

Aquatic Invasive Species Management Report

Schroon Lake

2021 Final Report

Prepared By:

INVASIVE SOLUTIONS



DIVE COMPANY, LLC

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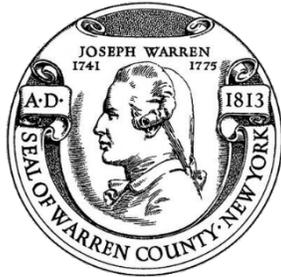
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Acknowledgments

This report was prepared for the County of Warren pursuant of WC 84-19- Schroon Lake Aquatic Invasive Species Control Program in accordance with Section V. Reporting: resolved by the Warren County Board of Supervisors Resolution No. 100 of 2020 of the March 20, 2020 Board Meeting.



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1340 State Route 9
Lake George, NY 12845

Funding for the Department's milfoil control activities is through a Memorandum of Agreements between the District and the Town of Chester, Town of Horicon and Town of Schroon.



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Chestertown, New York 12817



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Preface

Everyone at Invasive Solutions would like to thank the County of Warren, the Town of Chester, the Town of Horicon, the Town of Schroon, and all the folks we worked with throughout the year for their time, understanding, hard work, and commitment to ensuring Schroon Lake continued its path to success. Additionally, we would like to thank the lake associations and volunteers for their continued commitment and hard work in the common goal of success. There is always a lot of work going on behind the scenes bringing everything together and working to better understand the intricacies of the lake, leading to the better management of the lake as a whole. The 2021 season wrapped up as another successful year, and as always, we are excited to be a part of team that makes it happen.

Introduction

The 2021 harvest season consisted of four weeks, one in June, two in July, and one in August. Weeks were scheduled to try to best fit the varying growth cycles of the different aquatic invasive species (AIS) located within the lake and the time constraints and needs of the harvesting team.

Week one was in part scheduled to address the earlier growing cycle of Curly-leaf Pondweed (CLPW,) using its earlier emergence among other plants to our advantage and addressing it before it has the chance to complete its growing cycle. Additionally, we use this week to address both high trafficked sites and sites we outline as priority based upon harvesting results from the year(s) prior.

The second and third week were scheduled back-to-back to allow for a more efficient and fluid harvest for the dive team, allowing them the flexibility to adjust their harvesting plan as needed. Generally, these weeks we start off working high priority sites based upon previous determinations and current conditions and try to cover as many sites as we are able.

The fourth week we focus on ensuring we've had the chance to visit all the sites throughout the lake, revisit sites which we've determined need a follow-on harvest, and address as many AIS sightings and reports as able if there any which have not been followed up on yet.

Of the twenty-seven sites on the lake, fifteen sites had a decrease in harvested weight, four had no change with no AIS harvested, and eight had an increase in harvested weight. Furthermore, eight of the fifteen sites which had a decrease have seen a decrease in harvested weight each year since 2018, and eight sites produced too little AIS to be weighed. In total, there was 834.4 lbs. harvested, up from the previous year of 543.1 lbs. Most of the increase in harvested weight came from three sites, two of which consistently produce AIS due to their shallow nature and high boat traffic, to which they received an additional harvest this season.

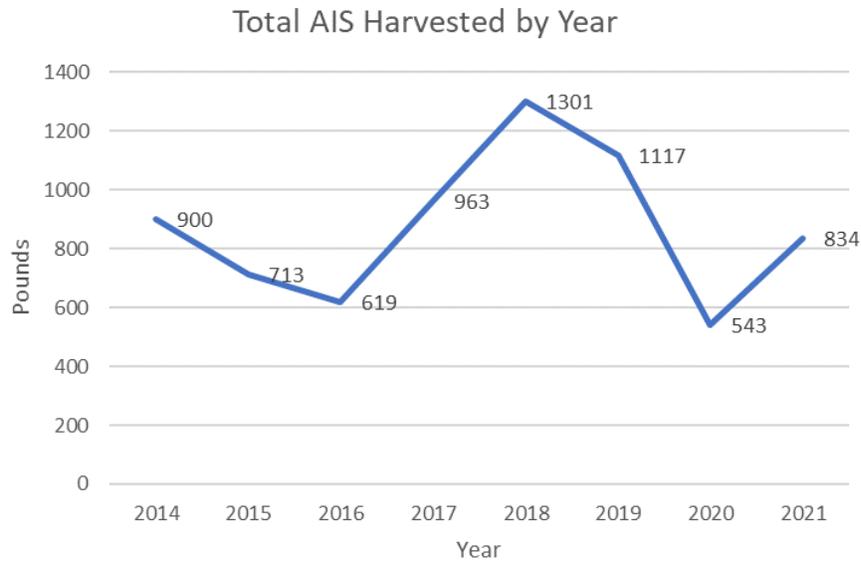
Methodology

The successful harvesting of aquatic invasive species is an ever-evolving world which requires knowledge in many areas to include the bodies of water and their specific tendencies, especially in relation to their natural flow and prevailing winds, seasonal changes, historical AIS data and patterns, and knowledge of AIS and their life cycles. Considering the many variables, we develop a foundation for a management plan to lay the groundwork for the harvest season, while still allowing flexibility for minor changes in harvesting methods to ensure the best harvesting practices are always being employed.

For the management of Schroon Lake, we begin planning by using historical harvest data to prioritize site management based upon factors like historical plant densities, harvesting trends, the location of AIS sites, and AIS type and life cycles. Throughout the season, our Crew collects data, to include plant locations via GPS waypoints, plant size and life stage, harvest weights, and general data specific to the plant location, all of which is considered throughout the current and successive years.

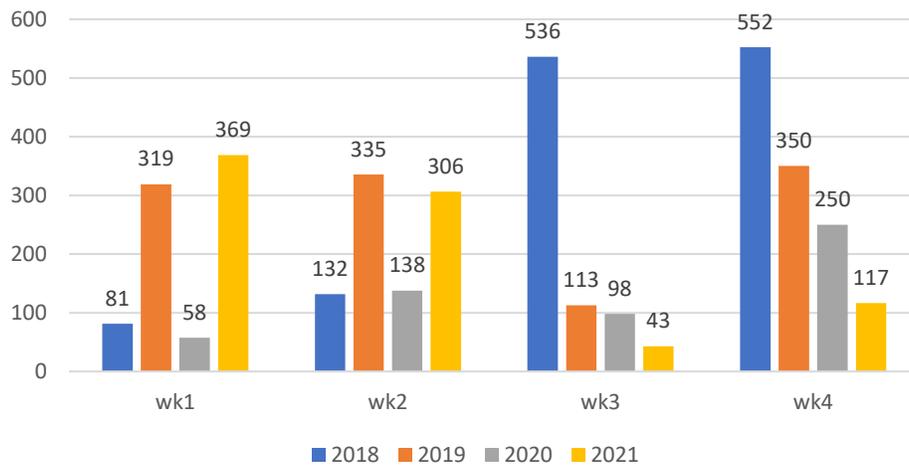
Starting the season, we begin harvests based off our prior planning for the year, working accordingly to make sure to best utilize the time available, and progress and adapt our management as dictated by our findings. We are continuously monitoring the growth cycle of the AIS to ensure we are using the most effective harvesting techniques for the most thorough removal of all AIS plant matter, while leaving in place the native plant communities.

