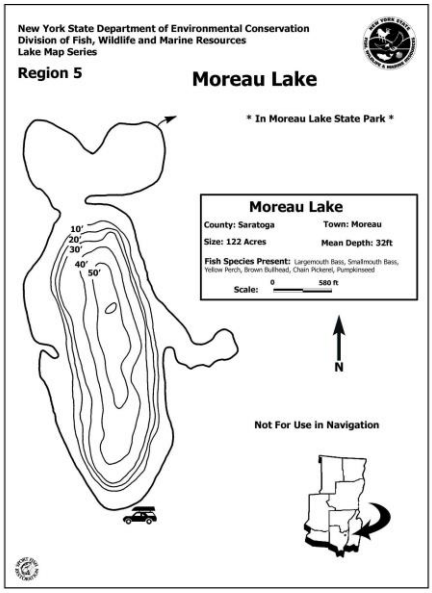
Capital Region PRISM
Partnership for Regional
Invasive Species Management

Cornell Cooperative Extension | Saratoga County
50 West High St.
Ballston Spa, NY 12020
(518) 885-8995

Capital Region PRISM Aquatic Invasive Macrophyte Survey Report

Date: September 5th, 2023
Site Name: Moreau Lake State Park, Moreau Lake
General Information: (518) 793-0511
Site Size: 122 acre(s) / Lake Perimeter: / 2.9 Miles
Mean Depth: 32 Feet
GPS Location of Site/Parking lot: 43.226288 -73.708176
Physical Address: 605 Old Saratoga Road Gansevoort, NY 12831
County: Saratoga
Town: Moreau NY 12831
Property Owner Contact: Andy Damon Stewardship Specialist
NYS Office of Parks, Recreation & Historic Preservation
Saratoga-Capital District 19 Roosevelt Dr. Saratoga Springs, NY 12866
(O): 518-584-2000, ext. 152 andy.damon@parks.ny.gov
Survey Leaders: Hannah Coppola, Andy Damon
Phone: 518-885-8995
Email: hwe22@cornell.edu
iMapInvasives User ID: 21052



Summary

On September 5th, 2023 the Capital Region PRISM with the assistance of the NYS OPRHP, conducted an AIS detect and monitor survey on Moreau Lake in Saratoga County. Top-side visual methodology was conducted along the edge (littoral zone) of the shoreline to survey for AIS. The primary focus of this survey mapped out Eurasian water-milfoil (EWM) beds to detect growth from surveys conducted in 2020, and 2022. The entirety of the main section of Moreau Lake was surveyed, comprised of 87.8 acres. The back pond was not surveyed. Field Maps was utilized to accurately document growth and density changes. The weather for this survey created ideal visibility into the water for the mapping of EWM.

Aquatic Invasive Species Present

- Eurasian water-milfoil; (*Myriophyllum spicatum)* is a very high threat species with an assessment score of 100. http://nyis.info/wp-content/uploads/2018/01/5cdc8_Myriophyllum.spicatum.NYS_.pdf For General Information:http://nyis.info/invasive_species/eurasian-watermilfoil/
- Chinese Mystery Snail *(Bellamya Cipangopaludina chinensis)* was detected throughout the waterbody. https://nyis.info/wp-content/uploads/2017/10/55afa_Bellamya-chinensis-Ecological.pdf
- No other AIS species were detected, although curly leaf-pondweed has been reported in 2020.

Areas of Concern:

The presence of Eurasian water-milfoil is becoming more abundant and denser since surveys conducted in 2020 & 2022. EWM beds are annually showing to merge to form singular beds with dense/sparse growth. Please note the mapped presence polygons and data table below for specific points as posted in ArcGIS iMap Mobile Advanced (IMMA). EWM polygons were mapped using Field Maps to determine growth and density changes.

- Many of the previously separate polygons mapped in 2022, have shown to merge together in 2023. The merging of these beds decreases native plant diversity and abundance.
- The patches of (EWM) found on the South end of the lake by the boat launch, have merged together to form a monoculture in the middle/upper area of the polygon (Object ID: 13746). The lower south-west corner contains sparse/trace presence.
- The bridge between the north and south body of water continues to have sparse populations of milfoil posing a potential area of concern in the future. EWM beds to the right of the bridge have shown to merge since 2022.

