

2023 Upper Saranac Lake Aquatic Invasive Species Management Project Report

Upper Saranac Foundation
It still is, and always will be, about Water Quality



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Abbreviations List

Abbreviation	Complete Text
AID	Aquatic Invasive Divers (USF divers)
AIS	Aquatic Invasive Species
APA	Adirondack Park Agency
APIPP	Adirondack Park Invasive Plant Program
AWI	Paul Smith's College Adirondack Watershed Institute
EWM	Eurasian watermilfoil
NYSDEC	New York State Department of Environmental Conservation
USLAISMP	Upper Saranac Lake Aquatic Invasive Species Management Project
USL	Upper Saranac Lake
USF	Upper Saranac Foundation
VLM	Variable-leaf watermilfoil

Executive Summary

Aquatic invasive species (AIS) pose a significant threat to the Adirondack environment and economy. For more than a decade, the Upper Saranac Foundation (USF) has worked to address invasive species on Upper Saranac Lake (USL). The USF has had unprecedented success in managing AIS and could arguably be considered the leader in AIS management techniques.

The USF's history of preventing the spread of AIS has proven to be effective restoring Upper Saranac Lake and Fish Creek Public Campground, promoting healthy ecosystems, and allowing for continued recreational enjoyment. The first whole-lake AIS control program in the Adirondacks was established on Upper Saranac Lake.

The Upper Saranac Lake-Aquatic Invasive Species Management Project (USLAISMP) is part of a larger watershed protection program, developed by the USF, that uses a combination of AIS prevention, monitoring, management, control activities and education to inhibit AIS spread. The USF is committed to the long-term success of maintaining the water quality of the watershed.

This report can be summarized in the following key points:

1. Two AIS found and targeted for removal in the waterbodies of Upper Saranac Lake are Eurasian watermilfoil (*Myriophyllum spicatum*) and Variable-leaf milfoil (*Myriophyllum heterophyllum*). Eurasian Watermilfoil was first discovered on Upper Saranac Lake in 1996 and Variable-leaf milfoil first found in lower Fish Creek Pond in 2014. Eurasian watermilfoil (EWM) and Variable-leaf milfoil (VLM) most widespread aquatic invasive species across the Adirondacks.

2. The USF has been working cooperatively on AIS management projects in the watershed since 2004 and has established a clear track record of sustaining this type of project.
3. Hand harvesting AIS has proven to be effective and has helped restore the Upper Saranac watershed to its original natural beauty and environmental quality, allowing for continued recreational enjoyment.
4. Upper Saranac Lake Management of AIS includes Lower Fish Creek Pond; downstream of the Route 30 bridge and the Fish Creek Public Campground to the outlet of Upper Saranac Lake at the Bartlett Carry Dam
5. For years, USF contracted independent companies for this AIS management service. Beginning in 2022 the USF took over AIS operations by employing and supervising our own divers. The shift in administration reduced the expense to USF while providing a direct management approach that further increased efficiency.
6. In 2023 the USF devoted 804 work hours into harvesting AIS in USL. This is a reduction from 2022 when 897 hours was devoted to AIS harvesting.
7. There was a total of 45.3 pounds of milfoil removed from USL in 2023. This is a just up from 2022 when 44.6 pounds was removed.
8. The weight of EWM harvested increased from 33.75 pounds in 2022 to 38.3 pounds in 2023, and the total poundage of VLM harvested dropped from 10.85 pounds in 2022 to 7 pounds in 2023.
9. The total number of plants decreased from 1089 plants harvested in 2022 to 814 plants harvested in 2023. EWM plants harvested was reduced from 893 plants in 2022 to 729 plants in 2023, and the total number of VLM plants harvested dropped from 196 plants in 2022 to only 85 plants harvested in 2023
10. Of the 39 lake zones, 13 are considered EWM free (no milfoil found for four consecutive years or more) in 2023. This trend continues to move in a positive direction with more milfoil free zones increasing each year. In 2021 only six sites were considered milfoil free. 30 of the 39 locations had either a decrease or no change in the number of EWM plants harvested in 2023. The largest concentrations of EWM were found in Little Square Bay and Buck Island
11. VLM was found in only 4 of the 39 zones and is contained to the central part of the lake. At one time there were 13 sites where VLM has been found. 3 of the zones that once contained VLM are now considered milfoil free (no milfoil found for four consecutive years or more). The largest concentration of VLM is in Lower Fish Creek Pond. Since 2020 no VLM plants were located south of the narrows. Of the 4 current sites where milfoil was found in 2023, only one location, Saginaw Bay had an increase in the number of VLM plants found and harvested.

12. With less harvesting dive time, the poundage and the number of plants harvested understandably has stayed low. Consistent yearly harvesting comparisons are used to measure efficacy of AIS management. The harvest reduction trend of average pounds and plants removed per hour quantifies the continued success of the dive operation and the understanding that the USF is maintaining control of AIS.
13. Over time the USF has reduced diver time and expenses of harvesting without jeopardizing control. While initial estimates in 2003 anticipated an annual AIS maintenance budget to be between \$100,000 and \$150,000, the cost for AIS harvesting in 2023 totaled \$40,200. The significant decrease from years prior to 2022 and 2023 can be attributed to two factors; the reduction in dive time needed, and the USF hiring and managing its own dive team.
14. AIS, once a prevailing problem on USL, has been reduced to infrequent occurrences. In 2004 the USF removed 20 tons of milfoil at a cost of \$450/littoral acre. This is a dramatic contrast compared to 2023, when 45.3lbs. was removed, and the cost was reduced to \$33.50/littoral acre.

Introduction

The Upper Saranac Foundation's mission is to preserve, enhance and protect the natural beauties, environmental quality and recreational enjoyment of the USL watershed. This goal is consistent with tasks delineated in the Upper Saranac Lake Aquatic Invasive Species Management Project (USLAISMP). The USLAISMP addresses the threat of AIS and protects citizens' investment for private and publicly owned lands through AIS hand harvesting management.

In 2004, the USF initiated an aggressive three-year intensive management project to remove AIS from USL. In that initial year, 20 tons of Eurasian Watermilfoil - *Myriophyllum spicatum* (EWM) was harvested from the 5,200-acre lake. Since then, yearly maintenance has reduced EWM from a predominant plant to a rare species.

