treatment efforts.

Additional Treatment Sites

- **Challenge:** Strategizing resources to target treatment the most effectively.
- **Considerations:** Adding better sonar and having access to TKPOA Biobase data monthly can enhance treatment strategies based on real-time infestation density. Access to plant height data during the working season would also be beneficial.
- **Optimization:** Spot treatment sites should be large enough to be treated fully in one day to optimize staff and treatment time, as traveling to and treating multiple small sites in one day is not feasible.

Monitoring Regimen

- **Challenge:** Rake pulls should not be the sole method for evaluating the composition and health of growing plants. They do not necessarily capture everything present in the water. Additionally, a raked plant may have already lost turgor pressure or begun the decomposition process. Was the plant that was processed on the rake emergent, floating, submergent? The individual performing the rake pull may not be able to determine if the plant was originally lying down or standing upright.
- **Observation:** <https://www.iriproducts.com/UV/cmt.html> IRI was invited to observe the rake pull process on August 15, 2024. You can view a typical rake pull day on the link provided. As shown in the video, very few plants were found in the UV-treated area. It would have been beneficial to assess the viability of the plants extracted during the rake pull.

- **Recommendation:** Employing multiple assessment methods such as video, photography, sonar, aquatic vegetation survey will provide a more comprehensive representation of the sample area.
- **Biovolume Reduction:** Should be calculated accurately using treatment polygons to differentiate treated from non-treated areas, avoiding any unintentional overlap.

Lake Morphology

- **Challenge:** Lake morphology and bank slopes vary, with some docks having significant clearance differentials.
- **Adaptation:** Areas with sloped or obstructed bottoms require a smaller or more flexible treatment array for better footprint coverage. Image D illustrates how sloped bottom surfaces can affect treatment adequacy. A hinged configuration of the array would minimize the clearance issue.

Treatment Array Modifications

- **Challenge:** Better movement with faster travel times around project site. Lessen overlap.
- **Maneuverability:** Streamlining modifications to the treatment array can allow better maneuvering in tighter areas. UV boats need configurations that can easily adapt to different sites, speeding up treatment and minimizing unnecessary overlap. See Image E.

GPS Monitoring

- **Challenge:** Recording in real time where the vessel is and for how long. User friendly interface that can be applied to other third-party vessels providing service.
- **Recommendation:** Both vessels were equipped with two GPS devices each. One device was customized for area calculations. The second device was an off the shelf device that was semi customizable. The off-the-shelf GPS device could be beneficial to other parties. The brand is OneStepGPS and had a small monthly fee of \$14/month. This device enabled the project managers to see boat movements and track start/stop times. IRI suggests that this device be mounted on other vessels such as harvesters or other monitoring vessels to help track locations. GPS history is tracked and can easily be queried.

Other issues and/or comments that IRI is currently trying to improve or mitigate that can improve treatment operations in the 2025 season and beyond include:

- Mapping in advance would be beneficial to plan travel time and designate docking areas.
- Weather or other external issues impacted our ability to treat areas as scheduled, therefore a treatment plan with some flexibility to allow for boat swaps and maintenance without the need to confirm every change.
- Currently we are trying to modify the light chambers structural configuration to minimize UV light gaps in treatment.
- Obstacles in treatment areas.
- Streamline maintenance procedures. For example, a complete treatment array swap would allow to simply disconnect the treatment chamber and replace/swap with a spare. Then, the used one will be refreshed with new or refurbished UV lights at the IRI facility and remain on hand for the next change.
- Have the treatment chamber allow adjustability to treat smaller plants at a closer proximity. Perhaps after the first and second treatment, change the array to a lower sitting frame that will allow a closer treatment to these smaller plants.

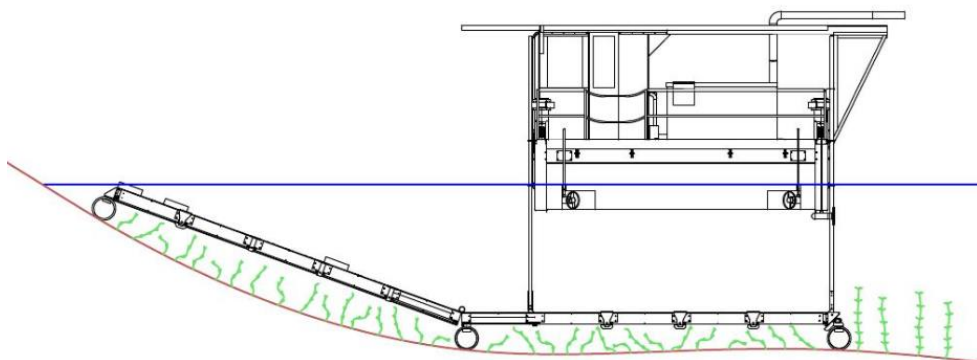
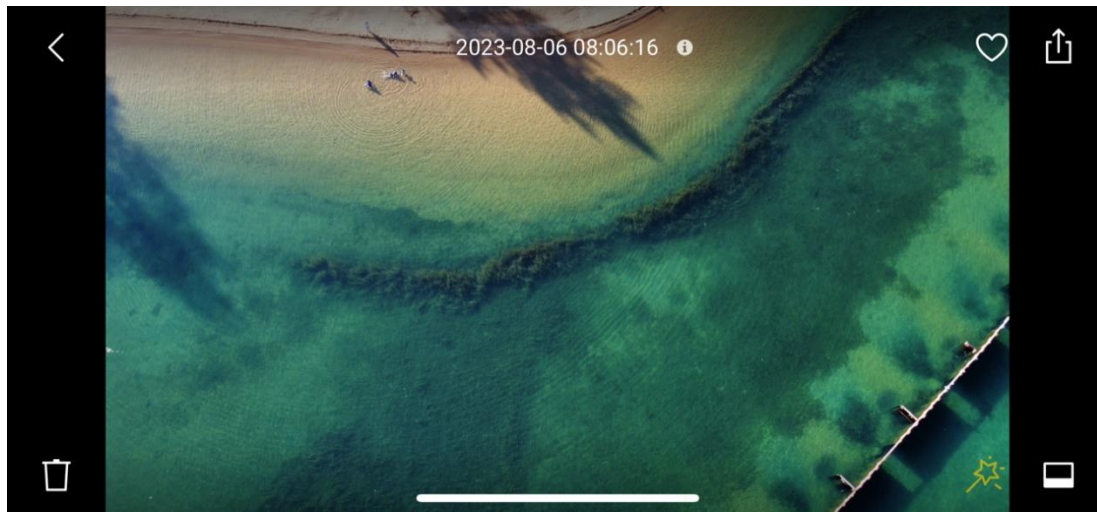
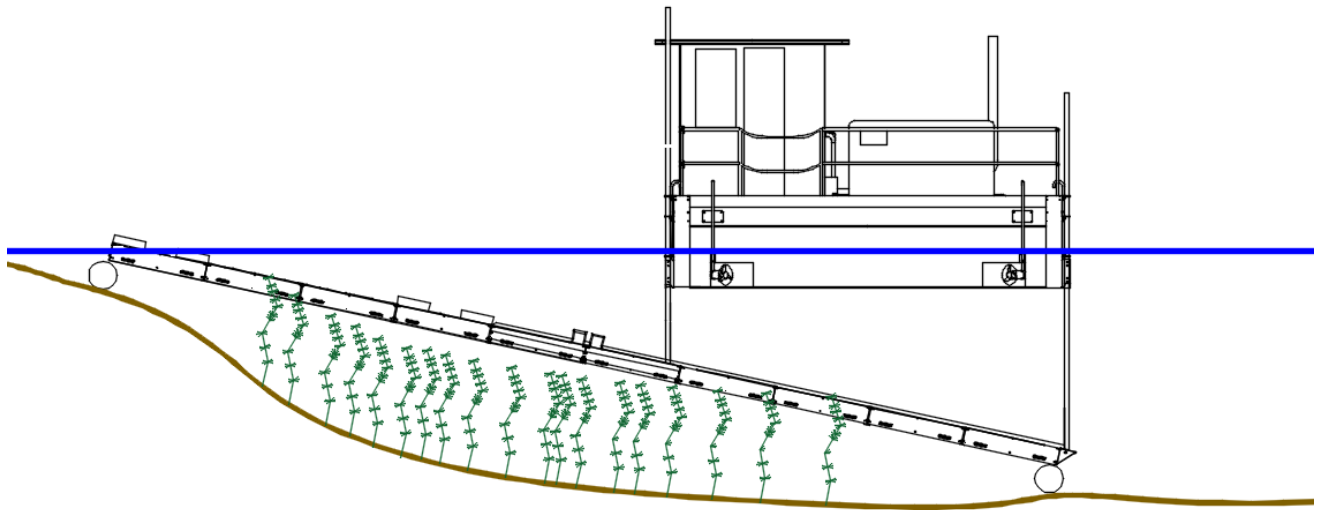