- Overall, the majority of the littoral zone/perimeter has sparse to dense populations with one monoculture near the boat ramp on the South end of the waterbody. The East side of the waterbody shows little to no EWM growth. EWM was observed for the first time in 2023 in the Eastern Pond. These individual plants have been recorded as presence points. Many of the areas with trace/sparse populations of EWM contain well established native species populations.

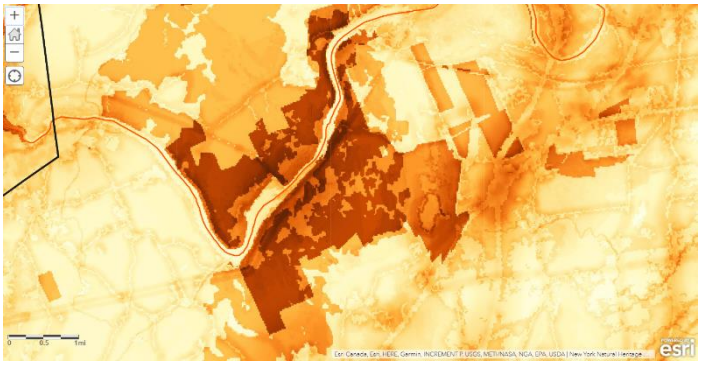
Site Description:

Moreau Lake State Park is within a NYS Bird Conservation Area. Moreau Lake BCA is a stopover site for Neotropical migratory songbirds especially forest dwelling migrants during both spring and fall migrations. This waterbody is accessible by non-motorized boats. There is a strong presence of non-motorized personal watercraft recreation.

iMapInvasives Prioritization Model:

The area is ranked high on the prioritization model comprehensive score attribute with a strong coloring on the heat map. The vector of transition exist and the region is surrounded by protected and natural areas.

- https://www.arcgis.com/home/webmap/viewer.html?webmap=57d30ff9bff7426c8950d90b0ba43bba&extent=-81.0352,39.2503,-70.2686,45.8067



Survey Techniques:

- Visual Inspection of Surface and Subsurface. Ideal weather conditions allowed for accurate mapping with this method.

Map: Searched Area: Moreau Lake State Park (Entire Littoral Zone of main waterbody)

Figure 1

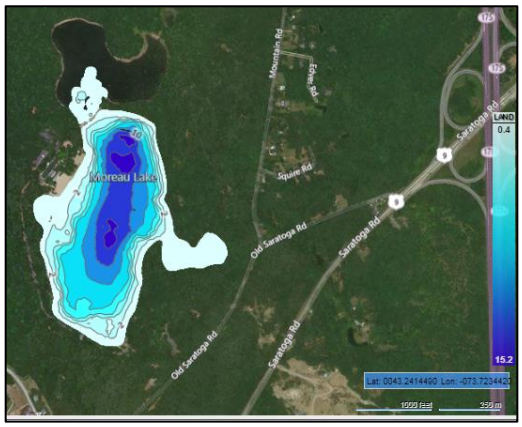


Figure 2

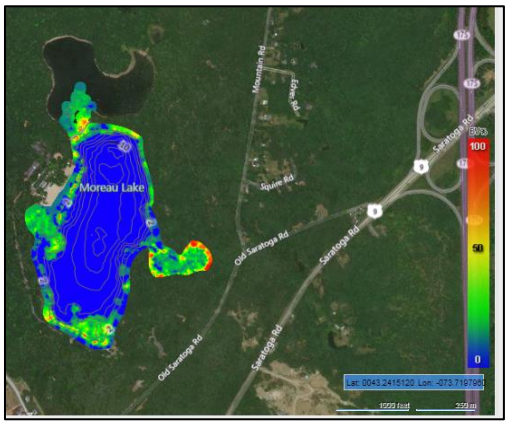


Figure 1: Bathymetric map of Moreau Lake and a portion of Back Pond indicating the topography as the thin contour lines. Color indicates the lake depth, with the lightest shade representing shallower waters and darkest shade representing deeper waters. Depth is measured in meters. Areas where data is missing (i.e. large portion of Back Pond) will be shown as the underlying aerial imagery, or black sections.