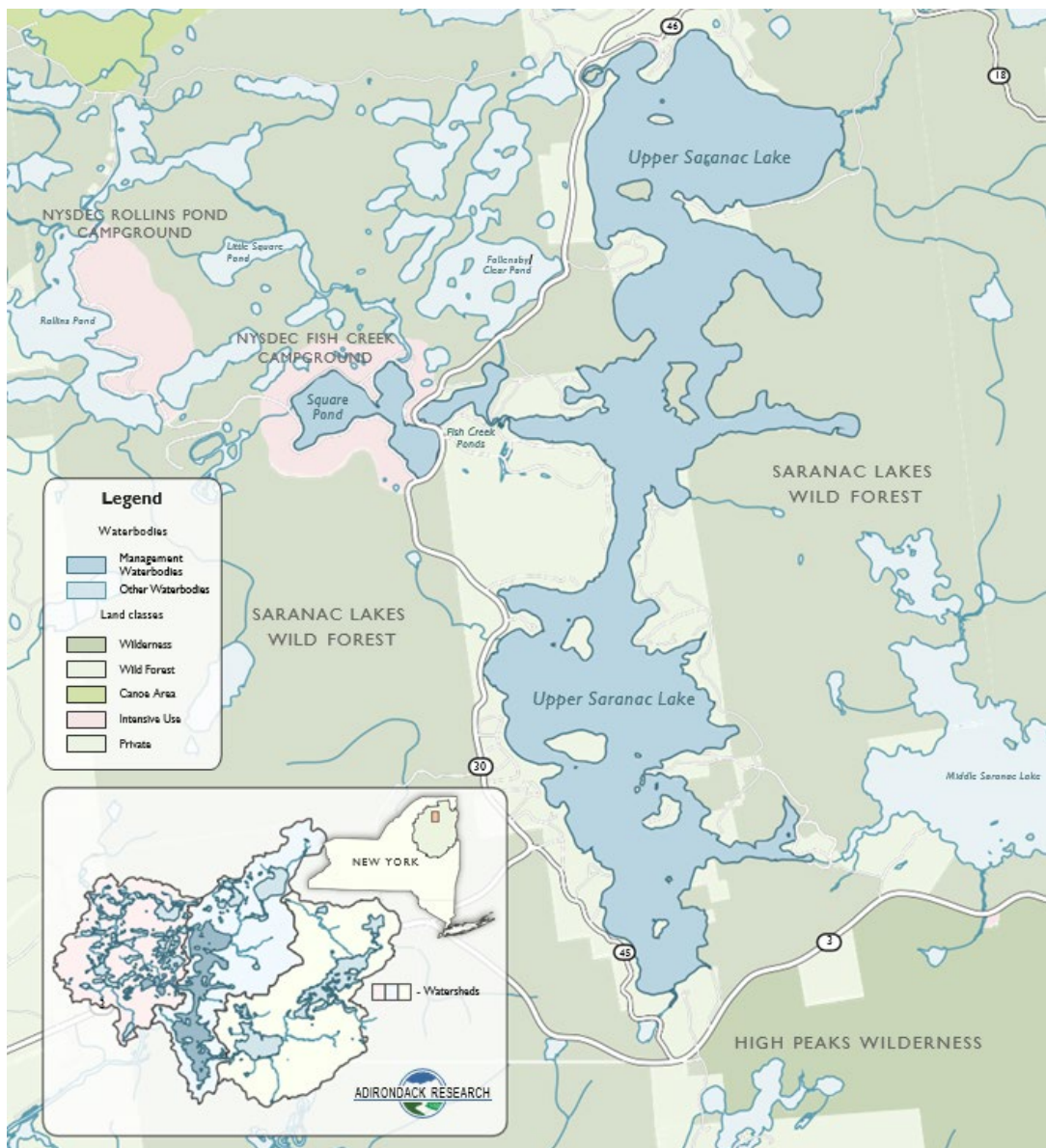
As documented by the Adirondack Watershed Institute (AWI) at Paul Smith's College, "where once AIS was a significant nuisance on USL, AIS populations are almost non-existent". The AWI *Upper Saranac Lake Limnology and Water Quality Report, 2017* stated, "Eurasian water milfoil occurred on only 1% of the 588 study segments during August." (Laxson, Yerger, Faverau, Kelting, 2018). By 2019 AIS was not detected by AWI on USL in any of the study segments (Laxson, 2019).

Upper Saranac Watershed

Upper Saranac is a 49,504-acre watershed located in Franklin County, New York. The watershed, dominated by forest cover, forms the headwaters of the Saranac River, one of the main tributaries to Lake Champlain. Upper Saranac Lake (USL) is the largest body of water in the watershed. The lake is a 5,200-acre lake that drains into Middle and Lower Saranac Lakes. There is 47 miles of shoreline along Upper Saranac Lake and 1,200 acres of littoral zone (where plants can grow).

Approximately thirty percent of the shoreline is in State ownership and there are approximately 600 private properties along the shore. Major access points to USL are the DEC Boat Launch at Saranac Inn, Fish Creek and Rollins Pond State Campgrounds, the DEC Fishing Access Site at Indian Carry, Bartlett Carry, and the Weller Pond Carry. Upper Saranac Lake is also served by a private boat livery and numerous private launches.

Upper Saranac Lake supports both a warm water and cold-water fishery and is equally valued for its exceptional aesthetic value. The user population of the lake includes a large number of tourists, non-resident - second home owners, a growing retired population, local area residents, and a number of summer youth camps. Fish Creek Public Campground, with over 300 shoreline sites, has direct water access to USL. USL is a popular destination for recreational canoeists and boaters, and is considered a prime destination for recreational activities in the region.



Project Location

Methodology

Project data is collected, maintained, analysed and displayed to accurately document, evaluate, and interpret AIS management. Documentation of locations and amounts of AIS removed provides a better longitudinal understanding of AIS management. Through this evaluation, the USF continues to adapt and improve to advance management techniques and reporting methods.

The USF, working together with our divers, the NYSDEC, and the APA, developed a protocol that limits impact to users during the project, while providing long lasting impacts.

Aquatic Plant Surveys: Comprehensive plant surveys are completed throughout the growing season. Surveys are completed using surface spotting techniques. Visual surveys performed from a motorboat or stand-up paddle board are enhanced with the use of sonar detection from a Lawrance ELITE-7Ti Chartplotter sonar unit.

The survey observations are conducted using either grid search patterns or traveling in a serpentine pattern, beginning from the shoreline to a depth of 18 feet or. Using these techniques, maps are produced indicating locations of AIS using a GPS. Weights and lobster buoys mark milfoil locations to assist divers in pinpointing plants.



Photo 1. Lobster Buoy marking milfoil plant location – Photo: Guy Middleton

The use of survey data assesses the efficacy of hand harvesting AIS by analyzing pre and post management abundance in management areas. The surveys are designed to map milfoil and locate any new invasive species. AIS removal data obtained from each harvesting season documents density level changes over time. Collective data helps guide the development of long-term aquatic plant management planning and comparability.

Milfoil Monitoring Program: Data obtained from monitoring and harvesting is used to provide context and a qualitative baseline for developing a historic set of aquatic plant community records. This data assists in guiding management as well as monitoring to quantify progress and assess efficacy of our management techniques.

Beginning in 2004 The Upper Saranac Foundation contracted Adirondack Watershed Institute (AWI) to provide independent monitoring, evaluation and reporting of AIS control efforts. The specific objectives were to assess the efficacy of hand harvesting Eurasian water-milfoil by analyzing current and historical milfoil abundance across underwater study locations.

Data collected in this study was very effective in assessing the efficacy of the USF's AIS management techniques from the inception of the program. With such low-density levels and no AIS detected by AWI in 2019 it was determined that this monitoring method was no longer providing an accurate depiction of AIS levels in the lake. Although EWM was not found by AWI, there was, and still is AIS in USL. The transect monitoring program was discontinued in 2020.

Poundage and plant counts: USF also monitors efficacy of our management by tracking poundage of plants removed each day and year. Beginning in 2015, in addition to recording pounds harvested the dive crew maintains data on the number of plants harvested. In areas of low AIS densities, such as USL, this is a more precise measuring system.

The dive crew maps and documents plant locations via GPS waypoints. Plants weights are determined by filled bags. Each filled bag weighs 25 lbs. This weighing system is consistent with past practices and with most other AIS harvesting companies throughout the region.

Harvesting: Beginning in 2022 the USF took over AIS operations by employing our own dive team. The shift in administration significantly reduced the expense to the USF while provided a more direct management approach to further increases efficiency. Prior to 2022, the USF contracted independent companies for this management service from Invasive Solutions Dive Company (ISDC) and Aquatic Invasive Management (AIM). Also beginning in 2022 the USF expanded to, and contracting out our divers to other waterbodies outside the USL watershed further offsetting USF's cost.

