

# 2015 Report

## Adirondack Aquatic Regional Response Team



Adirondack Watershed Institute

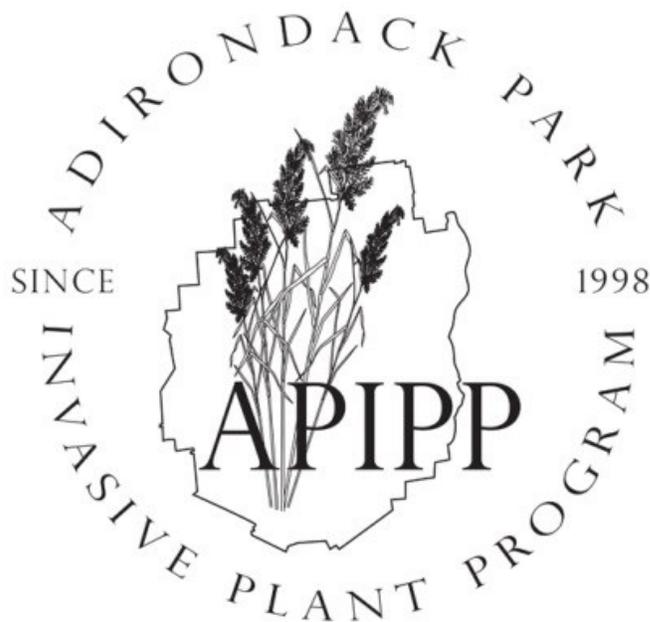
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## Acknowledgements

The Adirondack Park Invasive Plant Program (APIPP) is one of the eight partnerships for regional invasive species management in New York State whose mission is to protect the Adirondack region from the negative impacts of invasive species. The Adirondack Watershed Institute (AWI) is a program of Paul Smith's College that conducts work to protect and conserve water resources of the Adirondack Park. The narrative, data and results presented in this report were synthesized by Sean Regalado, Lindsey Pett, Leah Gorman, and Emily Hastings, who constituted the APIPP's aquatic invasive species (AIS) regional response team in 2015. These individuals also conducted the aquatic plant surveys and performed the geographic information systems (GIS) work needed to develop the aquatic plant maps. The field work and reporting was conducted under the supervision of Dr. Daniel L. Kelting, AWI Executive Director, and Erin Vennie-Vollrath, Aquatic Invasive Species Project Coordinator for the Adirondack Park Invasive Plant Program (APIPP), with assistance from Dr. Corey Laxson, AWI Research Associate. This project was supported by the APIPP which receives funding through New York State's Environmental Protection Fund.



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**Introduction**

The Adirondack Park Invasive Plant Program (APIPP), through its Aquatic Invasive Species (AIS) volunteer monitoring program and partners, has conducted AIS surveys on more than 300 lakes and ponds since 2002. The AIS distribution data gathered each year is recorded online using iMapInvasives (<http://imapinvasives.org/>) and used to create annual AIS distribution maps for the region (Figure 1). This information is used by APIPP and partners to better inform the public and their representatives about AIS in Adirondack waters and helps focus needs for prevention and management in the region.

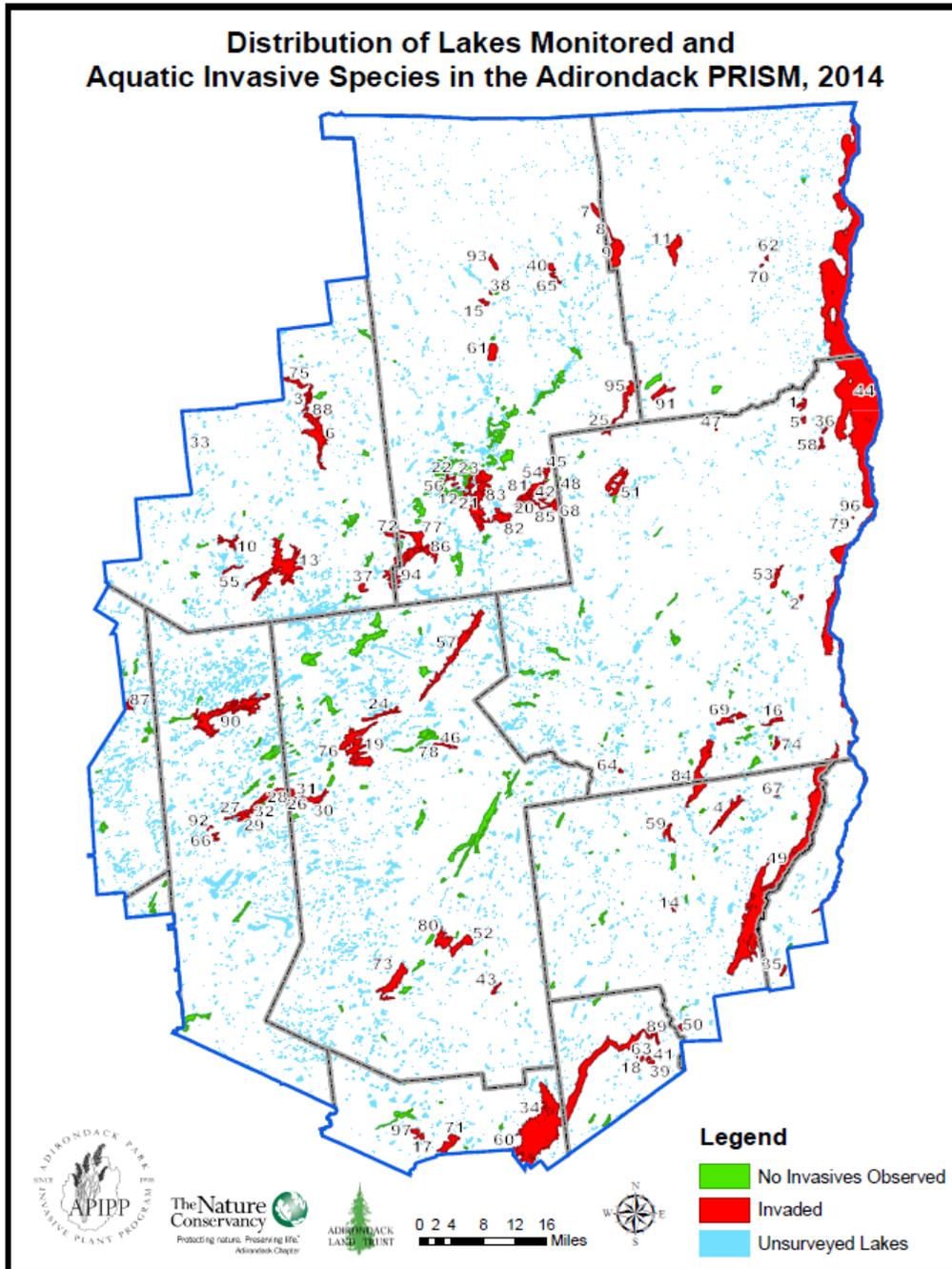


Figure 1. AWI Aquatic Plant Survey Locations 2011-2014.

The Adirondack Watershed Institute (AWI) of Paul Smith's College has conducted complete aquatic plant surveys of Adirondack Waters since the summer of 2011. Initial funding was from the Great Lakes Restoration Initiative (GLRI), which restricted surveys to the Eastern Lake Ontario Watershed of the Adirondack Park. Between 2011 and 2014, 80 lakes were surveyed (Figure 2). In 2015, with funding from The APIPP, AWI was able to perform comprehensive AIS surveys on waters outside of the GLRI watershed. 2015's survey efforts were focused within the southeastern portion of the Adirondack Park due to the lack of AIS distribution data in that area. The team also had additional capacity to remove newly discovered infestations of AIS using SCUBA and hand harvesting after achieving the appropriate permitting requirements.

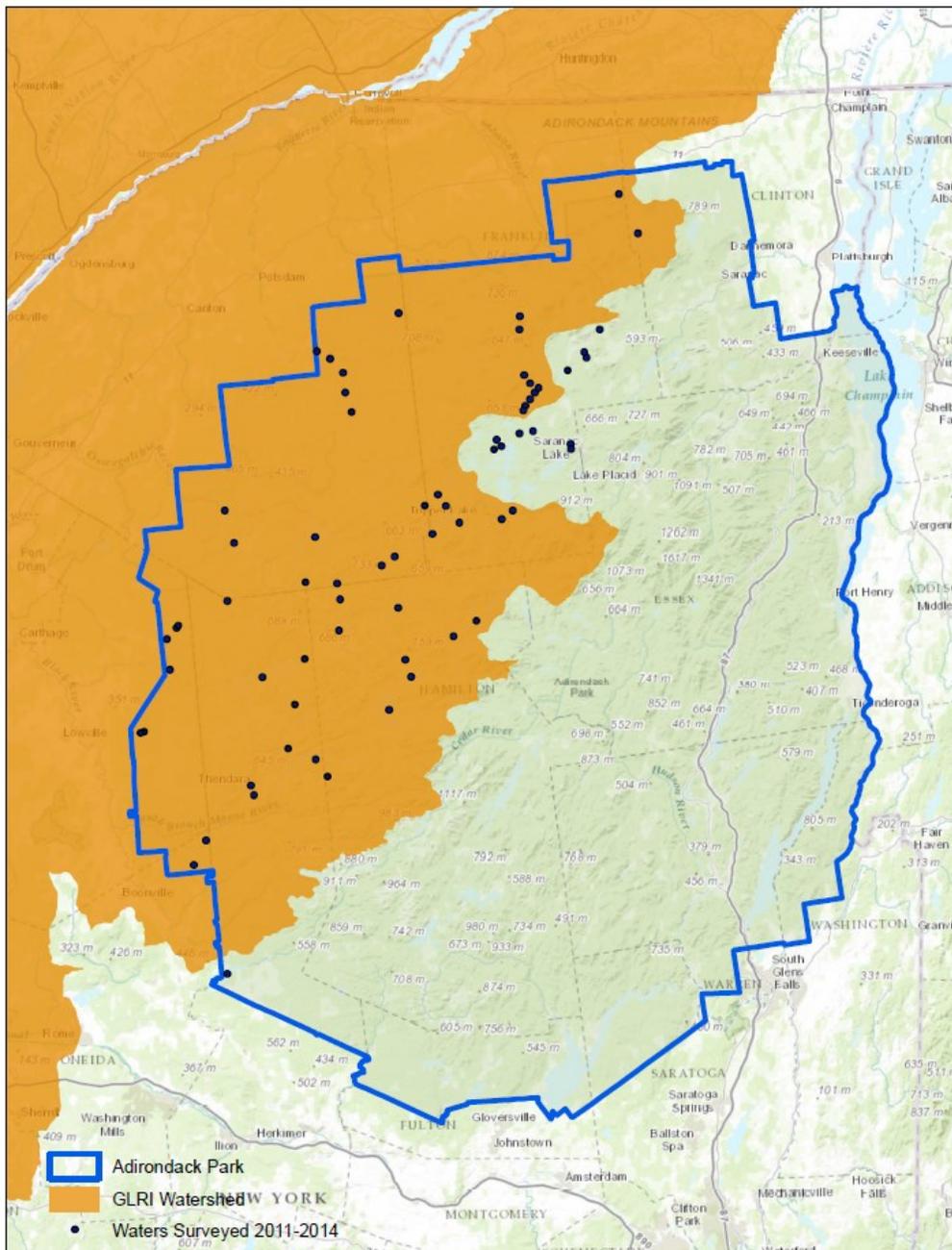


Figure 2. AWI Aquatic Plant Survey Locations

## Objective

The objective of the AIS regional response team was to detect and document the distribution of aquatic invasive plant infestations on prioritized Adirondack Lakes through systematic vegetative surveys of the littoral zone as well as monitor for the invasive animal spiny waterflea using plankton tows. A secondary objective of the team was to perform rapid response management actions on any new, small, or isolated aquatic invasive plant infestations that were discovered using best management practices. AIPPP's AIS Project Coordinator used GIS and existing AIS distribution and monitoring data for the Adirondacks to prioritize lakes to be surveyed by the response team in 2015 (Table 1). Lakes that are in excess of 4,500 acres in size were excluded from the selection process due to the extensive time and significant resources that are required to thoroughly survey large waterbodies. The remaining lakes were prioritized according to the following criteria:

### Priority 1

- Adirondack lakes that had never been surveyed for AIS and were thought to have a boat launch.
- Adirondack lakes that are located within the Southern Lake Champlain/Lake George, Mohawk, Sacandaga, or Upper Hudson Watersheds that had not been surveyed for AIS in the past three years.
- Adirondack lakes of special concern (newly opened to public, largest known AIS-free lake, etc.).

### Priority 2

- Adirondack lakes that are located within the Southern Lake Champlain/Lake George, Mohawk, Sacandaga, or Upper Hudson Watersheds that had been surveyed for AIS in the past three years.

### Priority 3

- Adirondack lakes located within the Ausable/Boquet, Black, Grass, Oswegatchie, Raquette, Salon/Trout, Saranac/Chazy, or St. Regis Watersheds that had not been surveyed for AIS in the past three years.

## Methodology

The AIS regional response team conducted comprehensive aquatic plant surveys of a lake's littoral zone using a combination of visual surveys and rake tosses performed from canoes as well as by snorkeling. Using these techniques, the team surveyed the entire littoral zone of each lake in a serpentine search pattern and mapped the location, species composition, and species % cover of all aquatic plant beds discovered. The perimeters of plant beds were mapped with a handheld GPS unit and field data was recorded on a paper datasheet. Visual surveys were supplemented by periodic (and equidistant) rake tosses and snorkeling using a consistent protocol: Four snorkel sites per lake in plant beds where the substrate cannot be seen from the surface were chosen including the launch site due to the high probability of AIS to be located where boats enter a lake. Once the full scope of the plant community was ascertained, the newly found species were appended to the species list associated with that particular plant bed in the paper datasheet. All field data was entered into ArcGIS to create aquatic plant maps for each lake using the NYS Area Hydrography 1:24,000 shapefile. When surveying, the team worked in two person crews from canoe. Each crew was equipped with a bathymetric map of the lake, portable depth sounder, handheld GPS unit, two-sided rake toss, snorkel and fins, and a digital camera. Depths were checked periodically while surveying to ensure that the far shore edge of the littoral zone was covered. The relationship between depth and littoral zone extent varies depending on water clarity across lakes. For example, a lake with high clarity will have a larger littoral-extent than a lake with low clarity. At the beginnings of each survey each team estimated the depth/littoral-extent relationship using rake tosses and depth sounders and then used this relationship as a general guideline for the rest of the survey. A vertical plankton tow through >15' of water column was performed on each lake done to monitor for invasive plankton. A dissecting microscope in the AWI lab was utilized to identify possible invasive plankton from each tow sample.



Lake Luzerne Boat Launch



**Regional response team at South Lake,  
Ohio, NY**



**Two person crew on Indian Lake.**



**AWI Jon boat near Indian Lake  
Boat Launch.**



**Team member identifying a native species of milfoil in Lake Abanakee, Indian Lake, NY**

acres. The largest bed mapped was 171 acres with the smallest bed mapped at 362 square feet. 1,868 rake tosses were performed with 734 of these returning plant samples.

The most abundant native plant species recorded were *Brasenia schreberi*, followed by *Eriocaulon sp.* and *Sparganium sp.* The Least abundant species recorded were *Lemna minor*, *Caltha natans*, and *Potamogeton alpinus* (Table 2 – Incidence does not indicate abundance). A small bed of *P. crispus* was managed in Lake Luzerne (See page 71).



**Indian Lake from the Narrows**

## Results

From June 16 through August 20, 2015 38 lakes were surveyed (Table 1, Figure 3). Of these 38 lakes, 17 contained AIS with 15 containing historic infestations and 2 documented as newly invaded (Table 3). *Myriophyllum spicatum* was the most common AIS found (13 lakes), followed by *Bythotrephes longimanus* (4 lakes) and *Potamogeton crispus* (4 lakes), and finally *Myriophyllum heterophyllum* (2 lakes). New infestations of *M. heterophyllum* in Peck's Lake and *M. heterophyllum* and *M. Spicatum* in Square Pond were found.

A total of 407 miles of shoreline were surveyed on these 38 lakes. On average, it took about 6 hours to survey each lake. The largest lake surveyed was Indian Lake at 4,332 acres with the smallest lake surveyed, Lake Forest, at 21 acres. The average size of the lakes surveyed was 670 acres.

A total of 3,486 acres of aquatic plant beds were mapped. The average bed size was 4.8

Table 1. Lakes surveyed between 6/15/2015 and 8/19/2015

Lake Name	County	Date Surveyed	Priority
East Caroga	Fulton	6/15/2015	2
West Caroga	Fulton	6/15/2015	1
Canada Lake	Fulton	6/16/2015	2
Canada Lake Outlet	Fulton	6/17/2015	2
Pine Lake	Fulton	6/18/2015	1
Adirondack Lake	Hamilton	6/23/2015	2
Mason lake	Hamilton	6/23/2015	1
Peck's Lake	Fulton	6/24/2015	1
Lake Algonquin	Hamilton	6/25/2015	3
Floodwood Pond	Franklin	6/29/2015	1
Little Square Pond	Franklin	6/29/2015	1
Square Pond	Franklin	6/29/2015	1
Fish Creek Pond	Franklin	6/29/2015	1
Lake Pleasant	Hamilton	6/30/2015	2
Oxbow Lake	Hamilton	7/1/2015	3
Piseco Lake Outlet	Hamilton	7/1/2015	2
Piseco Lake	Hamilton	7/2/2015	2
Sacandaga Lake	Hamilton	7/6/2015	2
Garnet Lake	Warren	7/7/2015	2
Paradox Lake	Essex	7/8/2015	1
Putnam Pond	Essex	7/9/2015	2
Eagle Lake	Essex	7/9/2015	1
Lincoln Pond	Essex	7/13/2015	3
Lake Forest	Warren	7/13/2015	1
Lake Luzerne	Warren	7/14/2015	1
Fourth Lake	Warren	7/14/2015	2
Lake Vanare	Warren	7/14/2015	2
Indian Lake	Hamilton	7/20/2015-7/23/2015	1
Adirondack Lake	Hamilton	7/23/2015	2
Schroon Lake	Essex	7/26/2015-7/29/2015	3
Harris Lake	Essex	7/30/2015	2
Friend's Lake	Warren	8/5/2015	1
Pyramid Lake	Essex	8/6/2015	1
Cedar River Flow	Hamilton	8/10/2015	2
Thirteenth Lake	Warren	8/12/2015	2
Lewey Lake	Hamilton	8/13/2015	2
North Lake	Herkimer	8/18/2015	1
South Lake	Herkimer	8/19/2015	3

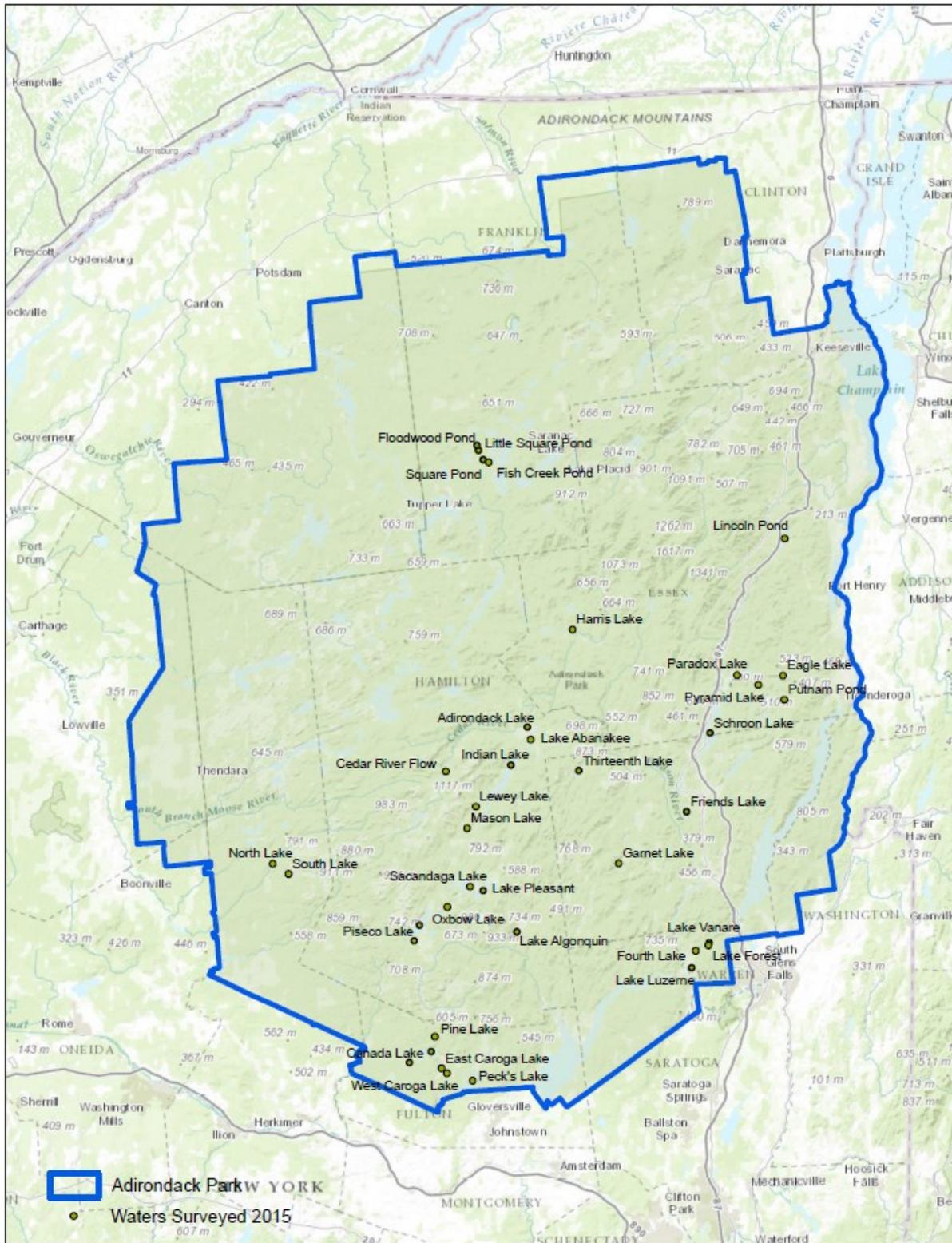


Figure 3. Prioritized Lakes Surveyed for Aquatic plants 2015.