Figure 2: Percent Vegetation BioVolume map of Moreau Lake and a portion of Back Pond indicating the percent of water column occupied by plant matter at the mapped locations. Color indicates the percent of plant in a water column, with the blue shade representing open water (0%), green to yellow representing 1-50%, yellow to red representing 51-99%, and darkest red representing 100%. Areas where data is missing (i.e. large portion of Back Pond) will be shown as the underlying aerial imagery, or black sections. (Courtsy of April Brun NYS OPRHP Water Quality Unit.

Capital Region PRISM
Partnership for Regional
Invasive Species Management

Cornell Cooperative Extension | Saratoga County
50 West High St.
Ballston Spa, NY 12020
(518) 885-8995

Common Name	Scientific Name	Location (GPS)	Growth Type	Phenology	Abundance
Eurasian water-milfoil; European water-milfoil	Myriophyllum spicatum	Note IMMA Polygons	Submerged/Rooted	Submerged	Sparse/dense
Chinese mystery snail	*(Bellamya Cipangopaludina chinensis)*	Sediments	N/A	Animal	Medium

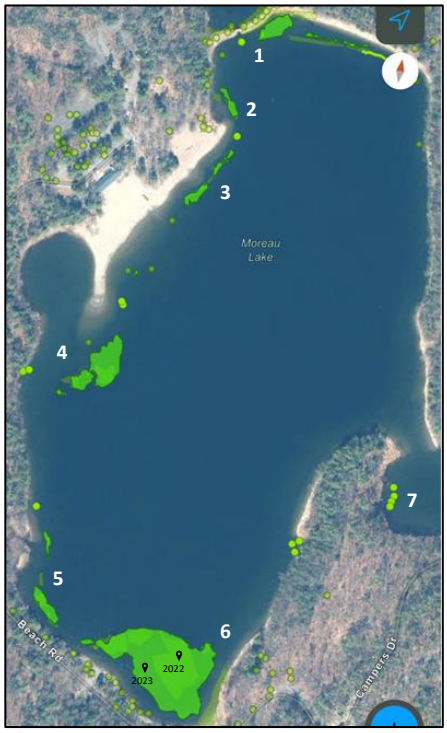
Section 2: Survey Result Summary

Searched Area:
Entire littoral zone excluding the back pond of Moreau Lake.

Areas of Concern Locations:

1. North End/ Small Section of Bridge
2. Upper Beach Area
3. Front of Beach
4. West Side of Lake
5. Bottom West Side
6. South End of Lake / Boat Launch Area
7. East Side Cove

The image to the right depicts polygons from the years of 2022, and 2023. Brighter colored polygons represent data from 2023 (*example provided in image*). Overlaying this data indicates EWM growth patterns, with many smaller polygons from 2022 beginning to merge together in 2023.



This image contains polygons from 2022 & 2023, showing annual growth increase.

1. North end / small section of bridge area surrounding natural beach. Historic problematic area of human disturbance

Location: 43.235473, -73.711780
Total Area of Pinned Presences: .28 acres
Object ID (*left to right*):
61558: Presence point. *Three plants found in front of bridge area. Native pondweed is dominant.*
13737: 0.05acres. *Sparse clumps throughout native vegetation.*
13738: 0.004acres. Scattered plants/clumps *primarily along the vegetative edge of littoral zone; shows notable growth in native vegetation in shallower area littoral zone, than polyline to the right.*

2227: 0.015acres polyline. *Scattered plants/clumps found in the littoral zone vegetative edge. Dominant species of this edge.*
13739: 0.015acres. *Sparse with scattered clumps. Mixed with native clasping leaf pondweed, EWM subdominant to natives in this area.*

Cornell Cooperative Extension | Saratoga County
50 West High St.
Ballston Spa, NY 12020
(518) 885-8995

2. Upper Beach Area

Location: 43.234437, -73.712651
Total Area of Pinned Presences: 0.08 acres
Object ID (*top to bottom*):
13735: 0.08acres. *Primarily sparse with scattered clumps. Roughly 30% density. Low portion of polygon containing higher density.*
61557: Presence point. *Five individual plants detected.*