Harvest Numbers



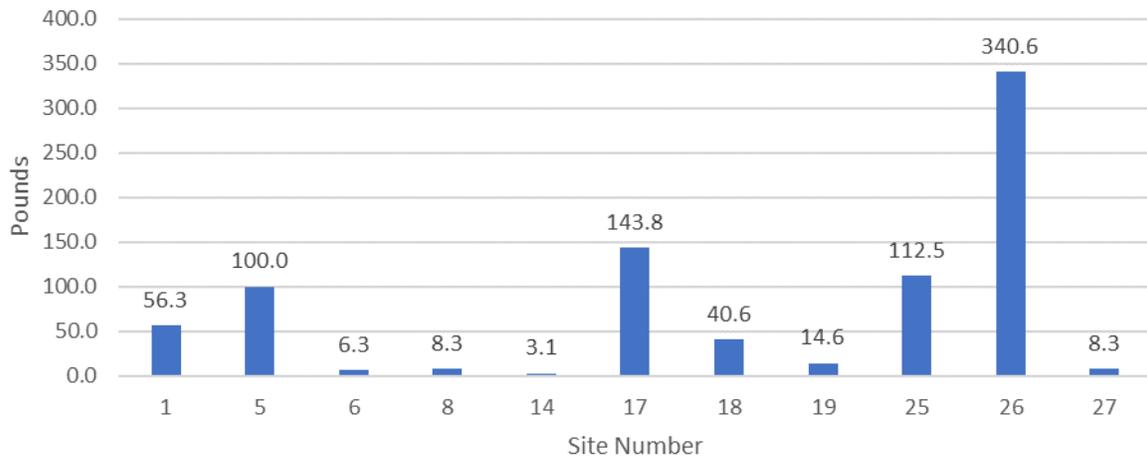
Yearly Change in Lbs. Harvested	
2020-2021	53.6%
2019-2020	-51.4%
2018-2019	-14.1%
2017-2018	35.2%
2016-2017	55.6%
2015-2016	-13.2%

Weekly Harvest Total Comparison



Note: Week four consistently produces high AIS harvested weights.

2021 Pounds Harvested by Site

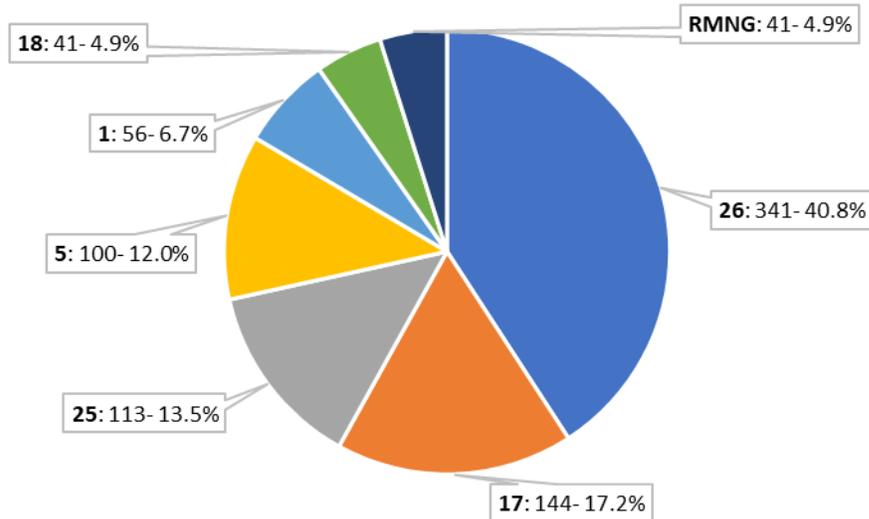


Note: This graph does not include sites without AIS (sites 2, 3, 7, 9, 11, 13, 21, 23) or sites with too little AIS harvested to weigh (sites 4, 10, 12, 15, 16, 20, 22, 24)

Pounds Harvested per Site: 2018 - 2021											
Site #	2018	2019	2020	2021	% Change	Site #	2018	2019	2020	2021	% Change
1	111.5	237.5	12.5	56.3	350.4%	15	0.6	0.0	(11 EWM)	(5 EWM)	-6
2	0.0	(6 AIS)	(10 AIS)	0.0		16	6.3	(3 EWM)	(35 EWM)	(78 EWM)	+43
3	0.0	(8 EWM)	(2 EWM)	0.0		17	11.1	25.0	56.3	143.8	155.6%
4	481.3	31.3	4.2	(21 EWM)	-99.9%	18	9.4	16.7	28.1	40.6	44.4%
5	5.0	87.5	1.0	100.0	9900.0%	19	21.9	31.3	17.7	14.6	-17.6%
6	6.3	(8 EWM)	12.5	6.3	-50.0%	20	143.8	(5 EWM)	(28 EWM)	(18 EWM)	-10
7	0.0	0.0	0.0	0.0	0.0%	21	50.0	3.1	0.0	0.0	0.0%
8	55.0	18.8	9.2	8.3	-9.5%	22	12.5	(15 EWM)	(7 EWM)	(3 EWM)	-4
9	0.0	0.0	0.0	0.0	0.0%	23	6.3	9.4	(3 AIS)	0.0	-3
10	(3 EWM)	(1 EWM)	0.0	(1 EWM)	+1	24	12.5	6.3	4.2	(21 EWM)	-99.9%
11	0.0	0.0	(1 EWM)	0.0	0	25	68.8	250.0	87.5	112.5	28.6%
12	11.3	6.3	6.3	(69 EWM)	-99.9%	26	37.5	287.5	91.3	340.6	273.3%
13	(1 EWM)	0.0	0.0	0.0	0.0%	27	68.8	87.5	187.5	8.3	-95.6%
14	181.9	18.8	25.0	3.1	-87.6%	Total	1301.3	1116.7	543.1	834.4	53.6%