Image D – (top) Rigid and semi rigid treatment chamber does not allow for more flexible wrapping of surface, therefore creates larger gaps in heavily sloped area and these areas may not receive the same treatment as areas that have the chamber closer, creating a line of vegetation (middle) that was not treated adequately *Image is from 2023 Lakeside Beach*. (bottom) Using a hinged array design would reduce the clearance between the bottom surface and effectively "hug" or conform to the surface contours, minimizing treatment differentials.

General UV Vessel information

IRI operated two UV treatment vessels during the season. These vessels feature light chambers equipped with multiple UV light skids operating in the germicidal range (254nm - 275nm). The chambers deliver a lethal dose of radiation to damage the DNA of plant cells, preventing their replication.

- **Vessel II:** Equipped with a 16ft by 40ft light chamber, powered by a 99kW generator, with hull dimensions of 8ft x 28ft.
- **Vessel III:** Features a 16ft by 40ft light chamber, powered by a 99kW generator, with an 8ft x 32ft hull.

Both vessels are powered by a barge that supplies electrical power to a grid of UV-C lamps in the light chamber, which is lowered over the plants. Maintenance should be performed at manufacturer-recommended intervals and include general safety and service inspections to optimize treatment and minimize downtime. Whenever feasible, major maintenance should be done on weekends or when the vessel is not in operation.

UV Treatment Tracker Report

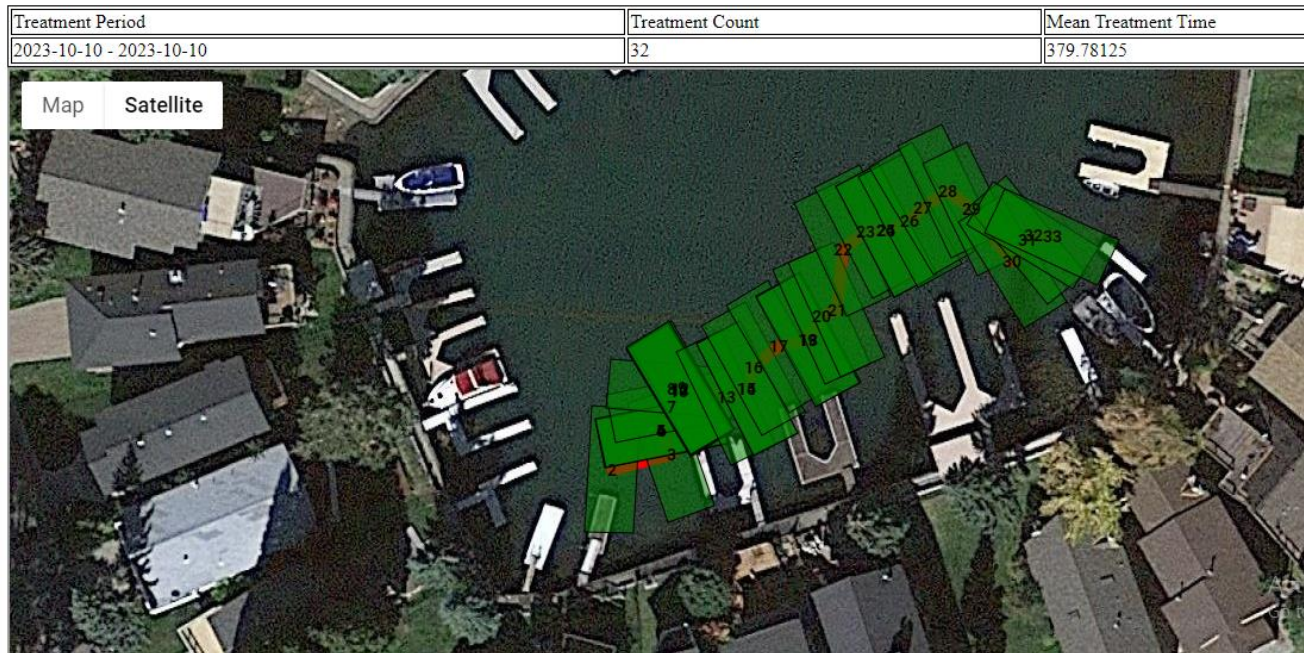


Image E – 2023 GPS tracking system. Demonstration shows when treatment vessel is making turns, how IRI may achieve uneven treatment. In this area the vessel operator was moving the vessel every 7.5 minutes, averaging 15 minutes per area.

Attachment D includes general UV treatment vessel specifications and schematics of each vessel used at Tahoe Keys.

Key Features of the UV Vessels

- Each vessel has a slow-moving power barge with a flotation system supporting the UV-C light chamber, which is adjustable using winch cables.
- A marine diesel-powered electric generator supplies all the electrical power requirements for the vessel and UV-C light chamber.

- A programmable control system with timers automates repetitive operations, and remote cameras allow operators to make visual observations of plant conditions under the chamber.
- Customized GPS systems for location boundaries and treatment set up tracking.
- Current models feature 99 kW generators. Previous models had propane generators and gasoline conversions.
- Due to increased demand from COVID-19, UV-C lamps and LED-UVC products are becoming more mainstream and rapidly evolving. Ongoing in-house testing is being conducted on many improved types available.
- As UV-C light output improves, exposure time and the distance between lamps and plants can be greatly optimized.

2024 Tracking system

The images F-L depict UVC-treated areas. Image F provides an example of the entire treated site 26. The tracking dashboard indicates that site 26 was treated by Vessel III, recording the number of treatment setups each day and the total acres treated. It also notes the dates of each treatment, allowing you to determine the duration. For instance, Image E shows that it took 6 days to treat site 26.

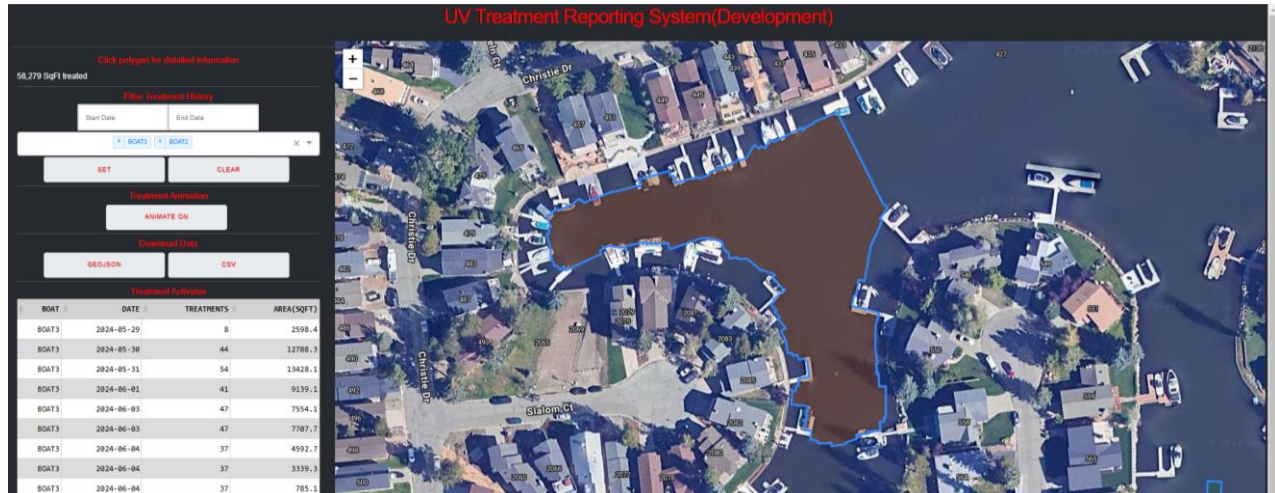


Image F

Image G illustrates Day 1, shown in red, where the operator treated approximately 12,000 square feet. The green area indicates the treatment performed on the second day, with an overlap of about 20 feet between the two areas. With improved equipment and additional training, this overlap can be minimized.