3. Front of Beach

Location: 43.233534, -73.712502
Total Area of Pinned Presences: 0.152
Object ID (*top to bottom*):
13733: 0.08acres. *Primarily dense area of EWM.*
13732: 0.03acres. *Middle polygon is bordering between dense/sparse with multiple plant clumps detected.*
13731: 0.1acres. *Multiple pockets of EWM growing in this area, showing potential to merge.*

4. West Side of Lake/Sandbar

Location: 43.231161, -73.714297
Total Area of Pinned Presences: 0.152
Object ID (*top to bottom*):
13730: 0.007acres. *Sparse*
61556: Presence point. *One plant detected.*
61555: Presence point. *Two plants detected.*
13729: 0.47acres. *Smaller monoculture with outer north-west edge sparse clumps.*
13754: 0.123. *Sparse clumps*.
13756: 0.01. *Sparse clumps/plants*.
61595: Presence point. *Single plant*.
61593: Presence point. *Single plant.*

Cornell Cooperative Extension | Saratoga County
50 West High St.
Ballston Spa, NY 12020
(518) 885-8995

5. Bottom West Side

Location: 43.228403, -73.714025
Total Area of Pinned Presences: 0.2
Object ID (*top to bottom*):
61554: Presence point. *Two plants detected.*
13727: 0.04acres. *EWM density at 35%, scattered plants and clumps.*
13725: 0.16acres. *outer edges sparse with middle of polygon dense EWM growth at roughly 68%.*

6. South End / Boat Launching Area

Location: 43.227653, -73.711976
Total Area of Pinned Presences: 2.53acres
Object ID (*left to right*):
13747: 0.03acres. *Scattered clumps at roughly 45% cover.*
13746: 2.5acres. Largest infestation detected on waterbody. Monoculture present in middle/upper area of polygon, while lower south-west corner contains sparse/trace population. This area has shown significant growth in comparison to 2022 polygons. This area is highly disturbed by boater traffic (non-motorized watercraft only).

7. East Side Cove

Total Area of Pinned Presences: N/A
Object ID (*left to right from top to bottom*):
61579: Presence Point. *3 plants*
61578: Presence Point. *1 plant*
61580: Presence Point. *2 plants*
61570: Presence Point. *1 plant*
61567: Presence Point. *1 plant*
61568: Presence Point. *1 plant*
61569: Presence Point. *2 plants*
61562: Presence Point. *1 plant*
61563: Presence Point. *2 plants*
61559: Presence Point. *1 plant*
61561: Presence Point. *1 plant*

Section 3: Comprehensive Report Annual Growth Patterns 2022-2023

2022 Eurasian water-milfoil			2023 Eurasian water-milfoil			
*AOC & Bed #	Size (Ac.)	Size (Sq. Ft.)	*AOC & Bed #	Size (Ac.)	Size (Sq. Ft.)	% Cover
1, 9977	0.01	435.6	1, 61558	point	X	X
1, 9975	0.07	3049.2	1, 13737	0.05	2178	26-50%
1, 9972	0.06	2613.6	1, 13738	0.0004	17.4	51-75%
1, 1490	.0005	25.6	1, 2227	0.015	653.4	26-50%
1, 9970	.004	210	1, 13739	0.015	653.4	26-50%
2, 9978	0.02	871.2	2, 13735	0.08	3484.8	30%
2, 9979	0.01	435.6	2,61557	point	X	X
2, 9980	0.01	435.6	X	X	X	X
3, 9981	0.002	87.12	3, 13733	0.08	3484.8	51-75%
3, 9982	0.01	435.6	3, 13732	0.03	1306.8	51-75%
3, 9983	0.02	87.12	3, 13731	0.1	435.6	26-50%
3, 1491	0.01	435.6	X	X	X	X
4, 9990	0.11	4791.6	4, 13730	0.007	304.92	5-25%
4, 9988	0.07	3049.2	4, 61556	point	X	X
4, 9991	0.01	435.6	4, 61555	point	X	X
X	X	X	4, 13729	0.47	20473.2	51-79%
X	X	X	4, 13754	0.123	5357.88	26-50%
X	X	X	4, 13756	0.01	435.6	26-50%
X	X	X	4, 61595	point	X	X
X	X	X	4, 61593	point	X	X
5, 9993	0.01	435.6	5, 61554	point	X	X
5, 9994	0.02	87.12	5, 13727	0.04	1742.4	26-50%
5, 9995	0.05	2178	5, 13725	0.16	6969.6	51-75%
5, 1493	0.01	435.6	X	X	X	X
6, 9964	0.17	7405.2	6, 13747	0.03	1306.8	26-50%
6, 9965	0.12	5227.2	6, 13746	2.5	108900	76-100%
6, 9966	0.74	32234.4	X	X	X	X
6, 9967	0.02	87.12	X	X	X	X
X	X	X	7, 11 points	Equates to 16 individual plants		

