



Department of
Environmental
Conservation



Region 9 Aquatic Invasive Species Monitoring Program Aquatic Vegetation Survey



Silver Lake, Wyoming County, NY

Final Report, 2025

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NYS Department of Environmental Conservation

Bureau of Invasive Species and Ecosystem Health, Invasive Species Coordination Section

in cooperation with NYS Water Resources Institute at Cornell University

AIS Monitoring Program: Problem Definition and Background

Aquatic invasive species (AIS) are non-native plants, animals or pathogens that have the potential to cause harm to the environment, economy, or human health once introduced. Some of these impacts can include competition with native species for habitat and food resources, predation on native species, and impairment of water quality. Over the past two centuries, the Great Lakes have seen the establishment of 188 non-native species introduced through ballast water of commercial vessels, canals, organisms in trade, and recreational boats and equipment. While there are numerous aquatic invasive species management activities being conducted by multiple agencies and special interest groups in Lake Erie and Lake Ontario, the capacity for similar efforts in inland waterways within the Great Lakes watershed in Region 9 of New York has been limited. Without knowing the full distribution and degree of establishment of invasive species, managers are less likely to be able to efficiently manage infestations and prevent their further spread. The Region 9 AIS Program aims to bridge the gap in this knowledge and assist in early detection-rapid response (EDRR) of aquatic invasive plants, invertebrates, and vertebrates through a variety of sampling techniques.

The Region 9 AIS Program was initiated in 2022 with the goal of monitoring high-priority water bodies for target invasive plant species, including hydrilla, water hyacinth, water lettuce, European frog-bit, and water chestnut, to be added into the state's preferred data repository (iMapInvasives). The program aims to be a complete monitoring and management program that consists of a variety of survey components, all to provide a more descriptive picture of the presence of AIS in the region. These components include point-intercept submersed aquatic vegetation surveys of a random-systematic design for presence/absence and density of native and invasive plants using the rake toss method (Madsen 1999; Madsen and Wersal 2017), zooplankton sampling, and macroinvertebrate sieve surveys, where applicable.

Project Description

SILVER LAKE: ASSESSMENT HIGHLIGHTS		
379 Acres surveyed	AIS detections occurred at 97.7% of all sample stations, including Curly-leaf pondweed, European frog-bit, and invasive watermilfoil with the most frequent invader as Invasive watermilfoil at 86% of vegetated sites	24 Plant species found 4.49 species Average richness of sample sites 39.3 Adj. Floristic Quality Index Score*
265 Sample sites		
1187 Unique observations		

*The FQI was determined using the Universal Floristic Quality Assessment and should only be loosely interpreted as follows: **High quality**, where the mean C is greater than 4 and the FQI is greater than 50, **medium quality**, where the mean C is 2-4 and the FQI is 20-50, and **low quality**, where the mean C is 0-2 and the FQI is 0-20

The Region 9 AIS Strike Team conducted a point-intercept survey at Silver Lake from June 11-26, 2025. Silver Lake is 836 acres. Based on bathymetric data, much of the center of the lake was excluded and 379 total acres were surveyed, with an average depth of 5.3 feet at all points sampled. The deepest part of the lake surveyed was 16.8 feet (points over 25 feet excluded from average, as rake tosses were not performed at these locations). The dominant substrate types of the lake are muck/cobble/gravel/sand. The dominant bottom coverage is macrophytes/benthic algae/woody debris. Biovolume measurements were also taken and processed using the Biobase software, which found that vegetation made up 46% of the water column, where present in the area surveyed.

A total of 256 points were surveyed across the two years using the rake-toss method, a standard across New York state. Two rake tosses are performed at each point on either side of the vessel, with total vegetation density and individual species density collected. Density is recorded using the following scale: Zero (0), Trace (1), Sparse (2), Moderate (3), and Dense (4). The data collected is then averaged to estimate species density and frequency in both lakes, all of which can be found in the Appendix at the end of this report. Typically, rake tosses are performed at all locations that fall between 0 and 25 ft, but due to several points showing no growth toward the center of the lake, staff focused on the more direct littoral zone (0-100m from shore) to cover as much of the lake as possible. A biovolume layer is also included in the map of Overall Density, and the Biobase report is attached at the end of this report.

Invasive Species at Silver Lake

Three* invasive plants were found in Silver Lake, curly-leaf pondweed (*Potamogeton crispus*), European Frog-bit (*Hydrocharis morsus-ranae*), and invasive watermilfoils (*Myriophyllum spicatum* and *Myriophyllum spicatum* x *Myriophyllum sibiricum*) which made up ~42% of the total species occurrences at the points surveyed in the lake. *It is believed that both watermilfoils are present in Silver Lake, but it is difficult to determine quickly in the field so the species have been grouped into a single species complex for the purpose of this report. Zebra mussels and mystery snails were found in the lake, but have been excluded from analysis. Charts and maps of frequency, whole rake abundance (density) and species composition at each survey point can be seen in Appendices I and II.



Curly-leaf pondweed (*Potamogeton crispus*) is dominant throughout New York and all of the United States. Vegetative reproduction through turions or hardened overwintering buds that begin to grow in autumn and persist throughout the winter in a slow-growing or dormant state, is the most important form of reproduction for curly-leaf pondweed. This makes it one of the first plants to appear each season, appearing as early as February/March. Curly-leaf pondweed often outcompetes native plants and may impede recreation. It typically dies off by July but has been persisting through the fall in many New York lakes in recent years.

Eurasian watermilfoil (*Myriophyllum spicatum*) and Hybrid watermilfoil (*Myriophyllum spicatum* x *Myriophyllum sibiricum*). Eurasian watermilfoil is widespread throughout the U.S. and has also been found to hybridize. Hybrid milfoil is a hybrid between Eurasian watermilfoil and Northern watermilfoil (*Myriophyllum sibiricum*). Although Northern watermilfoil is native to New York, hybrid milfoil is considered invasive and shares many of the characteristics of Eurasian watermilfoil. Both watermilfoils can withstand low water temperatures, giving it the ability to overwinter beneath ice and begin to grow earlier each season than most other native aquatic plants. Hybrid watermilfoil also has the propensity to form dense canopies, impeding recreation and contributing to declines in native aquatic plant diversity and abundance. Fragmentation is believed to be the main source of spread. A piece of plant no larger than 2 inches, so long as there is a stem and a node with leaves, can establish an entire new infestation.



European frog-bit (*Hydrocharis morsus-ranae*) is a free-floating aquatic plant with heart-shaped leaves that form rosettes. The species does have roots, but they are not typically anchored to the substrate, unless in shallow waters. However, both roots and rosettes can tangle with other vegetation and create dense clumps, which can prevent light from reaching native submerged plants underneath. European frog-bit reproduces primarily through turions, or buds that overwinter and begin to grow when spring arrives. One European frog-bit plant can produce 100 to 150 turions in a single season.

Zebra mussel (*Dreissena polymorpha*), a mollusk named for its dark, zig-zagged stripes on its shell, are triangular, shaped like the letter D, with a sharply pointed edge at the hinge. They can be found attached to objects and many surfaces, giving them the ability to clog pipes and block water flow, damage boats and other property, and injure water-goers with their sharp edge. Zebra mussels can also attach to other native mussels, which ultimately die because they cannot feed. They are also filter feeders that can rapidly filter entire bodies of water. During the summer, they filter a volume of water equal to all the water in the Hudson River estuary every 2-4 days! This efficient feeding method lessens the amount of food available to native invertebrates and other animals, disrupting food webs and threatening other species in the waterbody. Overall, once they are attached to an ideal surface, zebra mussels multiply rapidly and form dense colonies. One individual can release up to one million eggs each year.