Image G

Image H illustrates Day 3 treatment, shown in green. This area was relatively small but challenging to maneuver around. Consequently, the operator treated approximately 10,000 square feet that day.



Image H

Image I illustrates the treatment on Day 4, shown in green. On this day, the operator moved to a new section of site 26 and treated the area over the aeration device. Throughout the day, the operator had to frequently reposition to avoid blocking the passage channel for oncoming boating traffic.

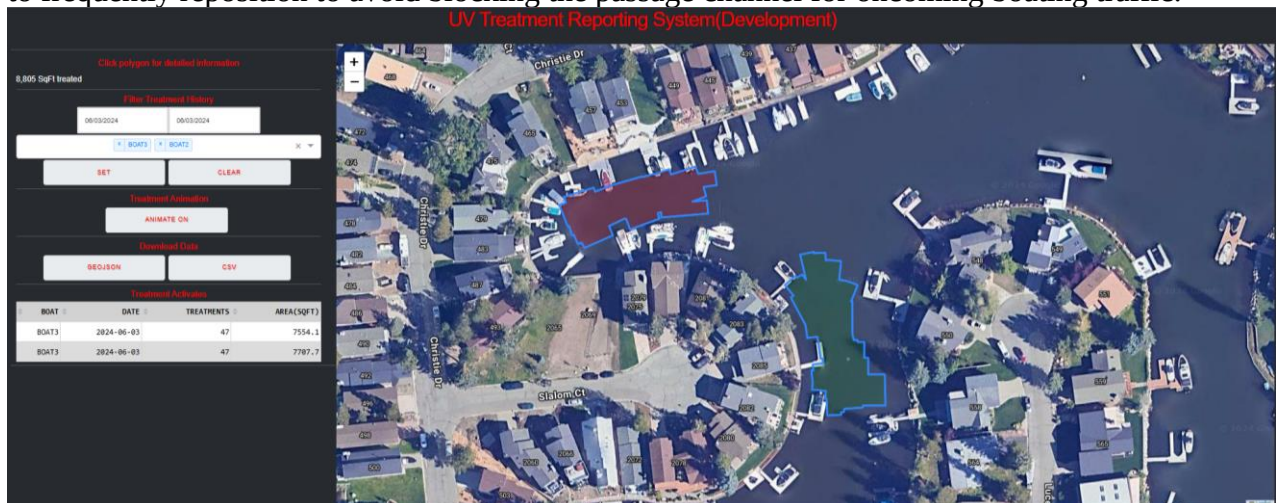


Image I

Image J represents Day 5 of treatment, indicated in green. Although treatment had been completed ahead of schedule by the end of Day 4, moving to the next site early would have caused disruptions to the associated monitoring efforts conducted by other contractors, resulting in non-compliance with the permits and design. Adhering to the calendar schedule was necessary, and operators were not authorized to move to the next site without approval. Due to the difficulties in making field adjustments to start at a new site early, operators often treated an additional day at the current site instead of moving to the next one on the calendar. Therefore, our contractors conducted an extra day of fine-level treatment at the site.

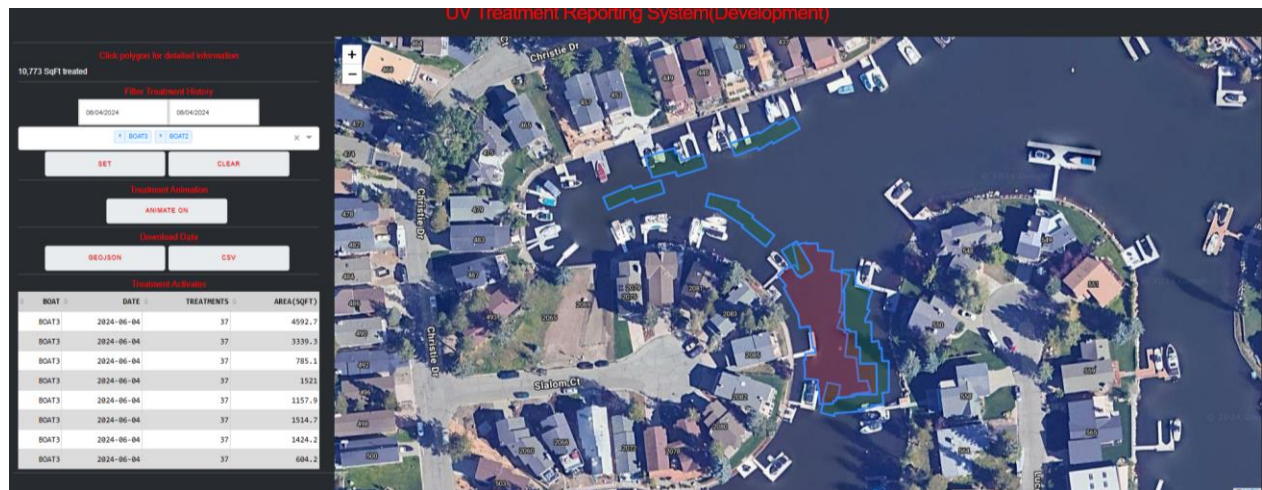


Image J

Image K illustrates the transition of a non-treated area section entering the UVC treated area 5 days after treatment.