**Table 2. Species found during lake surveys ordered by incidence (# of lakes containing these aquatic plant taxa).**

<b>Species</b>	<b>Incidence</b>	<b>Species</b>	<b>Incidence</b>
<i>Brasenia schreberi</i>	31	<i>Potamogeton praelongus</i>	9
<i>Nuphar variegata</i>	31	<i>Myriophyllum tenellum</i>	9
<i>Sparganium sp.</i>	30	<i>Myriophyllum alterniflorum</i>	7
<i>Sagittaria graminea</i>	30	<i>Lobelia dortmanna</i>	7
<i>Potamogeton epihydrus</i>	29	<i>Potamogeton illinoensis</i>	6
<i>Nymphaea odorata</i>	29	<i>Potamogeton pussilus</i>	5
<i>Vallisneria americana</i>	29	<i>Utricularia minor</i>	5
<i>Potamogeton natans</i>	28	<i>Ceratophyllum demersum</i>	4
<i>Potamogeton ampifolius</i>	27	<i>Potamogeton zosteriformis</i>	4
<i>Eriocaulon sp.</i>	27	<i>Myriophyllum sibiricum</i>	4
<i>Potamogeton robbinsii</i>	26	<i>Potamogeton crispus*</i>	4
<i>Utricularia vulgaris</i>	24	<i>Bythotrephes longimanus</i>	4
<i>Utricularia purpurea</i>	24	<i>Potamogeton foliosus</i>	3
<i>Najas sp.</i>	21	<i>Myriophyllum heterophyllum*</i>	2
<i>Nymphoides cordata</i>	21	<i>Potamogeton alpinus</i>	2
<i>Isoetes sp.</i>	20	<i>Potamogeton nodosus</i>	2
<i>Nitella sp.</i>	19	<i>Myriophyllum farwellii</i>	2
<i>Potamogeton gramineus</i>	17	<i>Potamogeton vaseyi</i>	2
<i>Elodea nuttallii</i>	15	<i>Potamogeton oakesianus</i>	1
<i>Utricularia intermedia</i>	15	<i>Myriophyllum verticillatum</i>	1
<i>Potamogeton perfoliatus</i>	13	<i>Persicaria amphibia</i>	1
<i>Myriophyllum spicatum*</i>	13	<i>Lemna minor</i>	1
<i>Elodea canadensis</i>	10	<i>Caltha natans</i>	1

**Table 3. Lakes surveyed with aquatic invasive species.**

<b>Lake Name</b>	<b>AIS Found</b>
Lake Pleasant	<i>Bythotrephes longimanus</i>
Piseco Lake	<i>Bythotrephes longimanus</i>
Sacandaga Lake	<i>Bythotrephes longimanus</i>
Peck's Lake	<i>Myriophyllum heterophyllum</i> ~, <i>Bythotrephes longimanus</i>
East Caroga	<i>Myriophyllum spicatum</i>
West Caroga	<i>Myriophyllum spicatum</i>
Lake Algonquin	<i>Myriophyllum spicatum</i>
Floodwood Pond	<i>Myriophyllum spicatum</i>
Little Square Pond	<i>Myriophyllum spicatum</i>
Putnam Pond	<i>Myriophyllum spicatum</i>
Lincoln Pond	<i>Myriophyllum spicatum</i>
Square Pond	<i>Myriophyllum spicatum</i> ~, <i>Myriophyllum heterophyllum</i> ~
Fish Creek Pond	<i>Myriophyllum spicatum</i> , <i>Myriophyllum heterophyllum</i>
Paradox Lake	<i>Myriophyllum spicatum</i> , <i>Potamogeton crispus</i>
Eagle Lake	<i>Myriophyllum spicatum</i> , <i>Potamogeton crispus</i>
Lake Luzerne	<i>Myriophyllum spicatum</i> , <i>Potamogeton crispus</i>
Schroon Lake	<i>Myriophyllum spicatum</i> , <i>Potamogeton crispus</i>

\* AIS

~ new infestation

## Lodging and Travel

The response team worked four, ten hour days in order to reduce travel and lodging costs. The team met every Monday morning at Paul Smith's College to organize equipment and prepare for the coming week. Prior to departure, the team checked all field equipment and filled the transport vehicle's gas tank as well as the motorboat's if it was planned on being used that week. The crew then drove directly to the launch site for the lake they planned to survey that day. Generally, the team traveled to clusters of priority lakes near towns and surveyed them not in their strict prioritizations but rather in the most economical order to increase efficiency. Weather played a role in determining the survey order. If there were high winds in the forecast, large lakes were avoided. Generally, one lake was surveyed each day, but occasionally multiple lakes were surveyed in a day. Some lakes required multi-day surveys. The two largest lakes, Indian and Schroon Lake, took a week of surveying each (Table 1). Lodging was chosen based upon its proximity to a cluster of priority lakes (cost of lodging was weighted against the cost of travel). Over the summer, a total of 60 hours of travel time and 230 hours of survey time were logged. These sums do not include lunch, break, office, and logistic hours.

## Data Limitations

Data in this report is limited by three sources of error: spatial accuracy, lake area accessibility, and precision of abundance estimates in large plant beds. Handheld Garmin GPS units were used in these surveys, limiting the spatial data to 10-15 ft. of accuracy. High wind or flowing waters may also disassociate spatial data on paper from its corresponding GPS points by several feet, particularly in the rake toss data. The accuracy of the handheld GPS in this study is widely accepted as a spatial standard in aquatic plant survey methodologies (e.g. Hauxwell et al. 2010; Janauer 2003; Nelson, Cheruvellil, and Soranno 2006). Although GPS units with greater accuracy are available, using them in this wet environment is uneconomical. Flowing waters were rarely surveyed this summer, so the error caused by a moving GPS unit was minimal, and in high wind all effort was made to keep the canoe stationary. Most lakes exist in a gradient of open water to complex wetland ecosystems to terrestrial land. Occasionally, wetlands such as swamps and marshes form a maze of trees, stumps, snags, wetland plants, and emerging muddy masses limiting the accessibility of canoes. In these areas, the species list may be lacking. Lastly, as plant bed size increases the precision of percent cover estimates is reduced. It is difficult to ascertain true percent cover in very extensive beds or in lakes where the entire floor is littoral zone.



AWI Van at Fourth Lake near Lake Luzerne, NY

## Adirondack Lake

Adirondack Lake is a 214 acre lake found in the Town of Indian Lake, Hamilton County, nested in the Upper Hudson watershed.

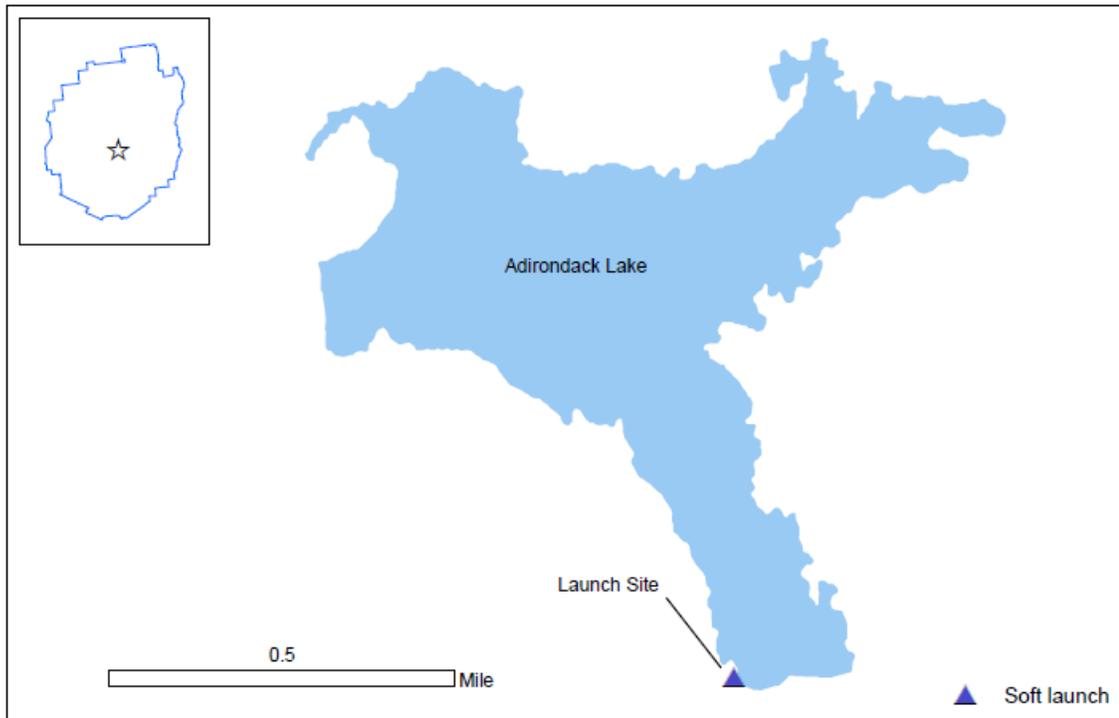


Figure 4. Location Map of Adirondack Lake, location of launch site utilized by response team and locations of other watercraft access points, both public and private. Soft launches are where motor boats can be launched but do not have a cement ramp. Hardtops are where motor boats can be launched and do have a cement ramp. Hand launches are where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 19 aquatic plant beds were mapped in Adirondack Lake covering 29.7 acres of surface water, representing 13.9% of the lake area. The most abundant aquatic plant species found were *Nuphar variegata*, *Nymphaea odorata*, and *Nymphoides cordata*. The least abundant aquatic plant species found were *Najas sp.*, *Sparganium sp.*, and *Eriocaulon sp.* (Figure 5). A total of 34 rakes were tossed, of which 3 returned plant specimens. The only species returned by the rake tosses was *Eleocharis parvula* and *N. odorata*.

No AIS were found in Adirondack Lake.

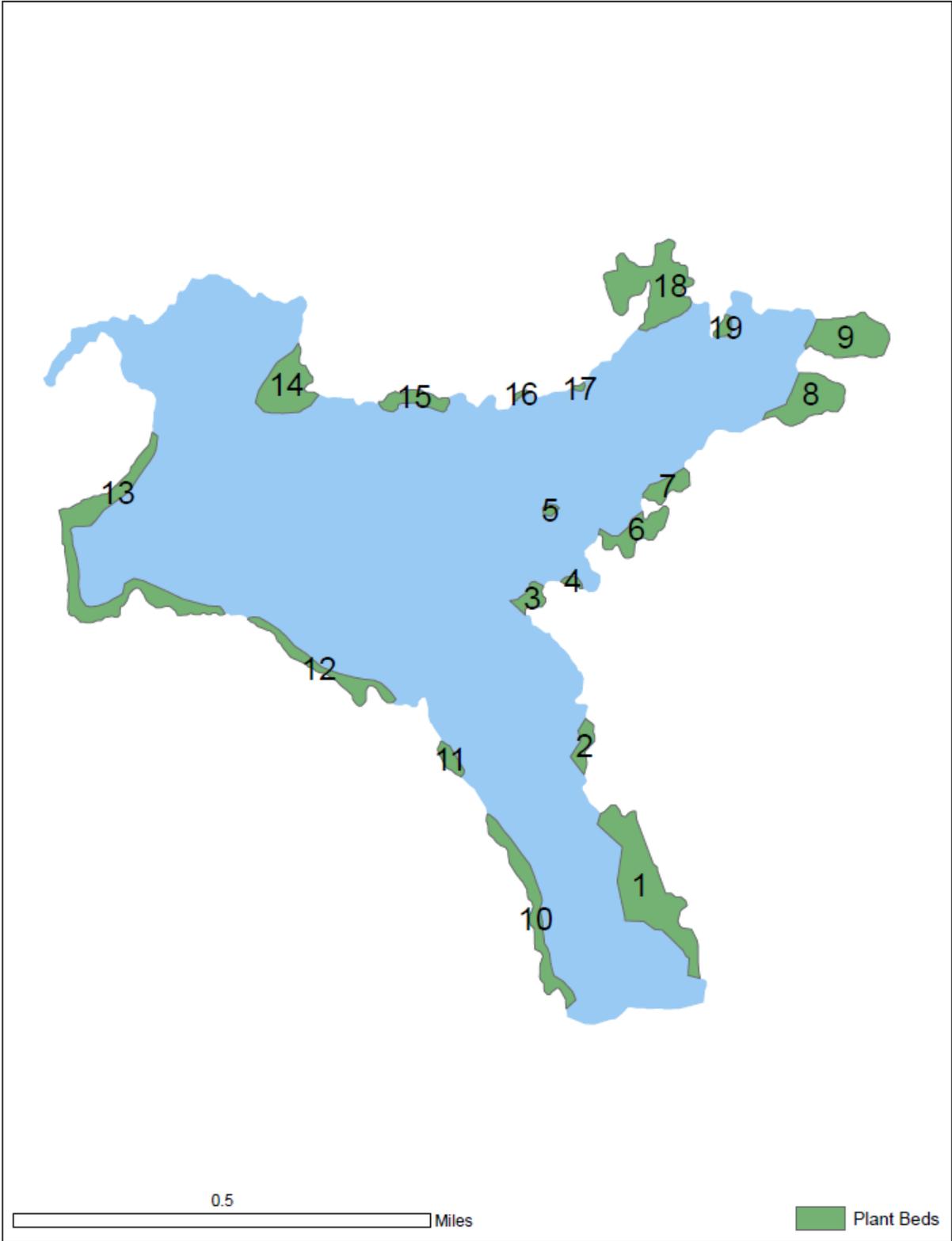


Figure 5. Aquatic plant bed map for Adirondack Lake. Bed IDs correspond with Table 1, supplemental data.

## Canada Lake

Canada Lake is a 1,048 acre lake complex found in the Town of Caroga, Fulton County, nestled in the Mohawk watershed.

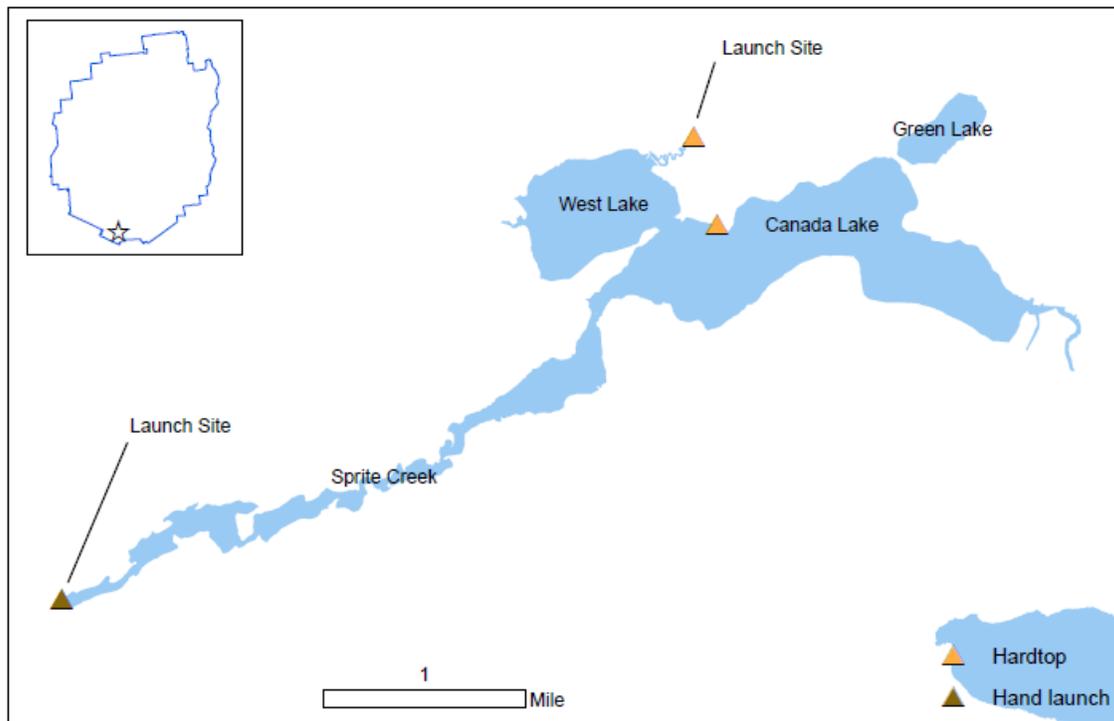


Figure 6. Location map for Canada Lake and location of launch site utilized by response team and locations of other watercraft access points, both public and private. Soft launches are where motor boats can be launched but do not have a cement ramp. Hardtops are where motor boats can be launched and do have a cement ramp. Hand launches are where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 42 aquatic plant beds were mapped in Canada Lake covering 277.0 acres of surface water, 22% of the lake area. The most abundant aquatic plant taxa found were *Eleocharis parvula*, *Sparganium sp.*, and *Sagittaria graminea*. The least abundant aquatic plant taxa found were *Potamogeton ampifolius*, *Nitella sp.*, and *Isoetes sp.* (Figure 7-8). A total of 43 rakes were tossed, of which 15 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Utricularia vulgaris*, *Sparganium sp.* and *Utricularia intermedia*. The least abundant aquatic plant taxa returned by the rake tosses were *Brasenia schreberi*, *Vallisneria americana*, and *Potamogeton natans*.

No AIS were found in Canada Lake.

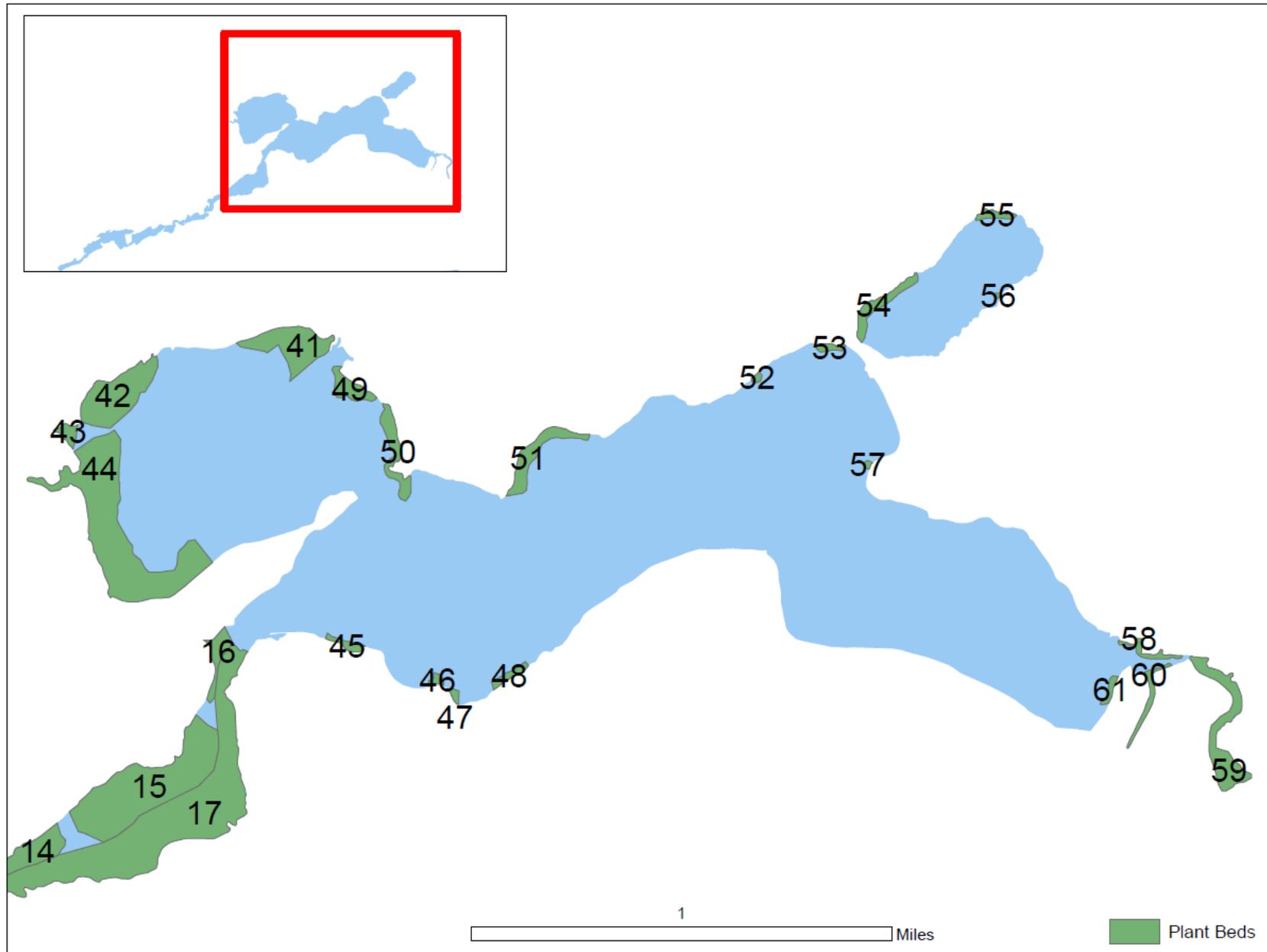


Figure 7. Aquatic plant bed map for Canada Lake East. Bed IDs correspond with Table 2, supplemental data.



Figure 8. Aquatic plant bed map for Canada Lake West (Sprite Creek). Bed IDs correspond with Table 2, supplemental data.

## Caroga Lakes

East and West Caroga Lakes are 237 and 320 acre lakes respectively. These lakes are found in the Town of Caroga, Fulton County, nested in the Mohawk watershed.

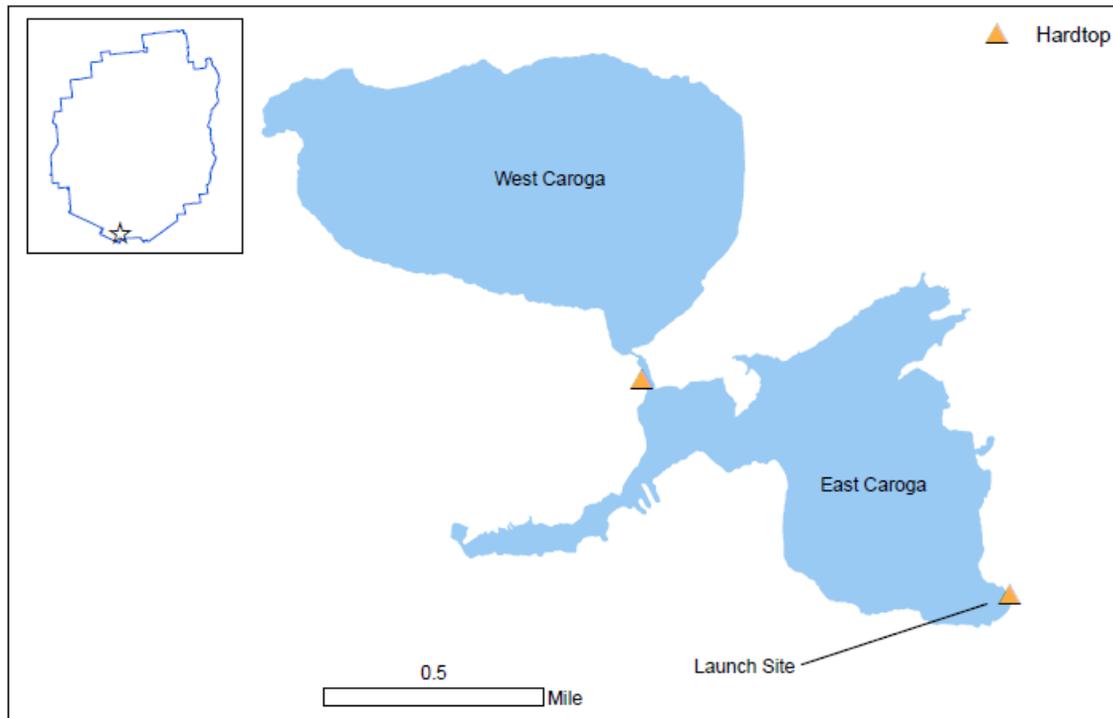


Figure 9. Location map for Caroga Lakes and location of launch site utilized by response team and locations of other watercraft access points, both public and private. Soft launches are where motor boats can be launched but do not have a cement ramp. Hardtops are where motor boats can be launched and do have a cement ramp. Hand launches are where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 19 plant beds were mapped in the Caroga Lakes covering 99.4 acres of surface water, 17.8% of the lake area. The most abundant aquatic plant taxa found were *Brasenia schreberi*, *Myriophyllum spicatum*, and *Eriocaulon sp.* The least abundant aquatic plant taxa found were *Potamogeton gramineus*, *Utricularia intermedia*, and *Potamogeton praelongus* (Figure 10). A total of 78 rakes were tossed, of which 34 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Potamogeton ampifolius*, *Eleocharis parvula* and *Utricularia vulgaris*. The least abundant aquatic plant taxa returned by the rake tosses were *Potamogeton epihydrus*, *Utricularia purpurea*, and *Najas sp.*

One AIS was found during the survey: *M. spicatum* (Eurasian water-milfoil). *M. spicatum* was detected in 15 plant beds in Lake Algonquin covering 83.5 acres, 84% of all plant beds and 15% of surface water. *M. spicatum* is a common AIS in the Adirondacks. No invasive plankton was detected.