Mystery snails are robust invasive snails with coiled, spiral shells. When their shell is pointed up, the shell opening is on the right. They graze on lake and river bottom material. There are different species of mystery snails: Chinese mystery snails are olive-colored, while banded mystery snails are light brown with reddish brown horizontal bands. Both species of snails are highly tolerant to poor water quality conditions due to the presence of an operculum, a trapdoor that closes and protects the snail until more favorable conditions arrive, which allows them to outcompete native snails. These snails give birth to live young and are nearly impossible to eradicate once established.



Management

Best management practices are methods, techniques and plans that have been tested to achieve an objective, while keeping finance resources in mind. It is also critical to evaluate the feasibility and efficacy of potential management options as they relate to the overall goal of plant management within the lake. The primary management goals for invasive plant management considered by the DEC are prevention, eradication, and suppression/containment.

Prevention refers to management options that limit the spread and potential introduction of aquatic invasive species through education and outreach, physical barriers, decontamination methods, etc. New York's most successful prevention initiative is the Watercraft Inspection Steward Program, which educates hundreds of thousands of recreational water users and intercepts new invasive species attached to vessels, such as hydrilla, each year. To learn more about this program, visit <https://www.dec.ny.gov/animals/107807.html#:~:text=DEC%2C%20Parks%2C%20and%20the%20NY%20Natural%20Heritage%20Program,are%20connected%20within%20and%20beyond%20New%20York%20State.>

Eradication refers to control of a species to the point at which it is no longer found in the waterbody. This option is typically applied to emerging or less common species but may also be appropriate for early infestations of regionally widespread species. The evaluation of the feasibility of eradication as a goal is highly necessary, as not all infestations are capable of being eradicated, especially considering the potential treatment options used. Some methods will be ineffective at eradication no matter the size of infestation, purely from the method's mode of action. Mechanical methods like harvesters, for example, rarely (if ever) result in full eradication, as there is a high potential for induced fragmentation and vegetative reproduction. Typically, hand-pulling and/or chemical control are the most appropriate activities for a goal of eradication. But remember, species can always be reintroduced, which is why prevention activities post-eradication for several years is important.

Suppression, or containment, refers to the management of a species to limit continued spread both within and outside of the waterbody, and potentially offset negative impacts to the ecosystem with priority

treatment areas. This is a common goal for widespread species, especially at sites with high risk of reintroduction or sites with older, larger infestations. Physical methods such as hand-pulling, benthic barriers, mechanical harvesters, drawdown, and even targeted chemical control are options for suppression or containment. Another less common option with high potential is native plant restoration in areas that have plants with early-season senescence, such as curly-leaf pondweed. This may allow for native plant beds to take up space in disturbed areas that are at the greatest risk of invasion.

Recommendations for Silver Lake

Due to the widespread nature of invasive watermilfoil and curly-leaf pondweed, treatment of these species is not necessarily recommended at this time unless chemical control is found to be a potential option for treatment of Silver Lake necessary for improving recreational access, which is being impaired at certain areas of the lake. Chemical treatment was proposed by the lake association in 2025 for the 2026 season. Use of mechanical methods, such as a weed harvester, is **not recommended** due to the high potential for fragmentation and further spread of the species, except as a component of integrated pest management plan with the understanding that it will not aid in suppression of either species unless in conjunction with chemical control or another potential control technique.

The presence of hybrid watermilfoil has not been confirmed through genetic testing but is presumed due to leaflet counts performed in the field. Eurasian watermilfoil leaves typically have 14-21 leaflets, while the hybrid species will have 8-12. Hybrid milfoil has only been reported in this region at one lake through genetic testing conducted by this program in 2022. There are implications for chemical control of hybrid milfoils, so testing is recommended if treatment is desired, which can be conducted by the DEC team if requested.

European frogbit is also a common species in the region, and it appears to be currently managed through manual removal efforts. It is recommended that this control effort continue for potential eradication of the species. If it is not being managed currently, the DEC AIS Strike Team would potentially be able to conduct this removal with assistance from local stakeholders.

Additionally, spread prevention should be a high priority for Silver Lake, as it is a lake that experiences heavy recreational use. It is recommended that a boat steward be placed at the boat launch on high volume days and/or ensuring an AIS disposal station/signage is present to encourage users to Clean, Drain, and Dry and prevent AIS introductions.

Appendix I. Graphs and Tables

1. Plant Composition of Silver Lake

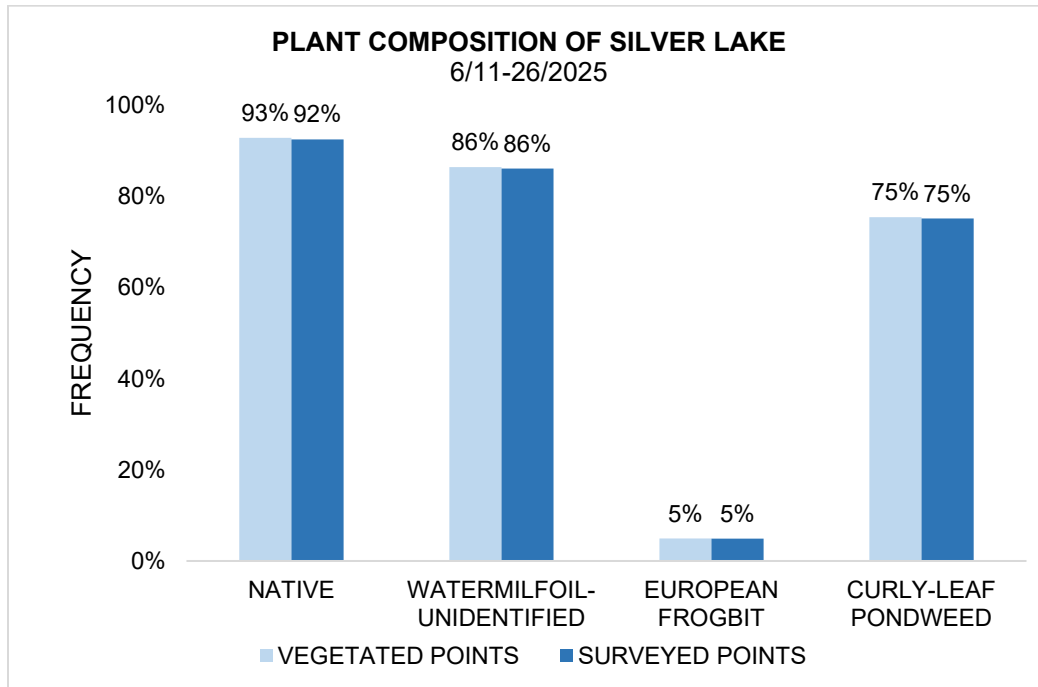


Fig. 1 Comparison of plant composition between **all surveyed** points and **vegetated** points in Silver Lake in 2025. This graph represents the overall frequency of individual species at all points surveyed within the lake as well as locations exclusively with vegetation. This can be interpreted as the frequency of surveyed points being representative for the entire lake, while the frequency at vegetated points is often higher because “zero” points have been eliminated.