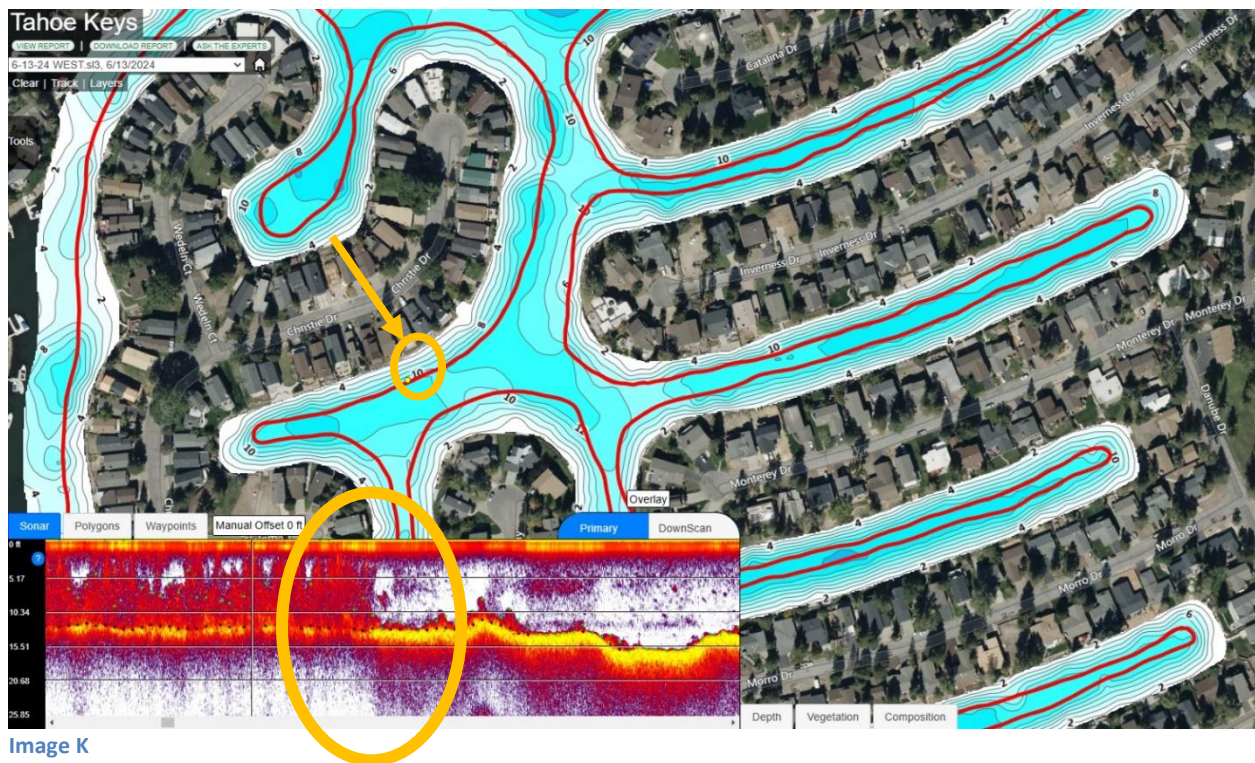
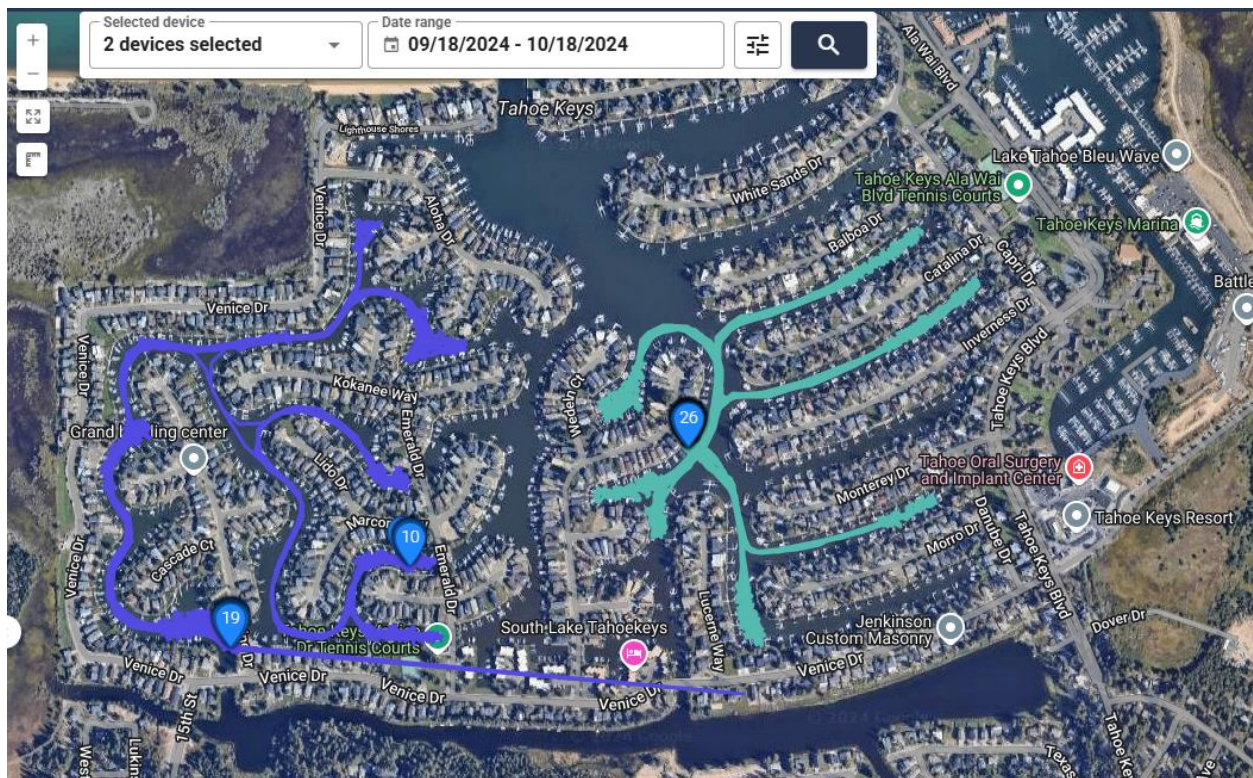


Image K

Image L illustrates the transition of a non-treated area section entering the UVC treated area 20 days after treatment. This image clearly depicts the wall of plants to the left and near bare sediment after the first treatment.



Image M below displays the tracking history obtained from the GPS units for the two UVC treatment vessels. The tracking history covers the period from September 18th through October 18th, 2024. The highlighted paths for both vessels represent the routes taken by each treatment vessel to reach a treatment site routinely. The implementation of additional docking stations may reduce travel time.



Ongoing Improvements and Next Steps

Over the past six years, IRI has progressively upgraded its UV treatment vessels at Lake Tahoe, beginning with a 32 SF array and expanding to two 640 SF vessels in 2024. This pilot project,

utilizing novel UVC treatment technology, has consistently achieved its goal of at least 75% control. Achieving this level of control with first-of-its-kind pilot units is highly encouraging and suggests that expectations for commercial-stage equipment could further enhance treatment capabilities.

Other UV-C pilot tools are continually being improved for faster and more effective treatment, especially in hard-to-access and shallow areas. Tools that enable remote and unmanned operation, faster travel, and other features that reduce treatment costs are also being developed.

IRI is committed to continuing UV treatment operations at Lake Tahoe. Currently, we are cleaning and retrofitting all the vessels used during the 2024 treatment season. This includes extensive cleaning of the protective quartz sleeves over the UV lamps, replacing corroded electrical wiring, upgrading the winches, and making other improvements to ensure all vessels are ready for deployment by May 2025.

IRI believes a comprehensive strategy for long-term and larger acreage sites, deploying multiple UVC vessels can significantly enhance treatment efficiency. Below are possible next steps for treatment coverage.

- **1 UVC Vessel:** Capable of covering 10 acres, three times per season. (30 treatment acres)
- **2 UVC Vessels:** Can cover 20 acres, three times per season. (60 treatment acres)
- **6 UVC Vessels:** Can cover 60 acres, three times per season (180 treatment acres)

IRI believes a combination of UVC treatment vessels, and a harvester can effectively treat both the midchannel and shoreline sites, this will reduce the cost of treatment and speed up the treatment process for the entire site.

We are prepared to commit at least the same capacity as in 2024, approximately 50 treatment acres. Over the past several years, we have tested a variety of UVC lamps and LEDs, leading us to believe we may have found a potential solution for treating near-shore problem areas. The waterproof UVC-LEDs we field-tested in Tahoe and performance-tested in-house have shown promising results. These new LEDs may enable the use of flexible panels that can contour to the shape of the sloped bottom. A small, flexible treatment vessel could be ready for field testing in 2025. This flexible panel can position the UVC light rays very close to the plants for more effective treatment.

2024 UVC results and Conclusion

The results of the UV treatment will be included in a comprehensive report, based on rake pull data and scans by others. Rake pull data and images were documented by multiple parties conducting the rake pulls. Additionally, IRI provided underwater video footage for selected sites to visually demonstrate the plants' condition "non-treated" and "treated" areas. These videos show the plants drooping shortly after UV treatment and decomposing in subsequent footage. IRI believes that future projects should include "before" and "after" treatment video data to more accurately assess the effectiveness of the UV treatment.

The provided links offer an array of videos and photographs showcasing various areas within the project site. These visual resources are invaluable for gaining a comprehensive understanding of the project's scope and environment:

- Project Site Videos (<https://iriproducts.com/UV/cmt.html>)
- Project Site Photographs (<https://iriproducts.com/UV/photos.html>)

By exploring these links, you can gain deeper insights into the different facets of the project and observe the details firsthand. If there is any specific area or detail, all project and video images from the UVC project are available upon request.