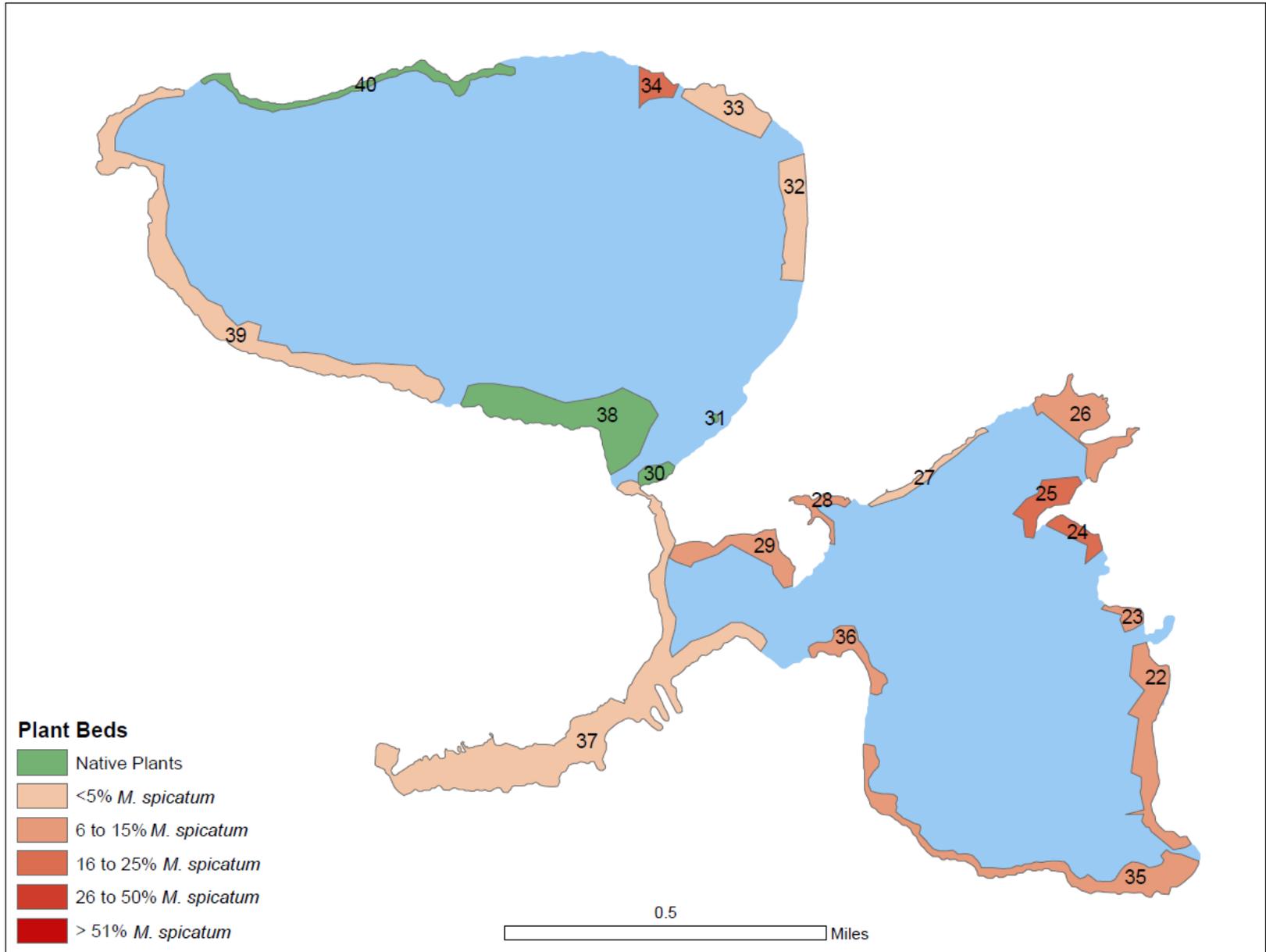


Figure 10. *M. spicatum* bed map for the Caroga Lakes. Bed IDs correspond with Table 3, supplemental data.

## Cedar River Flow

Cedar River Flow a 632 acre lake found in the Town of Lake Pleasant, Hamilton County, nested in the Mohawk watershed.

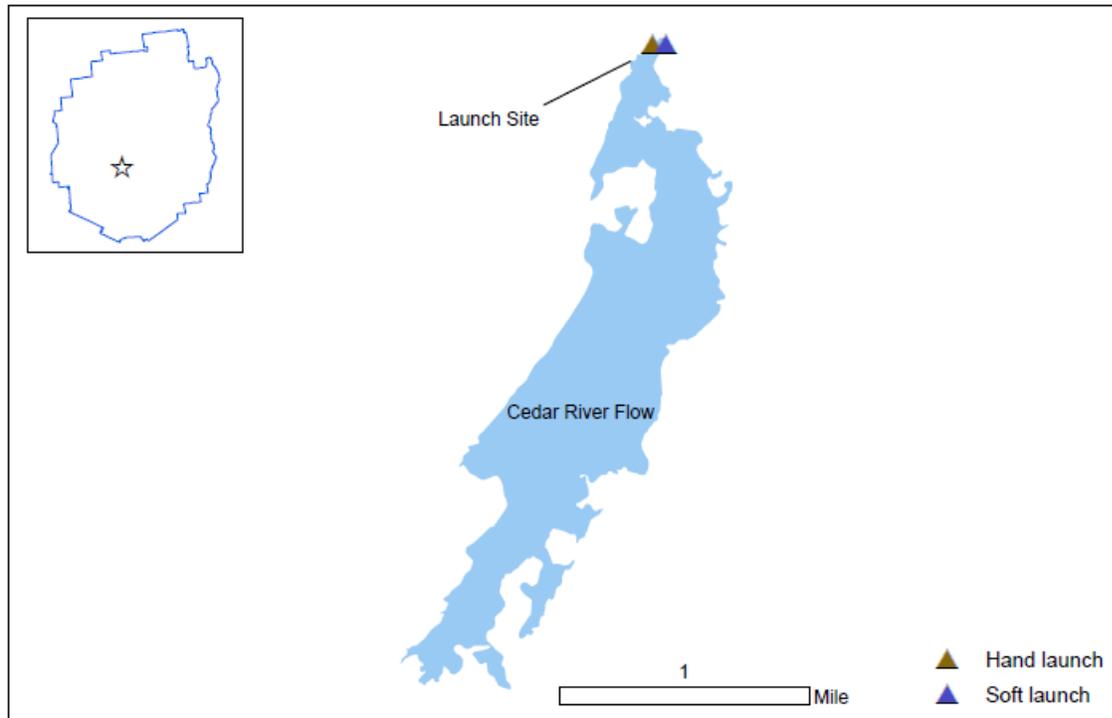


Figure 11. Location map for Cedar River Flow and location of launch site utilized by response team and locations of other watercraft access points, both public and private. Soft launches are where motor boats can be launched but do not have a cement ramp. Hardtops are where motor boats can be launched and do have a cement ramp. Hand launches are where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 15 plant beds were mapped in the Cedar River Flow covering 186 acres of surface water, 27.7% of the lake area. The most abundant aquatic plant taxa found were *Brasenia schreberi*, *Potamogeton natans*, and *Myriophyllum farwellii*. The least abundant aquatic plant taxa found were *Potamogeton robbinsii*, *Utricularia vulgaris*, and *Utricularia purpurea* (Figure 12-13). A total of 37 rakes were tossed, of which 11 returned plant specimens. The only taxon returned by the rake tosses was *Myriophyllum farwellii*.

No AIS were found in Cedar River Flow.

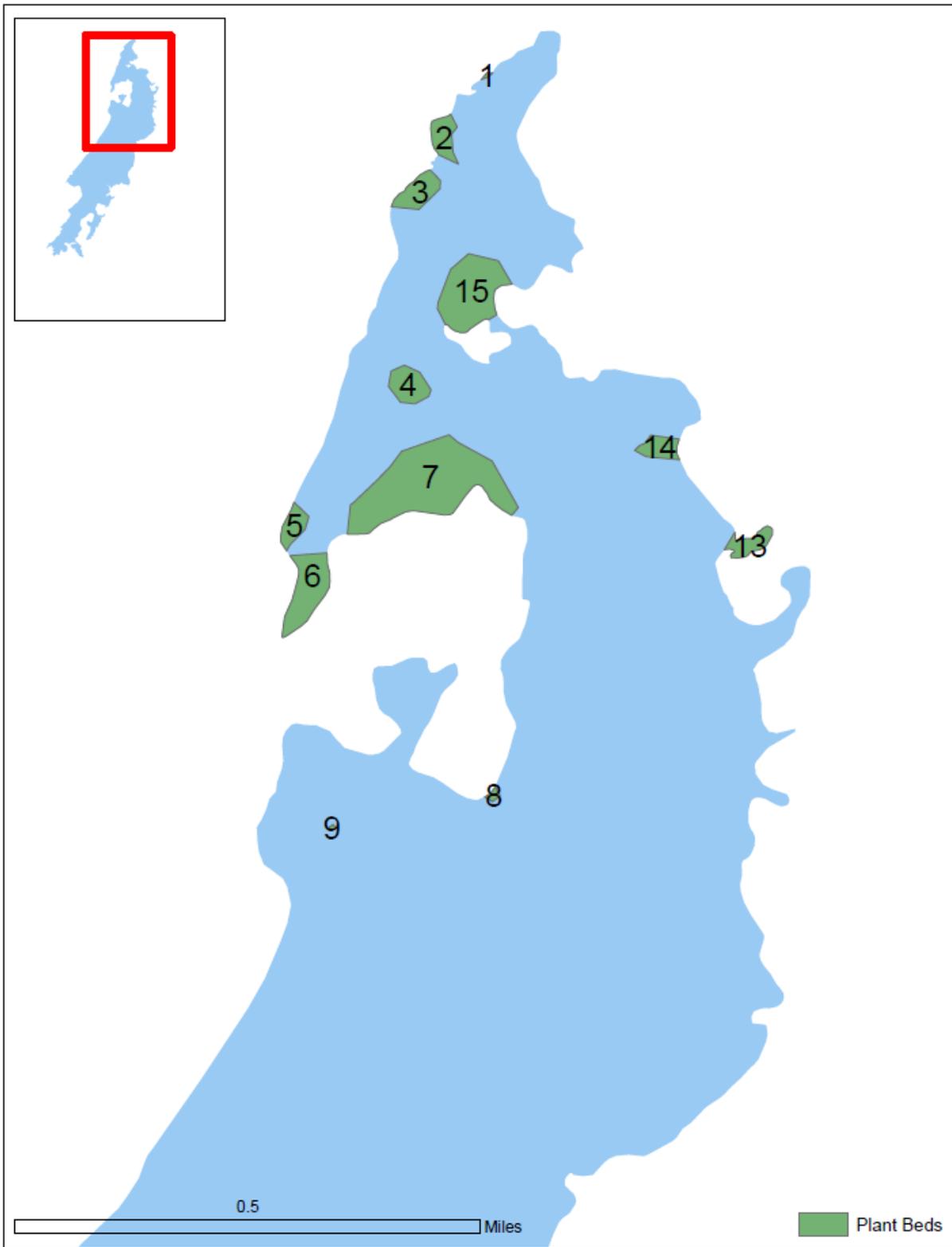


Figure 12. Aquatic plant bed map for the Cedar River Flow North. Bed IDs correspond with Table 4, supplemental data.

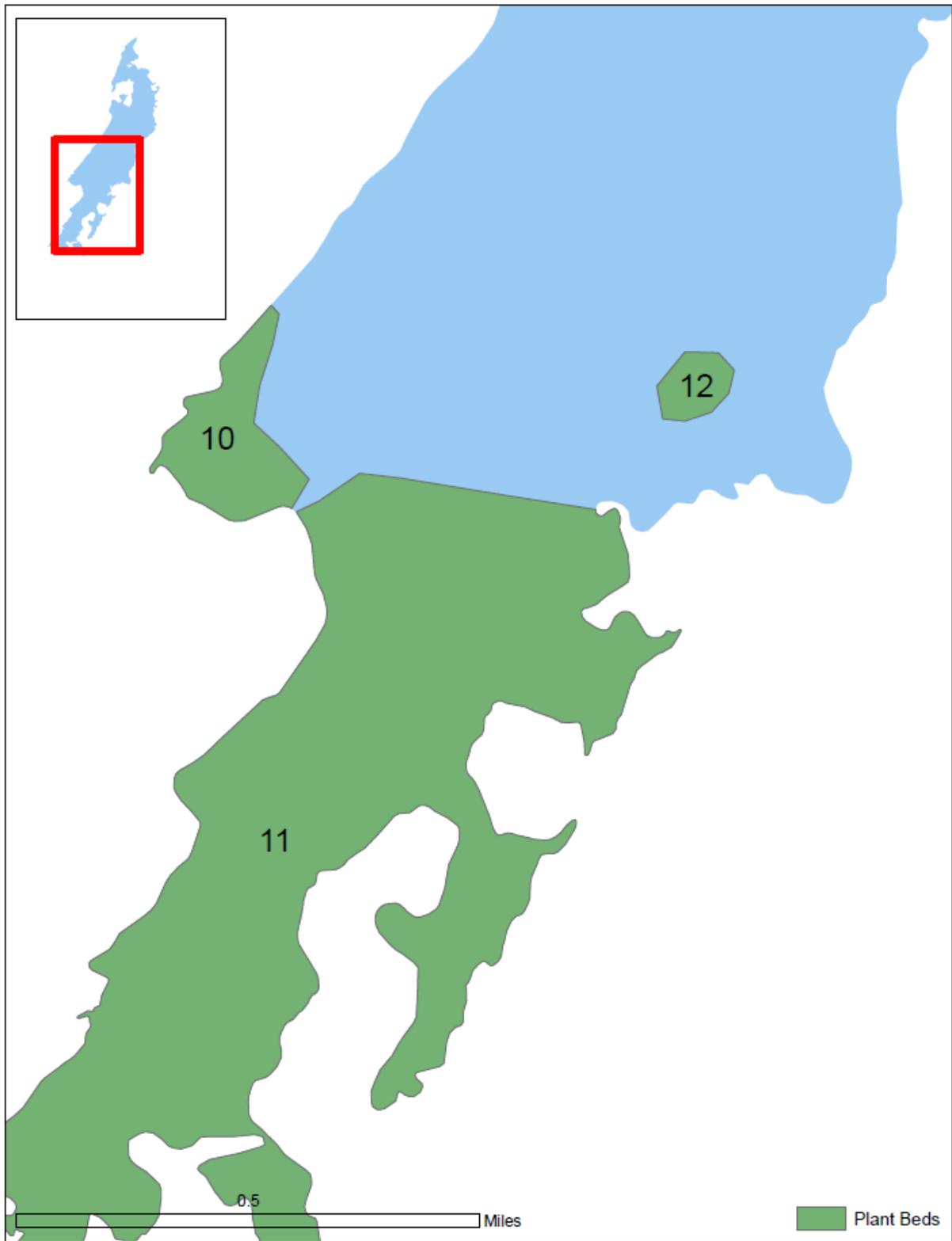


Figure 13. Aquatic plant bed map for Cedar River Flow South. Bed IDs correspond with Table 4, supplemental data.

## Eagle Lake

Eagle Lake is a 412 acre lake found in the Town of Ticonderoga, Essex County, nestled in the North Hudson watershed.

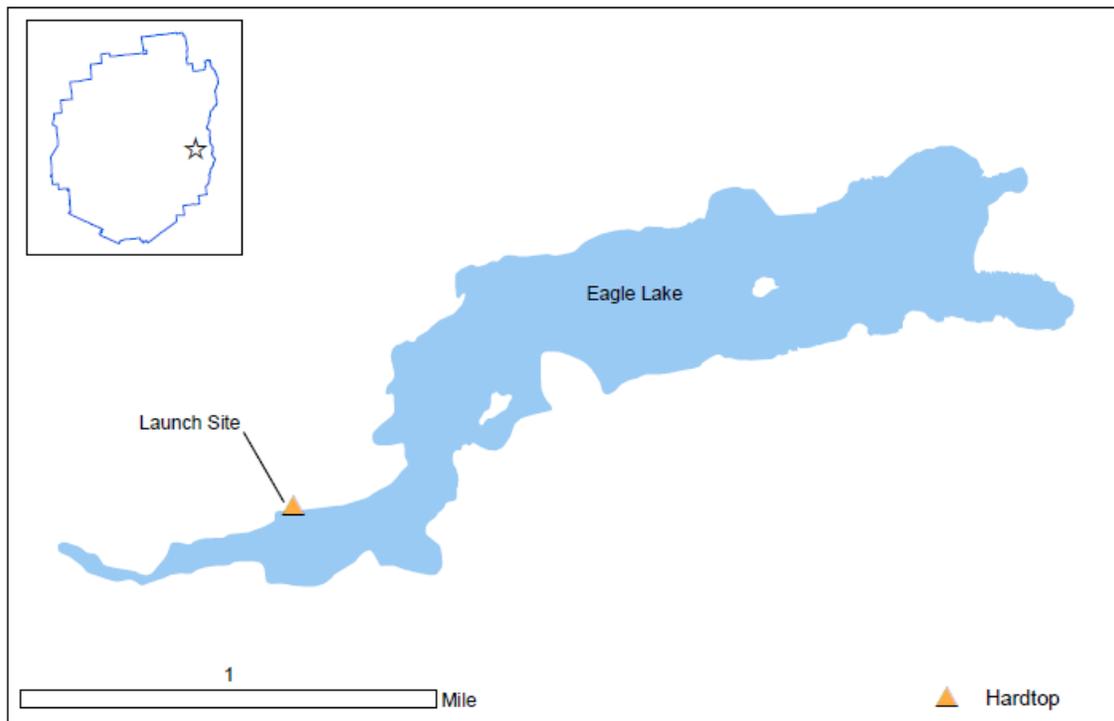


Figure 14. Location map for Eagle Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 27 plant beds were mapped in Eagle Lake covering 42.6 acres of surface water, 10.1% of the lake area. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Nymphaea odorata*, and *Brasenia schreberi*. The least abundant aquatic plant taxa found were *Potamogeton gramineus*, *Utricularia intermedia*, and *Potamogeton vaseyi* (Figure 15). A total of 36 rakes were tossed, of which 22 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Myriophyllum spicatum*, *Najas sp.* and *Brasenia schreberi*. The least abundant aquatic plant taxa returned by the rake *Elodea canadensis*, *Ceratophyllum demersum*, and *Potamogeton crispus*.

Two AIS were found during the survey: *M. spicatum* (Eurasian water-milfoil) and *P. crispus* (Curly-leaf pondweed). *M. spicatum* was detected in all 27 plant beds in Eagle Lake. *P. crispus* was detected in one bed in Eagle Lake cover 1.2 acres, representing 0.03% of all beds and 0.002% surface water. *M. spicatum* and *Potamogeton crispus* are common AIS in the Adirondacks. No invasive plankton was detected

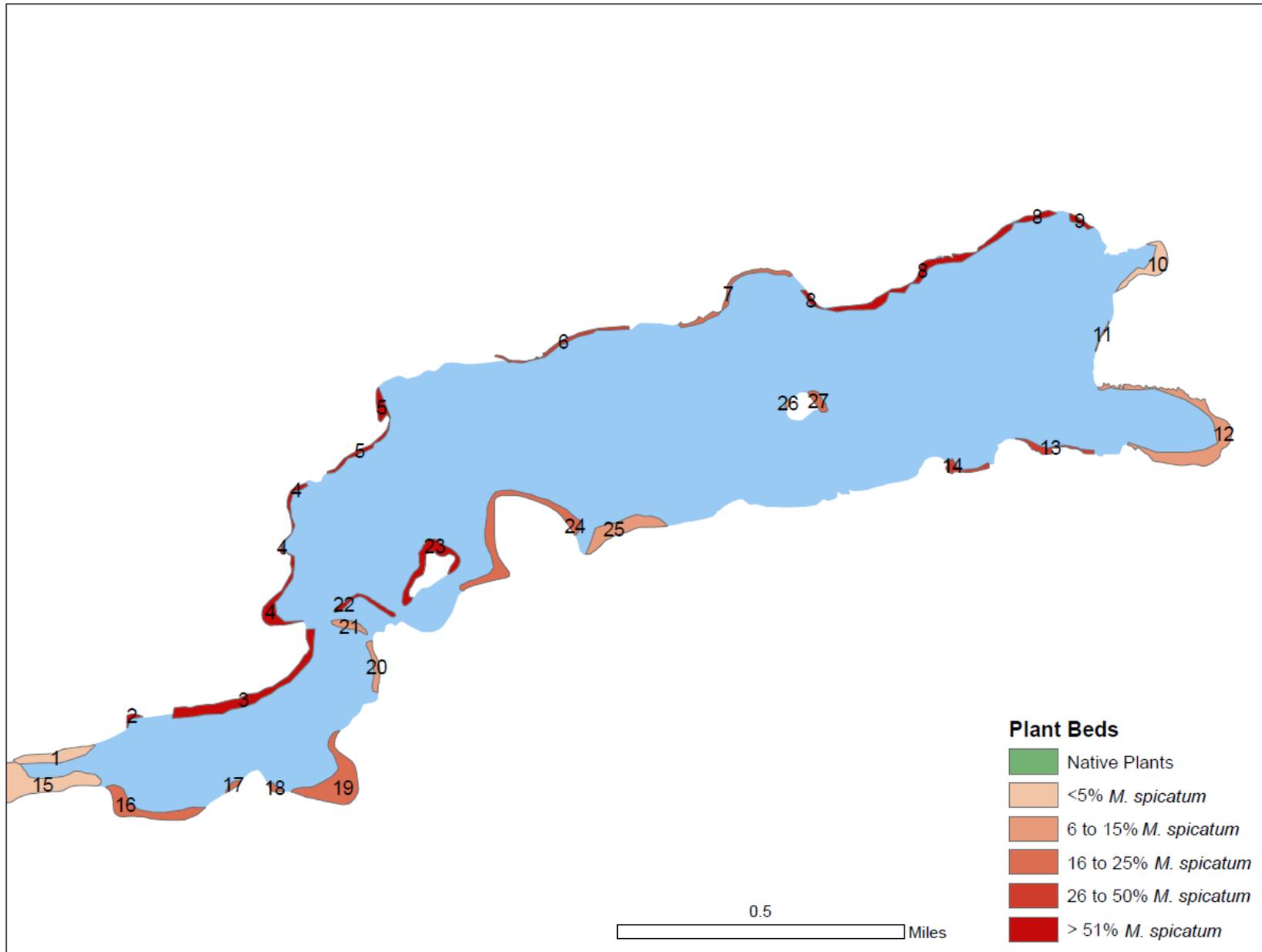


Figure 15. Aquatic plant bed map for Eagle Lake. Bed IDs correspond with Table 5, supplemental data.

## Fish Creek Complex

The Fish Creek Complex is a 684 acre lake system found in the Town of Santa Clara, Franklin County, nestled in the Saranac River watershed.

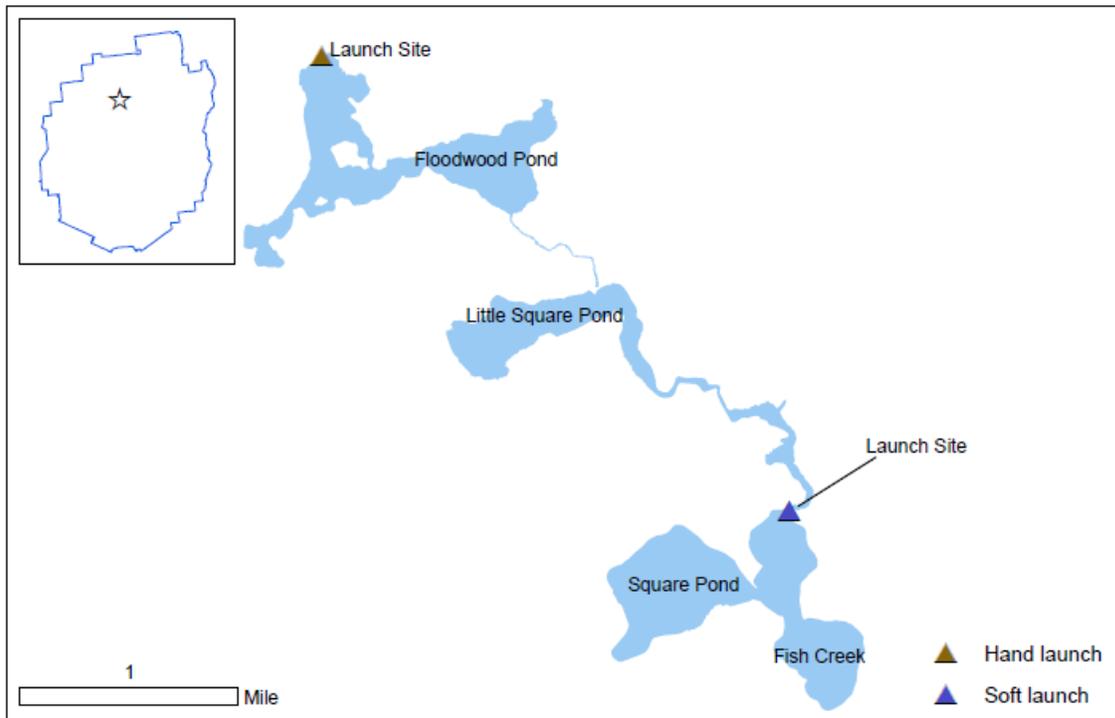


Figure 16. Location map for the Fish Creek Complex and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 42 plant beds were mapped in Fish Creek Complex covering 122 acres of surface water, 17.8% of the lake area. The most abundant aquatic plant taxa found were *Brasenia schreberi*, *Sparganium sp.*, and *Nuphar variegata*. The least abundant aquatic plant taxa found were *Utricularia minor*, *Myriophyllum alterniflorum*, and *Elodea nuttallii*. (Figure 17-21). A total of 107 rakes were tossed, of which 42 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Brasenia schreberi*, *Eleocharis parvula*, and *Najas sp.* The least abundant aquatic plant taxa returned by the rake tosses were *Elodea nuttallii*, *Potamogeton pusillus* *Utricularia purpurea*.