The management area includes Lower Fish Creek Pond; downstream of the Route 30 bridge and the Fish Creek Public Campground, through the entire Upper Saranac Lake to the outlet at the Bartlett Carry Dam. Divers utilize a Hookah Dive System. Each Hookah air compressor system allows two divers to hand harvest simultaneously. The invasive plants, both EWM and VLM were removed from the sediment by hand, including the root system and then bagged. An additional team member remained on the surface to retrieve plant fragments, notify boaters that divers are underwater and collect filled bags. Traditional "diver down" flags were deployed as well as additional safety navigation buoys which were strategically placed. A sediment curtain was utilized to assist in preventing fragments from floating outside the management area when needed.

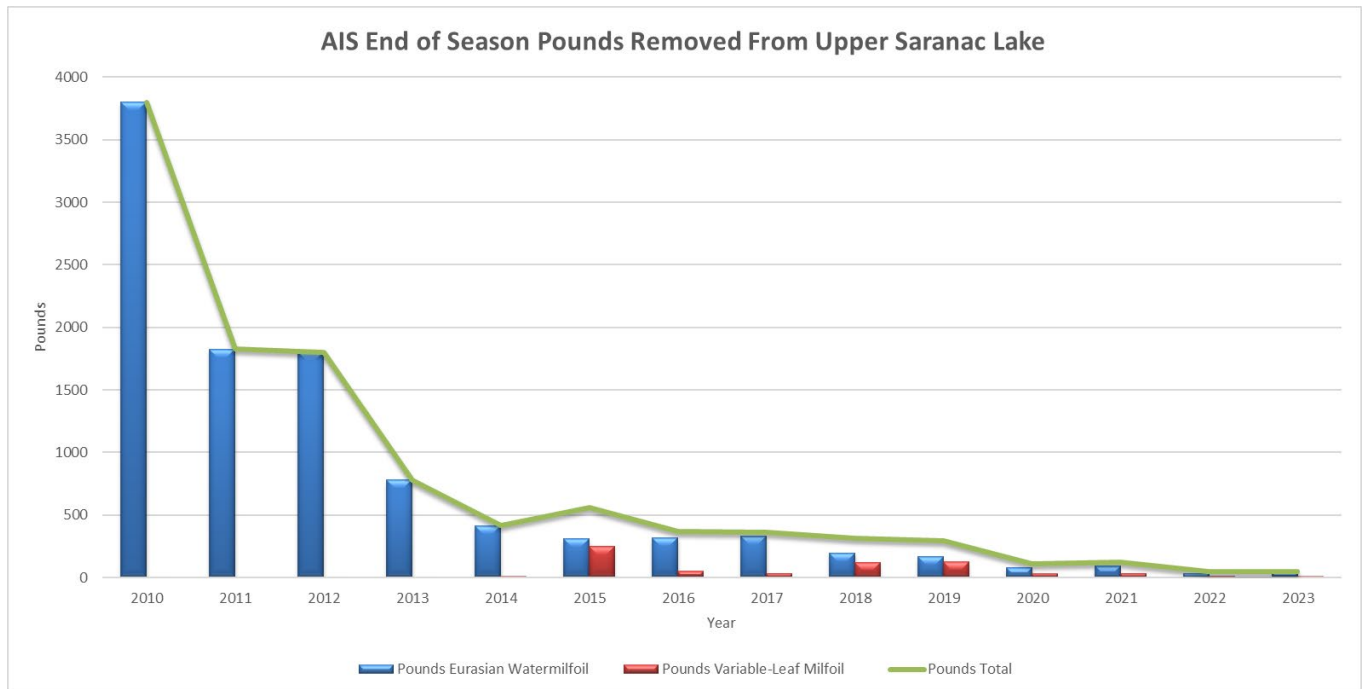


Photo 2. Diver locating and removing Eurasian watermilfoil plant– Photo: Meg Modley

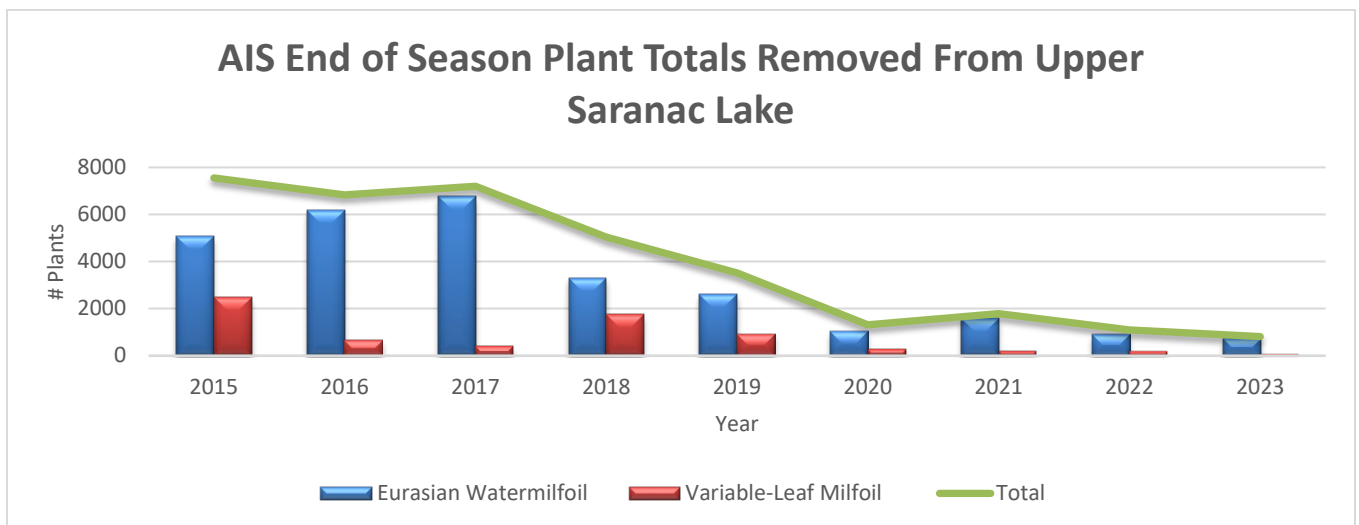
Dive crews use historical harvest data to prioritize site management. At the start of the season, divers focus on harvesting sites which have harbored VLM in the past as VLM is more readily identifiable early in the season. Early season focus shifts to past areas of growth of EWM. As plants grow towards the surface the dive crew utilizes calm weather for surface observations whenever possible, tailoring their harvesting around their observations.

Harvesting Summary: Divers initiated harvesting on June 5 and concluded October 12, 2023. Throughout this period, 804 work hours were devoted to harvesting AIS in USL. This is a reduction of 93 hours of diver work from 2022.

AIS Pounds Removed: There was a total of 45.3 pounds of milfoil removed from USL in 2023. The total poundage of EWM harvested increased from 33.75 pounds in 2022 to 38.3 pounds in 2023, and the total poundage of VLM harvested dropped from 10.85 pounds in 2022 to 7 pounds in 2023.



AIS Plant Counts: With density and poundage of milfoil drastically decreasing since the initiation of management in 2004, beginning in 2015 divers began counting the number of plants and type of AIS being removed as well as their locations. In a similar manor as poundage, the total number of plants removed also decreased. From 1,089 plants harvested in 2022 to 814 plants harvested in 2023. The total number of EWM plants harvested dropped from 893 plants in 2022 to 729 plants in 2023, and the total number of VLM plants harvested dropped from 196 plants in 2022 to 85 plants in 2023.



AIS plant count by zone over time: For tracking purposes, the lake is divided into 39 zones. Plant harvests are tallied daily and are compared yearly in each of the zones.