2. Frequency and Density of Plants in Silver Lake

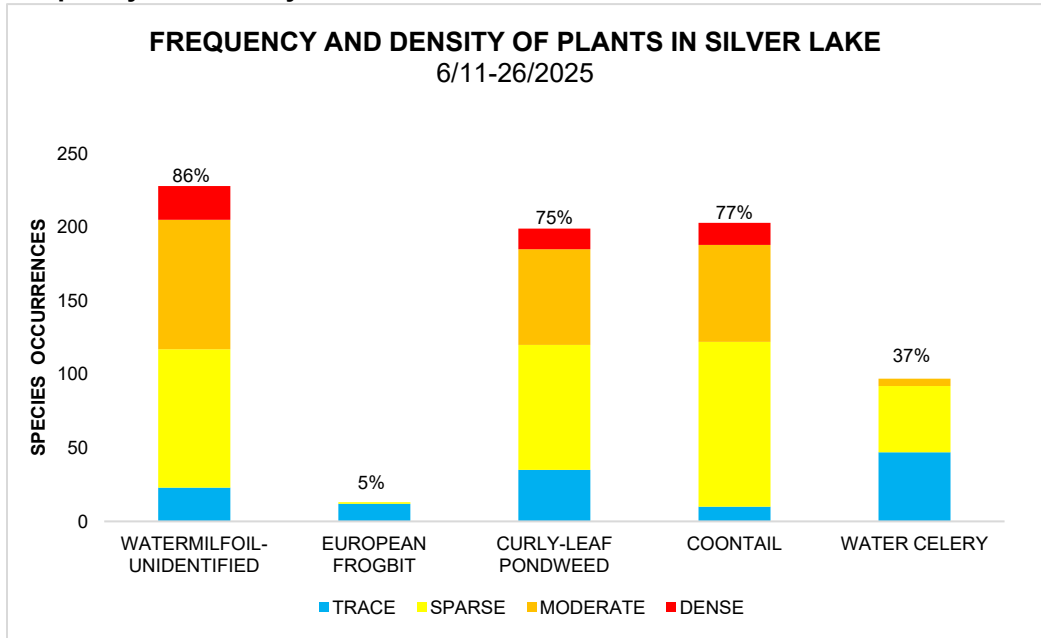


Fig. 2 Frequency and density of key native and invasive plants found in Silver Lake in 2025. This graph depicts the density or abundance levels (trace, sparse, moderate, and dense) broken down within the overall frequency of species at all vegetated points.

3. 3-Year Comparison Graph of Plants in Silver Lake

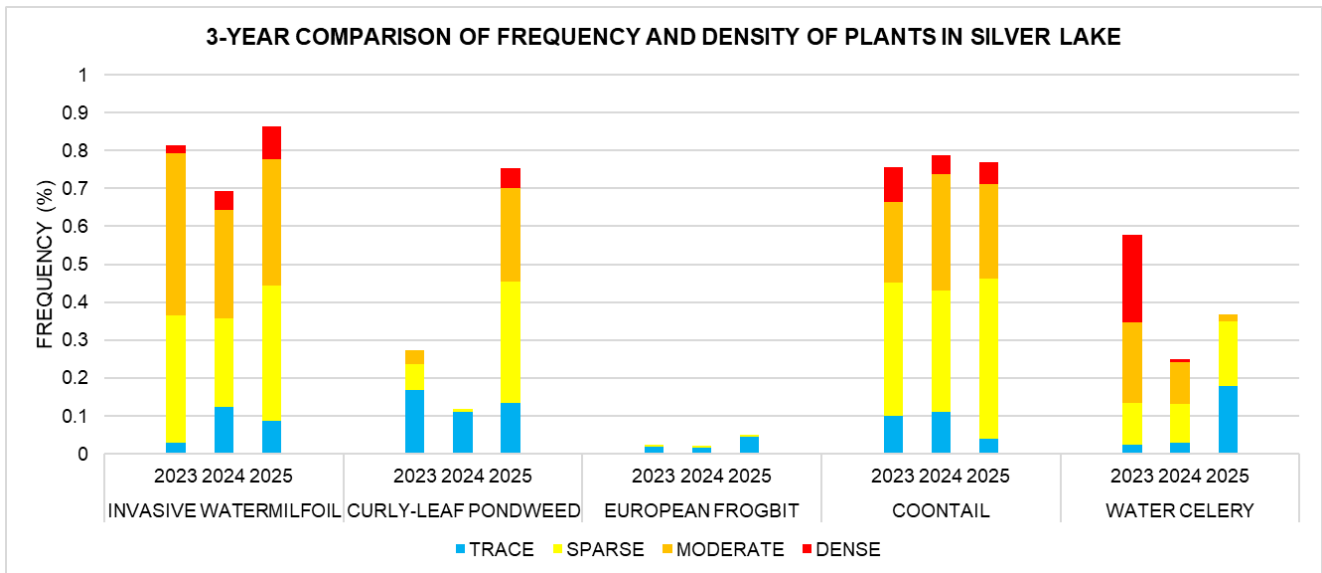


Fig 3. Comparison of density frequencies of key native and invasive plants found in Silver Lake in 2023, 2024, and 2025. Overall, the frequency of invasive species increased in 2025. This follows a trend for western New York, and could be attributed to the warmer growing season in 2025 as compared to the previous years.

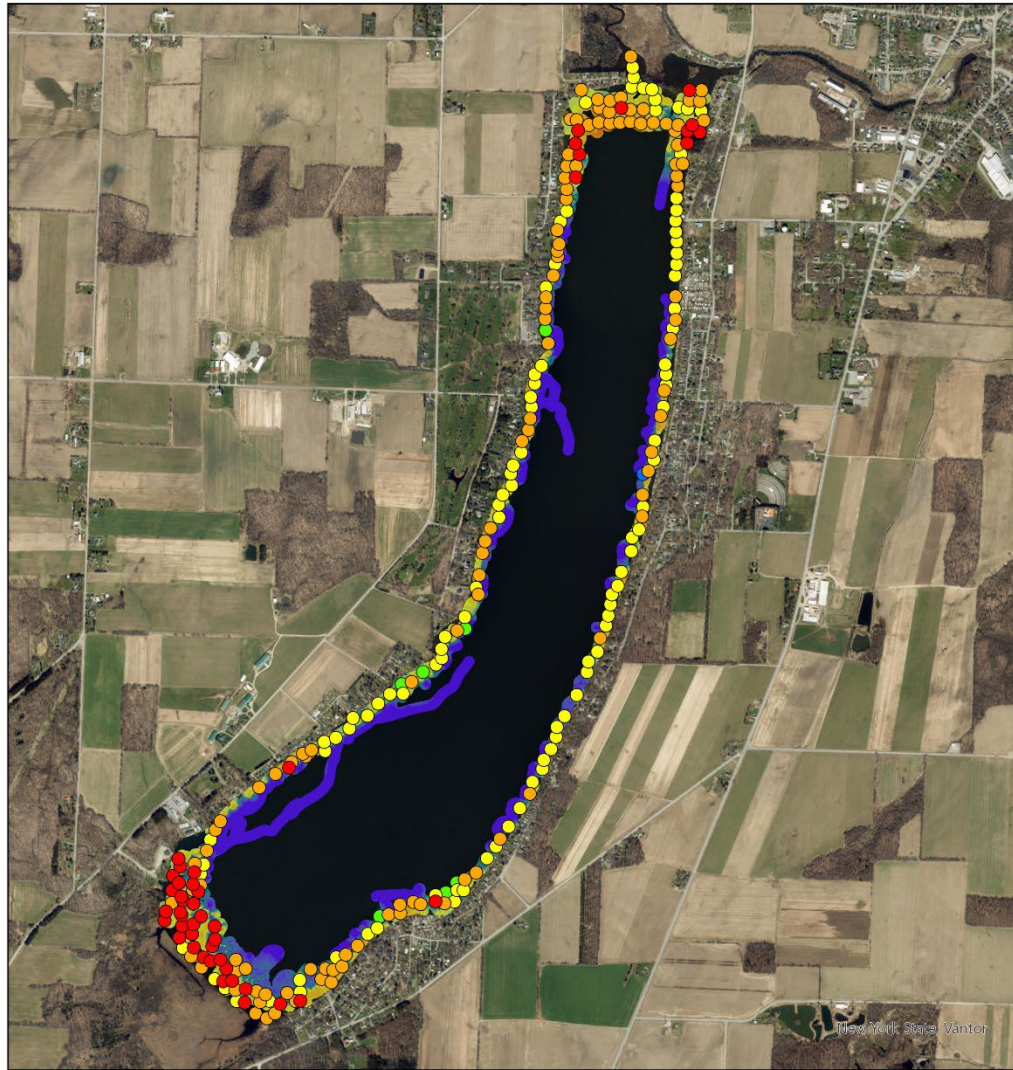
4. Overall Vegetation Summary of Silver Lake