*M. spicatum*, Eurasian water-milfoil, was detected in 15 plant beds in the Fish Creek Complex covering 77.4 acres of surface water, 63% of all plant beds and 11.3% of surface water. *Myriophyllum heterophyllum* was detected in 5 beds in the Fish Creek Complex covering 39 acres of surface water, 32% of all beds and 5.7% of surface water. *M. spicatum* and *Myriophyllum* are common AIS in the Adirondacks. No invasive plankton was detected.

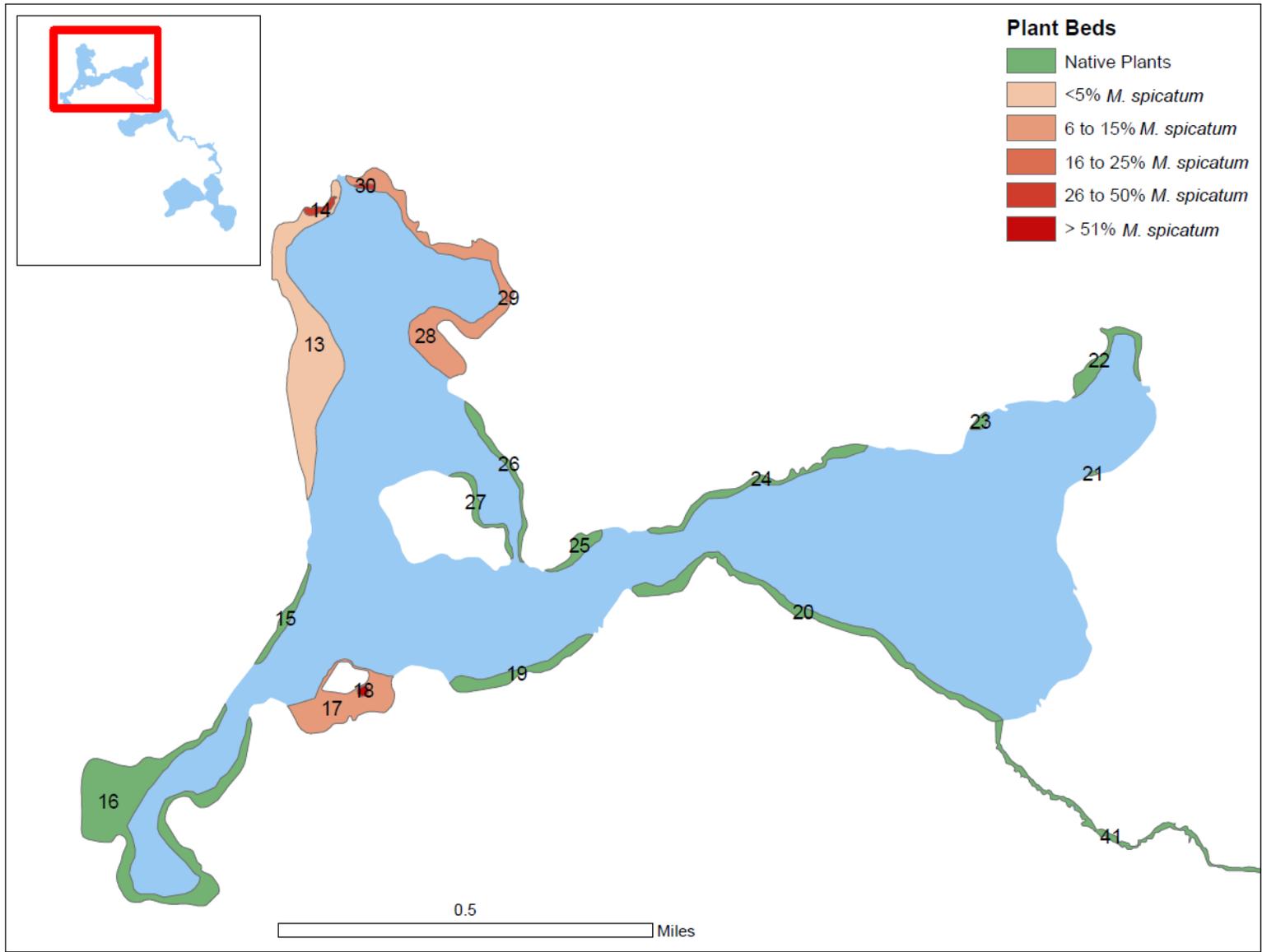


Figure 17. Aquatic plant bed map for Little Square Pond. Bed IDs correspond with Table 6, supplemental data.

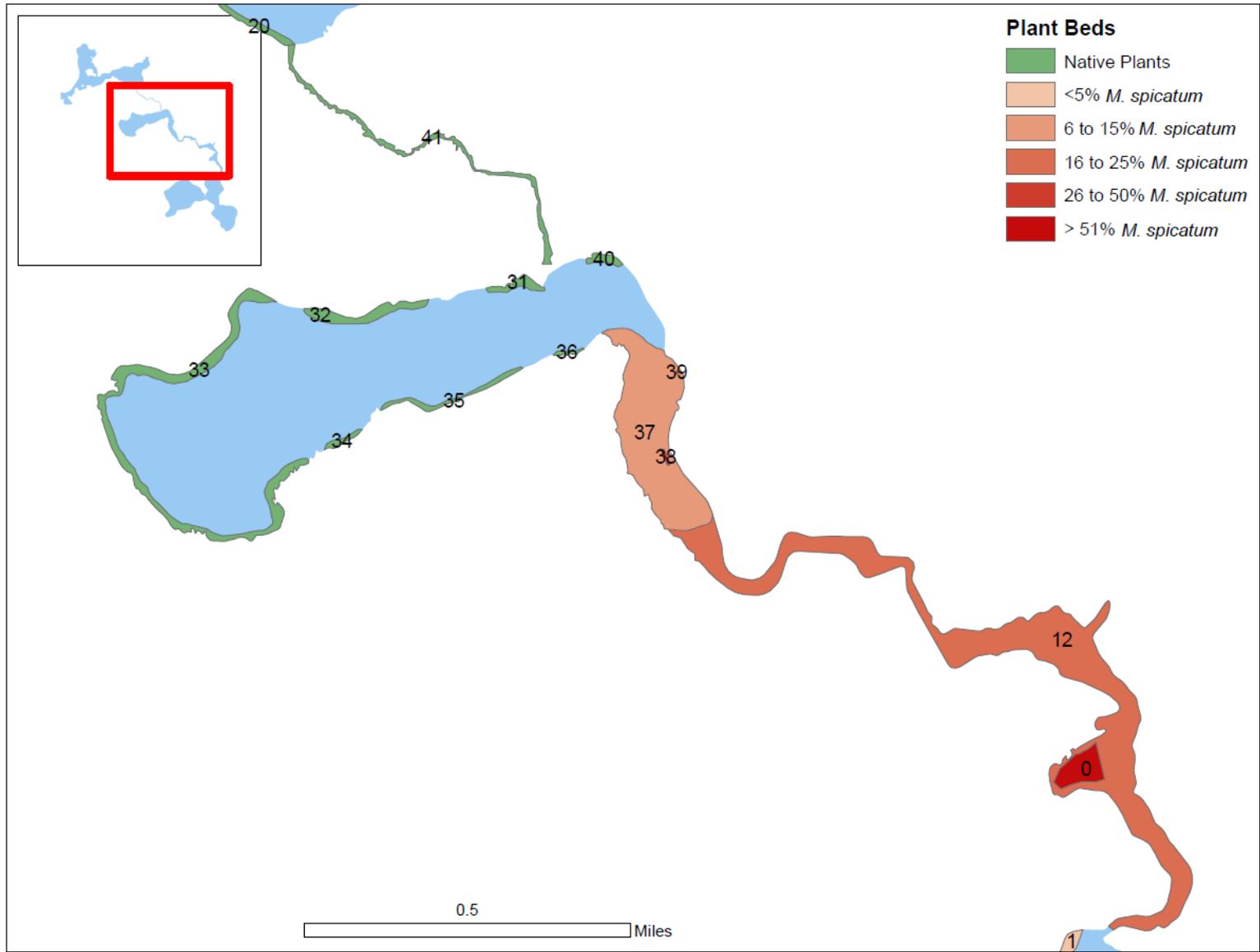


Figure 18. *M. spicatum* bed map for Little Square Pond. Bed IDs correspond with Table 6, supplemental data.

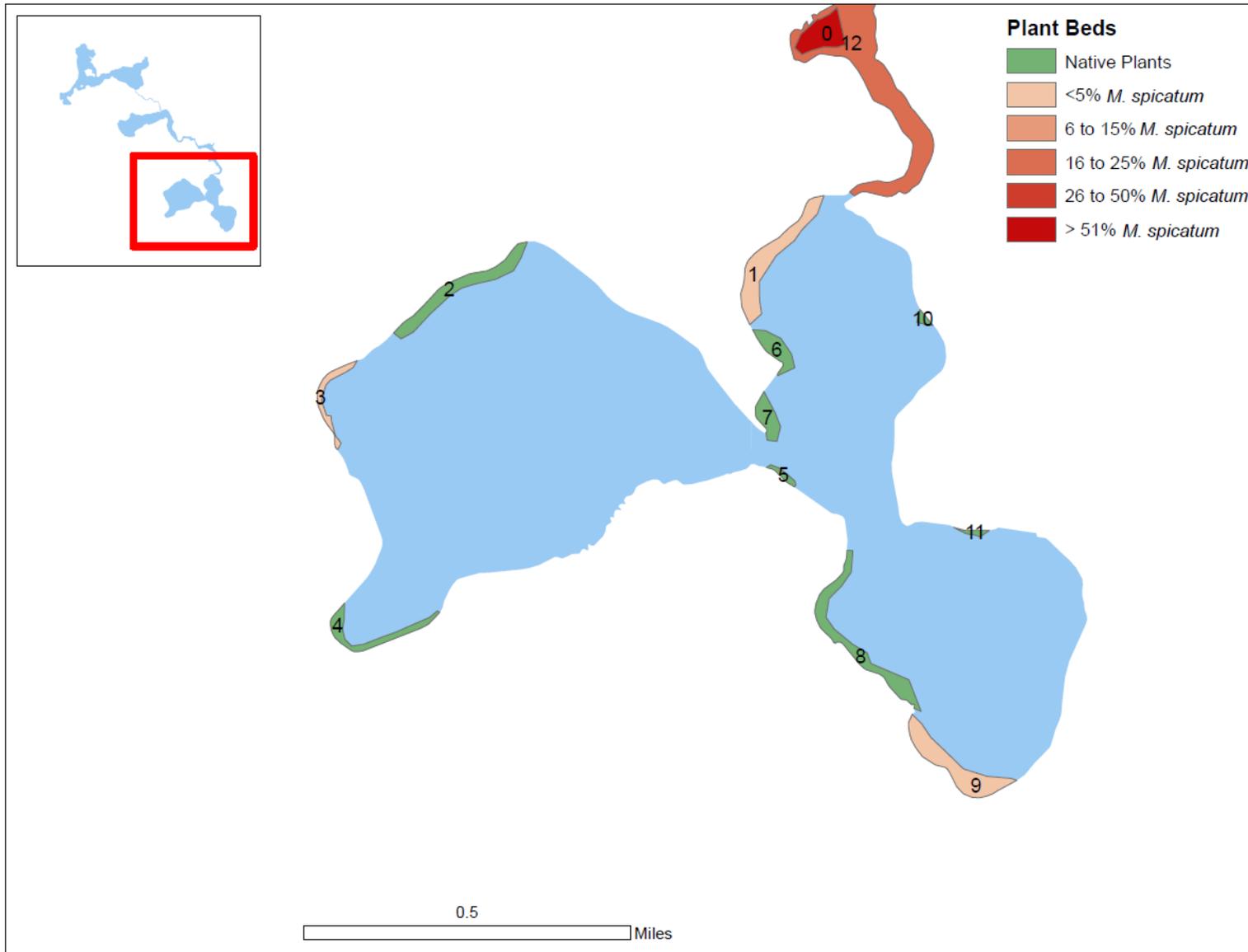


Figure 19. *M. spicatum* bed map for the Square and Fishcreek Pond. Bed IDs correspond with Table 6, supplemental data.

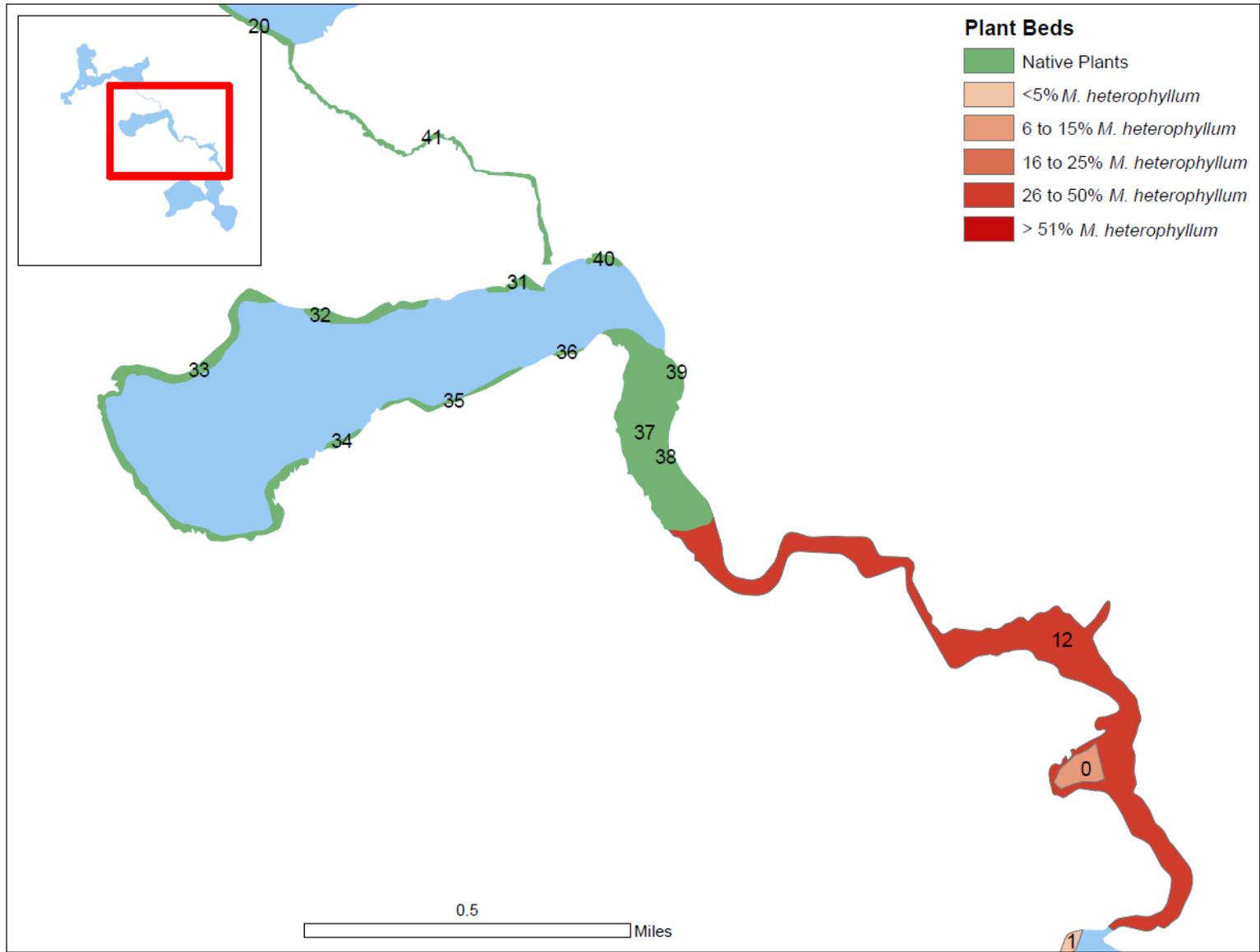


Figure 20. *M. heterophyllum* bed map for the Little Square Pond. Bed IDs correspond with Table 6, supplemental data.

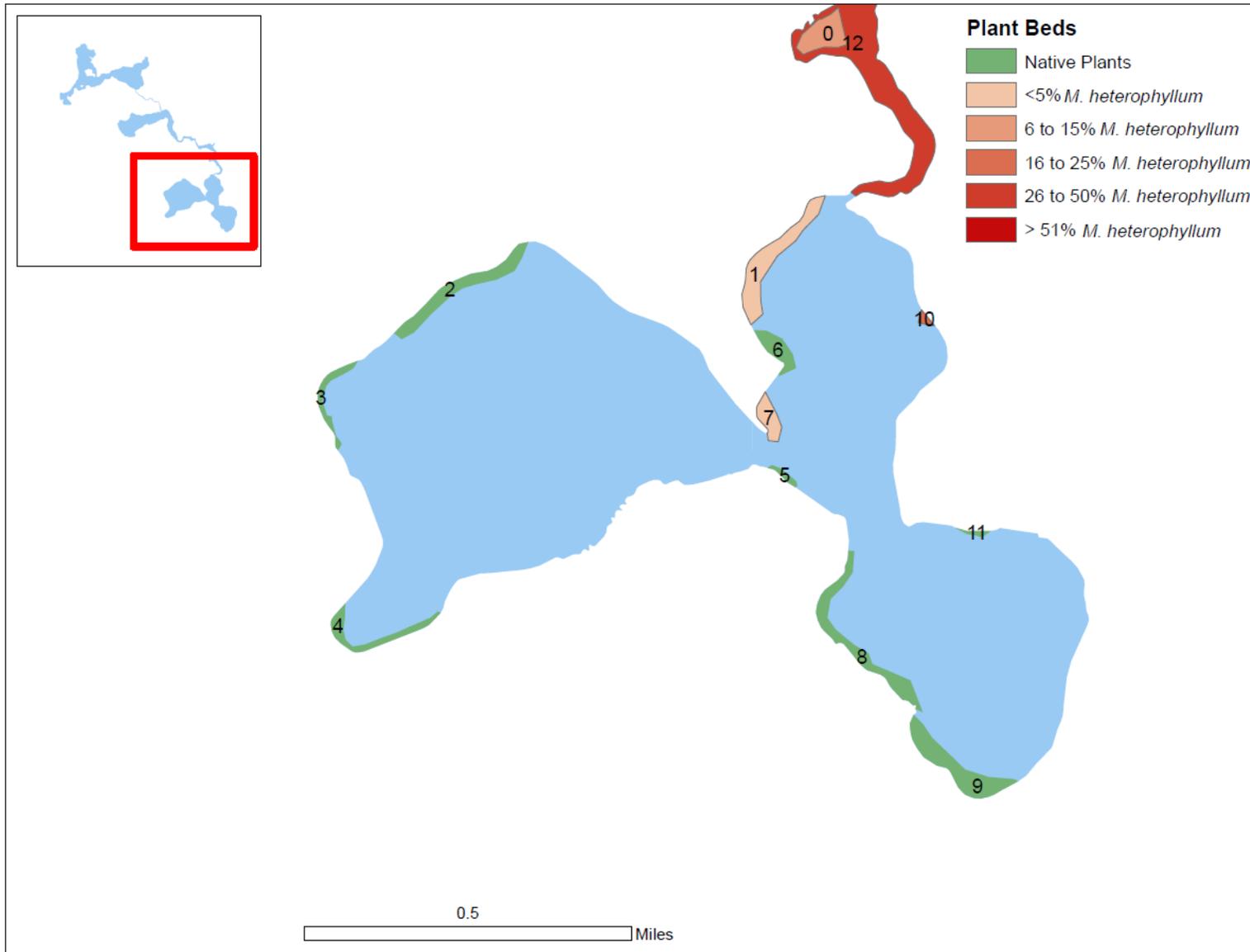


Figure 21. *M. heterophyllum* bed map for the Fish Creek Complex. Bed IDs correspond with Table 6, supplemental data.

## Fourth Lake

Fourth Lake is a 47.2 acre lake found in the Town of Lake Luzerne, Warren County, nested in the Upper Hudson watershed.

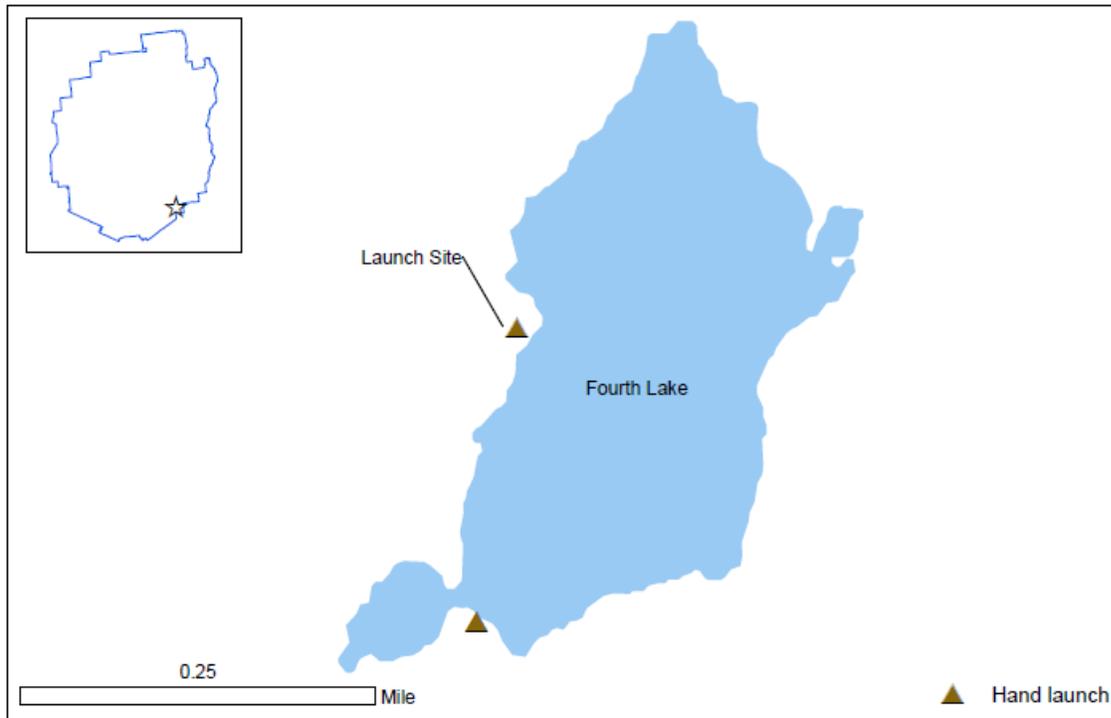


Figure 22. Location map for Fourth Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 15 plant beds were mapped in the Fourth Lake covering 33.6 acres, representing 32.8 % of surface water. The most abundant aquatic plant taxa found were *Myriophyllum farwellii*, *Potamogeton robbinsii*, and *Eleocharis parvula*. The least abundant aquatic plant taxa found were *Lemna minor*, *Potamogeton zosteriformis*, and *Utricularia intermedia* (Figure 23). A total of 34 rakes were tossed, of which 15 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Myriophyllum farwellii*, *Potamogeton robbinsii*, and *Eleocharis parvula*. The least abundant aquatic plant taxa returned by the rake were *Nymphoides cordata*, *Utricularia purpurea*, and *Elodea nuttallii*.

No AIS were found in Fourth Lake.