Site #	Site Name	Site #	Site Name
1	Back Bay	21	Narrows East
2	Saranac Inn point- Marlboro Club	22	Birch Point- Gull Point
3	College Row	23	Gilpin Bay
4	Tommy's Rock & Dry Island	24	Eagle Island-rock pile
5	N. Basin -N. Markham Point	25	North Gull Bay
6	Goose Island-rock pile	26	Pelky Bay
7	Green Island-rock pile	27	Gull Bay Connector
8	Green Bay- Moss Point Rock	28	Bungalow Bay
9	South Markham Point- Square Bay	29	South Gull Bay
10	Square Bay Divot- point north, Buck Island	30	Deer Island
11	Little Square Bay	31	Doctors Island, area
12	Buck Island	32	Birch Island, area
13	Buck Island Bay	33	Bull Point- Sekon Point
14	Whitney Point-Bottle Bay-Butternut Point	34	Bartlett Carry Bay
15	Saginaw Bay	35	Sekon Point- south of Wenonah
16	Fish Creek Bay	36	Chapel Island
17	Fish Creek Channel	37	East South Basin- Bartlett Carry Bay, entrance
18	Fish Creek Pond-Spider Creek	38	Corey's Island
19	Pork Bay	39	South Basin
20	Narrows West		

Eurasian Watermilfoil: The general trend for the total number of EWM plants harvested has continued to decrease since 2105. Of the 39 lake zones, 13 are considered EWM free (no milfoil found for four consecutive years or more). This trend continues to move in a positive direction with more milfoil free zones increasing each year. In 2021 only six sites were considered milfoil free. 30 of the 39 locations had either a decrease or no change in the number of EWM plants harvested in 2023. The largest concentrations of EWM were found in Little Square Bay and Buck Island

USL Harvested Plant Count by Site by Year				Eurasian Watermilfoil		Decrease	No Change	Increase	Eradicated			
Site Name	Site #	2015	2016	2017	2018	2019	2020	2021	2022	2023		
Back Bay	1	0	0	0	0	4	0	0	0	0		
Saranac Inn Point - Marlboro Club	2	0	4	0	0	0	0	0	0	0		
College Row	3	0	15	0	0	149	5	0	0	0		
Tommys Rock & Dry Island	4	0	0	0	0	0	0	0	0	0		
North Basin - Markham Point	5	44	305	1009	341	377	21	0	6	8		
Goose Island - Rock Pile	6	30	57	20	15	17	2	0	0	0		
Green Island Rock Pile	7	1	14	9	1	171	6	2	0	0		
Green Bay - Moss Rock Point	8	0	9	5	0	18	0	0	0	0		
South Markham point - Square Bay	9	31	212	422	92	64	16	15	13	20		
Square Bay South to Buck Island	10	78	82	91	80	8	6	0	4	15		
Little Square Bay	11	1327	1427	1690	910	499	283	400	279	211		
Buck Island	12	478	442	913	287	277	88	324	89	134		
Buck Island Bay	13	25	252	167	271	26	10	2	2	0		
Butternut Pt. Bottle Bay Whitney Pt.	14	21	175	266	269	60	7	39	12	11		
Saginaw Bay	15	104	617	504	146	44	66	41	11	21		
Fish Creek Bay	16	72	176	35	34	22	11	4	1	2		
Fish Creek Channel	17	34	2	0	4	9	0	0	0	0		
Lower Fish Creek Pond - Spider Creek	18	291	152	122	260	136	337	420	166	25		
Pork Bay	19	437	172	162	56	30	15	23	20	9		
Narrows West	20	2	31	14	0	0	0	0	0	0		
Narrows East	21	0	30	11	0	1	1	0	0	0		
Birch Point to Gull point	22	4	25	117	0	3	0	0	0	0		
Gilpin Bay	23	253	160	146	30	68	15	22	1	9		
Eagle Island - 2 Rock Piles	24	88	74	39	15	2	0	5	17	2		
Lilly Bay	25	40	27	68	60	29	4	0	0	0		
Pelky Bay	26	88	26	6	77	0	0	0	32	23		
Gull Bay Connector	27	8	0	0	0	0	0	0	0	0		
Bungalow Bay	28	59	17	40	40	1	9	0	46	37		
South Gull Bay	29	256	406	116	59	56	14	46	13	26		
Deer Island	30	123	107	72	10	27	35	23	64	27		
Doctors Island - area	31	132	74	130	11	1	0	0	0	0		
Birch Island - area	32	57	27	4	20	2	3	1	0	0		
Bull Point - Sekon Point	33	1	0	0	0	0	0	0	0	0		
Bartlett Carry Bay	34	23	13	41	50	25	0	0	54	31		
Sekon Point, Wenonah to Panther Pt.	35	388	276	179	55	81	4	0	58	40		
Chapel Island	36	0	94	3	0	0	0	0	0	0		
East South Basin - Bartlett Carry Bay -	37	130	82	58	21	8	2	38	0	0		
Corey Island	38	28	29	3	1	94	0	0	0	0		
South Basin	39	421	559	314	80	117	68	174	5	78		
Total Number of Plants Harvested		5074	6170	6776	3295	2426	1028	1579	893	729		

Variable-leaf watermilfoil: VLM was found in only 4 of the 39 zones and is contained to the central part of the lake. 3 of the zones that once contained VLM are now considered milfoil free (no milfoil found for four consecutive years or more). The largest concentration of VLM is in Lower Fish Creek Pond. Since 2020 no VLM plants were located south of the narrows. Of the 13 sites where VLM has been found in the past, 12 of the locations had a decrease or no change in the number of plants harvested in 2023. Only one location, Saginaw Bay found an increase in the number of VLM plants harvested. With VLM being aggressively managed in Fish Creek and Square Ponds within the NYSDEC Public Campground and its tributary, we anticipate seeing a reduction of VLM on the main lake in years to come.

USL Harvested Plant Count by Site by Year	Variable-leaf milfoil			Decrease	No Chang	Increase	Eradicated			
Site Name	Site #	2015	2016	2017	2018	2019	2020	2021	2022	2023
Back Bay	1	0	0	0	0	0	0	0	0	0
Saranac Inn Point - Marlboro Club	2	0	0	0	0	0	0	0	0	0
College Row	3	0	0	0	0	0	0	0	0	0
Tommys Rock & Dry Island	4	0	0	0	0	0	0	0	0	0
North Basin -Markham Point	5	0	0	0	0	0	0	0	0	0
Goose Island - Rock Pile	6	0	0	0	0	0	0	0	0	0
Green Island Rock Pile	7	0	0	0	0	0	0	0	0	0
Green Bay - Moss Rock Point	8	0	0	0	0	0	0	0	0	0
South Markham point - Square Bay	9	0	0	0	1	1	1	0	0	0
Square Bay South to Buck Island	10	0	1	0	0	0	0	0	0	0
Little Square Bay	11	0	0	0	0	1	0	0	0	0
Buck Island	12	0	9	1	5	2	10	1	0	0
Buck Island Bay	13	0	0	2	34	3	2	6	1	0
Butternut Pt. Bottle Bay Whitney Pt.	14	0	0	7	2	9	0	4	0	0
Saginaw Bay	15	0	0	0	0	0	4	37	2	16
Fish Creek Bay	16	63	19	36	41	77	22	54	3	1
Fish Creek Channel	17	553	112	163	284	290	58	10	10	4
Lower Fish Creek Pond - Spider Creek	18	1861	523	217	1372	536	181	92	180	64
Pork Bay	19	0	0	0	0	1	4	0	0	0
Narrows West	20	0	0	0	0	0	0	0	0	0
Narrows East	21	0	0	0	0	1	0	0	0	0
Birch Point to Gull point	22	0	0	0	0	0	0	0	0	0
Gilpin Bay	23	0	0	0	0	0	0	0	0	0
Eagle Island - 2 Rock Piles	24	0	0	0	0	0	0	0	0	0
Lilly Bay	25	0	0	0	0	0	0	0	0	0
Pelky Bay	26	0	0	0	0	0	0	0	0	0
Gull Bay Connector	27	0	0	0	0	0	0	0	0	0
Bungalow Bay	28	0	0	0	0	0	0	0	0	0
South Gull Bay	29	0	0	0	0	0	0	0	0	0
Deer Island	30	0	0	0	0	0	0	0	0	0
Doctors Island - area	31	0	0	0	0	0	0	0	0	0
Birch Island - area	32	0	0	0	0	0	0	0	0	0
Bull Point - Sekon Point	33	0	0	0	0	0	0	0	0	0
Bartlett Carry Bay	34	0	0	0	0	0	0	0	0	0
Sekon Point, Wenonah to Panther Pt.	35	0	0	0	0	0	0	0	0	0
Chapel Island	36	0	0	0	0	0	0	0	0	0
East South Basin - Bartlett Carry Bay -	37	0	0	0	0	0	0	0	0	0
Corey Island	38	0	0	0	0	0	0	0	0	0
South Basin	39	0	0	0	0	0	1	0	0	0
Total Number of Plants Harvested		2477	664	426	1739	921	283	204	196	85