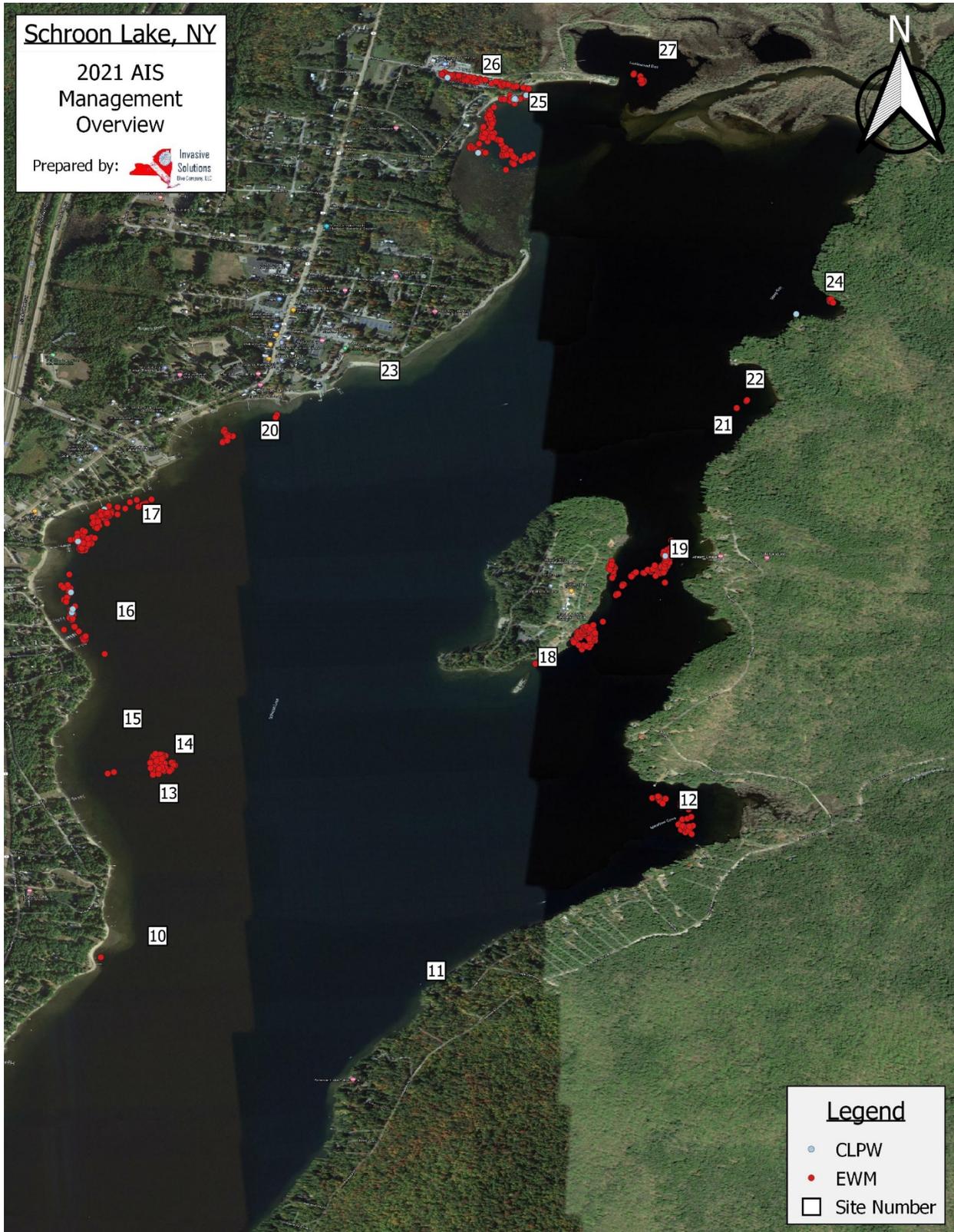
Highest Yielding Sites

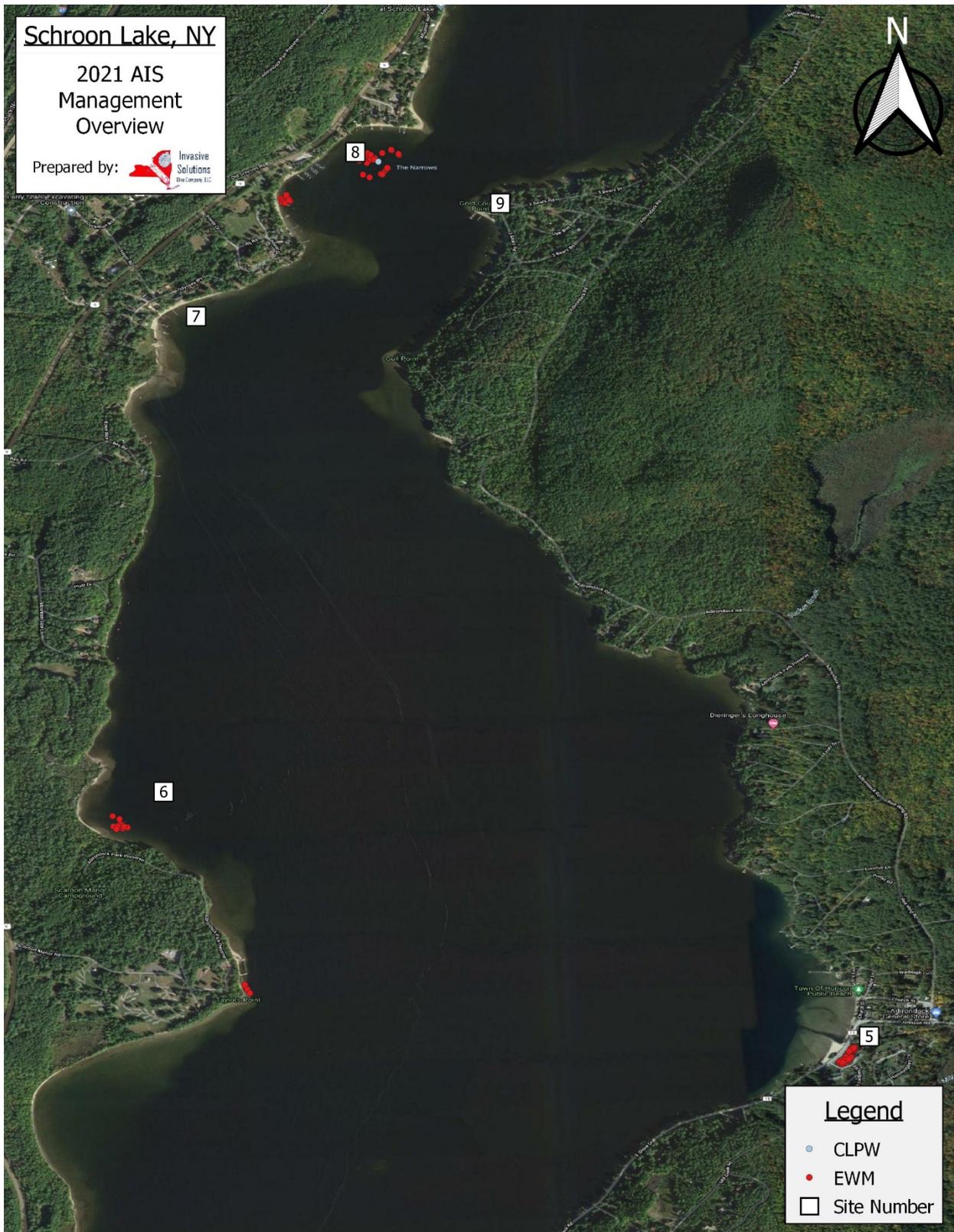
[site #: lbs harvested- % of total harvested weight]