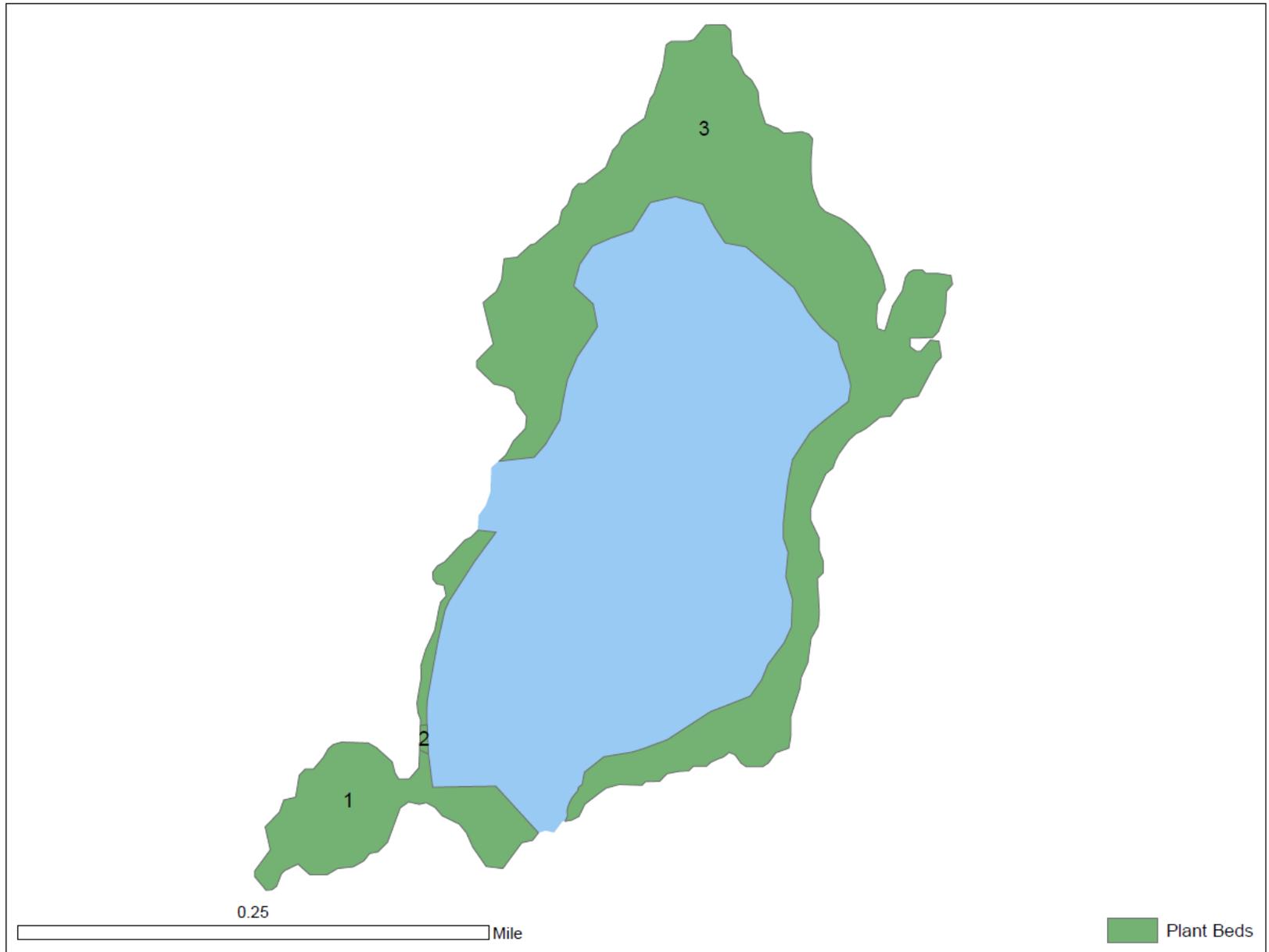


Figure 23. Plant bed map for Fourth Lake. Bed IDs correspond with table 7, supplemental data.

## Friend's Lake

Friend's Lake is a 440 acre lake found in the Town of Chester, Warren County, nestled in the Upper Hudson watershed.

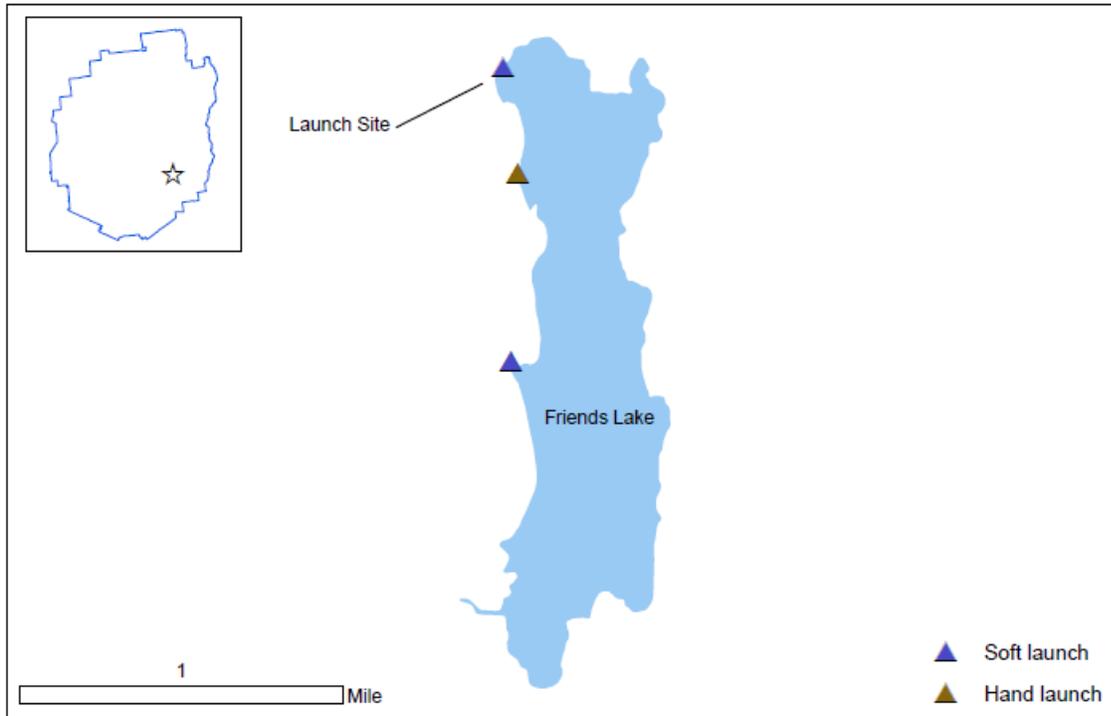


Figure 24 Location map for Friend's and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 12 plant beds were mapped in Friend's Lake covering 38.5 acres of surface water, roughly 8.8% of the lake area. The most abundant aquatic plant taxa found were *Nymphoides cordata*, *N. Brasenia schreberi*, *Nuphar variegata*. The least abundant aquatic plant taxa found were *Lobelia dortmanna*, *Myriophyllum tenellum*, and *Potamogeton illinoensis* (Figure 25). A total of 29 rakes were tossed, of which 19 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Najas sp.*, *Nitella sp.*, and *Chara sp.* The least abundant aquatic plant taxa returned by the rake were *Myriophyllum alterniflorum*, *Eriocaulon sp.*, and *Elodea nuttallii*.

No AIS were found in Friend's Lake.



Figure 25. Aquatic plant bed and rake toss map for Friend's Lake. Bed IDs correspond with table 8, supplemental data.

## Garnett Lake

Garnett Lake is a 329.9 acre lake found in the Town of Thurman, Warren County, nestled in the Upper Hudson watershed.

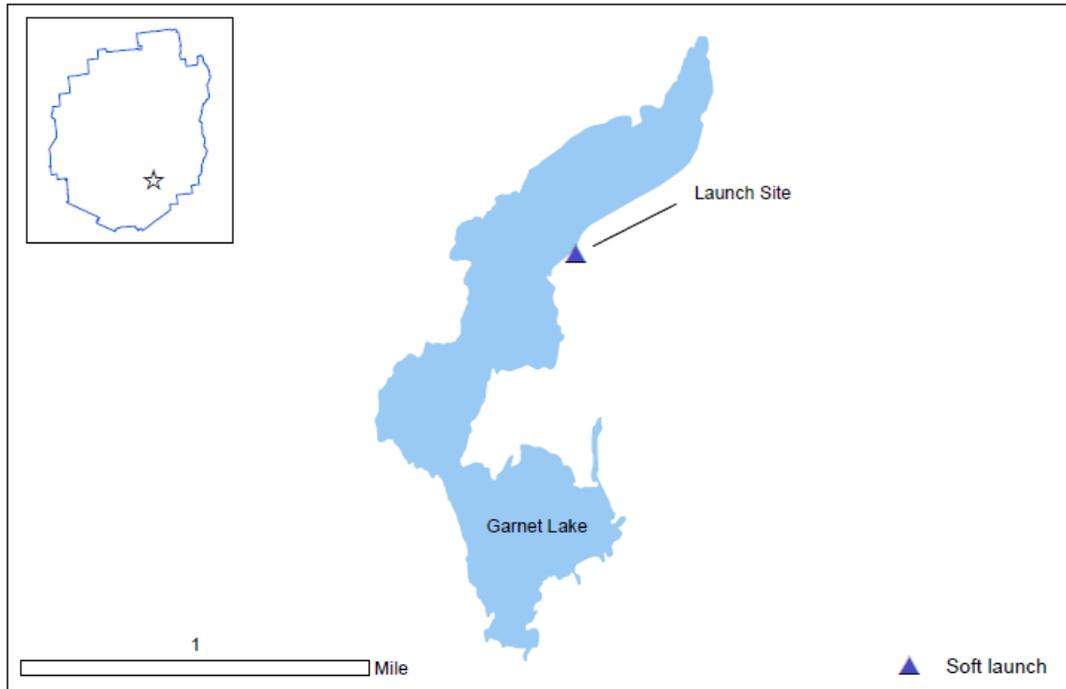


Figure 26. Location map for Friend's and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 12 plant beds were mapped in Garnett Lake covering 231.5 acres of surface water, roughly 70% of the lake area. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Nymphaea odorata*, and *Brasenia schreberi*. The least abundant aquatic plant taxa found were *Utricularia purpurea*, *Elodea nuttallii*, and *Nitella sp.* (Figure 27). A total of 37 rakes were tossed, of which 25 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Najas sp.*, *Potamogeton robbinsii*, and *Nitella sp.* The least abundant aquatic plant taxa returned by the rake were *Nuphar variegata*, *Potamogeton ampifolius*, and *Utricularia purpurea*.

No AIS were found in Garnett Lake.

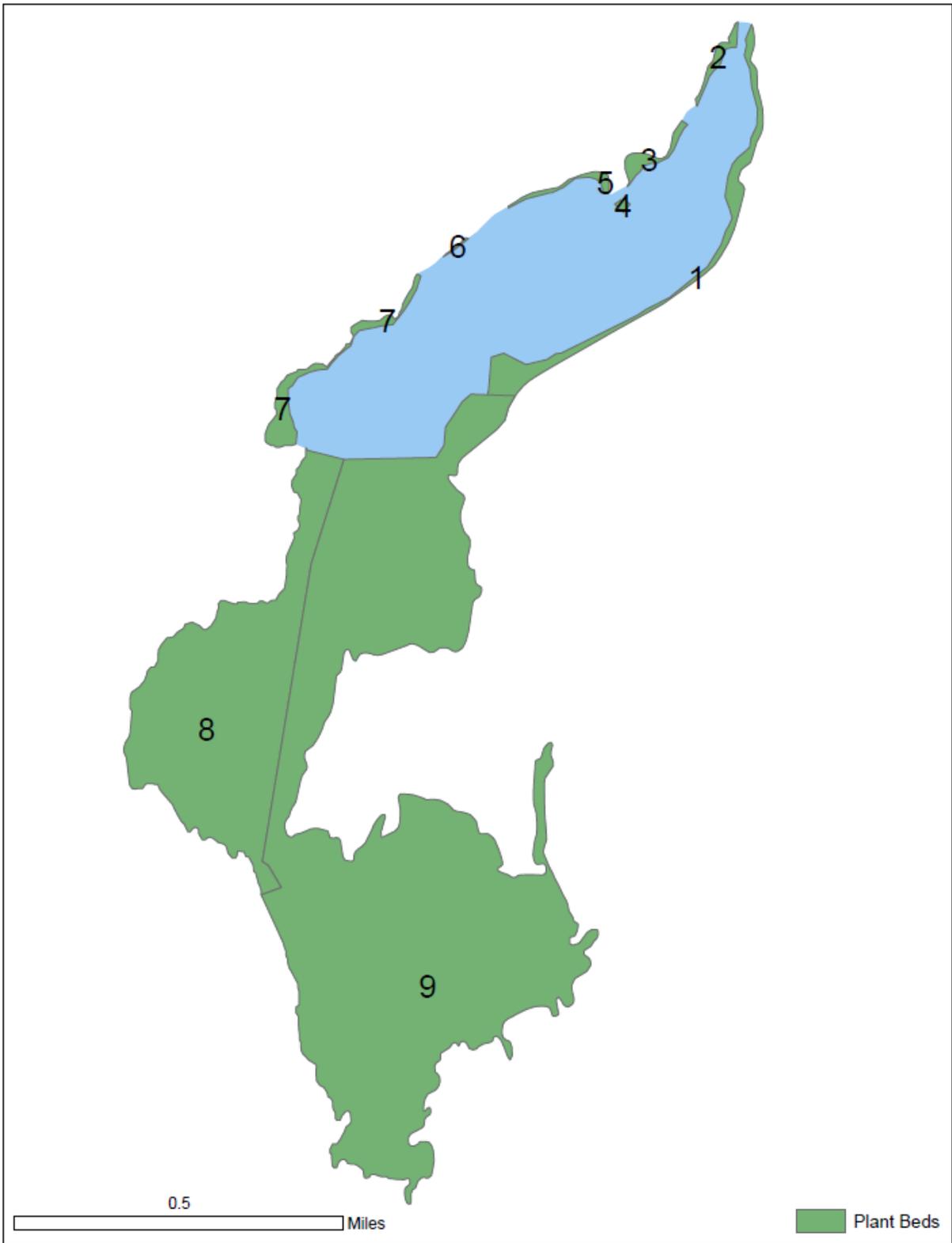


Figure 27. Plant bed map for Garnett Lake. Bed IDs correspond with Table 9, supplemental data.

## Indian Lake

Indian Lake is a 4332.7 acre lake found in the Town of Indian Lake, Hamilton County, nestled in the Upper Hudson watershed.

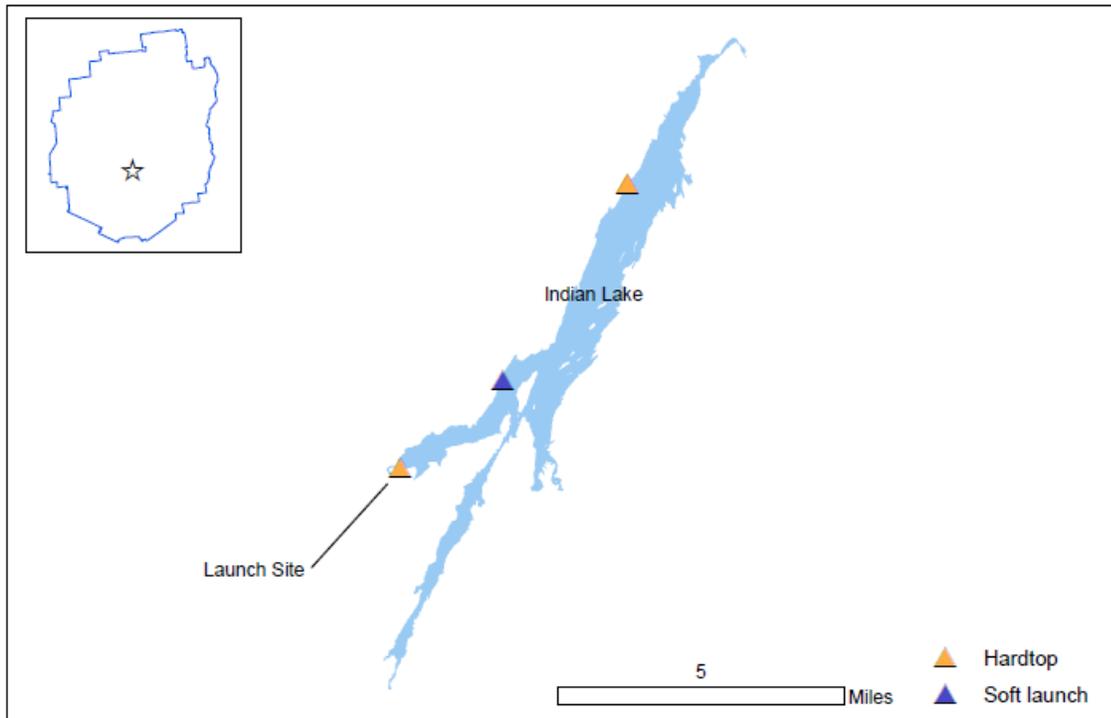


Figure 28. Location map for Indian Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 56 plant beds were mapped in Indian Lake covering 44.4 acres of surface water, representing 1% of the lake area. The most abundant aquatic plant taxa found were *Potamogeton epihydrus*, *Sparganium sp.*, and *Sagittaria graminea*. The least abundant aquatic plant taxa found were *Persicaria amphibia*, *Lobelia dortmanna*, and *Potamogeton pussilus*. (Figure 29-33). A total of 193 rakes were tossed, of which 13 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Eleocharis parvula*, *Eriocaulon sp.*, and *Nitella sp.* The least abundant aquatic plant taxa returned by the rake were *Potamogeton epihydrus*, *Chara sp.*, and *Sagittaria graminea*

No AIS were found in Indian Lake.

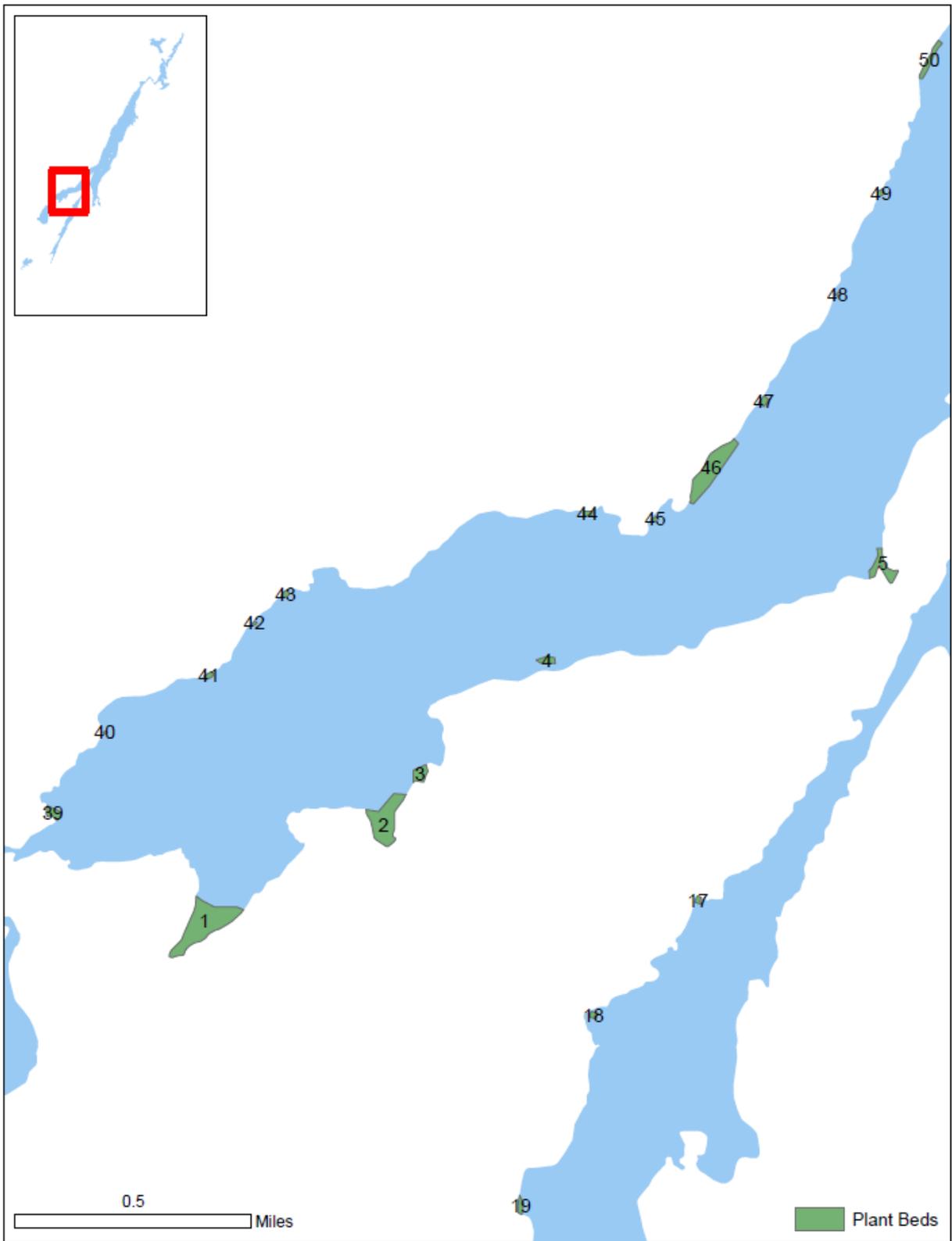


Figure 29. Aquatic plant bed map for Indian Lake. Bed IDs correspond with Table 10.

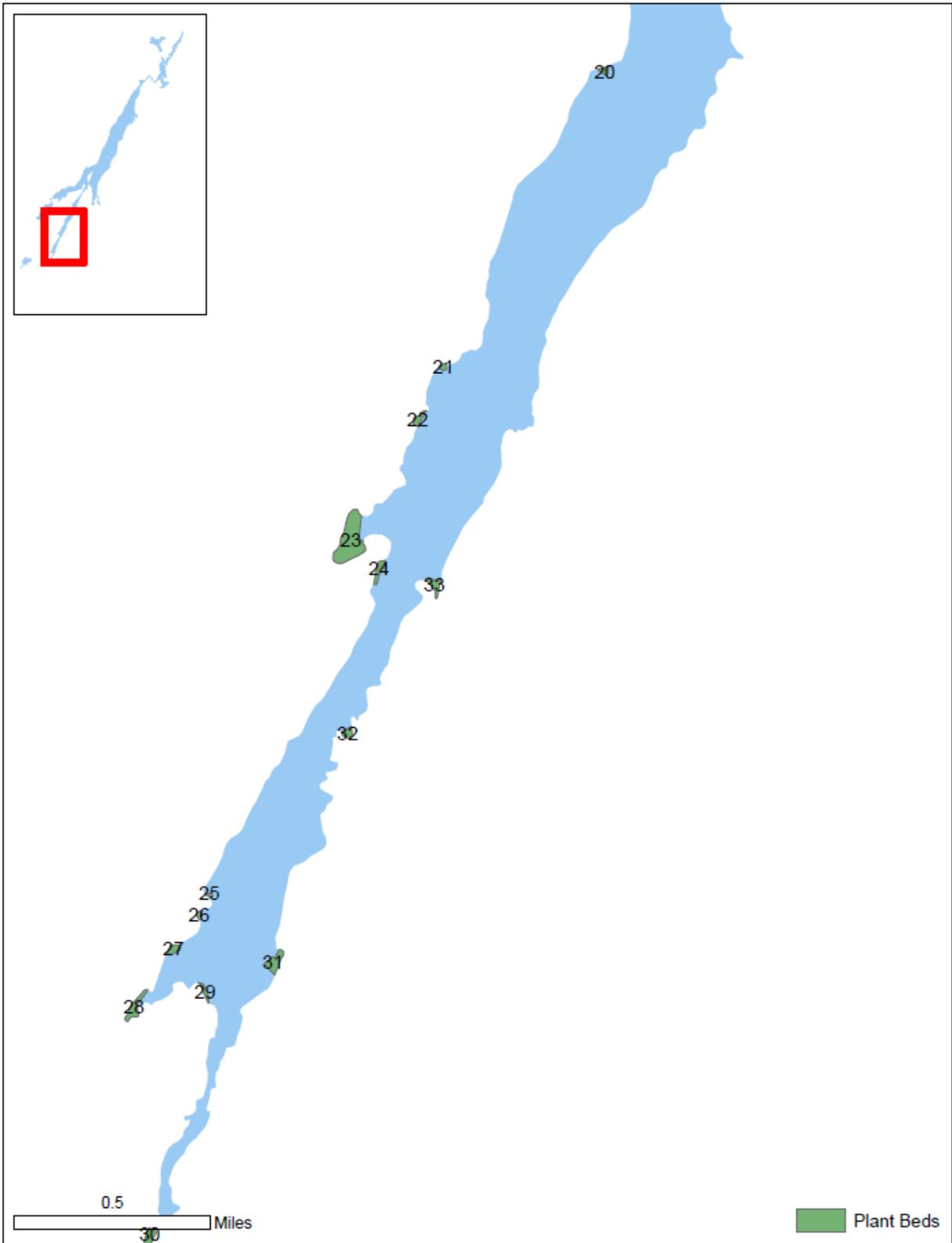


Figure 30. Aquatic plant bed map for Indian Lake. Bed IDs correspond with Table 10.