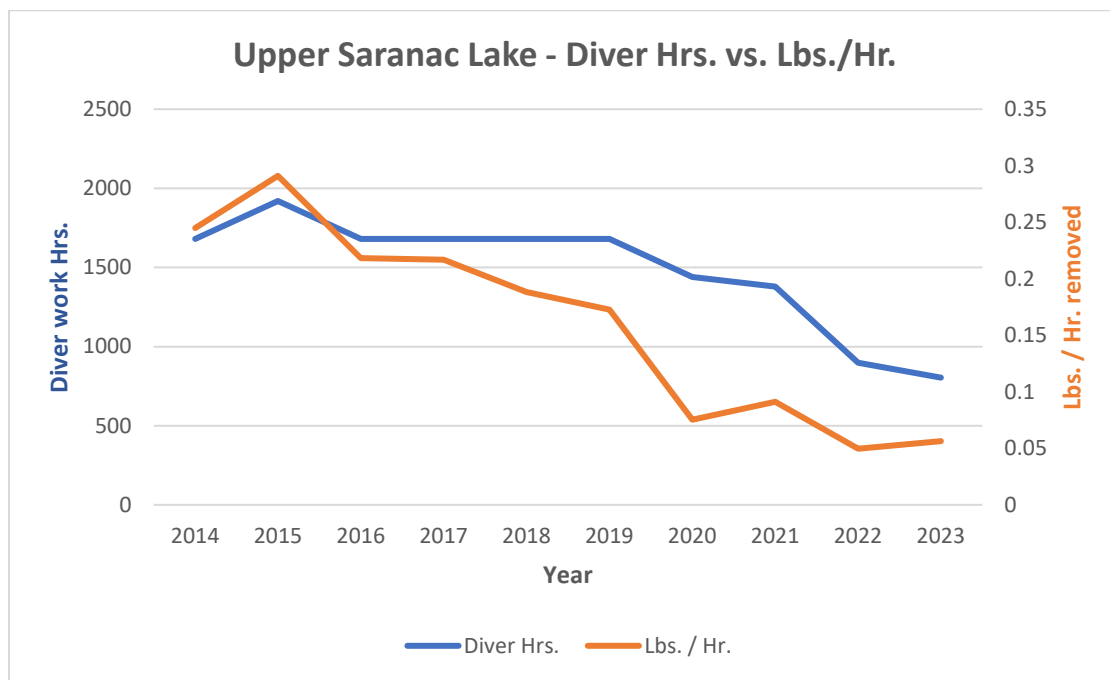
Dive harvest/hour comparison:

With less diver harvesting time being invested each year on USL the poundage and the number of plants harvested understandably decreases. When plant growth is less dense and dispersed over a large area it requires more diver harvesting hours to remove the same volumes of invasive plants.

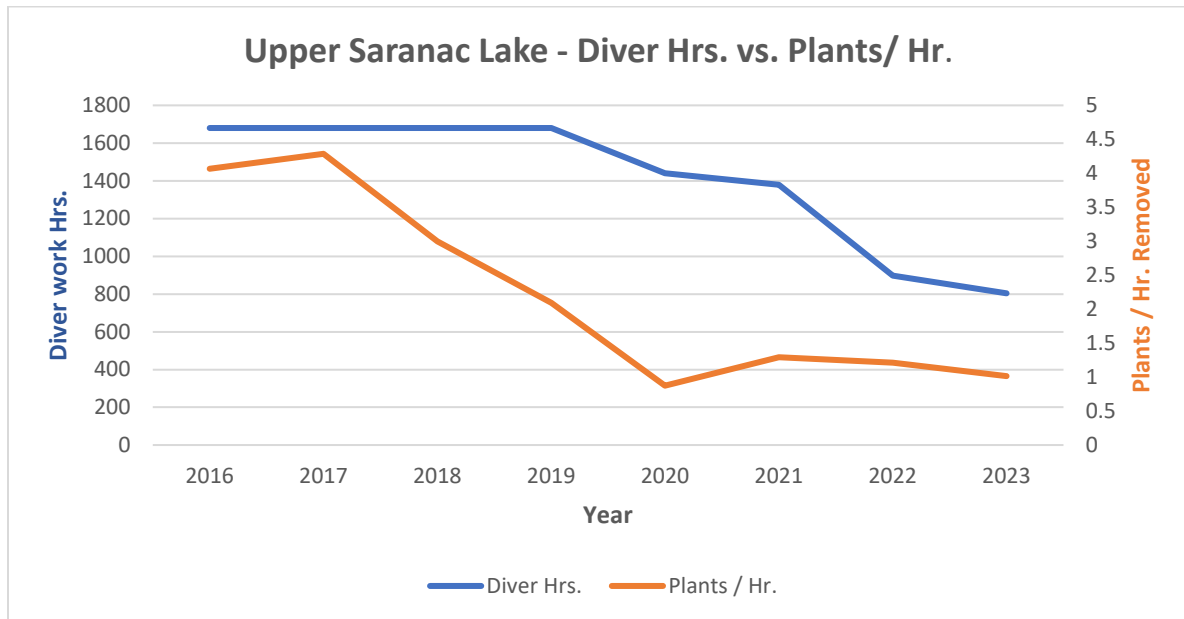
To assure that the USF stays ahead of milfoil growth we make yearly assessments that compares a consistent format, or in other terms comparing “apples to apples”. We do this by measuring yearly averages of pounds and the number of plants removed for each hour of diver operation.

The general reduction trend of average pounds and plants removed per hour over the years quantifies the continued success of the dive operation and the understanding that the USF is maintaining control of AIS.