Based on this pilot study, IRI knows that the aquatic invasive plants that were treated with approximately 15-minute UVC light lost turgor pressure and subsequently dropped. However, what remains unknown is the level of plant reduction deemed acceptable by stakeholders. There should be a global standard for the control and eradication of invasive plants. Most treatment methods will require ongoing maintenance and inspection to ensure that invasive plant levels are kept at a minimum.

After the first treatment, only a small remainder of plants remained according to the hydroacoustic scans and photographs. During the second treatment, the plants were shorter and smaller, suggesting that lowering the clearance of the treatment chamber could have allowed for closer contact with these smaller plants. By August, three months into treatment, IRI was confident that UVC treatment was successful at all sites. UVC is particularly effective at reducing the number of tall plants after the initial treatment.

At the beginning of this project, our goal was to reduce plant density by 75% and maintain a 4-foot clearance below the hull bottom. Each year, UV treatment successfully achieved this task. By August, most sites were bare, with only a few straggler plants remaining. On August 14, 2024, IRI spent the day with TKPOA staff to observe the rake pull process. Notably, very few plants were collected in the mid-channel compared to the shoreline, where UVC treatment was not used in 2024.

For additional information, images, or any questions or concerns, please contact IRI at 209-545-1663 or by email at john@IRIproducts.com.

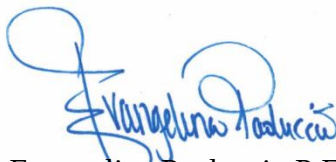
Sincerely,

Inventive Resources Inc.



John J. Paoluccio

President, Inventive Resources Inc.



Evangelina Paoluccio P.E.

Project Engineer, Inventive Resources Inc.

Attachment A
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
Treatment Map and Treatment Calendar

Boat II Docked at West Garmish

May						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27 Holiday	28	29	30	31	

June						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
						1
2	3	4	5 Mobilization	6	7	8
9	10 Site 13	11 Site 13	12 Site 14	13 Site 14	14 Site 14	15
16	17 Site 5	18 Site 5	19 Site 5	20 Site 3	21 Site 3	22
23	24 Site 11	25 Site 11	26 Site 11	27 Site 10	28 Site 10	29
30						

July						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
	1 Site 10	2 Site 10	3 Site 10	4 Holiday	5	6
7	8 Site 1	9 Site 1	10 Site 2	11 Site 2	12 Site 2	13
14	15 Site 2	16 Site 2	17 Site 13	18 Site 13	19 Site 14	20
21	22 Site 14	23 Site 14	24 Site 3	25 Site 3	26 Site 5	27
28	29 Site 5	30 Site 5	31 Site 5			

August						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
				1 Site 11	2 Site 11	3
4	5 Site 11	6 Site 10	7 Site 10	8 Site 10	9 Site 10	10
11	12 Site 10	13 Site 1	14 Site 1	15	16	17
18	19 Site 2	20 Site 2	21 Site 2	22 Site 2	23 Site 14	24
25	26 Site 14	27 Site 13	28 Site 13	29 Site 13	30 Site 3	31

September						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
1	2 Holiday	3 Site 3	4 Site 5	5 Site 5	6 Site 5	7
8	9 Site 5	10 Site 11	11 Site 11	12 Site 11	13 Site 10	14
15	16 Site 10	17 Site 10	18 Site 10	19 Site 1	20 Site 1	21
22	23 Site 2	24 Site 2	25 Site 2	26 Site 2	27 Site 13	28
29	30 Site 13					

October						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
		1 Site 13	2 Site 14	3 Site 14	4 Site 14	5
6	7 Site 3	8 Site 3	9 Site 5	10 Site 5	11 Site 5	12
13	14 Site 5	15 Site 11	16 Site 11	17 Site 11	18 Site 10	19
20	21 Site 10	22 Site 10	23 Site 10	24 Site 10	25 Site 1	26
27	28 Site 1	29	30	31 Holiday		

November						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11 Holiday	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Boat III Docked at Christie

May						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23 Mobilization	24	25
26	27 Holiday	28	29	30 Site 26	31 Site 26	

June						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
						1
2	3 Site 26	4 Site 26	5 Site 26	6 Site 15	7	8
9	10 Site 15	11 Site 15	12 Site 15	13 Site 15	14 Site 9	15 Site 9
16	17 Site 22	18 Site 22	19 Site 22	20 Site 22	21 Site 24	22 Site 24
23	24 Site 24	25 Site 24	26 Site 23	27 Site 23	28 Site 23	29 Site 23
30						

July						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
	1 Site 23	2 Site 26	3	4 Holiday	5	6
7	8	9 Site 26	10 Site 26	11 Site 26	12 Site 26	13 Site 26
14	15 Site 15	16 Site 15	17 Site 15	18 Site 15	19 Site 15	20 Site 9
21	22 Site 9	23 Site 9	24 Site 22	25 Site 22	26 Site 22	27 Site 22
28	29 Site 23	30 Site 23	31 Site 23			

August						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
				1 Site 23	2 Site 23	3 Site 24
4	5 Site 24	6 Site 24	7 Site 24	8 Site 24	9 Site 26	10 Site 26
11	12 Site 26	13 Site 26	14 Site 26	15 Site 26	16 Site 26	17
18	19 Site 15	20 Site 15	21 Site 15	22 Site 9	23	24 Site 9
25	26 Site 22	27 Site 22	28 Site 22	29	30	31

September						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
1	2 Holiday	3	4	5	6 Site 23	7 Site 23
8	9 Site 23	10 Site 23	11 Site 23	12 Site 24	13 Site 24	14 Site 24
15	16 Site 24	17 Site 26	18 Site 26	19 Site 26	20 Site 26	21 Site 26
22	23 Site 26	24 Site 26	25 Site 26	26 Site 15	27 Site 15	28 Site 15
29	30 Site 15					

October						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
		1 Site 15	2 Site 9	3 Site 9	4 Site 22	5
6	7 Site 22	8 Site 22	9 Site 22	10 Site 23	11 Site 23	12 Site 23
13	14 Site 23	15 Site 23	16 Site 23	17 Site 24	18 Site 24	19
20	21 Site 24	22 Site 2	23 Site 2	24 Site 2	25 Site 2	26
27	28	29	30	31 Holiday		

November						
Sun	Mon	Tues	Weds	Thur	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11 Holiday	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

- IRI 2024 treatment areas
- Single spot treatment areas
- Boat travel path



UVC Light Aquatic Invasive Plant Control Pilot Project 2024 Tahoe Keys Site Map	
Inventive Resources, Inc. 5038 Salido Blvd / PO Box 1316 Salido, California 95368 General Information: 209.545.1663	
DATE	11-22-24
SCALE	NTS
DRAWN BY	DS
CHECKED BY	EP
REVIEWED BY	JAP
EXHIBIT	1

IRI 2024 treatment areas

Single spot treatment areas

Boat travel path

Docking locations



UVC Light Aquatic Invasive Plant Control Pilot Project 2024
 Tahoe Keys
 Site Map

Inventive Resources, Inc.
 5038 Salida Blvd / PO Box 1316
 Salida, California 95368
 General Information: 209.545.1663

DATE	11-26-24
SCALE	NTS
DRAWN BY	DS
CHECKED BY	EP
REVIEWED BY	JAP
EXHIBIT	1

Attachment B
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
Treatment Site Maps