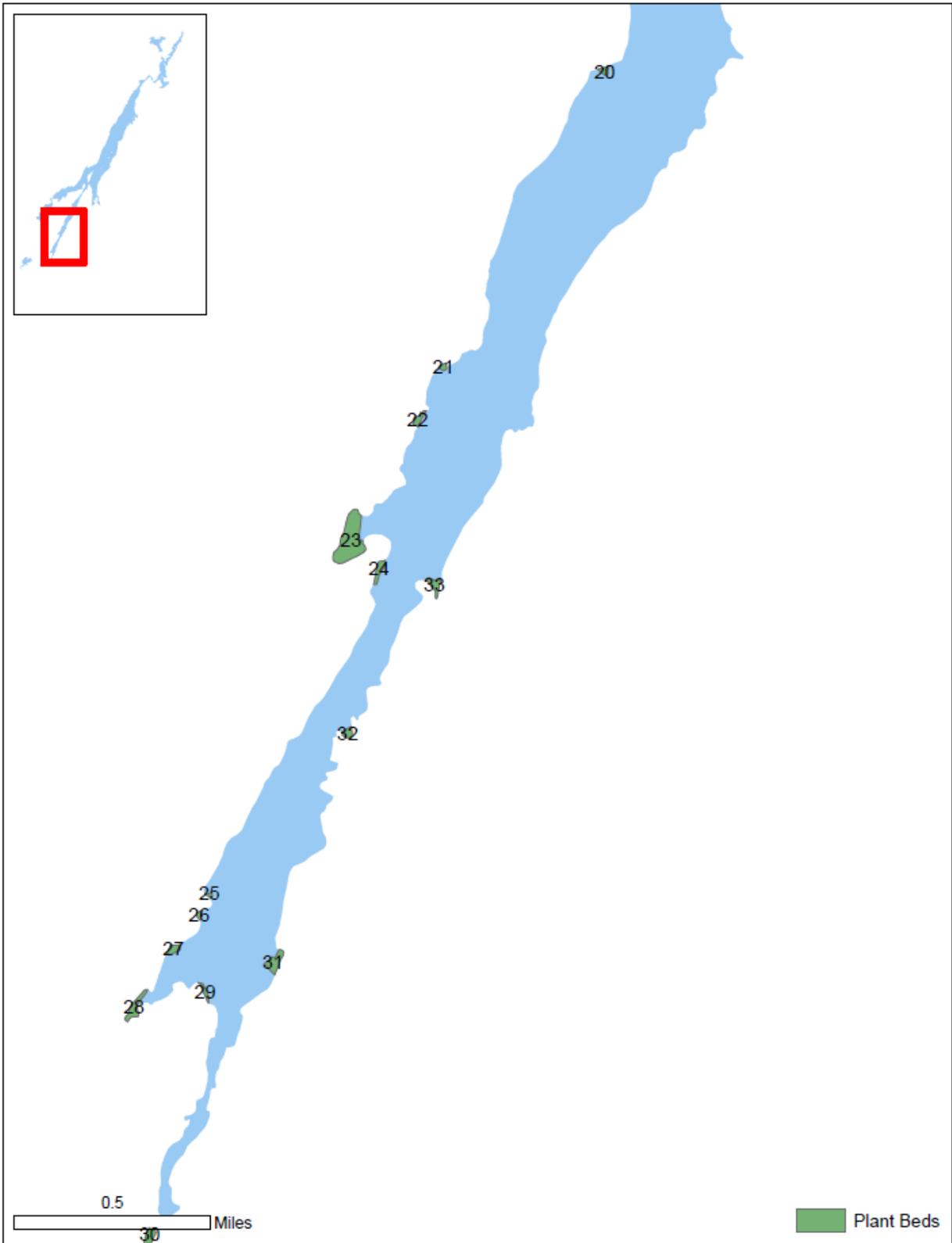


Figure 31. Aquatic plant bed map for Indian Lake. Bed IDs correspond with Table 10.

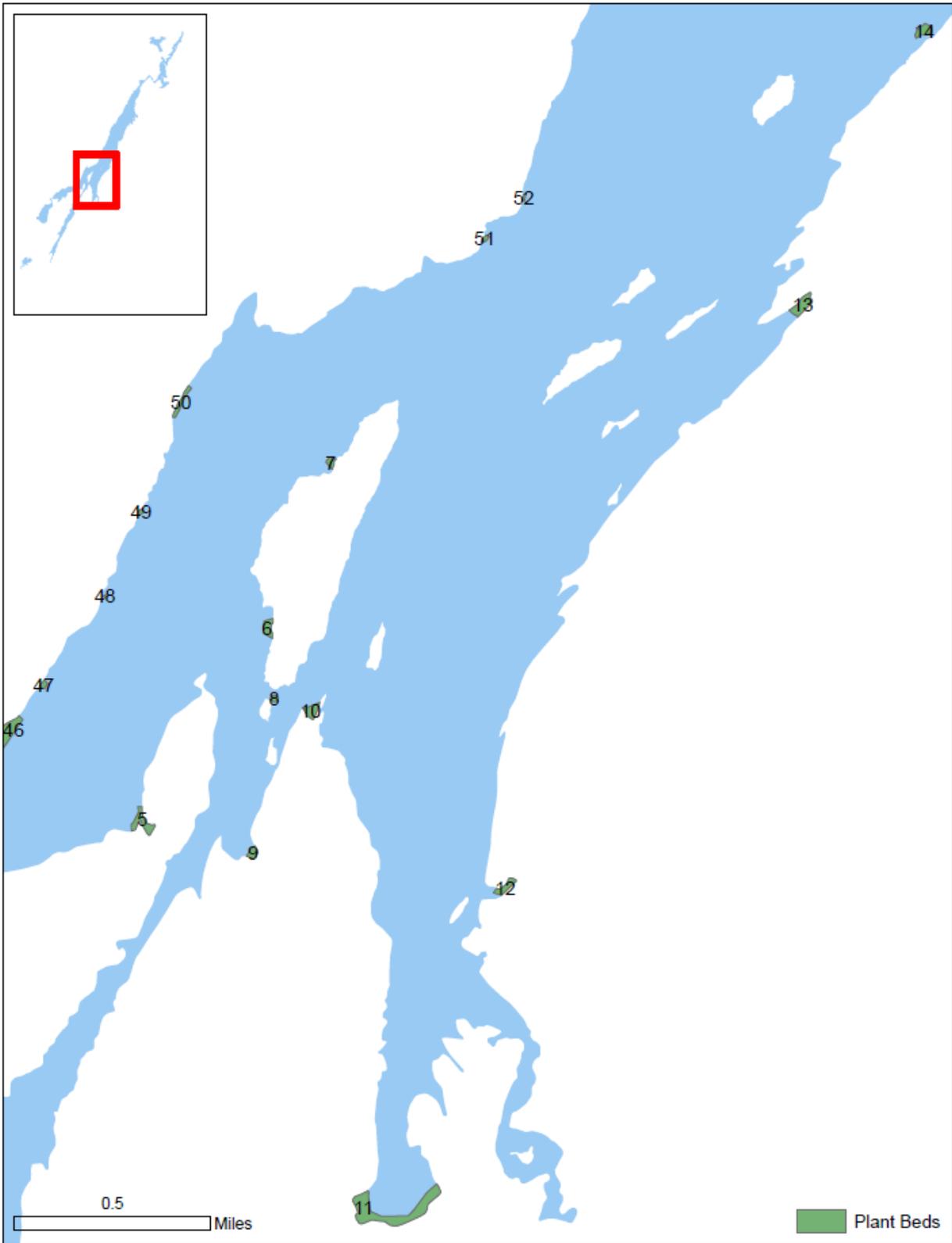


Figure 32. Aquatic plant bed map for Indian Lake. Bed IDs correspond with Table 10.

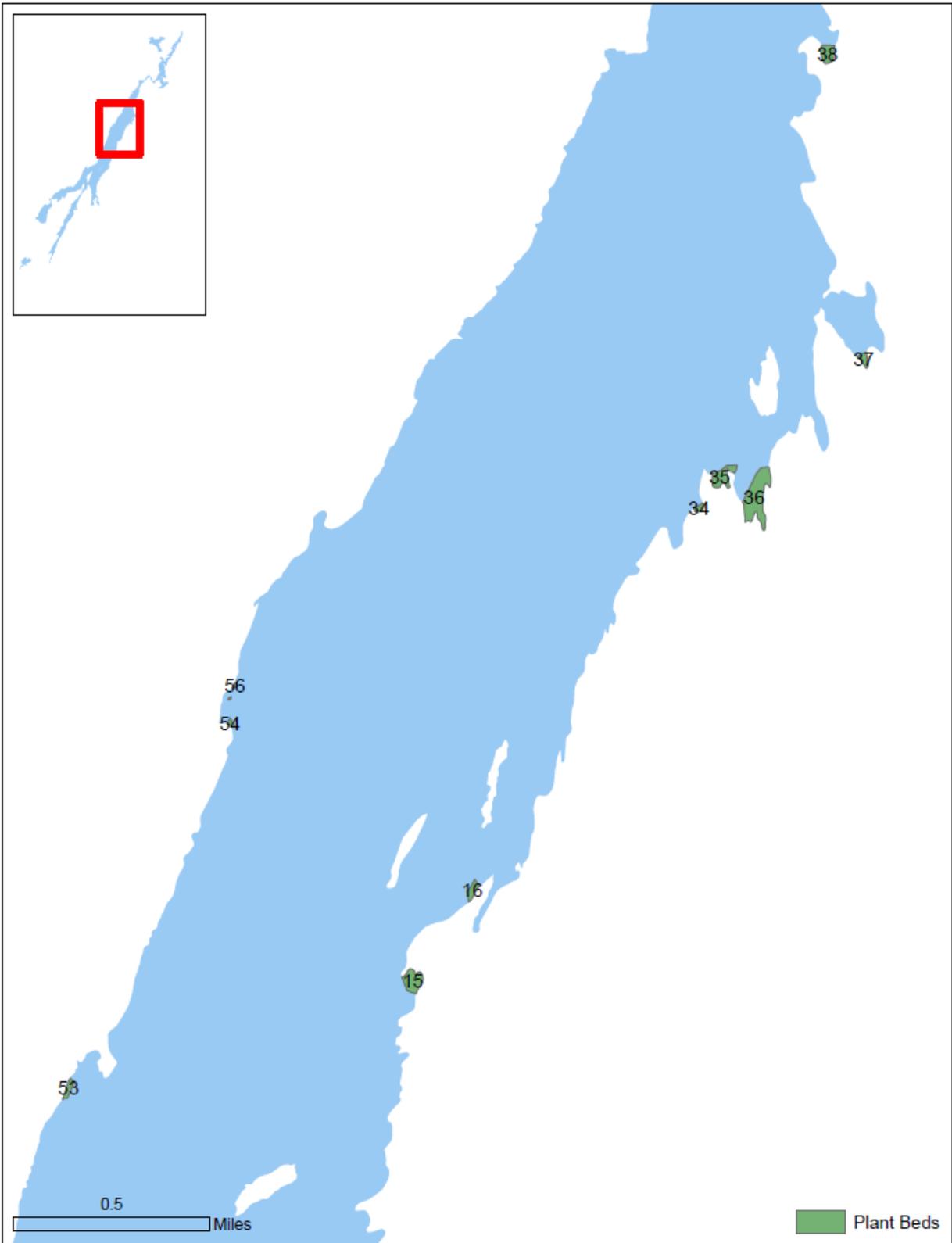


Figure 33. Aquatic plant bed map for Indian Lake. Bed IDs correspond with Table 10.

## Lake Abanakee

Lake Abanakee is a 530 acre lake found in the Town of Indian Lake, Hamilton County, nested in the Upper Hudson watershed.

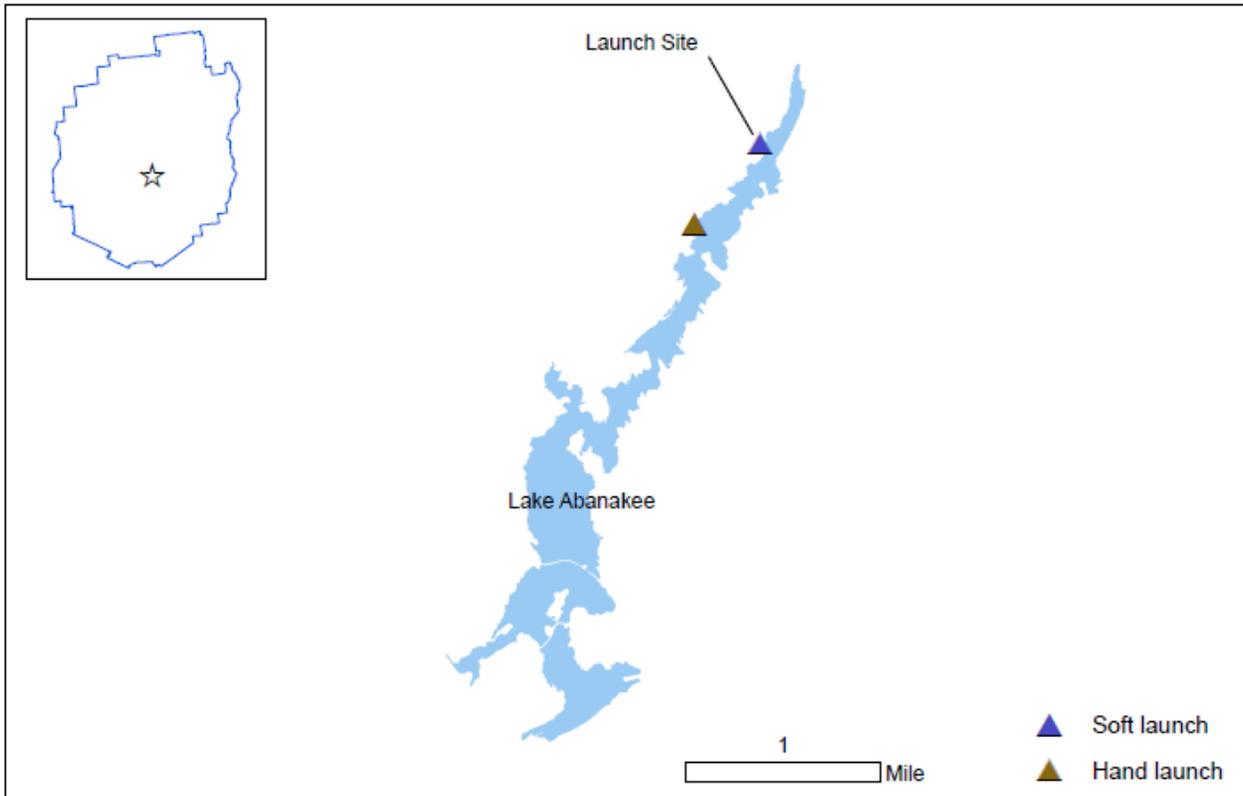


Figure 34. Location map for Lake Abanakee and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 8 plant beds were mapped in Lake Abanakee covering 434 acres of surface water, roughly 81% of the lake area. The most abundant aquatic plant taxa found were *Nymphaea odorata*, *Eleocharis sp.* (largely *E. parvula*), and *Nuphar variegata*. The least abundant aquatic plant taxa found were *Ceratophyllum demersum*, *Potamogeton spirillus*, and *Myriophyllum verticillatum* (Figure 35). A total of 64 rakes were tossed, of which 35 returned plant specimens. The most abundant aquatic plant taxa returned by rakes were *Sparganium sp.*, *Utricularia vulgaris*, and *Nymphoides cordata*. The least abundant aquatic plant taxa returned by rake tosses were *Ceratophyllum demersum*, *Vallisneria americana*, and *Nitella sp.*

No AIS were found in Lake Abanakee.

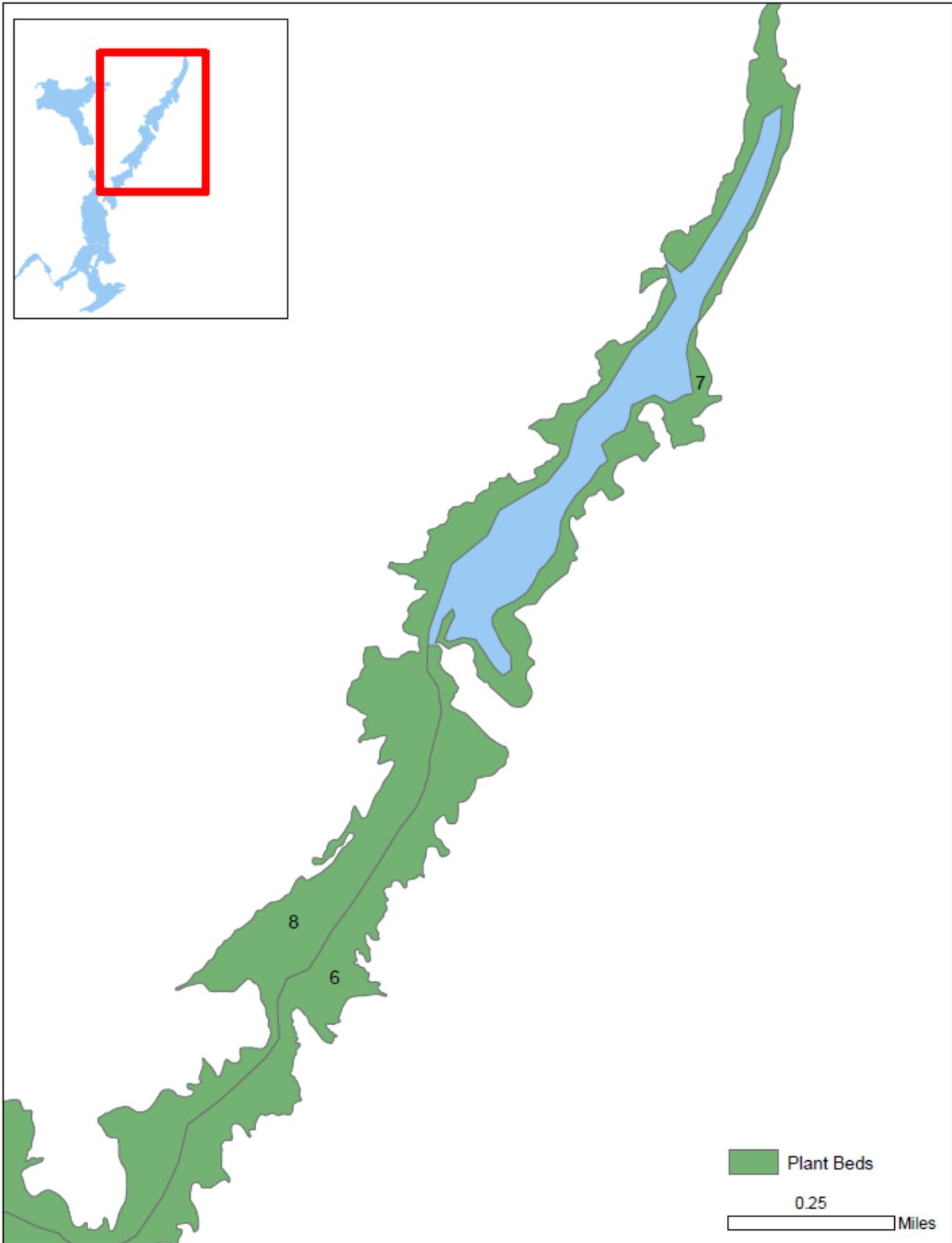


Figure 35. Aquatic plant bed map for Lake Abanakee North. Bed IDs correspond with Table 11.

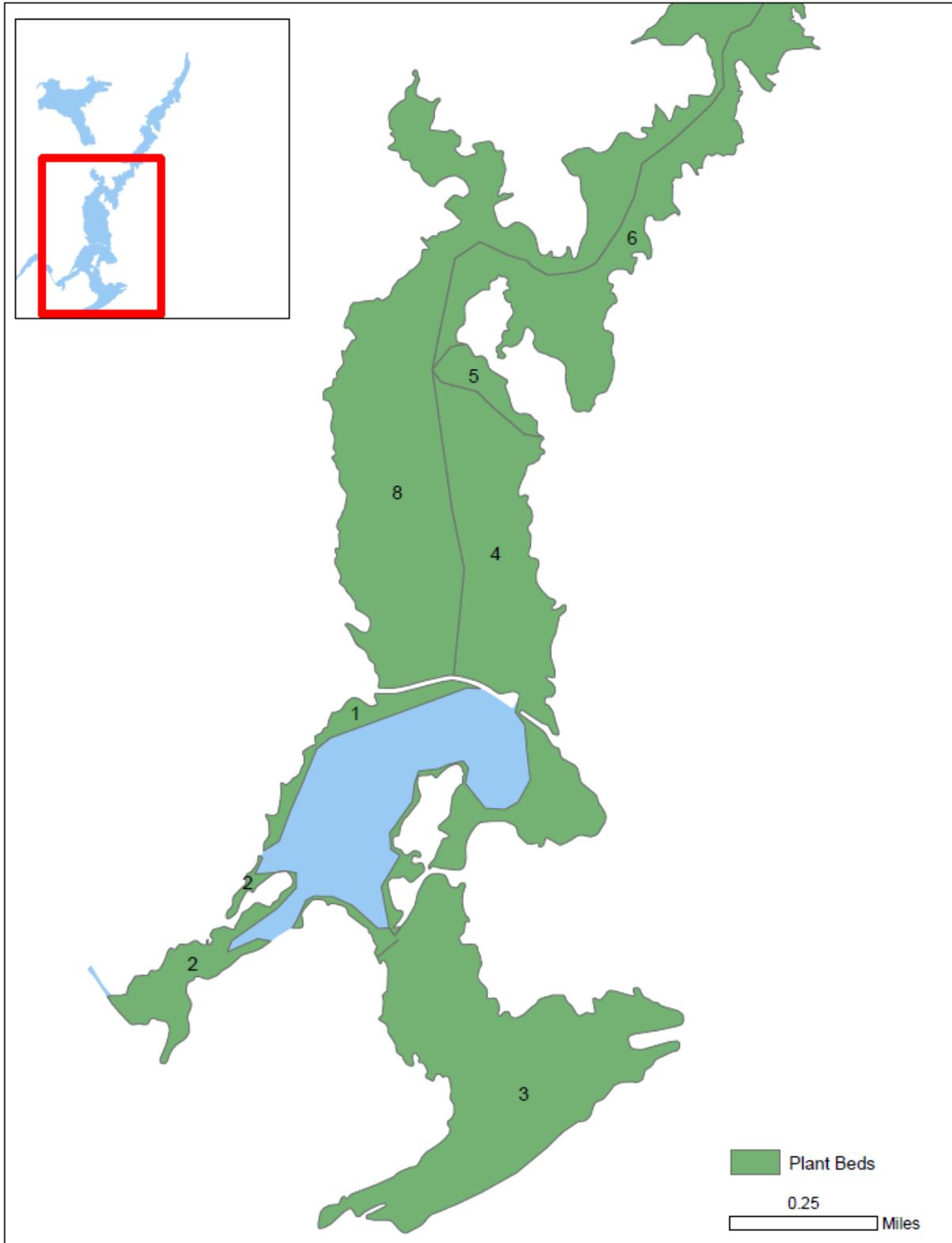


Figure 36. Aquatic Plant bed map for Lake Abanakee South. Bed IDs correspond with Table 11.