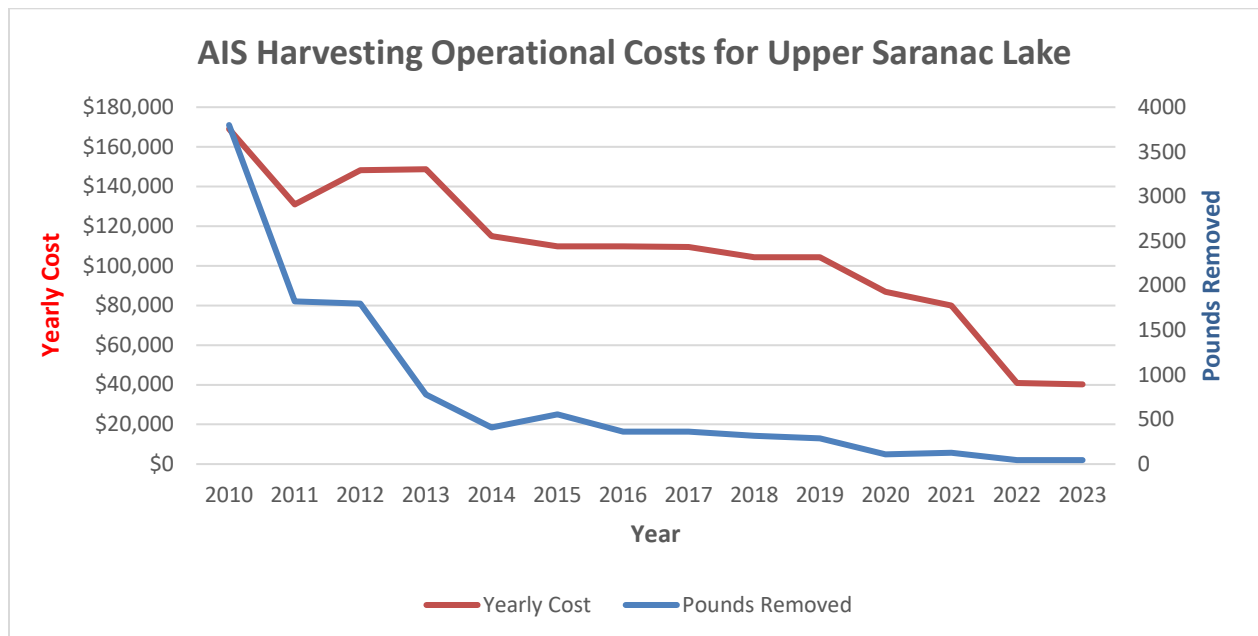
USL Average Lbs. and Plants Removed/ hr. Yearly Comparison					
Year	Dive Hrs.	Lbs. removed	Lbs./hr.	Plants removed	Plants / hr.
2016	1,680.0	367	0.2185	6,834	4.0679
2017	1,680.0	364	0.2166	7,202	4.2869
2018	1,680.0	316	0.1881	5,034	2.9964
2019	1,680.0	290	0.1726	3,514	2.0917
2020	1,500.0	109	0.0726	1,311	0.8740
2021	1,380.0	125.7	0.0911	1,783	1.2920
2022	897.5	44.6	0.0497	1,089	1.2134
2023	804.0	45.3	0.0563	814	1.0124



Providing that the pounds of milfoil or the number of plants harvested per hour does not increase significantly compared to our diver work hours we feel we are staying ahead of the growth curve. Observing that there was an increase in poundage, and the number of plants retrieved decreasing indicates that the plants found are larger and more mature than in previous years. While there is not a significant variation over the years it is something worth noting.



Cost: Over time the USF has reduced diver time and expenses of harvesting without jeopardizing control. While initial 2003 estimates anticipated an annual AIS maintenance budget to be between \$100,000 and \$150,000. The cost of management is now significantly lower with 2020 being the first year that the USL-AIS budget was under \$100,000. The cost for AIS harvesting in 2023 totaled \$40,200. This significant decrease from years prior to 2022 and 2023 can be attributed to two factors; the reduction in dive time needed, and the USF hiring and managing its own dive team.



Density level and cost per acre: The average AIS density levels of the littoral acres (where plants can grow 15’ of water depth or less) and diver cost over time are additional ways the USF monitors the efficacy of management.

The average August stem densities levels documented by AWI across all 16 Upper Saranac Lake transect sampling site locations and 588 segments in 2004 was estimated to be 660 stems/acre. By 2017 AIS occurred on only 1% of the 588 study locations with the average stems/acre of 15. This was 44 times lower than prior to initial management. By 2019, milfoil was not detected at any of the study sites (Laxson, 2019). The transect monitoring program was discontinued in 2020 when it was determined that this monitoring method was no longer providing an accurate depiction of AIS levels in the lake. Although milfoil was not found by AWI, there was, and still is AIS in USL.

Along with the decrease of milfoil found and harvested (20 tons in 2004 to less than 50 lbs. in 2023) the diver cost per acre also decreased significantly. Annual divers’ operational cost per littoral acre decreased from \$446 in 2004 to \$33.50 per acre in 2023.

AIS harvesting cost per acre on Upper Saranac Lake - 1,200 littoral acres						
Year	2004	2019	2020	2021	2022	2023
Average plants / acre AWI Independent Survey	650	Not detected	N/A	N/A	N/A	N/A
AIS removed	20 tons	290 Lbs.	109lbs.	126lbs.	44.6lbs.	45.3lbs.
Annual Cost	\$535,000	\$104,250	\$86,875	\$79,925	\$40,880	\$40,200
Cost/ Littoral acre	\$446	\$87.00	\$72.00	\$67.00	\$34.07	\$33.50

Success of the maintenance portion of the project can be attributed the following:

- Surface spotting used to locate AIS plants and guide diver management.
- Documentation and mapping of harvested locations to provide a historical comparison.
- Harvesting AIS when plants are young, limiting fragmentation and spread.
- Focus on areas surrounding and downwind of recent plant harvesting locations.
- Return multiple times to surface spot and dive areas that are known to produce plants.
- Prioritizing divers harvesting efforts to:
 1. Buoys dropped by the Lake Manager
 2. Problem areas known to produce re-growth
 3. Areas with potential growth

Over time the USF continues to adapt the program by incorporating data to improve and advance management techniques and reporting methods.

Conclusion

The USLAISMP uses a combination of AIS prevention, monitoring, and control activities to inhibit further AIS from establishing and spreading in the Watershed.

The success of combating invasive species has improved water quality and maintained native species in their natural habitats, ensuring the sustainability of our natural public resources for future generations. The program protects economic value through recreation, tourism, sportsmanship and second home ownership by providing clear waterways. Removal and control of AIS in the USL watershed protects downstream waters from infestation and helps prevent the export of AIS to non-infested waters.

The Upper Saranac Foundation, who is committed to the long-term sustainability of this project, will continue ongoing management to prevent any resurgence in AIS growth. The long-term outcome for the USLAISMP has improved water quality and maintained native species in their natural habitats, ensuring the sustainability of our natural public resources for future generations.