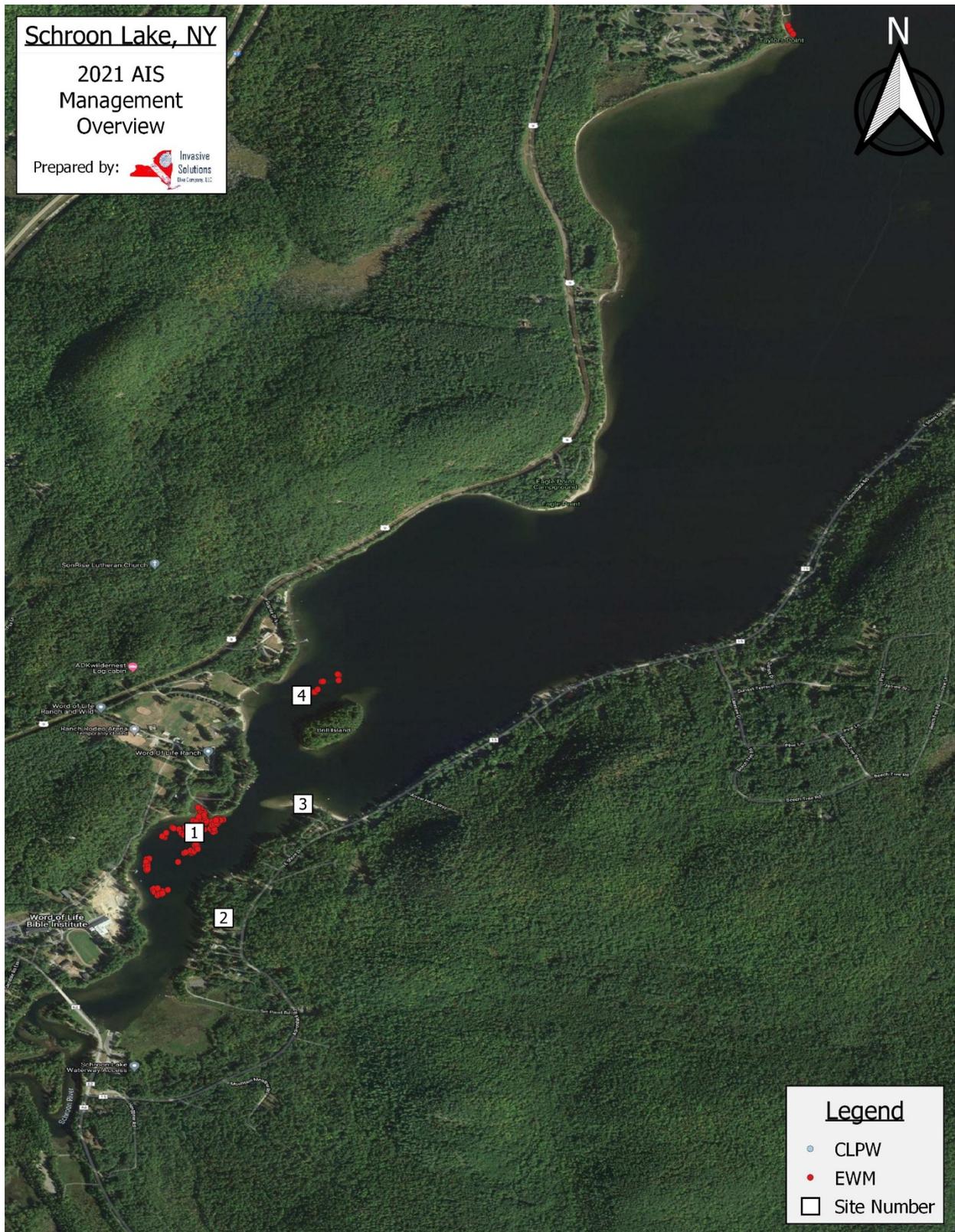


Note: RMNG represents the 21 remaining sites not specifically depicted in the chart.