Site 1 – First Treatment



Area: 13,596 ft²

Treatment time: 14.5 hours

Site 1 – Second Treatment



Area: 12,753 ft²

Treatment time: 15.4 hours

Site 1 – Third Treatment



Area: 14,182 ft²

Treatment time: 13.0 hours

Site 1 – Fourth Treatment



Area: 14,839 ft²

Treatment time: 13.6 hours

Site 2 – First Treatment



Area: 38,402 ft²

Treatment time: 41.0 hours

Site 2 – Second Treatment



Area: 41,752 ft²

Treatment time: 35.9 hours

Site 2 – Third Treatment



Area: 42,150 ft²

Treatment time: 35.5 hours

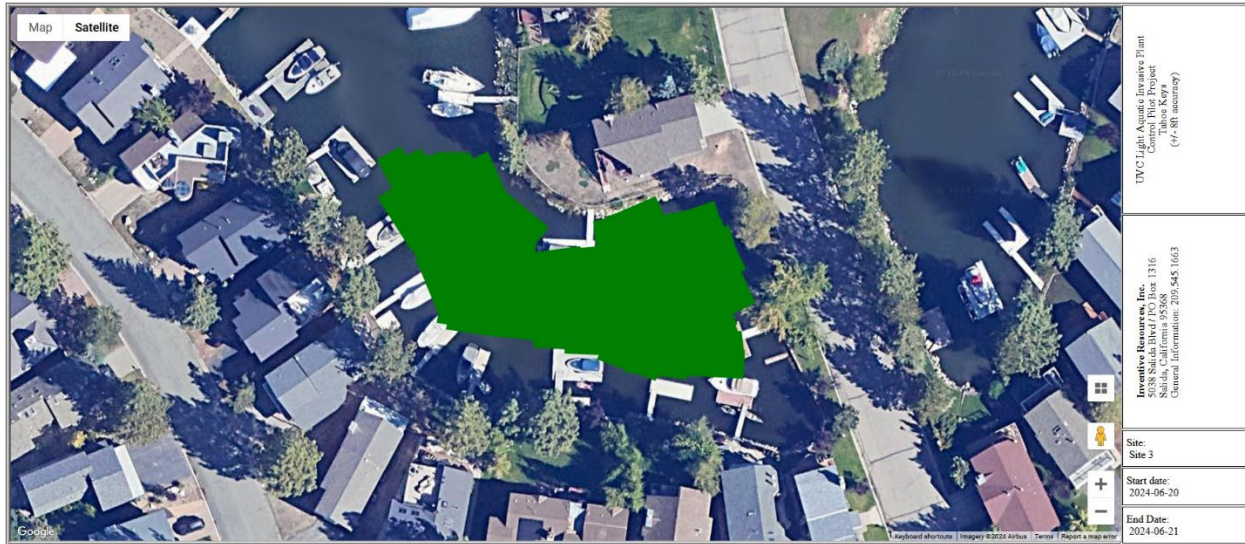
Site 2 – Fourth Treatment



Area: 35,072 ft²

Treatment time: 34.8 hours

Site 3 – First Treatment



Area: 16,897 ft²

Treatment time: 13.6 hours

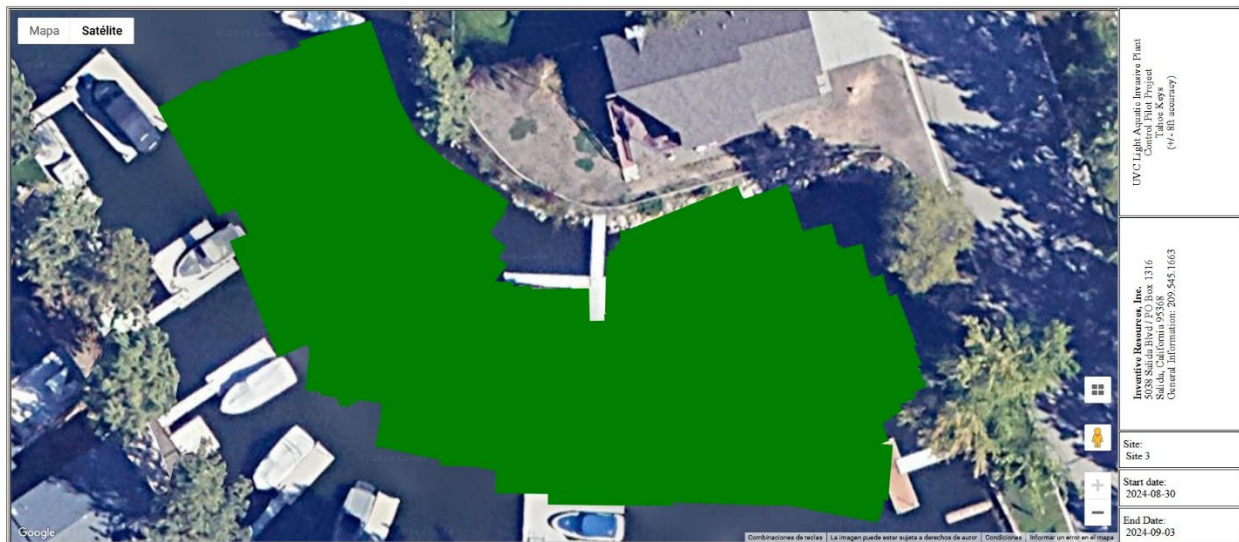
Site 3 – Second Treatment



Area: 17,642 ft²

Treatment time: 18.1 hours

Site 3 – Third Treatment



Area: 16,273 ft²

Treatment time: 11.6 hours

Site 3 – Fourth Treatment



Area: 17,547 ft²

Treatment time: 18.3 hours

Site 5 – First Treatment



Area: 29,956 ft²

Treatment time: 28.4 hours

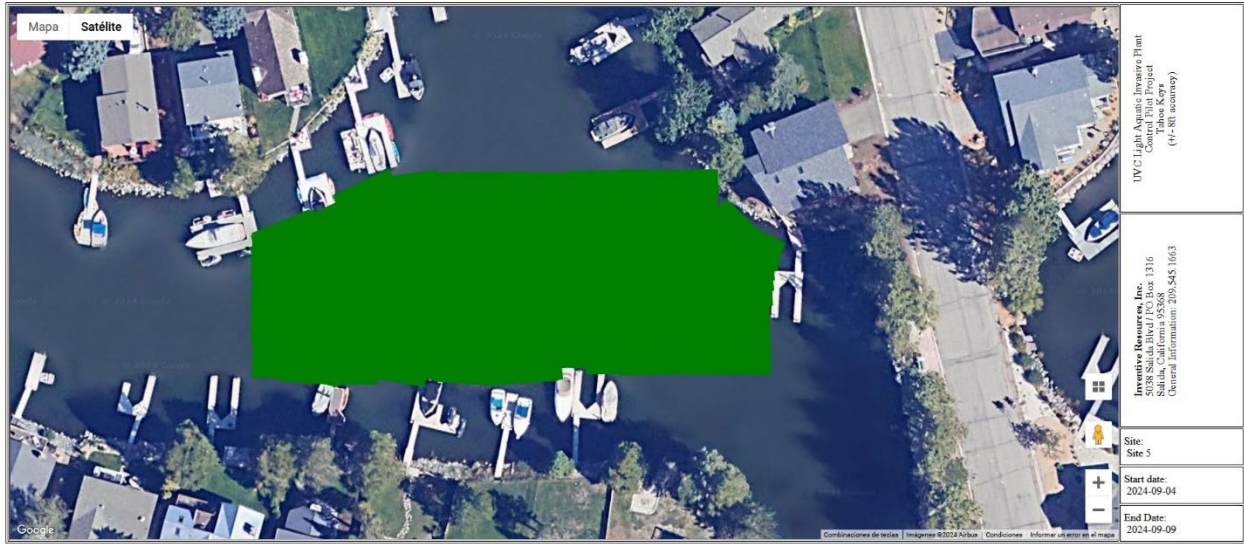
Site 5 – Second Treatment



Area: 32,477 ft²

Treatment time: 36.5 hours

Site 5 – Third Treatment



Area: 33,374 ft²

Treatment time: 36.0 hours

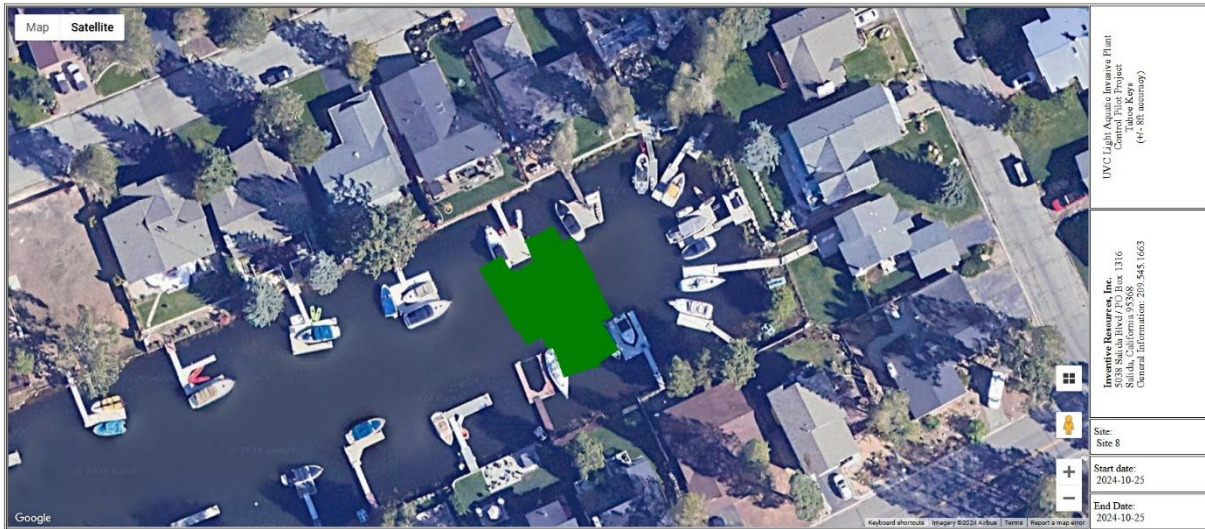
Site 5 – Fourth Treatment



Area: 30,506 ft²

Treatment time: 36.0 hours

Site 8s – First Treatment



Area: 3,861 ft²

Treatment time: 2.6 hours

Site 9 – First Treatment



Area: 18,759 ft²

Treatment time: 17.8 hours

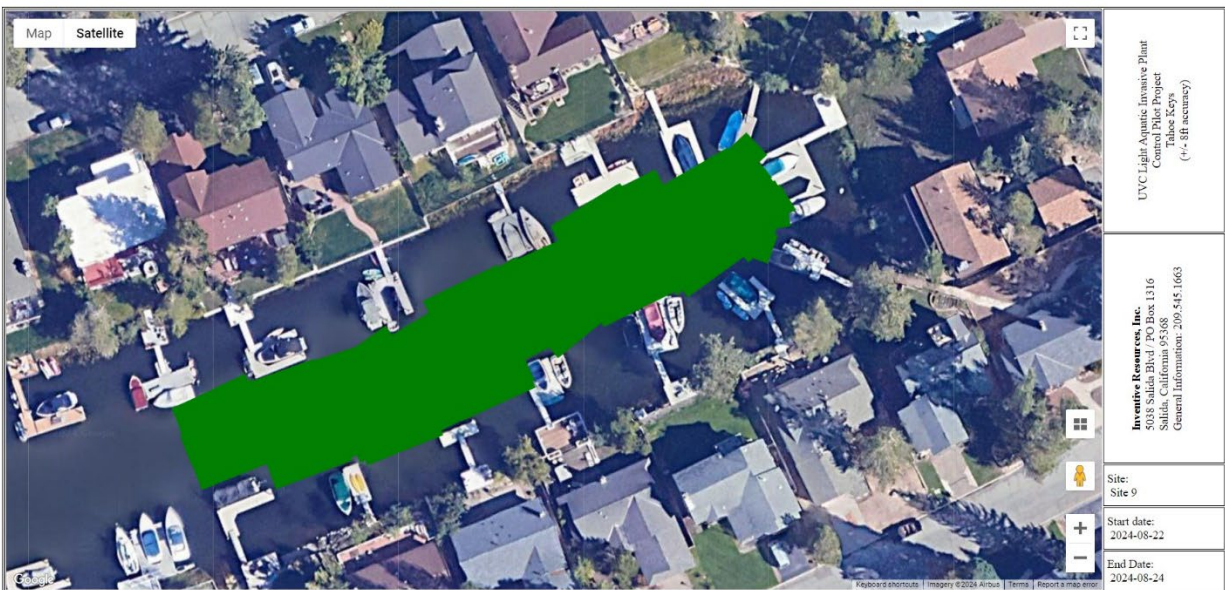
Site 9 – Second Treatment



Area: 21,495 ft²

Treatment time: 24.8 hours

Site 9 – Third Treatment



Area: 19,889 ft²

Treatment time: 16.1 hours