Areas of Concern (AOC) Locations:
1. North End/ Small Section of Bridge
2. Upper Beach Area
3. Front of Beach
4. West Side of Lake
5. Bottom West Side
6. South End of Lake / Boat Launch Area
7. East Side Cove

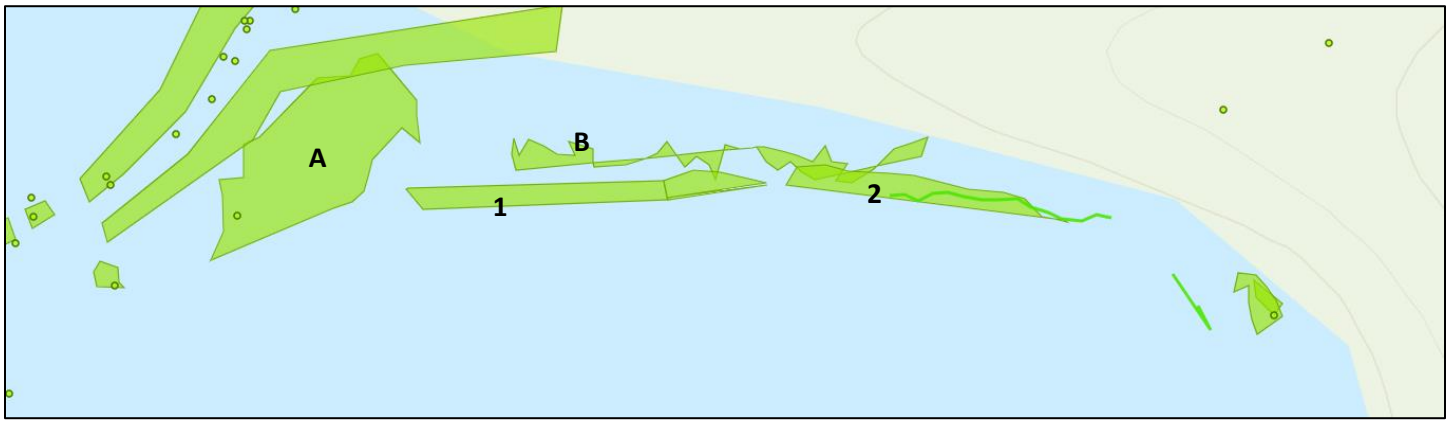
Capital Region PRISM
Partnership for Regional
Invasive Species Management

Cornell Cooperative Extension | Saratoga County
50 West High St.
Ballston Spa, NY 12020
(518) 885-8995