## Lake Algonquin

Lake Algonquin is a 275 acre lake found in the Town of Wells, Hamilton County, nestled in the Sacandaga watershed.

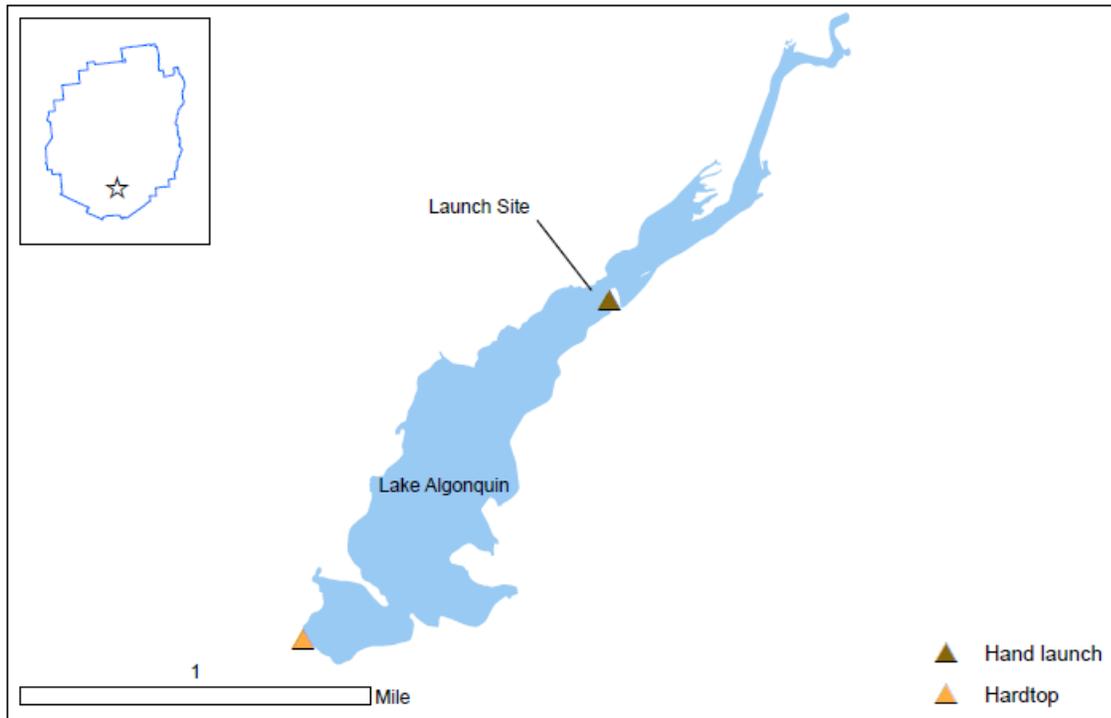


Figure 37. Location map for Lake Algonquin and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 19 plant beds were mapped in Lake Algonquin covering 48.4 acres of surface water, roughly 81% of the lake area. The most abundant aquatic plant taxa found were *Nymphaea odorata*, *Nymphoides cordata*, and *Nuphar variegata*. The least abundant aquatic plant taxa found were *Najas* sp., *Sparganium* sp., and *Eriocaulon* sp. (Figure 38). A total of 43 rakes were tossed, of which 15 returned plant specimens. The most abundant aquatic plant taxa returned by the rake was *Nitella* sp., *Eleocharis parvula*, and *Utricularia vulgaris*. The least abundant aquatic plant taxa returned by the rake tosses were *Potamogeton gramineus*, *N. variegata*, and *Myriophyllum spicatum*.

*M. spicatum*, Eurasian water-milfoil, was detected in 5 plant beds in Lake Algonquin covering 14.7 acres, 30% of all plant beds and 5% of surface water. *M. spicatum* is a common AIS in the Adirondacks. No invasive plankton was detected.

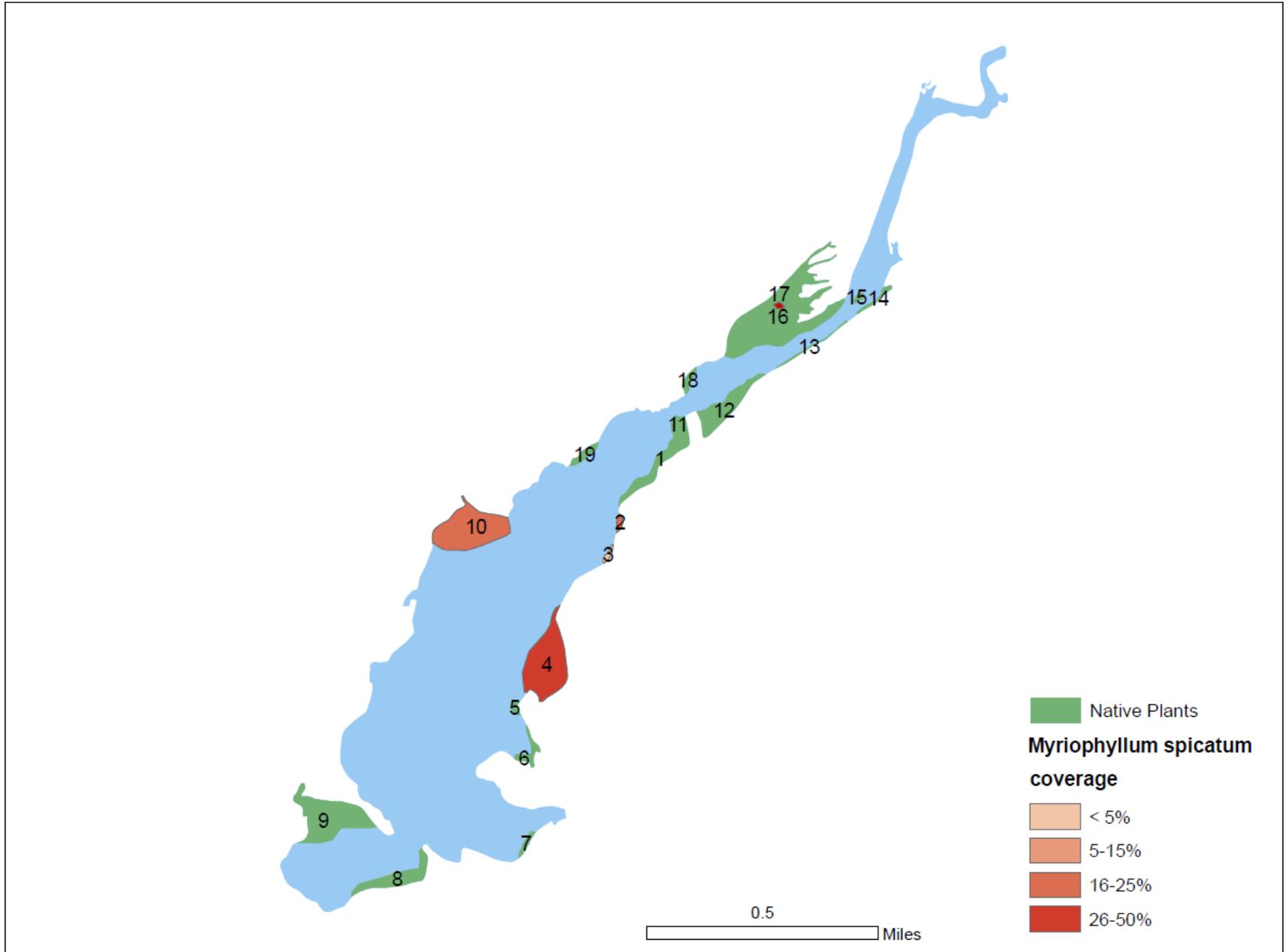


Figure 38. *M. spicatum* map. Bed IDs correspond with Table 12.

## Lake Forest

Lake Forest is an 8.5 acre lake found in the Town of Lake Luzerne, Warren County, nested in the Upper Hudson watershed.

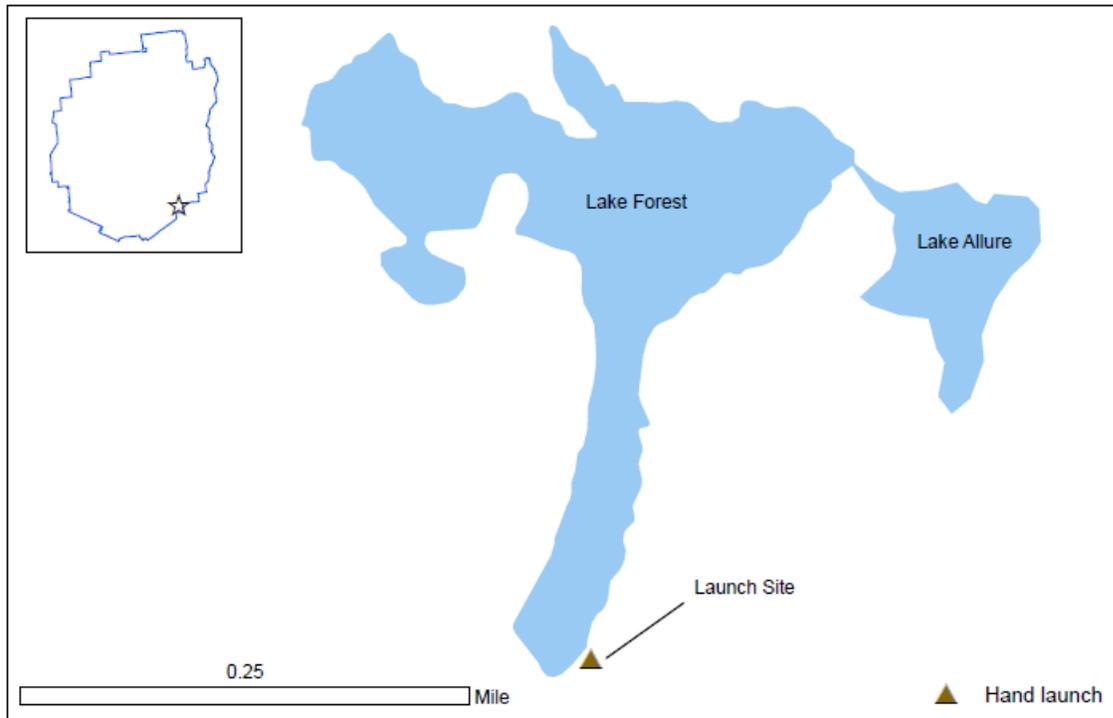


Figure 39. Location map for Lake Forest and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 2 plant beds were mapped in the Lake Forest covering 100% of the lake area. The most abundant aquatic plant taxa found were *Eleocharis parvula*, *Potamogeton ampifolius*, and *Potamogeton epihydrus*. The least abundant aquatic plant taxa found were *Potamogeton foliosus*, *Elodea nutalii*, and *Potamogeton zosteriformis* (Figure 40). A total of 21 rakes were tossed, of which 19 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Utricularia vulgaris*, *Nitella sp.* and *Sparganium sp.* The least abundant aquatic plant taxa returned by the rake were *Sagittaria graminea*, *Potamogeton robbinsii*, and *Vallisneria americana*.

No AIS were found in Lake Forest.

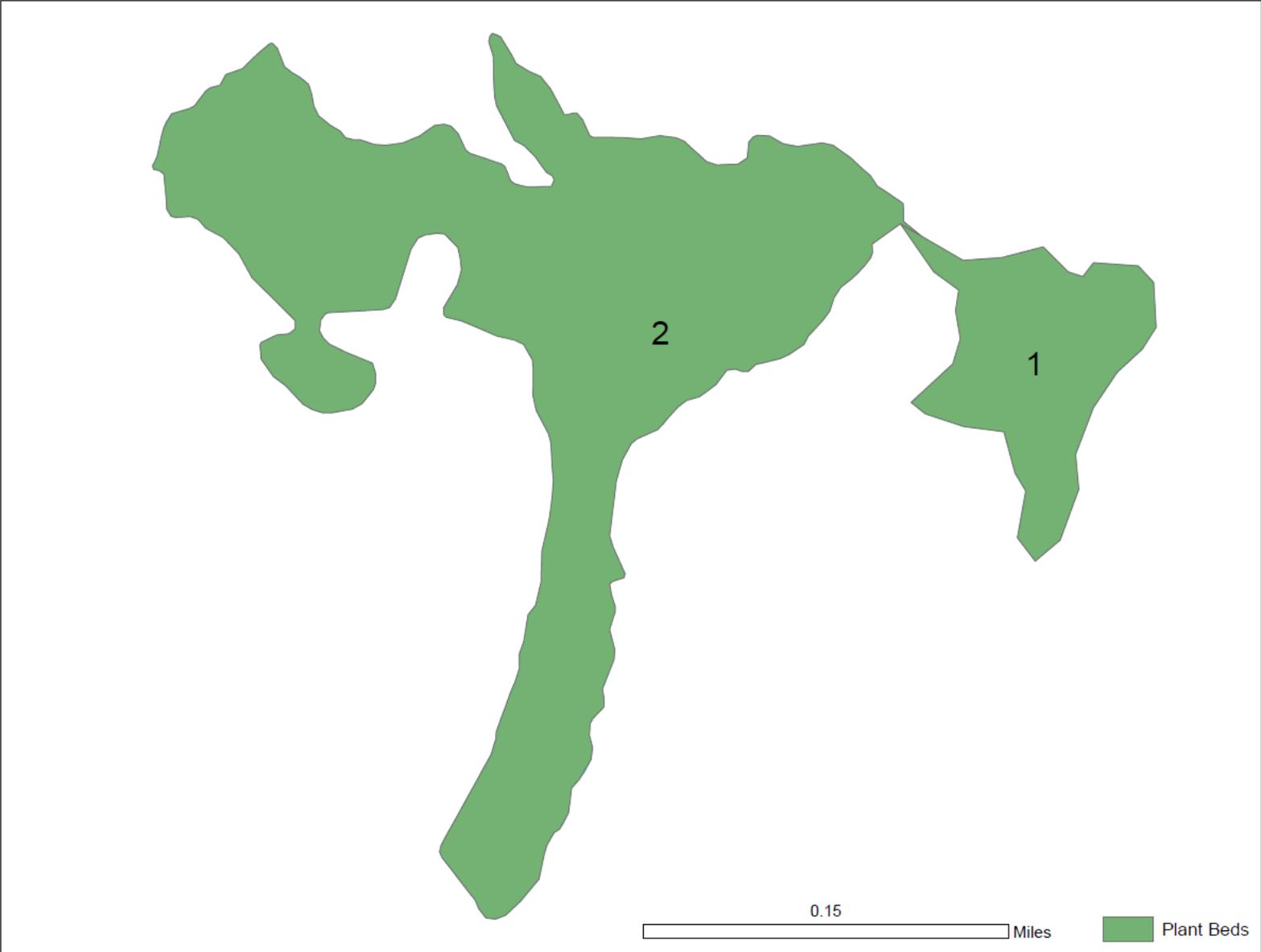


Figure 40. Aquatic plant bed map for the Lake Forest. Bed IDs correspond with Table 13, supplemental data.

## Lake Harris

Lake Harris is a 314 acre lake found in the Town of Newcomb, Essex County, nested in the Upper Hudson watershed.

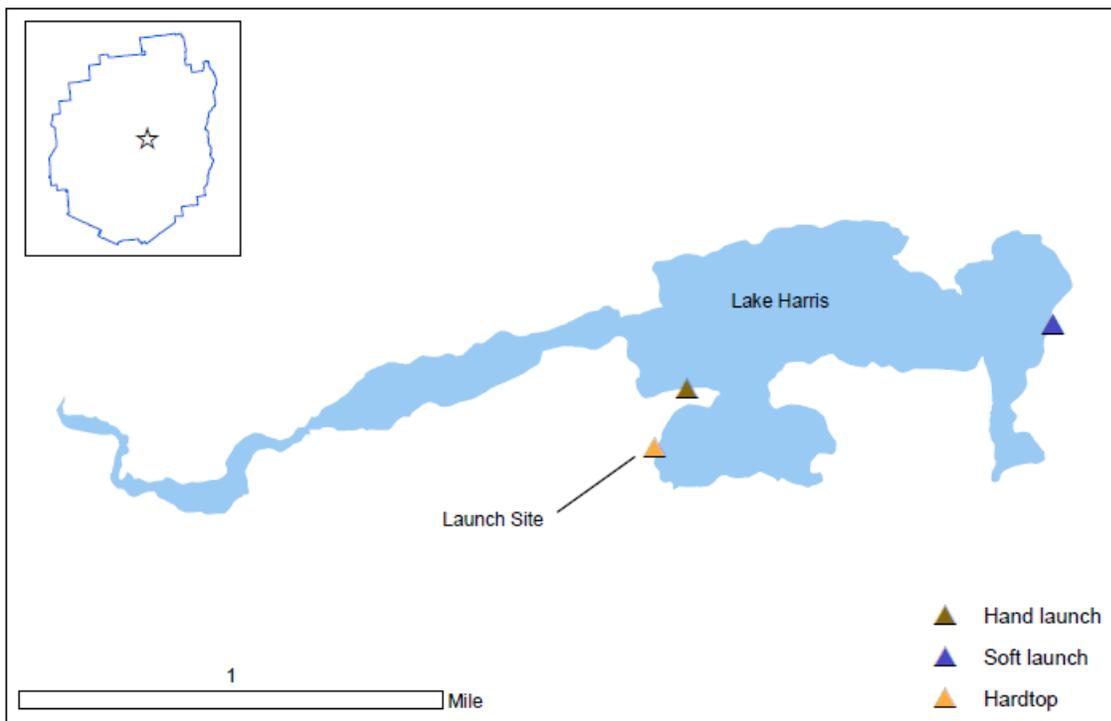


Figure 41. Location map for Lake Harris and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 12 plant beds were mapped in the Lake Harris covering 78 acres, representing 24.8 % of surface water. The most abundant aquatic plant taxa found were *Nymphaea odorata*, *Brasenia schreberi*, and *Potamogeton gramineus*. The least abundant aquatic plant taxa found were *Potamogeton zosteriformis*, *Myriophyllum tenellum*, and *Potamogeton pussilus* (Figure 42). A total of 22 rakes were tossed, of which 9 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Eleocharis parvula*, *Elodea canadensis*, and *Nitella sp.* The least abundant aquatic plant taxa found were *Sparganium sp.*, *Vallisneria americana*, and *Myriophyllum sibiricum*. The least abundant aquatic plant taxa returned by the rake tosses were *Sparganium sp.*, *Vallisneria americana*, and *Myriophyllum sibiricum*.

No AIS were found in Lake Harris.

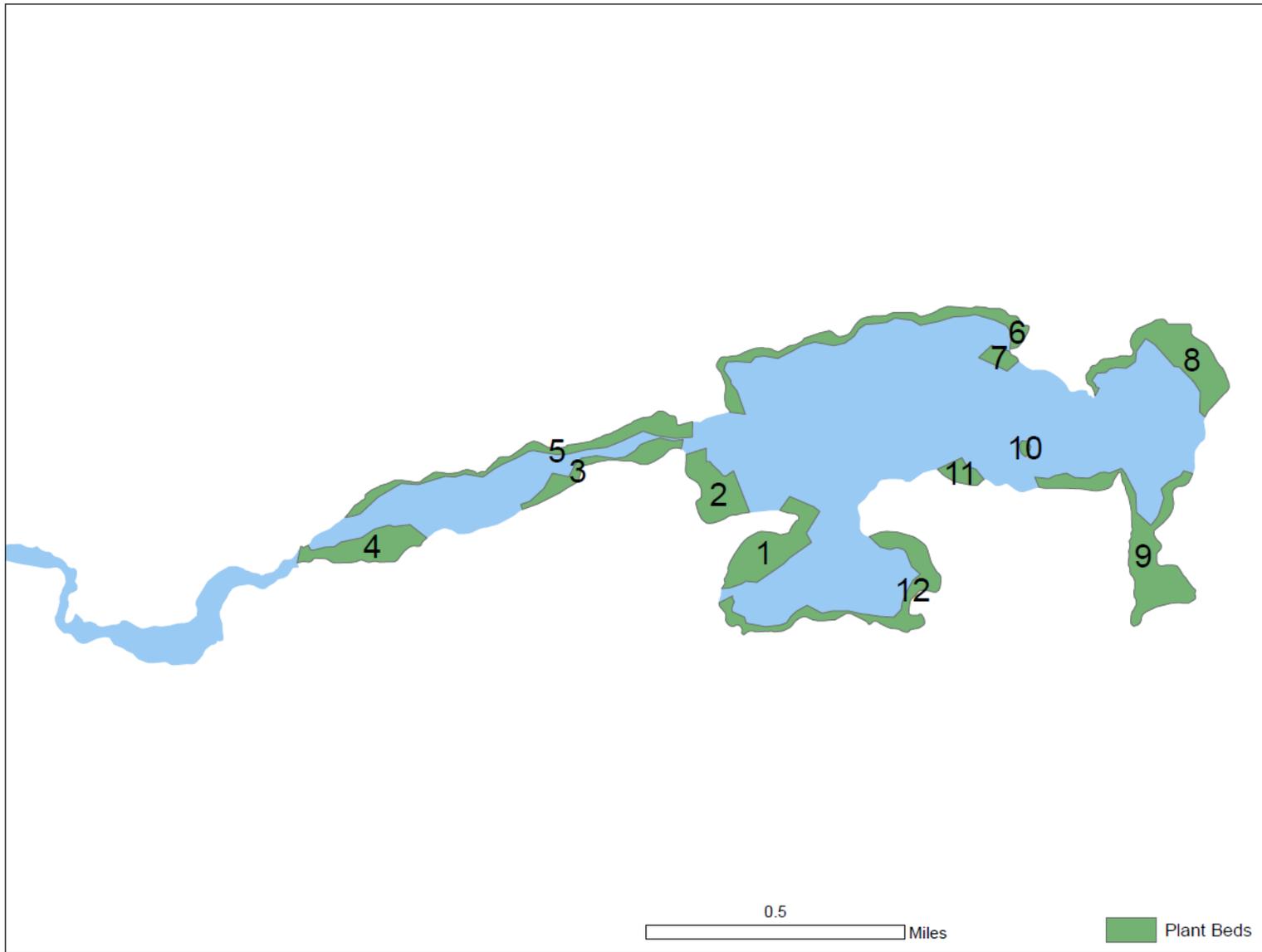


Figure 42. Aquatic plant bed map for the Lake Forest. Bed IDs correspond with Table 14, supplemental data.

## Lake Luzerne

Lake Luzerne is a 102 acre lake found in the Town of Lake Luzerne, Warren County, nestled in the Upper Hudson watershed.