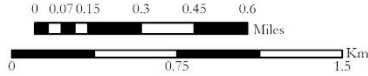
Lake Summary	11-26-Jun-25	Total Records: 265	Vegetated Records: 264	
Species	Total Species Occurrences	Total Frequency of Macrophytes (All observations)	Total Frequency of Macrophytes (Observations with Vegetation)	Average Species Density (Observations with Vegetation)
Curly-leaf pondweed	199	75%	75%	3
European frogbit	13	5%	5%	2
Invasive watermilfoil (M. spicatum or M. spicatum x M. sibiricum)	228	86%	86%	3
Coontail	203	77%	77%	3
Common waterweed	2	1%	1%	2
Nuttall's waterweed	96	36%	36%	2
Water stargrass	45	17%	17%	2
Common duckweed	47	18%	18%	2
Star duckweed	4	2%	2%	1
Slender naiad	13	5%	5%	2
Spatterdock	5	2%	2%	2
White water lily	18	7%	7%	2
Leafy pondweed	5	2%	2%	2
Long-leaved pondweed	2	1%	1%	2
Small pondweed	45	17%	17%	2
Whitestem pondweed	2	1%	1%	2
Richardson's pondweed	3	1%	1%	2
Unknown fine-leaved pondweed	2	1%	1%	1
Flat stem pondweed	16	6%	6%	2
Longbeak buttercup	3	1%	1%	2
Greater duckweed	46	17%	17%	2
Sago pondweed	20	8%	8%	2
False pondweed	5	2%	2%	2
Water celery	97	37%	37%	2

Appendix II. Maps

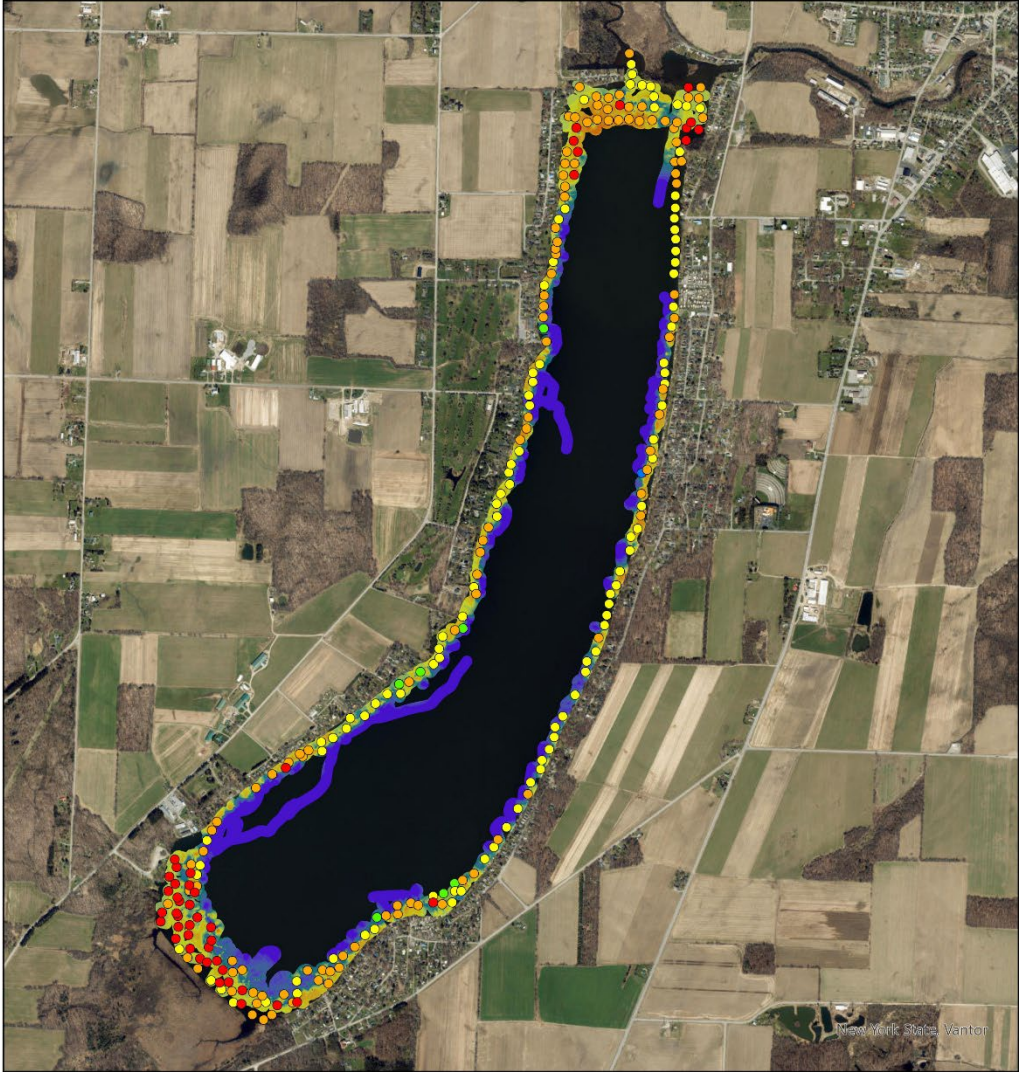
1. Whole Rake Abundance



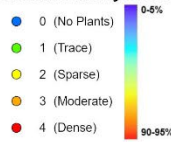

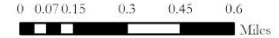

Overall Density 6/11-26/2025



 Department of Environmental Conservation	Silver Lake, Wyoming County, NY 78°1'52"W 42°41'49"N		Overall Density Biovolume (%) 0-5% 90-95%
	 NEW YORK STATE WATER RESOURCES INSTITUTE Cornell University	 	
Prepared by: Adam Turner NYS DEC Region 9 11/25/2025	Spatial Reference PCS: NAD 1983 UTM Zone 18N GCS: GCS North American 1983	Datum: North American 1983 Projection: Transverse Mercator Scale Factor: 0.9996	