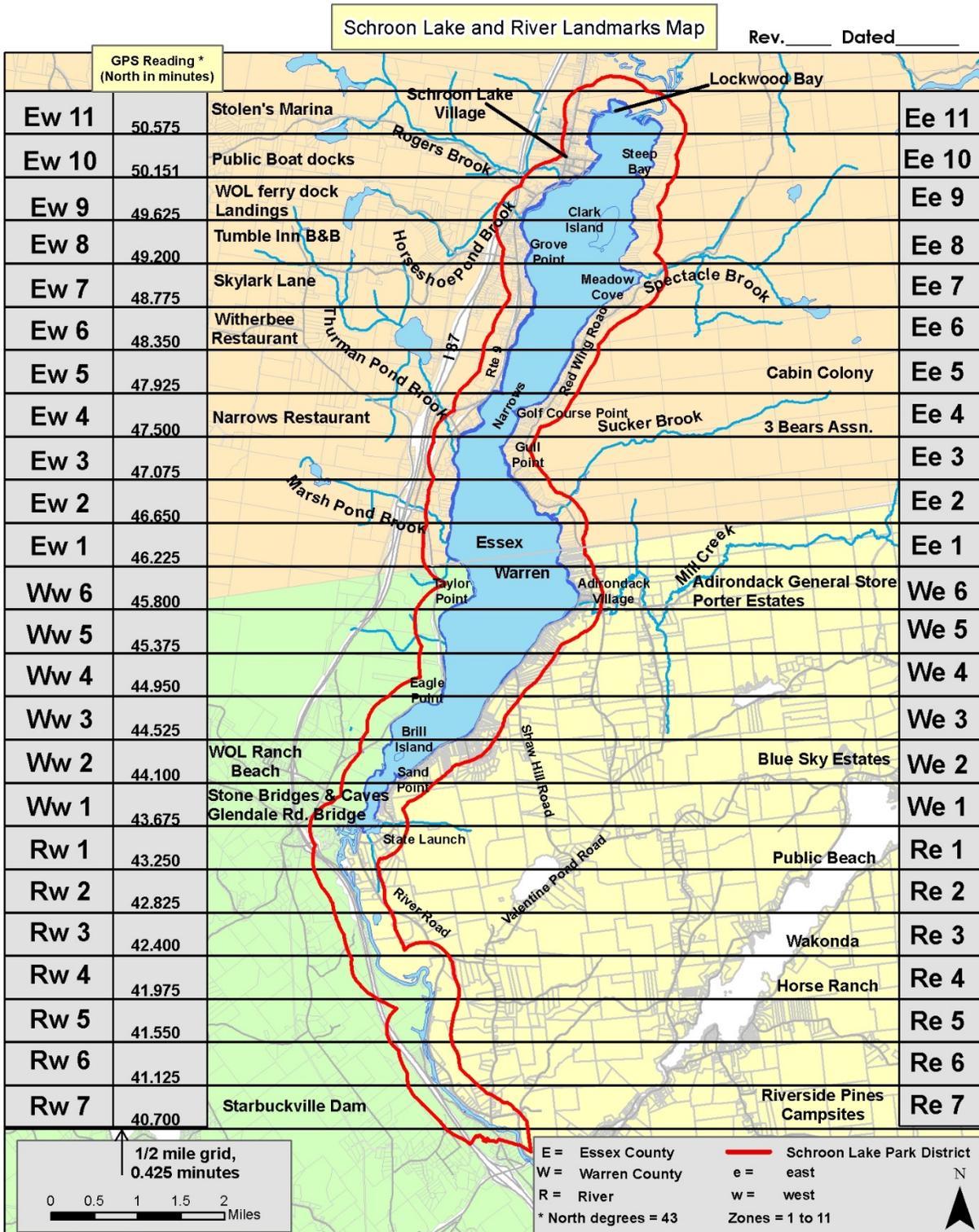
Site Maps







Scout Map



Site Reference Sheet

AIS Site Quick Reference List				
Scout ID	Site #	Description	Latitude	Longitude
Ww2	1	Word of Life Bay	43.733821	-73.806834
Ww1	2	Area S of Word of Life Bay	43.730379	-73.806063
We2	3	Sandy cove NE of Word of Life Bay	43.735174	-73.802347
Ww2	4	WOL Ranch/ west of Brill Island	43.73969	-73.802587
We6	5	ADK lodges	43.736233	-73.759102
Ew1	6	Taylor Point (Ww6) to cove N of T. Point	43.772513	-73.788131
Ew3	7	cove due W of Gull Point	43.791644	-73.786752
Ew4	8	West Narrows	43.79764	-73.778423
Ww4	9	East Narrows	43.795927	-73.773426
Ew6	10	western point N of Narrows	43.81325	-73.768001
Ee7	11	E shore N of Narrows	43.811917	-73.756675
Ee7	12	Meadow Cove	43.818627	-73.746396
Ew7	13	Skylark S	43.818865	-73.768096
Ew7	14	Skylark	43.820483	-73.766383
Ew8	15	S of Grove Point	43.821197	-73.768905
Ew8	16	N of Grove Point	43.825623	-73.769667
Ew9	17	The Landings N	43.829287	-73.768905
Ee8	18	Clark Island S	43.823719	-73.752392
Ee8 & Ee9	19	Clark Island narrows and N shore	43.827859	-73.747395
Ew9	20	WOL Island Dock to Rogers Brook	43.832666	-73.764004
Ee9	21	N of Narrows to Steep Point Cove	43.832285	-73.745824
Ee9	22	Steep Point Cove	43.83476	-73.744206
Ew9	23	Town of Schroon Boat Launch N	43.83476	-73.759007
Ee10	24	Steep Bay and surrounding shores	43.837853	-73.741589
Ew11	25	Terra Alta	43.844706	-73.753724
Ew11	26	Schroon Lake Marina	43.846324	-73.754628
Ew11	27	Lockwood Bay	43.846562	-73.748489

Site Summaries



Site 1- Word of Life Bay (Ww1)- This season we harvested 56.3 lbs. of Eurasian Watermilfoil (EWM) (no CLPW found,) which is up from the previous seasons' 12.5 lbs. but remains well below the totals from 2018 (111.5 lbs.) and 2019 (237.5 lbs.) This site sees higher production and boat traffic and is prioritized for the first week of harvest with a follow-up later throughout the season, however the Crew was unable to perform the follow-up the previous season. The first week of harvest the Crew harvested 2.25 bags, or all the measurable weight for the season. The Crew returned to the site in the fourth week of harvests finding an additional thirteen plants.

Site 2- Area south of Word of Life Bay (Ww1)- This site is a large area with varying densities of native vegetation and low numbers of CLPW and EWM. This site is searched when harvesting other sites in the region, with a focus on the historically producing areas. Although this site was searched twice throughout the season, no AIS was located.

Site 3- Sandy Cove NW of Word of Life Bay (We2)- This site tends to produce very low EWM numbers in native vegetation on the edge of the littoral area, even though the vegetation tracks further into the shallows. This site is searched when harvesting other sites in the region and no AIS was located.

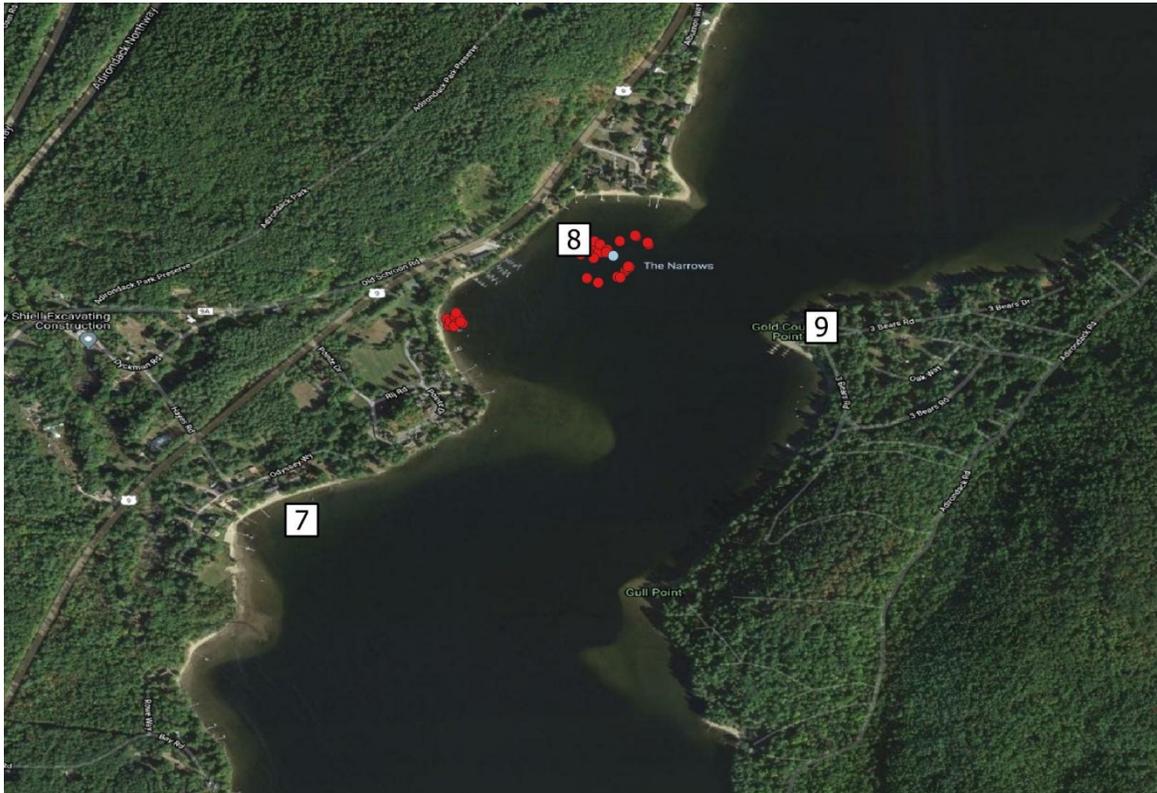
Site 4- Word of Life Ranch/ west of Brill Island (Ww2)- This site has historical EWM growth in an elevated littoral area northwest of the Brill Island and the mainland, with occasional EWM growth found close along the northwestern shore. All together there were twenty-one EWM plants harvested within the littoral north of the island, and no plants located close to shore. This site continues to see sharp drops in EWM harvested each year, with too little harvested to weigh this year, way down from 481.3 lbs. in 2018 (2020- 4.2 lbs.)



Site 5- ADK Lodges (We6)- This site has lush native vegetation which harbors EWM throughout much of the site. Furthermore, this site sees high boat traffic coupled with the abundance of docked boats, which lends to more of a challenge for harvesting. This site is visited early in the season to try to beat both peak native growth and boater traffic, with a follow-on harvest when able (no follow-on harvest in 2020.) This year the Crew harvested the site during the first week and noted there was already plants grown close to surface showing signs of surface disturbance and plant fragmentation being found within the site. Given the findings the first harvest week, the Crew returned to the site while there was high water, making the site inaccessible by boats and completed a follow-up harvest. This second harvest Crew found abundant EWM which ranged from one foot to grown to surface which produced almost 88% of the total harvested weight. Although this site shows a drastic increase in harvested EWM from 2020, the harvest totals are on par when the Crew is able to do a follow-up (i.e., 2019- wk. 1- 0.5 bags, wk. 2- 3 bags, 2021- wk. 1- 0.5 bags, wk. 2- 3.5 bags.)

Site 6- Taylor Point to cove north of Taylor Point (Ww6)- This site consists of two separate areas, the larger cove northwest of Taylor Point by a small stream, and the dock area just north of the point.