Site 9 – Fourth Treatment



Area: 19,805 ft²

Treatment time: 18.9 hours

Site 10 – First Treatment



Area: 40,920 ft²

Treatment time: 34.0 hours

Site 10 – Second Treatment



Area: 40,305 ft²

Treatment time: 39.5 hours

Site 10 – Third Treatment



Area: 42,541 ft²

Treatment time: 33.6 hours

Site 10 – Fourth Treatment



Area: 50,765 ft²

Treatment time: 42.3 hours

Site 11 – First Treatment



Area: 30,060 ft²

Treatment time: 33.5 hours

Site 11 – Second Treatment



Area: 28,428 ft²

Treatment time: 25.4 hours

Site 11 – Third Treatment



Area: 29,275 ft²

Treatment time: 28.8 hours

Site 11 – Fourth Treatment



Area: 29,648 ft²

Treatment time: 28.7 hours

Site 13 – First Treatment



Area: 16,947 ft²

Treatment time: 21.5 hours

Site 13 – Second Treatment



Area: 20,524 ft²

Treatment time: 20.0 hours

Site 13 – Third Treatment



Area: 21,755 ft²

Treatment time: 29.6 hours

Site 13 – Fourth Treatment



Area: 21,899 ft²

Treatment time: 25.1 hours

Site 14 – First Treatment



Area: 20,462 ft²

Treatment time: 21.3 hours

Site 14 – Second Treatment



Area: 25,038 ft²

Treatment time: 26.7 hours

Site 14 – Third Treatment



Area: 25,516 ft²

Treatment time: 15.4 hours

Site 14 – Fourth Treatment



Area: 25,488 ft²

Treatment time: 25.5 hours

Site 15 – First Treatment



Area: 28,426 ft²

Treatment time: 44.1 hours

Site 15 – Second Treatment



Area: 25,758 ft²

Treatment time: 47.3 hours

Site 15 – Third Treatment



Area: 25,205 ft²

Treatment time: 36.6 hours

Site 15 – Fourth Treatment



Area: 27,011 ft²

Treatment time: 46.6 hours

Site 22 – First Treatment



Area: 31,658 ft²

Treatment time: 39.0 hours

Site 22 – Second Treatment