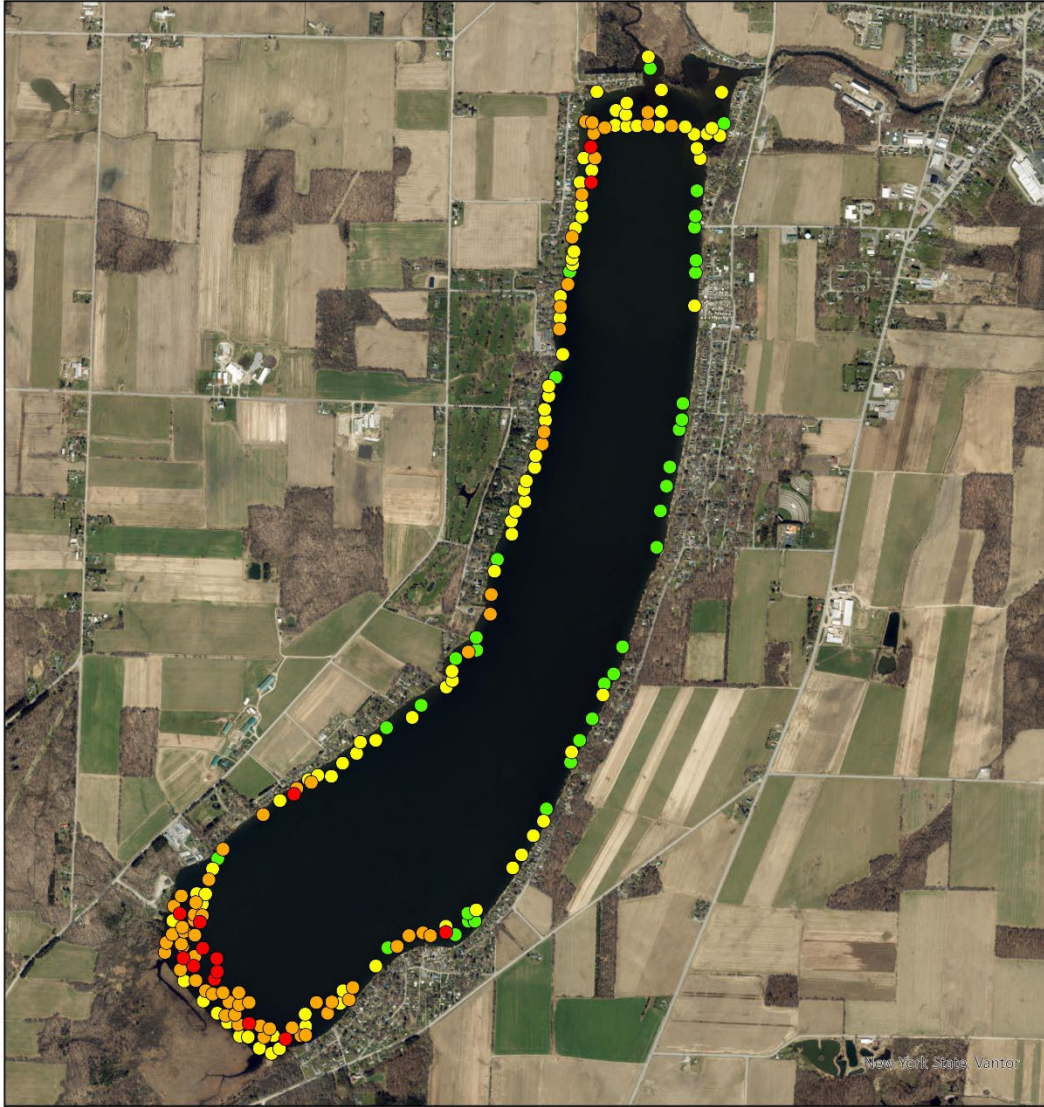
Overall Density 6/11-26/2025





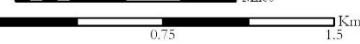


 <p>NEW YORK STATE OF OPPORTUNITY</p> <p>Department of Environmental Conservation</p>  <p>NEW YORK STATE WATER RESOURCES INSTITUTE Cornell University</p>	<p>Silver Lake, Wyoming County, NY 78°1'52"W 42°41'49"N</p>	<p>Overall Density Biovolume (%)</p>  <ul style="list-style-type: none"> ● 0 (No Plants) ● 1 (Trace) ● 2 (Sparse) ● 3 (Moderate) ● 4 (Dense)
<p>Prepared by: Adam Turner NYS DEC Region 9 11/25/2025</p>	<div style="text-align: center;">    </div> <p>Spatial Reference PCS: NAD 1983 UTM Zone 18N GCS: GCS North American 1983</p> <p>Datum: North American 1983 Projection: Transverse Mercator Scale Factor: 0.9996</p>	