Overall, the site saw a 50% reduction in EWM harvested from 2020. However, the northwest area of the site saw an uptick in EWM harvested where it was noted one small section of the area had localized plant clusters which accounted for the increase. The dock area by Taylor Point saw a dramatic decrease in EWM harvested with only twenty-four total plants harvested compared to one half bag in 2020.



Site 7- Cove due west of Gull Point (Ew3)- This site is a small cove with multiple docks and a native plant bed area which gets searched. This site does not produce AIS yearly and is considered non-priority. Although no rooted AIS was harvested, there was one EWM fragment recovered from the south end of the site.

Site 8- West Narrows (Ew4)- This site has seen a decrease in harvested weight each year since 2018 (2018- 55.0 lbs., 2019- 18.8 lbs., 2020- 9.2 lbs.,) with a total of 8.3 lbs. harvested from the site this year. Within the site are two main historical AIS areas, a large area in the northern half of the site and a small section located around a group of docks in the southwest. Within the northern section, there was a dramatic decrease in plants with a total of 35 EWM and one CLPW harvested. The southwest section of the site produced almost all the harvested weight with small, localized clusters of EWM generally concentrated on the edge of native plants.

Site 9- East Narrows (Ww4)- This small site focuses around two docks and the area immediately south. With an EWM fragment located to the west in site 8, the Crew expanded their search further south following native vegetation, locating no AIS.



Site 10- Western point north of Narrows (Ew6)- This site consists of a strip of native vegetation which does not produce AIS yearly and is considered non-priority, with one EWM harvested this season.

Site 11- East shore north of Narrows (Ee7)- This site consists of lower density native vegetation which generally parallels shore, with most of the attention focused in areas by boats and docks. This site does not produce AIS yearly with no AIS found this season.

Site 12- Meadow Cove (Ee7)- This site focuses on the deeper edge of the littoral where water flows into the lake and produces consistent, low volume AIS (2021- 69 EWM, 2020/2019- 6.3 lbs., 2018- 11.3 lbs.) mixed among native vegetation. This year divers had noted they were harvesting EWM which had great variation in size throughout the site and during the high waters most of the plant life was leaning at a sharp angle with the current.

Site 13- Skylark south (Ew7)- This site consists of a strip of native vegetation south of site 15, which inconsistently harbors EWM. No AIS located.

Site 14- Skylark Area (Ew7)- This site is a large area located east of sites 13 and 15 and is situated in open water, up to approximately 400 yards from shore. With the location of the site, extra caution is taken to set a highly visible work area which often gets broken into sections to minimize Crew exposure, and occasionally search patterns are halted to allow for safe passing of boat traffic. This site produces

EWM scattered throughout the native plant populations, with the bulk of this year's harvest coming from the northern half of the site. This site saw a reduction in harvested EWM from 25 lbs. in 2020 to 3.1 lbs. this year.

[Site 15- South of Grove Point \(Ew8\)](#)- This site consists of a native plant bed located west of site 14 which inconsistently harbors EWM, generally in the south half of the site. 5 EWM harvested.



[Site 16- North of Grove Point \(Ew8\)](#)- This site is a continuation of the thin native plant bed following the bathymetry from site 17, which runs along the outskirts of the docks in the area. Crew harvested a total 78 EWM, up from 2020's 35, but noted they were finding tall plants with localized clusters of small plants which accounted for the bulk of the EWM harvested.

[Site 17- The Landings north \(Ew9\)](#)- This site is located outside the Word of Life ferry dock landings and stretches from an area south of Horseshoe Pond Brook, north, with native plants throughout. AIS is located within the native vegetation in the deeper areas of the littoral just past the end of the docks in the area. This site has seen harvested AIS weights more than double each year since 2018, with a harvested weight of 143.8 lbs., up from 2020's 56.3 lbs. With the rising trend in AIS numbers, this site was visited three of the four harvest weeks for continual monitoring of the site, which allowed the Crew more time to work the site further north finding additional areas with EWM. In the first week of harvesting the

Crew reported finding a large variance in plant height and age, locating small, new growth, up to larger, more developed EWM which appeared to have already been disturbed from the surface, creating plant fragmentation within the area harvested. Crew harvested the bulk of the AIS from two areas, an area in the south and an area in the middle of the site (previously the northern edge of the dive areas,) which had consistent AIS within these sections and produced the bulk of the AIS for the site. Upon the final week of harvesting, the Crew returned to the site and began near docks north of the site and worked south to the middle area which produced the higher volume earlier in the season. Within the newly inspected northern area, Crew found sporadic EWM which led them back to the middle area where they harvested additional EWM which was mostly smaller, newer growth plants. Although this is already a large site, the area should continue to be searched further north looking for any EWM which could be a source of reinfestation for the site, particularly due to the abundance of docks and boats within the area.

Site 18- Clark Island south (Ee8)- In the area on the southeast of the island, generally by the barge dock area, EWM has slowly been increasing in harvested weight since 2018 (2018- 9.4 lbs., 2019- 16.7 lbs., 2020- 28.1 lbs.,) with a total of 1.63 bags or 40.6 lbs. this year. However, with the upward trend and the persistence of finding EWM peppered throughout the site, time working the site has increased to reverse the trend and to search for EWM which could be reinfesting the site. Throughout the year, Crew was finding EWM which ranged from 0.25-5' in height, mostly single stem plants, indicating continued new growth within the site. It's difficult to know if the plants being located are coming from continued fragmentation within the area, or if the Crew was finding plants which were already in the site from earlier in the season which had grown tall enough to identify within the native plants. Consistent monitoring of the site should continue to stay ahead of the EWM, helping to target the plant source and begin bringing down the numbers.

Site 19- Clark Island narrows (Ee8) and the north shore (Ee9)- This site begins about midway of the island and continues north about 200 yards and extends east across narrows, producing low numbers of EWM with occasional CLPW. The area on the western shore of Clark Island produces AIS within the same general areas but is being located more sporadically, with the exception of a more consistent producing area tucked close to shore. The channel area between the west and the east tends to harbor sporadic EWM but is challenging to fully inspect due to the high boat traffic and speed through the area. The area on the eastern shore produces mostly sporadic EWM and may continue further north than the Crew has been able to inspect, but as the site comes under better management, we aim to search more area to decrease the likelihood of AIS fragmentation to surrounding areas. Even with the addition of the harvest area east of the channel, which began seeing harvests last year (and which continues to expand,) we saw a second year of overall site numbers decrease, with a 17.6% decrease from 2020 (2021- 14.6 lbs., 2020- 17.7 lbs., 2019-31.3 lbs.)



Site 20- WOL Island Dock to Rogers Brook (Ew9)- This site has a band of native plants approximately 100 yards off the shoreline near the littoral edge which runs north towards Rogers Brook and becomes sparse at times. This site sees small populations of EWM which are quickly addressed when located. In 2018, there was 144 lbs. of EWM harvested in a concentrated area east of the WOL beach, but since is located sparingly. This site saw a decrease from 28 EWM plants in 2020 to 18 this year.

Site 21- North of Narrows to Steep Point Cove (Ee9)- This site starts north of the narrows on the east shore and runs north through a rocky area which has generally limited native vegetation and most often does not produce AIS. No AIS located.

Site 22- Steep Point Cove (Ee9)- EWM is typically located in low numbers within native vegetation in a central area of the site, with three plants harvested, down from last year's seven.