Area: 32,578 ft²

Treatment time: 35.5 hours

Site 22 – Third Treatment



Area: 32,301 ft²

Treatment time: 35.0 hours

Site 22 – Fourth Treatment



Area: 34,232 ft²

Treatment time: 37.5 hours

Site 23 – First Treatment



Area: 33,643 ft²

Treatment time: 43.3 hours

Site 23 – Second Treatment



Area: 34,221 ft²

Treatment time: 47.4 hours

Site 23 – Third Treatment



Area: 33,464 ft²

Treatment time: 42.0 hours

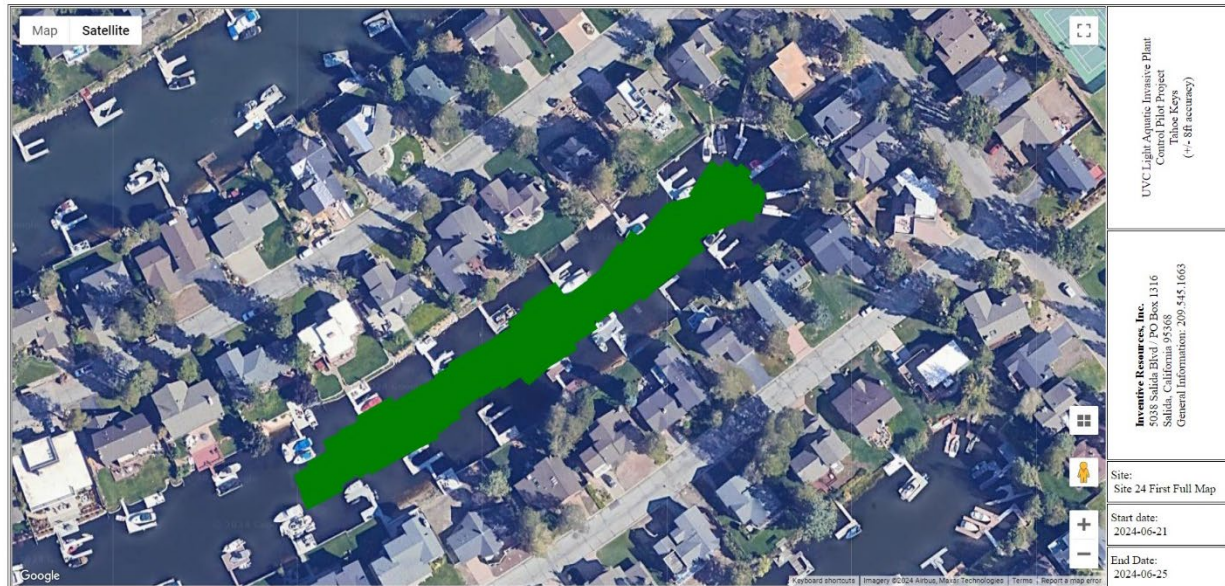
Site 23 – Fourth Treatment



Area: 36,317 ft²

Treatment time: 44.8 hours

Site 24 – First Treatment



Area: 32,289 ft²

Treatment time: 33.9 hours

Site 24 – Second Treatment



Area: 35,816 ft²

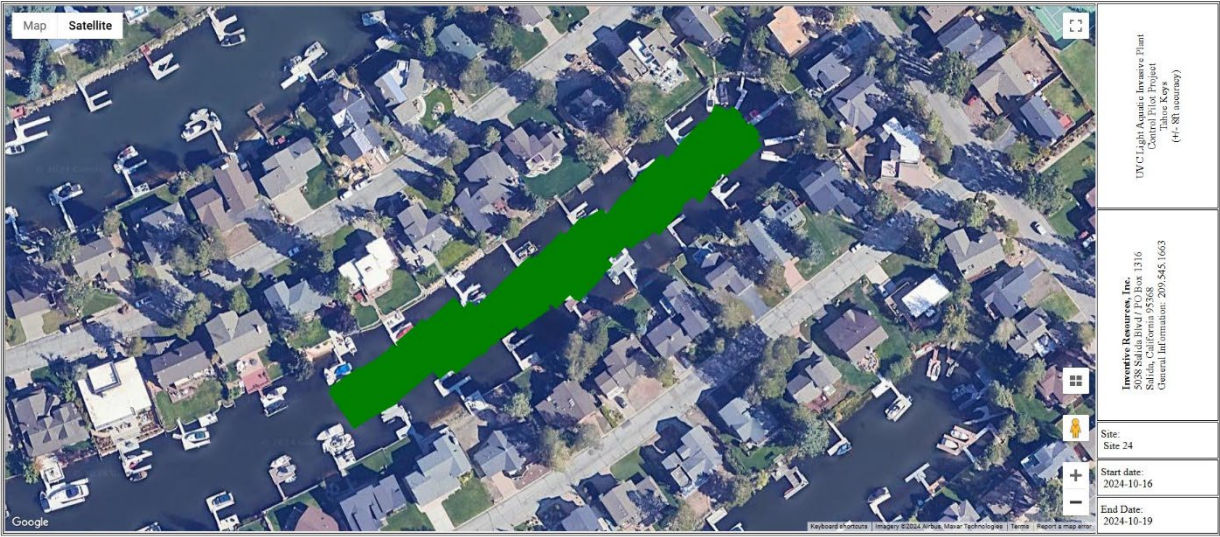
Treatment time: 43.1 hours

Site 24 – Third Treatment



Area: 34,771 ft²
Treatment time: 35.3 hours

Site 24 – Fourth Treatment



Area: 35,565 ft²
Treatment time: 35.1 hours

Site 26 – First Treatment



Area: 49,933 ft²

Treatment time: 57.3 hours

Site 26 – Second Treatment



Area: 51,378 ft²

Treatment time: 59.7 hours

Site 26 – Third Treatment



Area: 51,510 ft²

Treatment time: 62.8 hours

Site 26 – Fourth Treatment

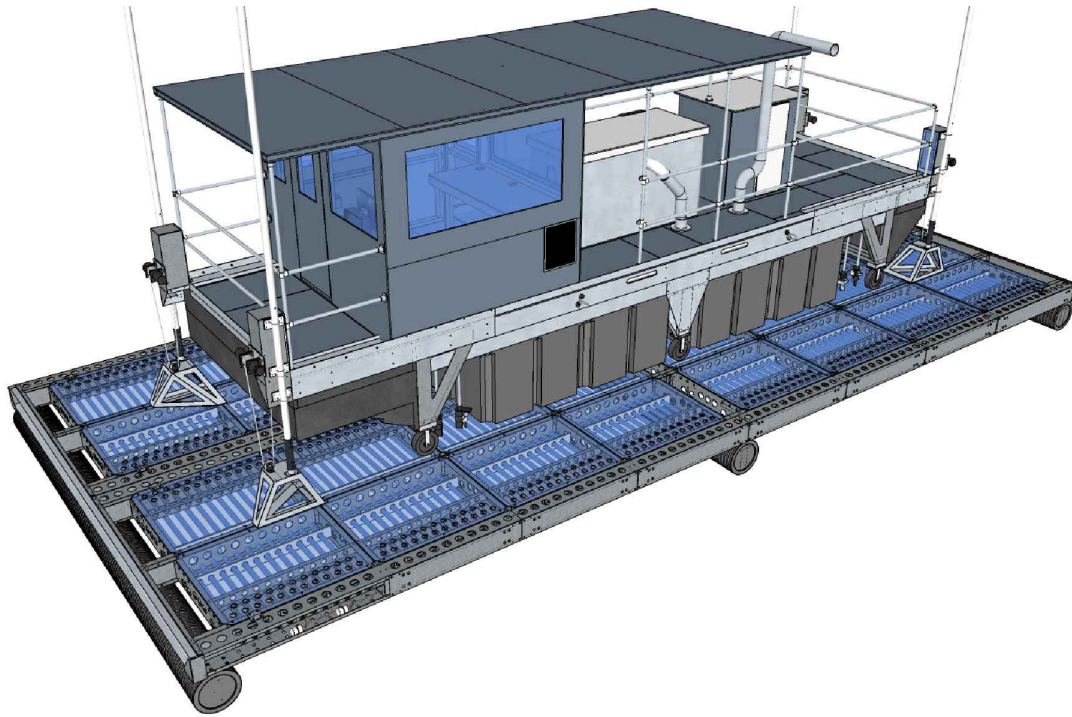


Area: 50,490 ft²

Treatment time: 77.0 hours

Attachment C
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
Daily checklist, Daily monitoring and observation logs, Pre-field checklists

Attachment D
UVC Light Aquatic Invasive Plant Control Pilot Project 2024
UV Treatment Vessel General Information



Boat II

8'x28' hull
 16'x40' light array
 99kW generator
 (13) 36V thrusters
 1.3mph speed

Boat III

8'x32' hull
 16'x40' light array
 99kW generator
 (10) 36V thrusters
 0.8mph speed