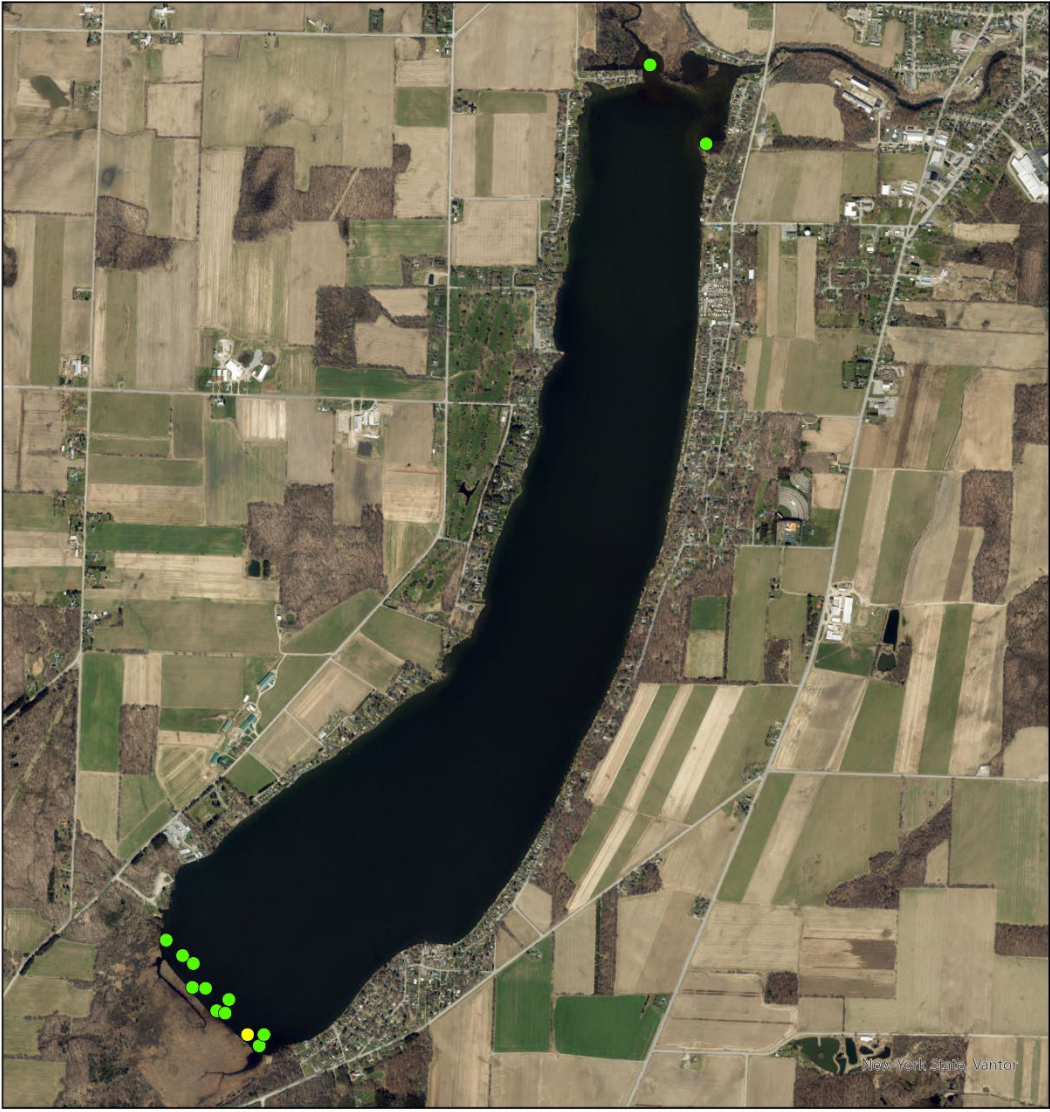
2. Individual Species Density




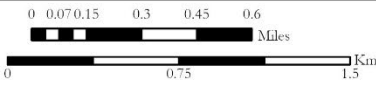
Species Density: Curly-leaf pondweed
6/11-26/2025



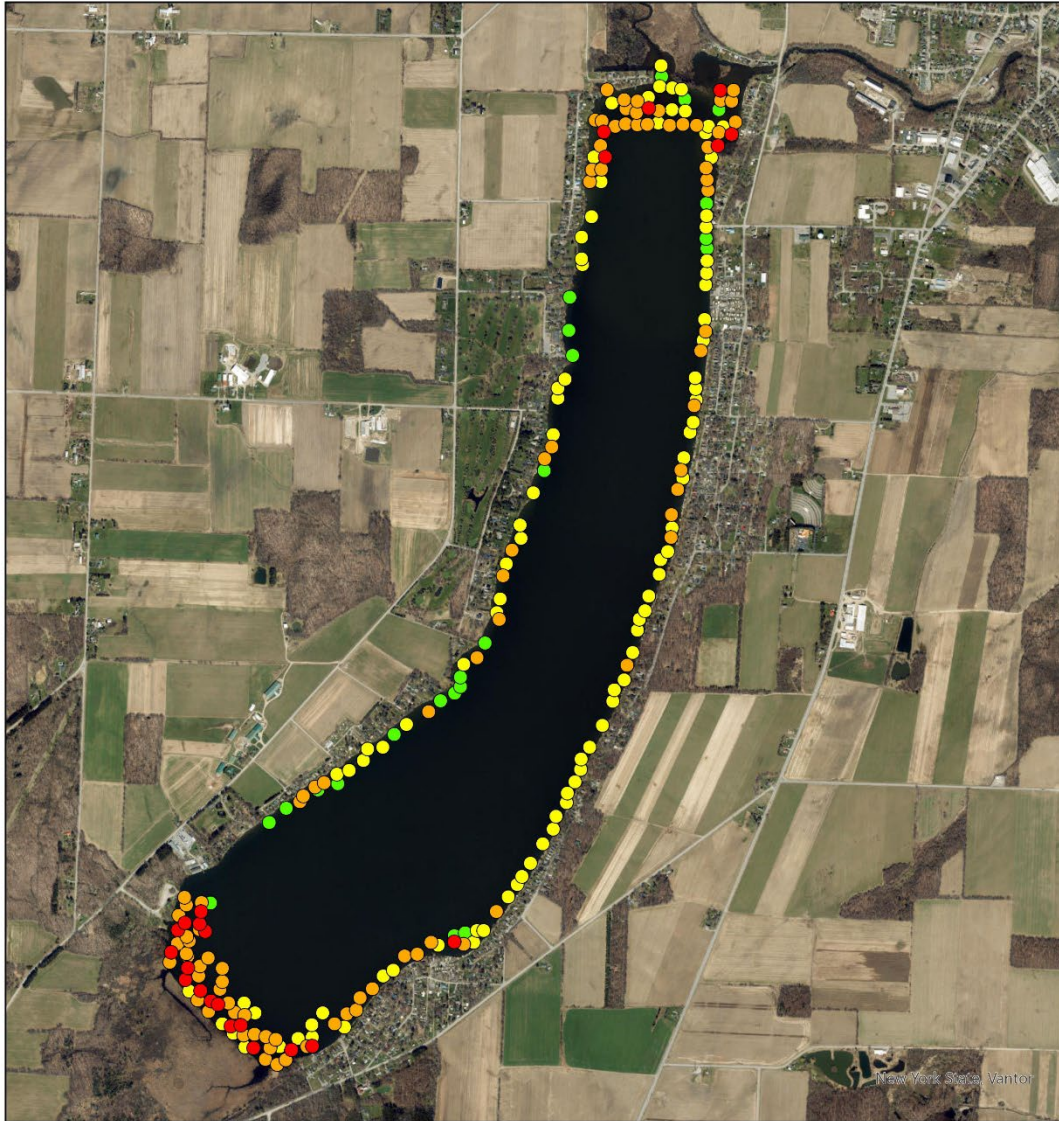
 <p>NEW YORK STATE OF OPPORTUNITY</p> <p>Department of Environmental Conservation</p>  <p>NEW YORK STATE WATER RESOURCES INSTITUTE Cornell University</p>	<p>Silver Lake, Wyoming County, NY 78°1'52"W 42°41'49"N</p>	<p>Species Density</p> <ul style="list-style-type: none"> ● 0 (No Plants) ● 1 (Trace) ● 2 (Sparse) ● 3 (Moderate) ● 4 (Dense)
<p>Prepared by: Adam Turner NYS DEC Region 9 11/25/2025</p>	<div style="display: flex; align-items: center;"> <div style="margin-right: 10px;"> <p>N</p>  </div> <div>  <p>Miles</p>  <p>Km</p> </div> </div> <p>Spatial Reference PCS: NAD 1983 UTM Zone 18N GCS: GCS North American 1983</p> <p>Datum: North American 1983 Projection: Transverse Mercator Scale Factor: 0.9996</p>	



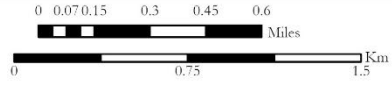
Species Density: European frog-bit 6/11-26/2025



 <p style="font-size: small;">Department of Environmental Conservation</p>  <p style="font-size: x-small;">NEW YORK STATE WATER RESOURCES INSTITUTE Cornell University</p>	<p>Silver Lake, Wyoming County, NY 78°1'52"W 42°41'49"N</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 10px;">N </div> <div style="text-align: center;">  <p style="font-size: x-small;">0 0.07 0.15 0.3 0.45 0.6 Miles 0 0.75 1.5 Km</p> </div> </div>	<p>Species Density</p> <ul style="list-style-type: none"> ● 0 (No Plants) ● 1 (Trace) ● 2 (Sparse) ● 3 (Moderate) ● 4 (Dense)
Prepared by: Adam Turner NYS DEC Region 9 11/25/2025	Spatial Reference PCS: NAD 1983 UTM Zone 18N GCS: GCS North American 1983	Datum: North American 1983 Projection: Transverse Mercator Scale Factor: 0.9996