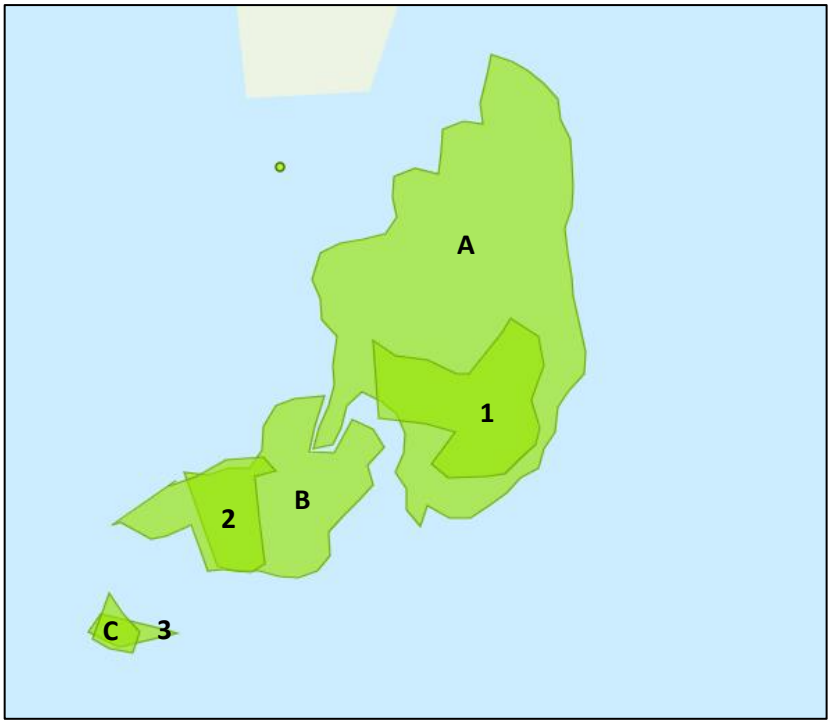
The images below show polygons from the years of 2022 and 2023 of the greatest EWM growth areas. Through these images, the spread and merging of EWM beds can be seen in areas of concern. Please refer to end of document for a comprehensive list of EWM bed acreage size difference.

North End/ Small Section of Bridge

Polygons A and B from 2023. Polygons 1 & 2 from 2022. A new bed of EWM was detected near the bridge area in 2023 (A), with sparse amounts mixed with native vegetation.



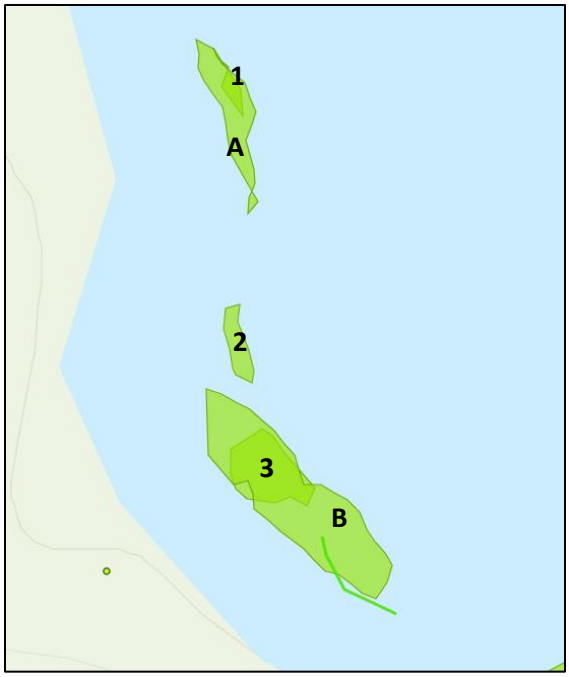
West Side of Lake



Polygons A, B, and C from 2023. Polygons 1,2, and 3 from 2022.

Cornell Cooperative Extension | Saratoga County
50 West High St.
Ballston Spa, NY 12020
(518) 885-8995