Site 23- Town of Schroon Boat Launch N (Ew9)- This site focuses on three main areas which are inspected for both EWM and CLPW. The largest area focuses on a native plant bed just outside the Schroon Beach Swimming area which typically produces the most AIS within the site. The other areas focus near the public boat launch/ dock area and the littoral to the west of the docks. No AIS located.

Site 24- Steep Bay (Ee10)- This site has seen a steady decline in EWM presence since 2018 (2018- 12.5 lbs., 2019- 6.3 lbs., 2020- 4.2 lbs.) with a total of 21 EWM harvested this year. The bay has diverse native vegetation with AIS generally found along the deep edge of the littoral.

Site 25- Terra Alta (Ew11)- Terra Alta is a large area located south of the Schroon Lake Marina entrance which consistently harbors EWM and CLPW and is annually among the highest producing sites. Harvest totals are as follows: 2018- 68.8 lbs., 2019- 250.0 lbs. (first year working east along south of the site), 2020- 87.5 lbs., and 2021- 112.5 lbs. This year Crews experienced high waters with very poor visibility and

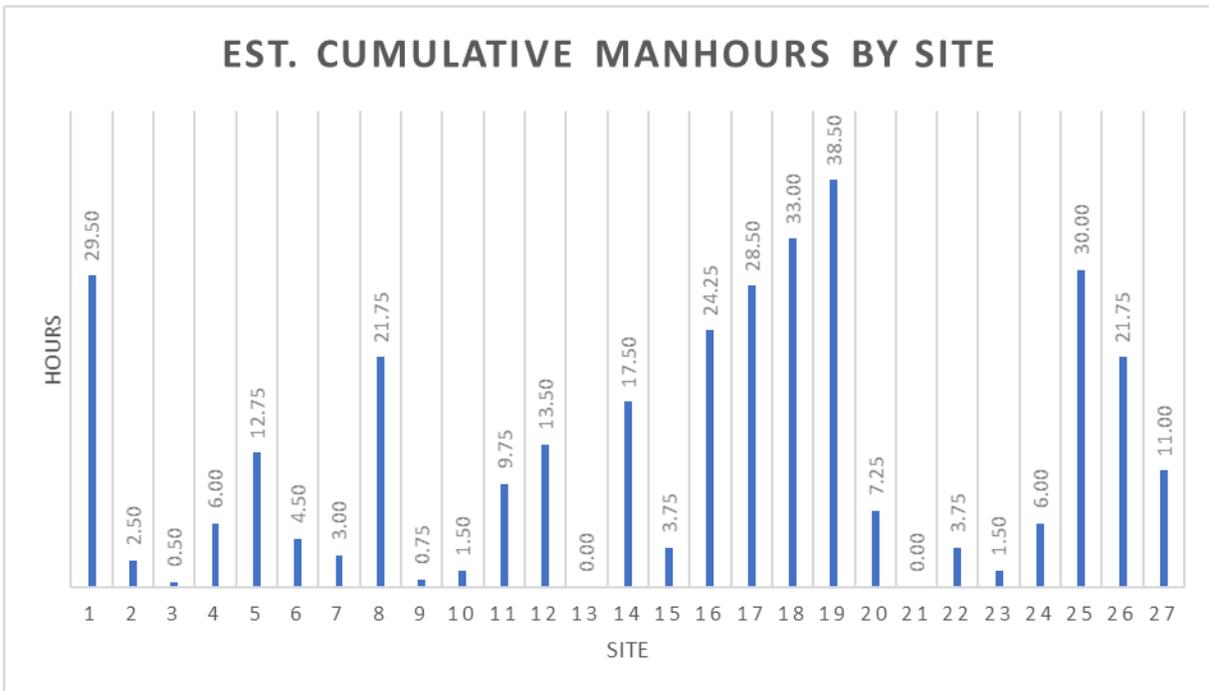
noted by the end of July AIS was already leaning over and appeared to be dying back. The management area within the site generally takes the shape of a C, starting just outside of the marina near the channel markers in native plants which run west near the shore. At the first dock westward is an area which typically harbors EWM and CLPW (with no other CLPW not found along the shoreline in the site.) From here the area continues south along the shoreline towards the Terra Alta cottages, then turns east forming the C. From the dock area south to nearby a buoyed swim area, EWM is found generally scattered with occasional clusters mixed within the native vegetation. By the buoyed swim area EWM density begins increasing, becoming more abundant south of the swim area, then continues east where EWM abundance begins decreasing as you get further from the shoreline. Just south of the southern section (bottom of the C) EWM can be found within dense native vegetation which does not get addressed. This area is unmanaged because with the high native plant density harvesting would be very difficult and time consuming, and the area is generally unnavigable.

[Site 26- Schroon Lake Marina \(Ew11\)](#)- This site sees fluctuations in harvested AIS (2018- 37.5 lbs. 2019- 287.5 lbs., 2020- 91.3 lbs., 2021- 340.6 lbs.,) which is closely related to the amount of harvest time spent within the site (2018- 2 harvests, 2019- 3 harvests, 2020- 2 harvests, 2021- 3 harvests.) Overall, this site is generally shallow with dense native plant beds, encounters high boat traffic, and uncoincidentally experiences high AIS fragmentation contributing to the persistency of in AIS abundance. Given these parameters, this site is worked at the start of the season to immediately reduce the presence of AIS and requires follow-up harvest(s) to keep ahead of it, helping to prevent its spread both in and outside of the bay. This site would need to be harvested each week to see large and long-term reductions in AIS numbers.

[Site 27- Lockwood Bay \(Ew11\)](#)- Lockwood Bay has EWM found throughout native vegetation in a band around the bay which widens near the mouth. The water within the bay appears darker, or more tannic than water outside of the bay, likely indicating a slower flushing rate. Additionally, this site seems to see lower boat traffic than many other areas of the lake. This year Crew found the water was darker and more turbid than usual, reducing visibility to about an arm's length, creating very slow and challenging harvest conditions. With overall time constraints of the harvest season, and considering the above factors, this site is often lower in site priority each year. There was much less EWM harvested in the site this year due to the very poor site conditions and minimal harvest time which was focused near the passageway to the site.

Time Estimates

Provided within is a breakdown of hourly estimations for major program activities and generalized worksite activity. With a 3-person dive team (Crew,) each crew-hour is reported as 3 manhours. Hourly estimations are reported in 0.25-hour blocks for ease of use.



<u>Cumulative Manhour Estimates</u>	
Harvesting activities	332.75
Meal periods/ decompression breaks	60.00
Lost time due to inclement weather	25.00

Discussion and Recommendations

As observed throughout many of the lakes we work on within the Adirondack Park, this year seemed to be an early and productive season. Even at the start of June, AIS was observed to be taller than often found at this point within many sites, and notably, larger plants were already highly branched. Moreover, with the increased plant height and size, Crews noted plants had been disturbed from the surface to include the first harvest week in June, which lead to higher fragmentation within sites.

Overall, we saw a total increase of 53.6% in harvested weight, from 543.1 lbs. in 2020 to 834.4 lbs. this year. Yet of the twenty-seven sites, fifteen sites saw a decrease in harvested weight, four saw no change with no AIS harvested, while eight saw an increase in harvested weight. Additionally, nine sites saw at least one additional harvest compared to last year, to include six of the eight sites which saw an increase. In short, with increased visits to a site, the likelihood of seeing an increase in harvested weight initially isn't out of the ordinary, but that's not to say there isn't still work to be done.