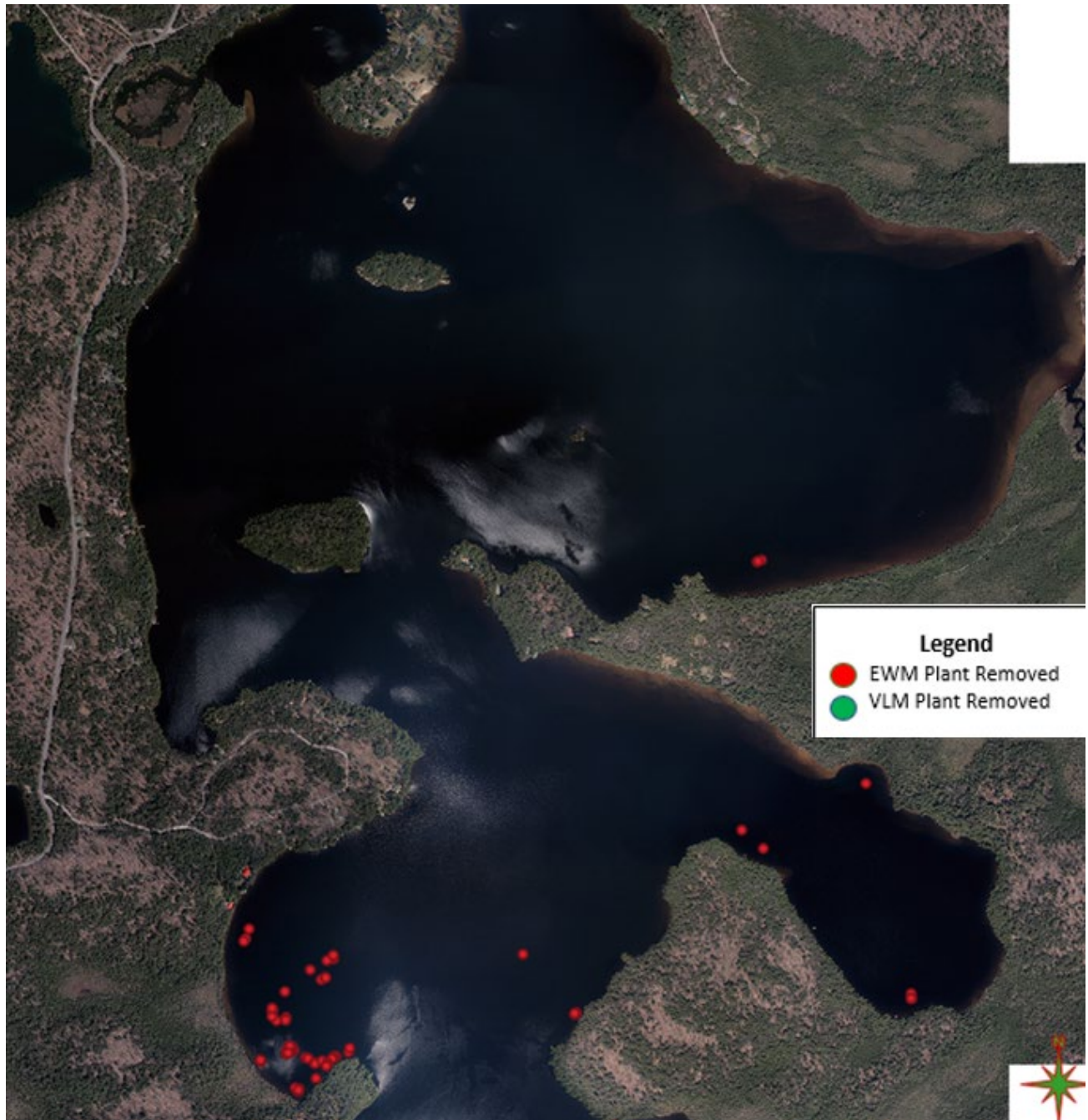
TECHNICAL REFERENCES CITED

Laxson, C. L., Yerger, E.C., Faverau, H. and D.L. Kelting. 2018. Upper Saranac Lake: 2017 Watershed Report. Paul Smith's College Adirondack Watershed Institute. Report No. PSCAWI 2018-07.*

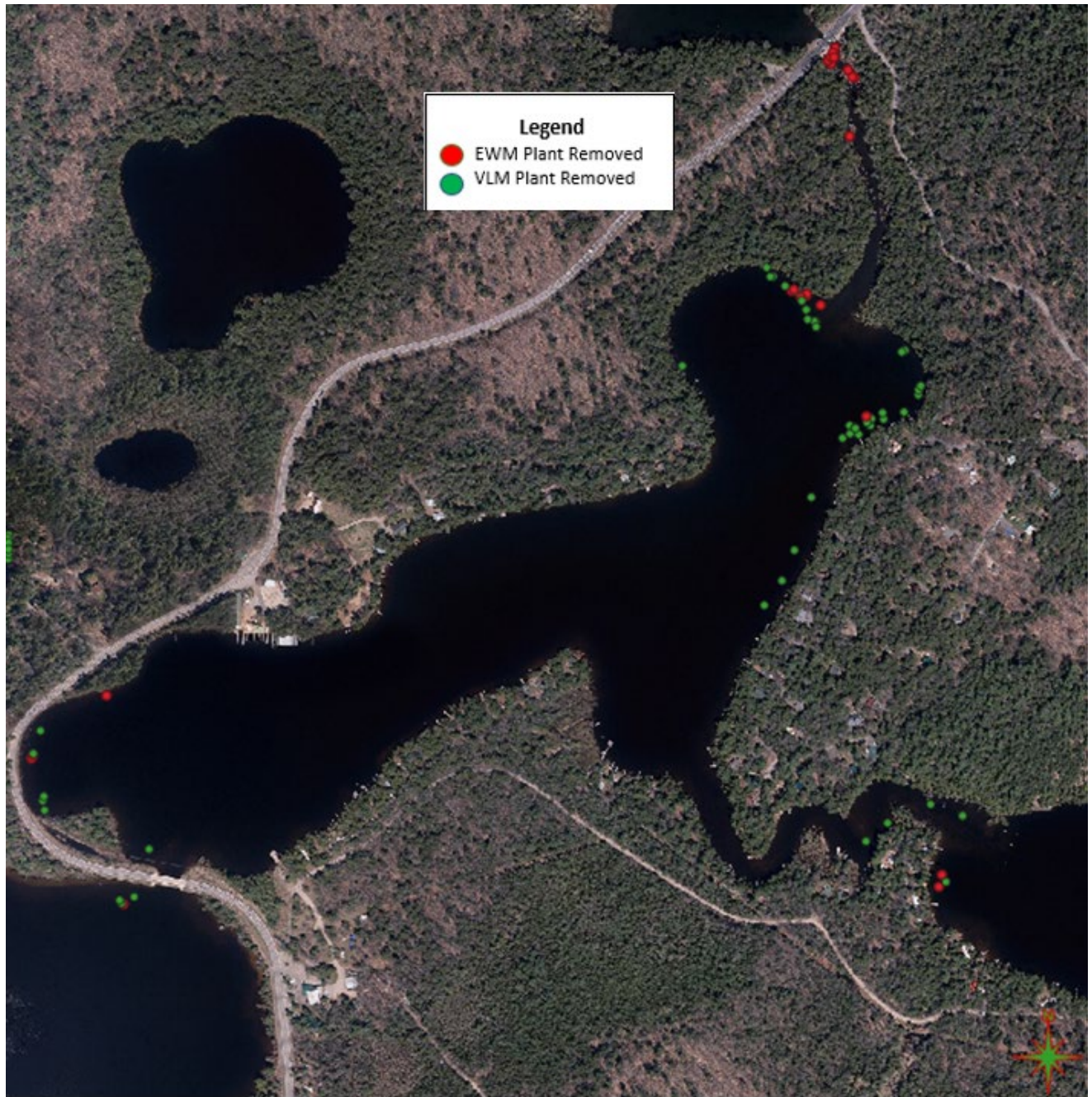
Laxson, C. 2019. Upper Saranac Lake Water Quality Update. Paul Smith's College Adirondack Watershed Institute.