Species Density: Unidentified invasive water-milfoil
6/11-26/2025



 <p>Department of Environmental Conservation</p>  <p>NEW YORK STATE WATER RESOURCES INSTITUTE Cornell University</p>	<p align="center">Silver Lake, Wyoming County, NY 78°1'52"W 42°41'49"N</p> <p align="center">N</p> 	<p>Species Density</p> <ul style="list-style-type: none"> ● 0 (No Plants) ● 1 (Trace) ● 2 (Sparse) ● 3 (Moderate) ● 4 (Dense)
<p>Prepared by: Adam Turner NYS DEC Region 9 11/25/2025</p>	<p>Spatial Reference PCS: NAD 1983 UTM Zone 18N GCS: GCS North American 1983</p> <p>Datum: North American 1983 Projection: Transverse Mercator Scale Factor: 0.9996</p>	

Silver Lake, Wyoming County New York

Report Time Stamp: 2025 August 15 - 20:32 (UTC) ... [REPORT LINK](https://s3-bb-prd-po-snr-rpt-use1.s3.amazonaws.com/e978662b-9150-4953-a9e0-e364274510f2/Report.html)
 (<https://s3-bb-prd-po-snr-rpt-use1.s3.amazonaws.com/e978662b-9150-4953-a9e0-e364274510f2/Report.html>)



Survey Metadata

Data Lindsay Yoder
 Collector:
 Survey Time 2023 June 12
 Stamp (UTC): - 14:42
 Starting 42.693419,
 Location: -78.025893
 Ending 42.682090,
 Location: -78.034362
 Distance 21.501 miles

Survey Settings

Includes Edited Data: Yes
 Track Buffer: 25 m
 BV Grid Cell Size: 5 m
 BV Minimum 5.0%
 Detection - Percent:
 BV Minimum 0.984 ft
 Detection - Depth:
 BV Maximum 25.000
 Detection - Depth: ft
 BV Sonar Channel: NA

Survey Statistics

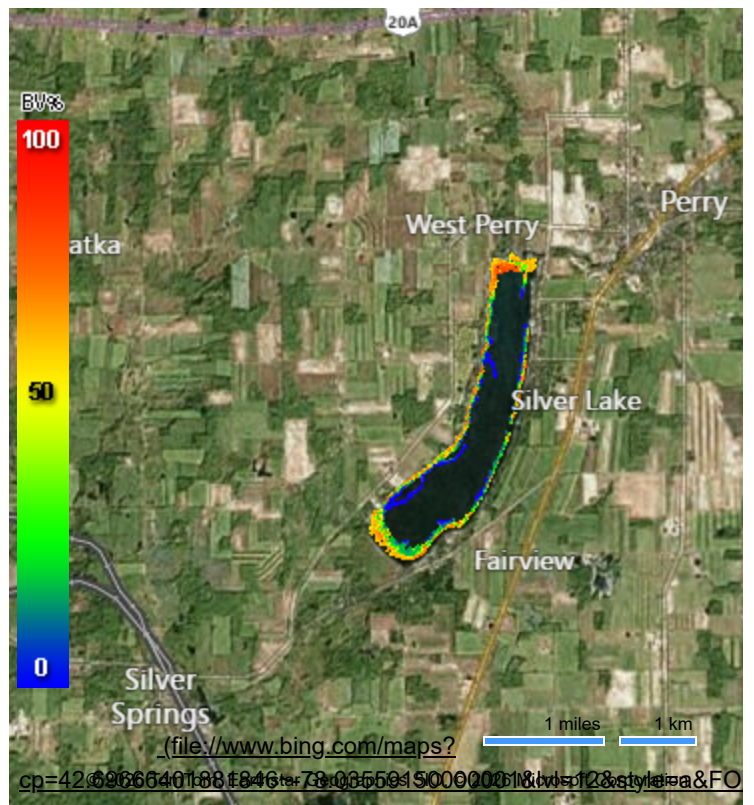
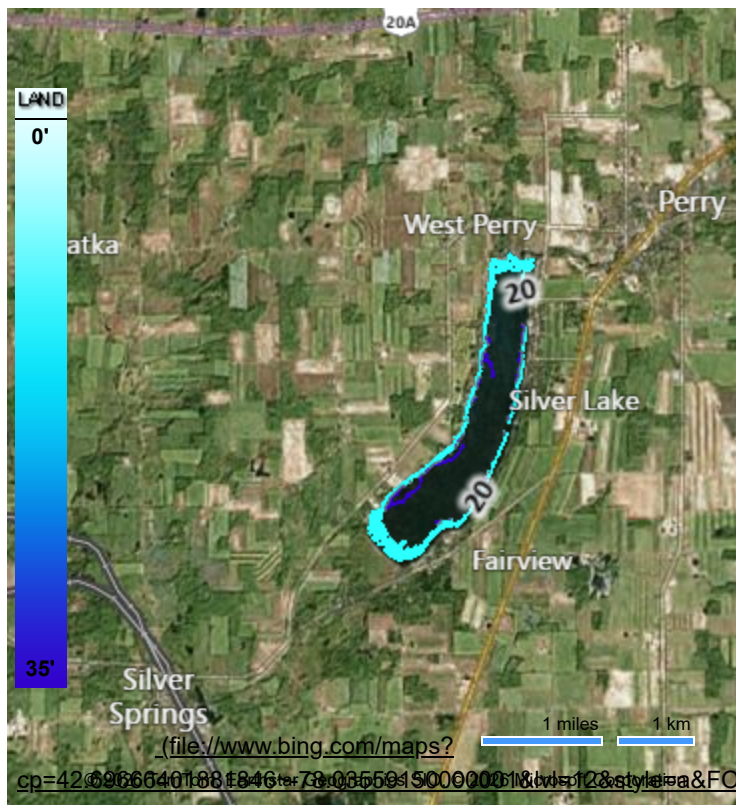
Average Water Temperature: 74.1 °F
 Survey Area: 250.937 acres
 Survey Volume: 2723.329 acre ft
 Percent of Waterbody Surveyed: 29.1%
 Waterbody Area: 862.891 acres
 Estimated Waterbody Volume: 9364.639 acre ft

Biovolume Summary

Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Depth Avg	No. Depth Records
Point	77.9%	46.1%	± 33.2%	35.9%	± 31.5%	2.99 - 35.20 ft	9.937 ft	25973
Grid	76.6%	47.2%	± 21.9%	36.2%	± 27.7%	0.30 - 35.13 ft	10.853 ft	74731

Bathymetric Contour Map

Vegetation Biovolume Heat Map



Biovolume Analysis by Quintiles

Type	0 - 20%	20 - 40%	40 - 60%	60 - 80%	80 - 100%
Point	47.8%	10.4%	3.0%	34.1%	4.6%
Grid	38.0%	11.6%	20.0%	29.9%	0.4%