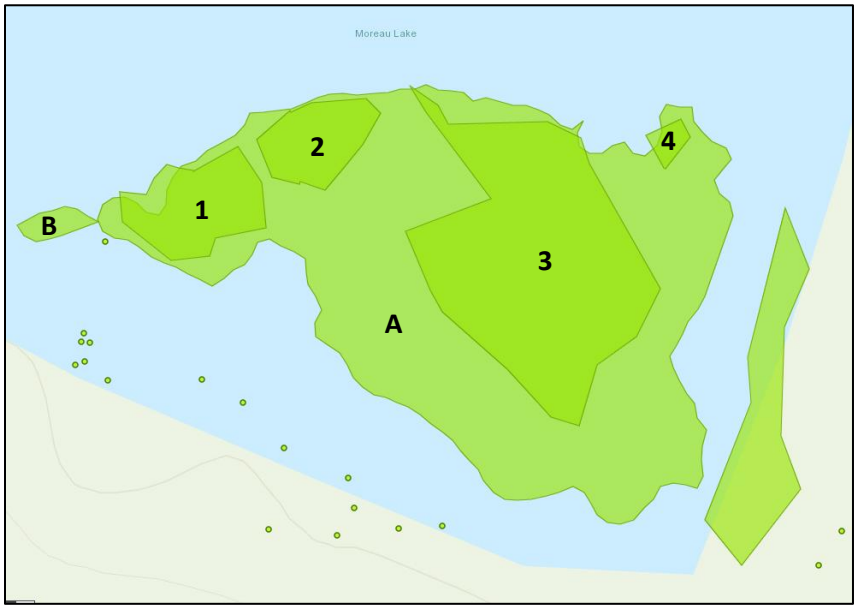
Bottom West Side



Polygons A and B from 2023. Polygons 1, 2 and 3 from 2022.

South End of Lake / Boat Launch Area

The largest growth of EWM is located at the South end of the waterbody directly in front of the boat launch. As previously mentioned, a monoculture present in middle/upper area of polygon, while lower south-west corner contains sparse/trace population. This area has shown significant growth in comparison to 2022 polygons.



Polygons A and B from 2023

Polygons 1, 2, 3, and 4 from 2022.

Cornell Cooperative Extension | Saratoga County
50 West High St.
Ballston Spa, NY 12020
(518) 885-8995

Section 4: Summary of Recommendations

This page provides recommendations of any treatment methods, monitoring methods, and restoration efforts based on the survey.

Treatment: *Describe briefly any recommendations for future treatment methods, why they are recommended, and any alternatives to consider. Please use abundance and site-specific factors in your treatment recommendation. Optional: Attach or reference BMP guidance document*

Selective Control Strategies:

- Diver Assisted Harvest Suctioning D.A.S.H
- Chemical Treatment with Selective Herbicide
  - ProcellaCOR

A number of chemicals impact the growth and survival of *M. spicatum. A*mine salts of Endothall (Hyrothol 191®), and Dipotassium Salts of Endothall (Aquathol K®), Diquat dibromide (Reward®), Komeen® have been found to be effective. Some of these herbicides may also affect other non-target rooted submerged plants, including some rushes. Treatment is most effective in still water in the spring while the plant is actively growing.

The amine formulations of 2,4-D granules (Navigate®, Aquakleen®, Aquacide®) are effective on controlling Eurasian watermilfoil and will not damage most non-target grasses. This herbicide method, however, is not appropriate for large unmanageable areas of milfoil. One lose-dose application (10 µg/ L) of fluridone (brand names Sonar® and Avast!®) applied in the early stages of growth has the potential to provide season-long control of milfoil. However, this application rate causes collateral damage to native vegetation. Liquid triclopyr (Renovate 3® and Renovate® OTF) can control milfoil without unintended damage to cattails and grasses. *Note: Always check state/provincial and local regulations for the most up-to-date information regarding permits for control methods. Follow all label instructions. Mention of chemicals, particularly the mention of brand names in this profile does not represent a recommendation by NY Sea Grant or Cornell University.* http://nyis.info/invasive_species/eurasian-watermilfoil/

Non-Selective Control Strategies

- Benthic Matts

Post- Survey Monitoring: *Briefly explain the monitoring procedure, when it will occur, and who will complete it. Consider the phenology of species when suggesting time-lines. If a separate management or monitoring plan was developed or to be completed, attach or describe here*.

- The Capital Region PRISM will commit to Early Detection AIS Surveys in Moreau State Park in a collaboration with the NYS OPRHP on an annual basis. The PRISM will continue to monitor the infestation(s) of Eurasian Water-milfoil; (*Myriophyllum spicatum)* and delineate their size using Field Maps polygons. The PRISM will also monitor for other AIS while this survey is being conducted.

- **Will post-treatment management be handled by another person/entity?**
  Not Applicable at this time.

- **Will an Invasive Species Management Plan be created?**
  Not Applicable at this time.

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

The New York State Department of Environmental Conservation provides financial support to The Capital Region PRISM via the Environmental Protection Fund