The sites which saw increased harvested weight were 1, 5, 10, 16, 17, 18, 25 and 26. Site 1 went from 12.5 lbs. in 2020 to 56.3 lbs. this year, with all the measurable weight coming from the first week's harvest and only 13 plants found upon a follow-up later in the season. Sites 5 (2020- 1 lb., 2021- 100 lbs.) and 26 (2020-91.3 lbs., 2021- 340.6 lbs.) are both sites which produce AIS each time they are harvested due to their shallow and productive nature, coupled with their high boat traffic. Both of these sites saw an additional harvest this year which is reflected in their harvest numbers, but if you were to compare them to 2019 when they saw an equal number of harvests as this year, their harvested weight totals are very comparable. We consider these sites as both priority and opportunistic harvest sites, where we target the sites early then aim to perform a follow-on harvest but will also harvest the sites again as time and opportunity allows. If you were to calculate the change in lake wide harvested weights without including these two sites, it would show an 11.6% decrease in total harvested weight. However, arguably, this is a hard analogy to make considering site 27 which can be a high producing site saw a 95.6% decrease in harvested weight but saw one less harvest this season, likely accounting for a considerable portion of its decrease.

In site 10 there was only one EWM harvested throughout the year. Site 16, which is just south of site 17, went from 35 harvested EWM in 2020 to 78 EWM this year, though the increase is almost anticipated while AIS communities are located and managed within site 17, as this is the likely source for AIS propagation in site 16. Both sites 16 and 17 are located nearby a number of docks and experienced high AIS fragmentation this season, seemingly playing a large role in the plant increase and regrowth throughout the year. Site 17 is of special interest and high priority due to its sharp rise in harvested weight each year since 2018. Overall, this is a large site with a wider littoral which produces consistent AIS. With the upward trend in harvested weight the site was worked three of the four harvest weeks to stay on top of the AIS growth and allow opportunity to explore the site into new territory. During the explorations outside of the previously targeted areas, EWM was found further north than the previous years which likely contributes to the reinfestation of the area. The bulk of the AIS harvested came from the high producing areas which experienced the surface fragmentation, ultimately leading to consistent regrowth throughout the season. Site 16 and 17 will remain high priority until the upward trend is reversed which should include further exploration to ensure there are no additional pockets of AIS.

Site 18 is the only other site which has been trending up in harvested weight since 2018 and as such has been and remains a priority site. Due to the upward trend, the site saw an additional harvest this year. This site also experienced surface fragmentation early in the season which led to consistent regrowth throughout the season. The heavy producing area within the site continues to be the area just north of the barge dock which has abundant native vegetation. Overall, the east side of Clark Island (to include site 19) is being worked more consistently to stay on top of the AIS growth. Last year Crews followed AIS from the east side of Clarks Island (within site 19) west across the channel finding AIS in new areas. It's plausible finding and harvesting these additional areas helped decrease the site's overall harvested weight from the year prior. However, there is more littoral on the western side of the channel both north and south towards site 18 which have not been explored and could harbor additional AIS pockets. Site 18 will remain priority until the upward trend can be reversed, and pending future results, the area as a whole may need further examination to see if there might be additional areas which should be explored that could be contributing to the AIS being found within the site.

Fifteen sites saw a decrease in harvested weights compared to last year. Of those sites, six see small annual fluctuations in harvested totals with the overall the numbers generally low, with three having produced no AIS. Eight of the fifteen sites have been trending down in harvest totals since 2018 with two producing no AIS. Nevertheless, even with the downward trends or current low harvest weights, there remains plenty of work to be done within the sites. Sites 4, 8, 14, 20, 21 and 27 have all produced high harvested weights (50+ lbs.) in previous years which highlights any one site's ability to be productive. Many of these sites are large which require committed time to thoroughly search the areas to keep large reinfestations from reoccurring. With decreased AIS populations we are able to more efficiently work sites reducing time spent in them, however follow-up visits are still typically recommended to monitor sites throughout the AIS growing cycle for best management.

In the coming season it would be advisable to give priority to high traffic and high producing sites early with a follow-on harvest(s.) Sites 5 and 26 are high producing sites, generally shallow, and see high boat traffic throughout the year, and sites 17 and 18 have seen an upward trend in harvest totals with high AIS abundance and harvest weights this year. Early harvests beat peak boating and native plant growth helping to increase harvest efficiency and reduce the likelihood of surface disruption and plant fragmentation, in turn reducing AIS abundance throughout the year. Thereafter, the sites should see follow-on harvest(s) throughout the season (growing cycle) to monitor plant growth and site production, helping to stay ahead of the AIS and identify any areas which may be experiencing AIS introduction from another area (more so sites 17 and 18.)

Annually site 1 is prioritized for an early harvest due to its size and increased boat traffic which has been producing positive results and should be continued moving forward. Site 25 had unusually poor visibility during the year and may benefit from an earlier harvest to ensure if any plants were missed they can be addressed early to help minimize their ability to propagate the area. Site 27 also had unusually poor visibility and received minimal harvest time this season, and though site factors suggest its generally isolated from the main lake and experiences lower boat traffic, should time allow, it may benefit from a harvest earlier than typically scheduled to address AIS earlier in its growth cycle.

Conclusion

Although the overall harvest numbers were up this year, much of the increased harvest weight can be accredited to three sites, while fifteen sites saw reduced harvest totals and eight sites had no AIS harvested. Furthermore, eight sites have been trending down in numbers since 2018 when we began our management on the lake. Fluctuations in numbers are typical in AIS management and with the overall number of sites seeing reduced AIS abundance, we are on a good trajectory with the problems areas in our crosshairs. There remains hard work to be done, but reduced numbers over the long-term within most sites show the harvest methods are working, and as we continue to better learn and manage sites possibly locating previously unknown AIS locations, we should see further reductions and success in the future.

In planning for the future, we will continue to evaluate the data collected to prioritize the sites to lay the foundation for the harvesting around the lake. Some of the things which play a role in the planning are the current and past trends and harvest schedules, seasonal harvest numbers, site use and AIS life cycles, which help to manage available harvest time and help to remain flexible, so we are able to react real-time to the seasonal growth patterns.

One growing trend around the lake is the expansion of sites, where we work to explore outside our typical harvest areas searching for unknown AIS beds considering site conditions and previous findings. As we explore new areas, we have continued to find additional spots which require follow-up in the successive years, taking from the available time, making follow-ups on previously harvested sites more challenging, or sometimes not possible. It's often within these areas where we see increased AIS numbers the following year or slowly decreasing AIS numbers over the long-term, which in turn takes more harvest time in these sites, ultimately taking time from another area.

It would be advisable to consider adding a fifth harvest week to the schedule to allow not just for recommended seasonal follow-up harvests in sites, but to allow for better site searches and exploration, helping to reduce AIS abundance over the long term. Note, the last week of the season is often the, if not one of highest producing weeks of the season, yet we are not usually able to address all the sites which could use more harvest time this final week. An additional week would allow crews to better monitor sites and address yearly highs as well as address all reported AIS sightings in a more time sensitive manor, helping to prevent sites from trending up in the future. This would also help prevent the see-saw effect you experience in sites as time gets reallocated from one site to another, resulting in the fluctuating harvest totals within a site from one year to the next.



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