Biovolume Analysis by Depth

Type	Depth	Count	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw
Point	0 - 1 m	24	100%	52.1%	± 1.2%	52.1%	± 1.2%
	1 - 2 m	9779	98.4%	56.7%	± 25.8%	55.8%	± 25.7%
	2 - 3 m	6715	91.8%	42.1%	± 31.8%	38.6%	± 31.6%
	3 - 4 m	1925	76.2%	27.0%	± 24.4%	20.6%	± 23.5%
	4 - 5 m	896	51.1%	15.5%	± 14.3%	7.9%	± 12.1%
	5 - 6 m	287	23.2%	9.9%	± 9.1%	2.3%	± 4.9%
	6 - 7 m	41	4.9%	11.0%	± 10.8%	0.5%	± 2.6%
	7 - 8 m	10	1.2%	8.5%	± 8.5%	0.1%	± 1.1%
	8 - 9 m	0	0%	0%	± 0%	0%	± 0%
9 m +	0	0%	0%	± 0%	0%	± 0%	

Grid	0 - 1 m	9111	100.0%	58.9%	± 10.3%	58.9%	± 10.3%
	1 - 2 m	22830	99.9%	57.2%	± 14.2%	57.1%	± 14.3%
	2 - 3 m	14410	98.5%	44.6%	± 23.3%	43.9%	± 23.8%
	3 - 4 m	6004	93.8%	28.0%	± 17.1%	26.3%	± 17.9%
	4 - 5 m	4463	71.6%	15.6%	± 9.4%	11.2%	± 10.6%
	5 - 6 m	4080	36.6%	10.6%	± 5.1%	3.9%	± 6.0%
	6 - 7 m	3672	15.3%	8.0%	± 2.8%	1.2%	± 3.1%
	7 - 8 m	3797	4.9%	8.3%	± 2.5%	0.4%	± 1.9%
	8 - 9 m	3701	2.4%	6.7%	± 1.3%	0.2%	± 1.0%
	9 m +	0	0%	0%	± 0%	0%	± 0%

Offsets

Trip Name	Trip Date (UTC)	Manual Offset (ft)	Tide Station Name	Avg Tide (ft)	Min Tide (ft)	Max Tide (ft)	Start Tide (ft)	End Tide (ft)
Sonar_2023-06-12_0 ...	2023 June 12 - 15:30	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-06-12_0 ...	2023 June 12 - 14:42	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-11_0 ...	2023 July 11 - 13:46	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-11_1 ...	2023 July 11 - 17:20	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-11_1 ...	2023 July 11 - 18:27	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-11_0 ...	2023 July 11 - 14:40	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-20_1 ...	2023 July 20 - 19:16	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-20_1 ...	2023 July 20 - 17:18	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-20_0 ...	2023 July 20 - 14:29	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-20_1 ...	2023 July 20 - 18:15	1.500	NA	NA	NA	NA	NA	NA
Sonar_2023-07-20_0 ...	2023 July 20 - 15:34	1.500	NA	NA	NA	NA	NA	NA
Sonar_2024-06-20_0 ...	2024 June 20 - 15:51	1.500	NA	NA	NA	NA	NA	NA
Sonar_2024-06-20_0 ...	2024 June 20 - 14:59	1.500	NA	NA	NA	NA	NA	NA
Sonar_2024-06-20_1 ...	2024 June 20 - 18:44	1.500	NA	NA	NA	NA	NA	NA
Sonar_2024-06-20_1 ...	2024 June 20 - 17:37	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-11_0 ...	2025 June 11 - 13:51	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-11_1 ...	2025 June 11 - 15:04	1.500	NA	NA	NA	NA	NA	NA

Sonar_2025-06-11_1 ...	2025 June 11 - 17:15	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-11_1 ...	2025 June 11 - 16:14	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-11_1 ...	2025 June 11 - 19:05	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-11_1 ...	2025 June 11 - 18:13	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-12_0 ...	2025 June 12 - 13:35	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-12_1 ...	2025 June 12 - 15:43	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-12_1 ...	2025 June 12 - 14:39	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-12_1 ...	2025 June 12 - 18:38	1.500	NA	NA	NA	NA	NA	NA
Sonar_2025-06-12_1 ...	2025 June 12 - 17:38	1.500	NA	NA	NA	NA	NA	NA

Glossary

AOI

Area of Interest: Defines the transects or contiguous data samples as depicted by the colored trip line. Separate areas of interest can be generated through merging of multiple trips, appending data to a single sonar log or lapses in time (greater than five minutes) within a sonar log.

Point

Individual Coordinate Point: A single point represents a summary of sonar pings and the derived bottom and canopy depths. Individual point data create an irregularly spaced dataset that may have overlaps and/or gaps in the data resulting in an increased potential for error.

Grid

Geostatistical Interpolated Grid: Interpolated and evenly spaced values representing kriged (smoothed) output of aggregated data points. The gridded data is most accurate summary of survey areas.

BVp

Biovolume (Plant): Refers to the percentage of the water column taken up by vegetation when vegetation exists. Areas that do not have any vegetation are not taken into consideration for this calculation.

BVw

Biovolume (All water): Refers to the average percentage of the water column taken up by vegetation regardless of whether vegetation exists. In areas where no vegetation exists, a zero value is entered into the calculation, thus reducing the overall biovolume of the entire area covered by the survey.

PAC

Percent Area Covered: Refers to the overall surface area that has vegetation growing.

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Appendix III: Methodology

Submersed Aquatic Vegetation Survey (Non-motorized)

The AIS Strike Team technicians utilize the point-intercept method and a random systematic sampling design to monitor plant distribution in small waterbodies throughout Region 9. Sample points are selected based on pre-generated locations across a 50 m² grid, overlaid on the New York State Priority Waterbodies Listing polygon layer in ArcMap 10.7. Coordinates of sampling points are loaded onto Garmin eTrex 30 GPS units. Depth is recorded and points are surveyed using the rake-toss method, wherein a double-sided garden rake attached to 50ft of rope is thrown from the boat, allowed to sink, and slowly dragged to retrieve a representative sample of vegetation at a given location. Two rake tosses are performed at each point on either side of the vessel, with total vegetation density and individual species density collected. Density is recorded using the following scale: Zero (0), Trace (1), Sparse (2), Moderate (3), and Dense (4). The data collected is then averaged to estimate overall density and lake wide distribution and recorded in SASPro, housed in the Survey123 application, which is quality checked before approval to upload into iMapInvasives.

Invertebrate Sieve Survey

At the end of the survey, a mesh sieve will be used to sample for invertebrates in shallow areas near the shoreline, specifically focusing on the Asian clam, the New Zealand mud snail, and mystery snails. Sediment will be scooped into the sieve and water will be poured over the sample to wash away fine sediments. This will be repeated up to 7 times in a ray pattern as much as depth will allow. Sessile invertebrates (zebra mussels) will be documented by observing stationary objects/vegetation within the waterbody. Only invasive invertebrate samples will be kept. Invasive animals will be disposed of or collected in a sampling jar with lake water. All species will be collected in a container with oxygenated water from the site and euthanized by a 2-step euthanization process suitable for the taxon as outlined by the 2020 AVMA Guidelines for the Euthanization of Animals, as AIS cannot be re-released into the water as per 6 NYCRR Part 576. This process includes immersion in 95% ethanol (10-30 mL/L for fish or 10-50mL/L for invertebrates) for at least 10 minutes, and then frozen. Species will be stored in 70% ethanol for preservation for educational purposes or disposed of. The species found will be noted in SASPro.