Appendix

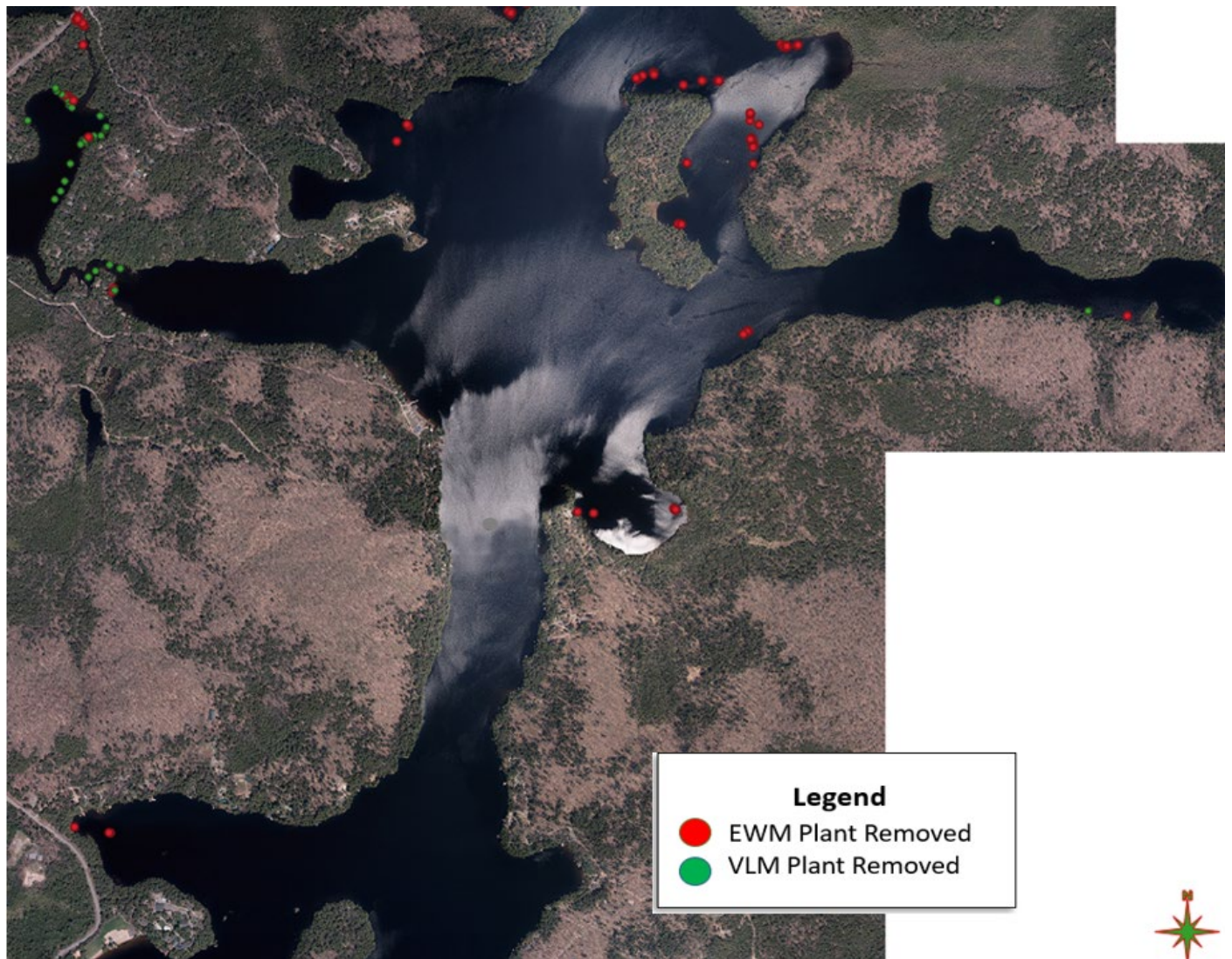
2023 AIS Harvest Location Maps:



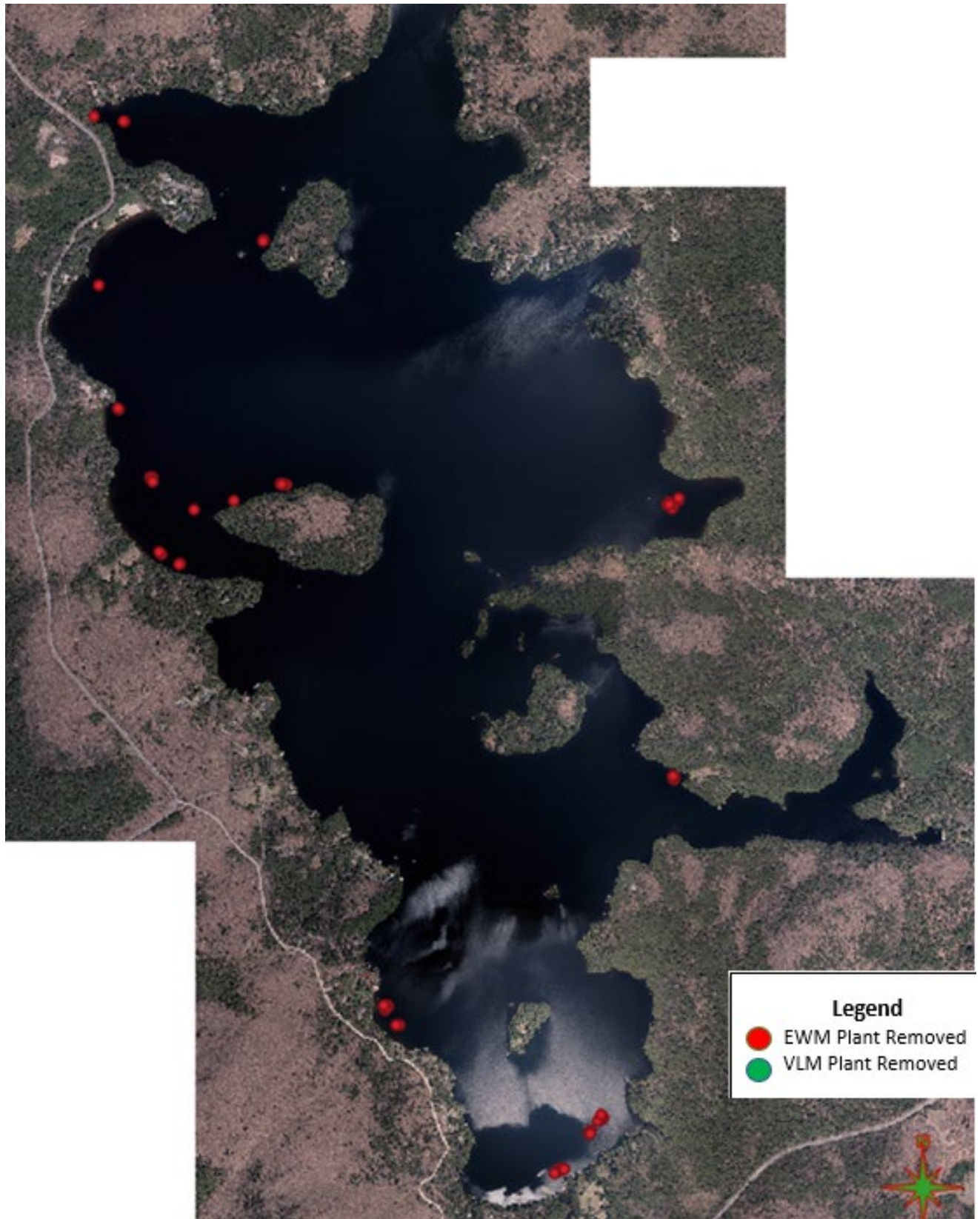
USL-North basin, Square Bay, Little Square Bay



USL-Lower Fish Creek Pond, Fish Creek Bay



USL-Buck Island, Fish Creek Bay, Saginaw Bay, Pork Bay, Narrows



USL-Narrows, Gilpin Bay, Gull Bay, Eagle Island, Pelky Bay, Bungalow Bay, Deer Island, Birch Island, Bartlett Bay, Corey Island and the South Basin