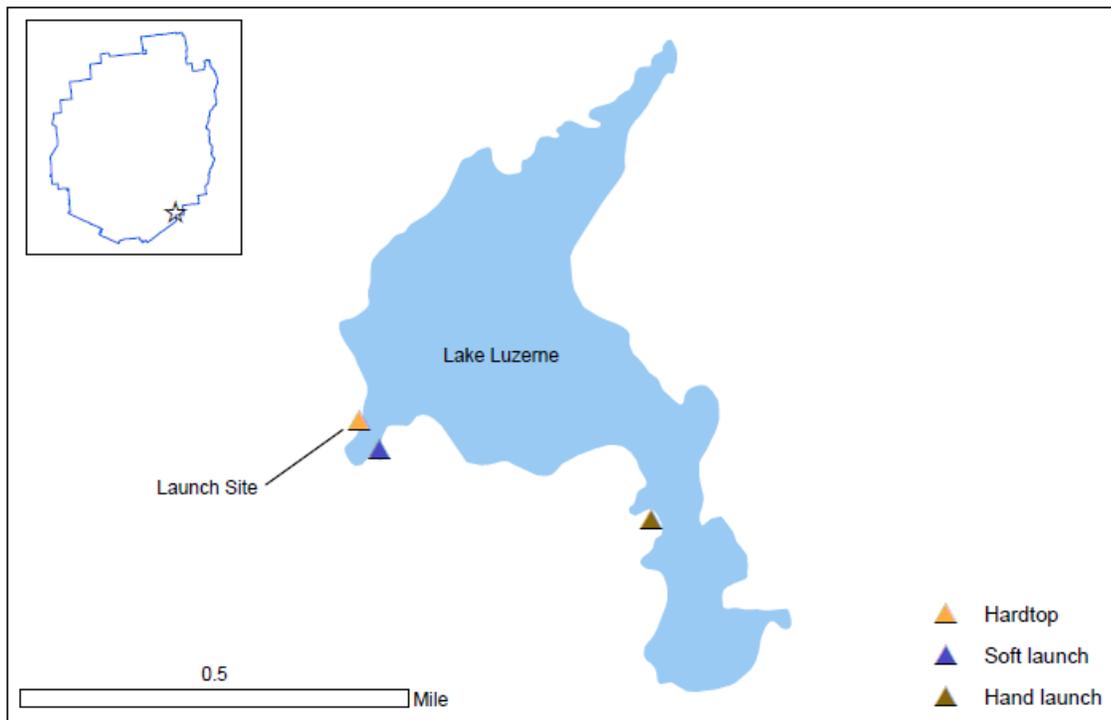


Figure 43. Location map for Lake Luzerne and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 15 plant beds were mapped in the Lake Harris covering 34.9 acres, representing 34.2 % of surface water. The most abundant aquatic plant taxa found were *Myriophyllum spicatum*, *Brasenia schreberi*, and *Nymphaea odorata*. The least abundant aquatic plant taxa found were *Potamogeton zosteriformis*, *Myriophyllum tenellum*, and *Potamogeton pussilus* (Figure 44). A total of 34 rakes were tossed, of which 15 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Potamogeton robbinsii*, *Nitella sp.*, and *Utricularia purpurea*. The least abundant aquatic plant taxa returned by the rake were *Ceratophyllum demersum*, *Nymphoides cordata*, and *Utricularia minor*.

*M. spicatum* was found in all 15 plant beds and *Potamogeton crispus* was found in one bed representing 0.46 acres of surface water.

## Management

Bed 9 was managed for AIS. *Potamogeton crispus* was hand harvested by four divers using snorkel for a total of 30 minutes. After thirty minutes new stems could not be located.

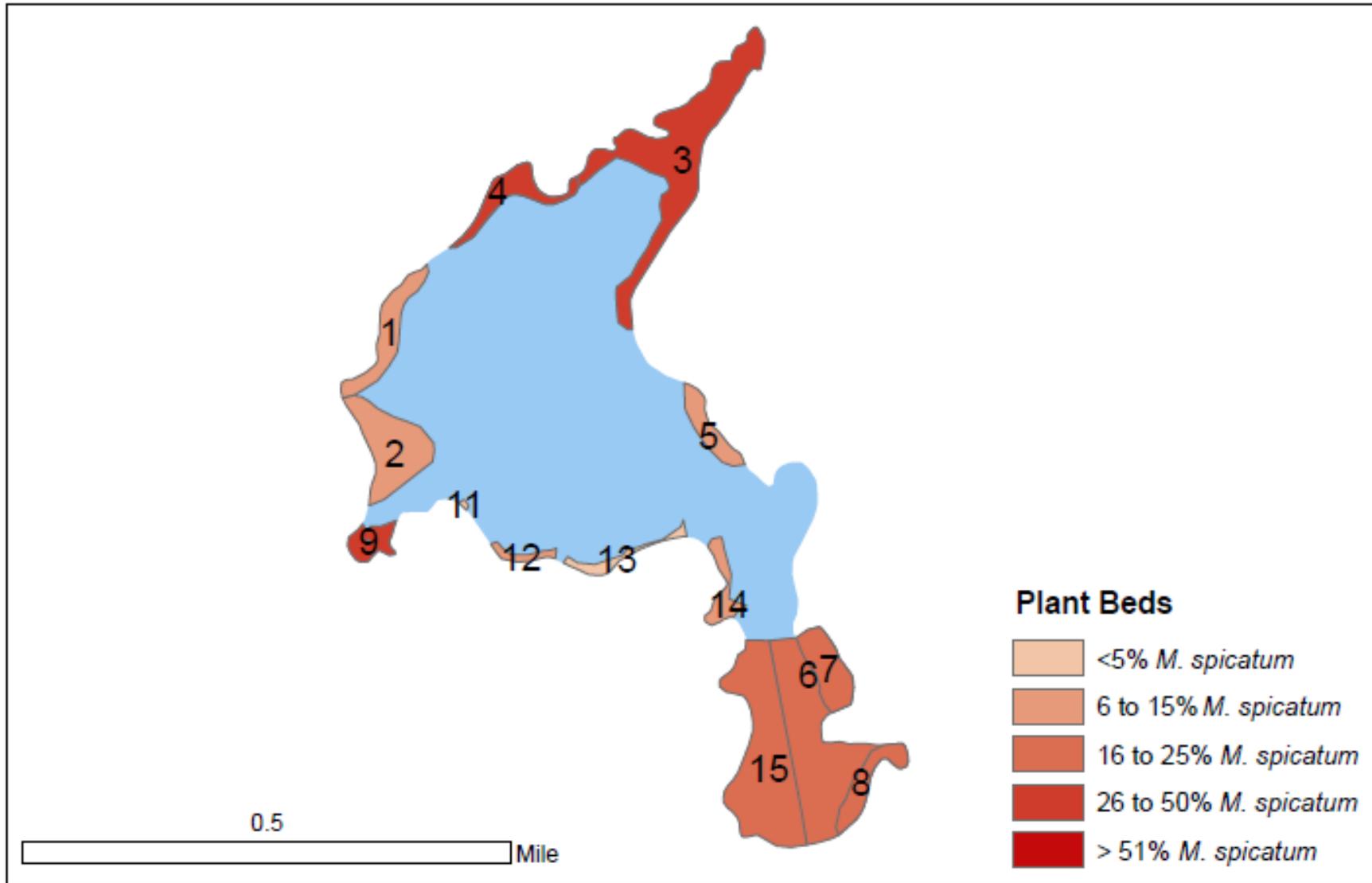


Figure 44. Bed map for Lake Luzerne. Bed IDs correspond with Table 15, supplemental data.

## Lake Pleasant

Lake Pleasant is a 1,453.5 acre lake found in the Town of Lake Pleasant, Hamilton County, nestled in the Sacandaga watershed.

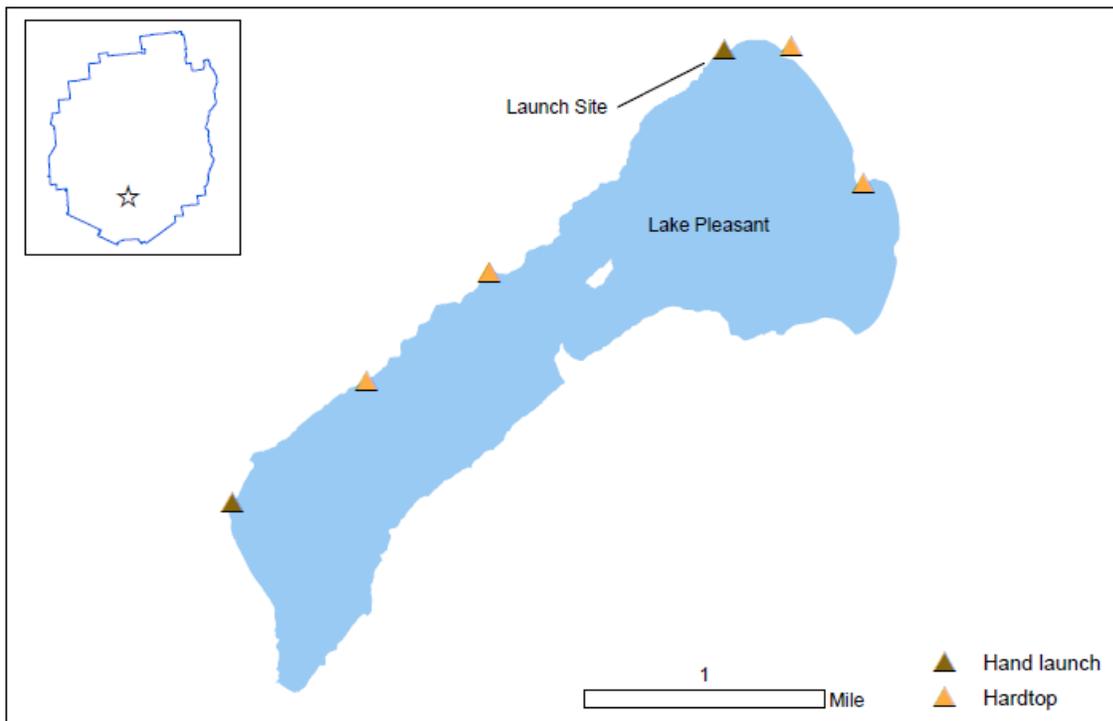


Figure 45. Location map for Lake Harris and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 25 plant beds were mapped in the Lake Pleasant covering 71.5 acres, representing 4.9 % of surface water. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Sparganium sp.*, and *Eleocharis parvula*. The least abundant aquatic plant taxa found were *Utricularia intermedia*, *Elodea canadensis*, and *Nymphoides cordata* (Figure 46). A total of 79 rakes were tossed, of which 26 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Eriocaulon sp.*, *Eleocharis parvula*, and *Najas sp.* The least abundant aquatic plant taxa returned by the rake tosses were *Elodea canadensis*, *Potamogeton ampifolius*, and *Utricularia intermedia*.

One AIS was found during the survey: *Bythotrephes longimanus* (spiny waterflea). A plankton tow returned 9 *Bythotrephes longimanus*.

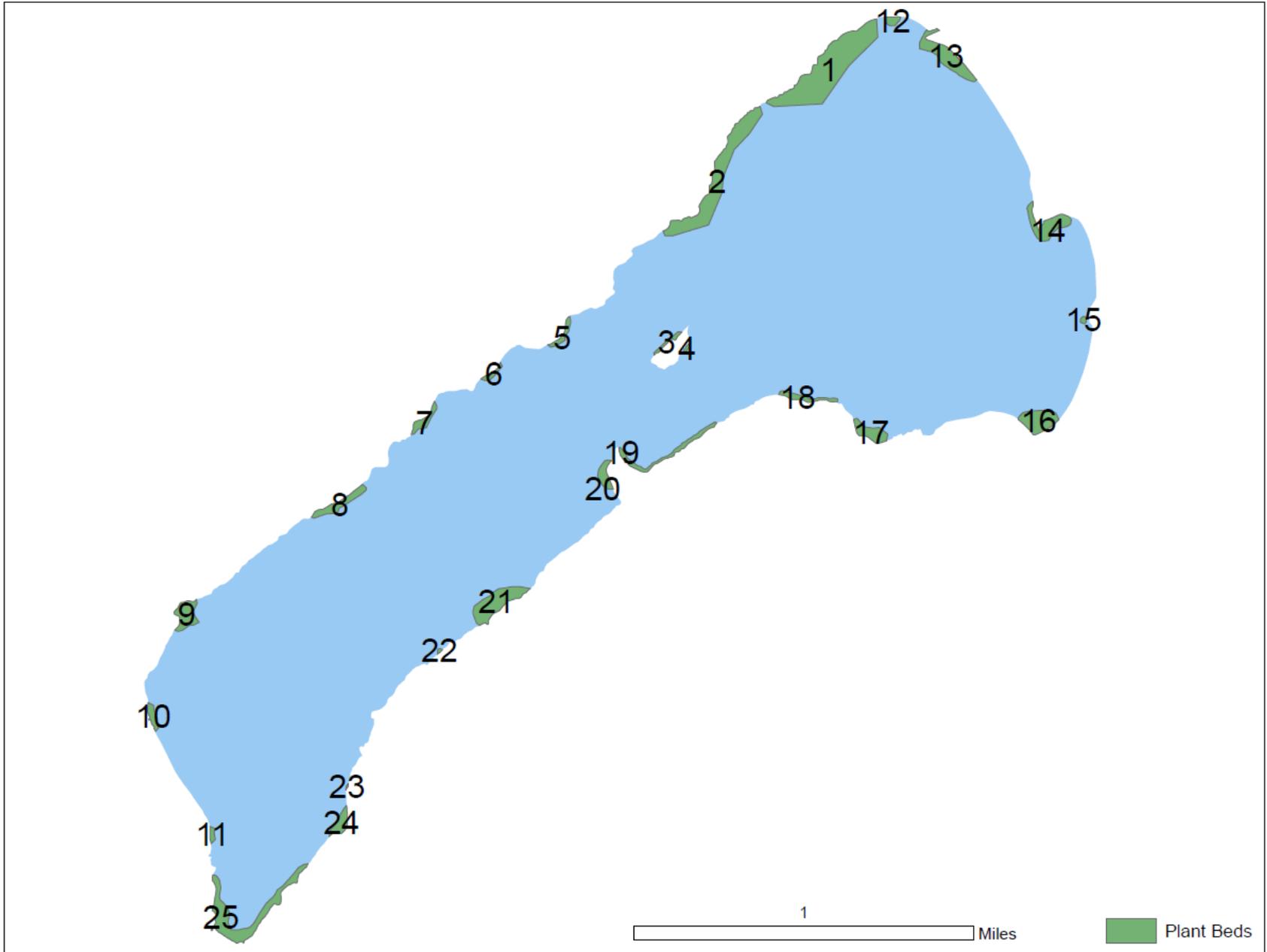


Figure 47. Bed Map for Lake Pleasant. Bed IDs correspond with Table 16, supplemental data.

## Lake Vanare

Lake Vanare is a 102.4 acre lake found in the Town of Lake Luzerne, Warren County, nested in the Upper Hudson watershed.

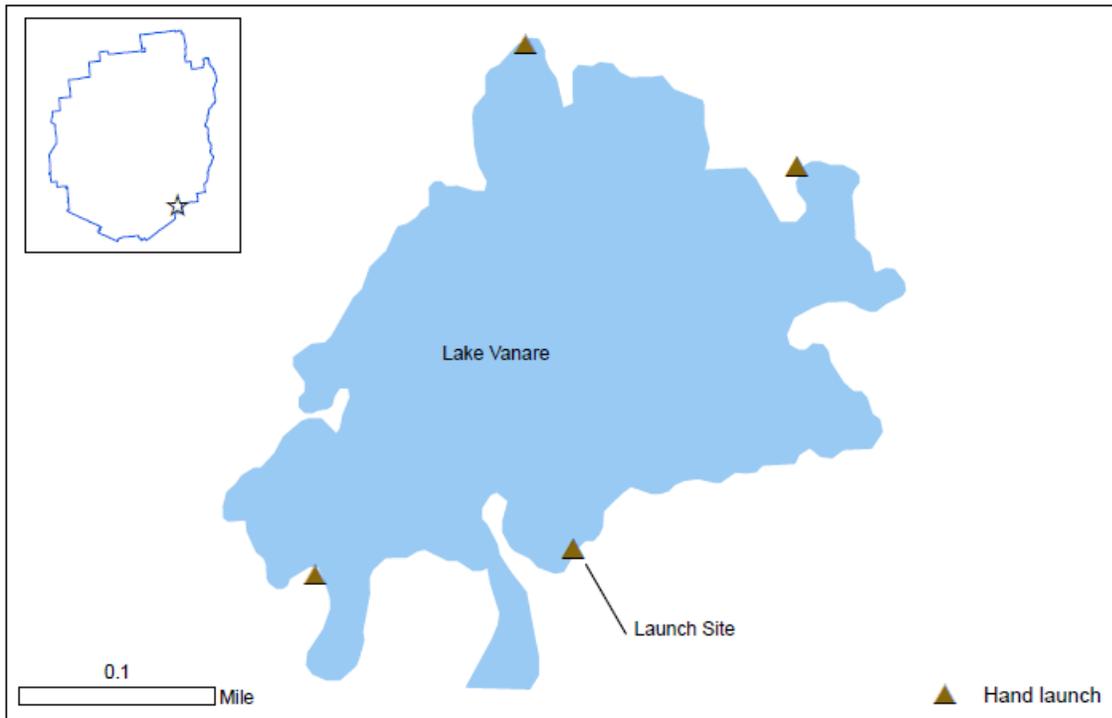


Figure 48. Location map for Lake Vanare and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 15 plant beds were mapped in the Lake Vanare covering 33.6 acres, representing 32.8 % of surface water. The most abundant aquatic plant taxa found were *Potamogeton robbinsii*, *Brasenia schreberi*, and *Potamogeton illinoensis*. The least abundant aquatic plant taxa found were *Lemna minor*, *Potamogeton zosteriformis*, and *Utricularia intermedia*. (Figure 49). A total of 34 rakes were tossed, of which 15 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Potamogeton robbinsii*, *Eleocharis parvula*, and *Vallisneria americana*. The least abundant aquatic plant taxa returned by the rake were *Potamogeton illinoensis* and *Potamogeton ampifolius*.

No AIS were found in Lake Vanare.

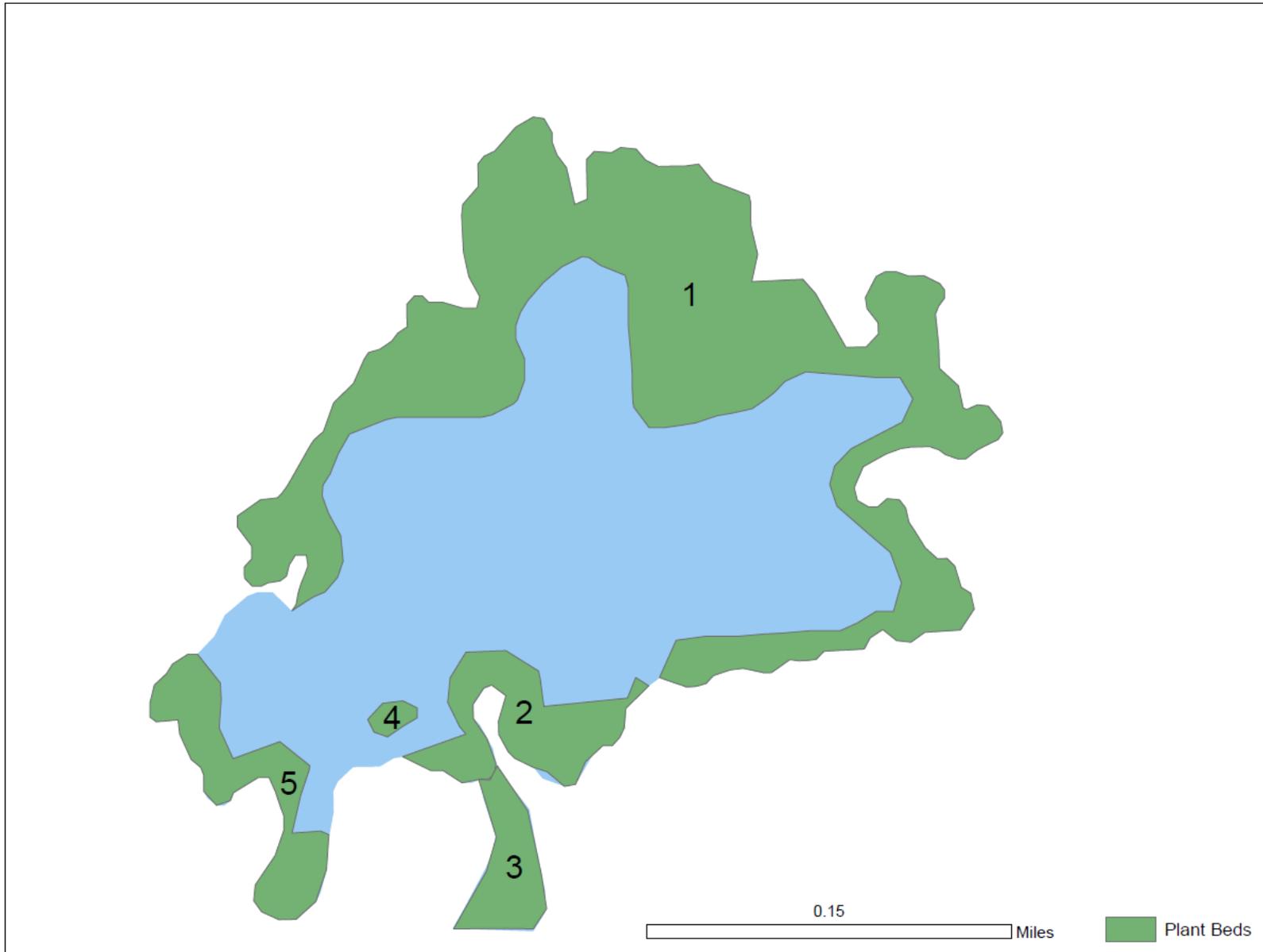


Figure 50. Plant bed map for Lake Vanare. Bed IDs correspond with table 17, supplemental data.

## Lewey Lake

Lewey Lake is a 365 acre lake found in the Town of Lake Pleasant, Essex County, nested in the Upper Hudson watershed.

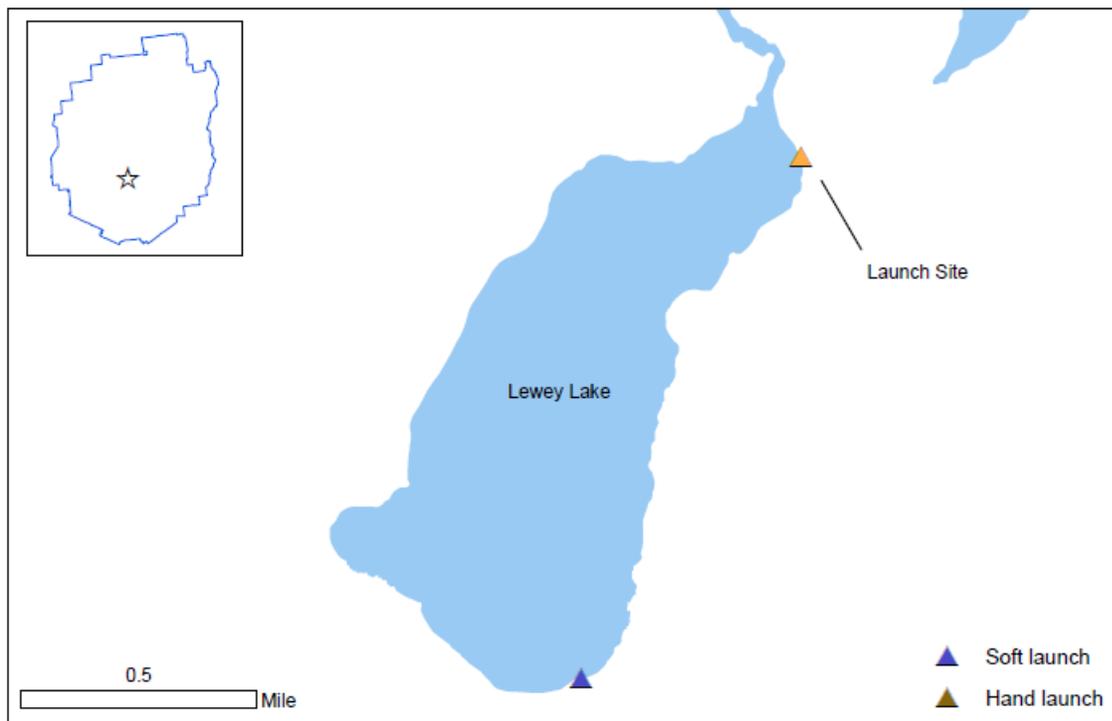


Figure 51. Location map for Lewey Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 11 plant beds were mapped in the Lewey Lake covering 55.5 acres, representing 15.2 % of surface water. The most abundant aquatic plant taxa found were *Nymphaea odorata*, *Brasenia schreberi*, and *Potamogeton gramineus*. The least abundant aquatic plant taxa found were *Potamogeton zosteriformis*, *Myriophyllum tenellum*, and *Potamogeton pussilus*. (Figure 52). A total of 18 rakes were tossed, of which 5 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Nitella sp.*, *Utricularia vulgaris*, and *Eleocharis parvula*. The least abundant aquatic plant taxa returned by the rake tosses were *Utricularia purpurea* and *Elodea canadensis*.

No AIS were found in Lewey Lake.



Figure 52. Plant bed map for Lewey Lake. Bed IDs correspond with Table 18, supplemental data.

## Lincoln Pond

Lincoln Pond is a 646.6 acre pond found in the Town of Elizabethtown, Essex County, nested in the Lake Champlain watershed.

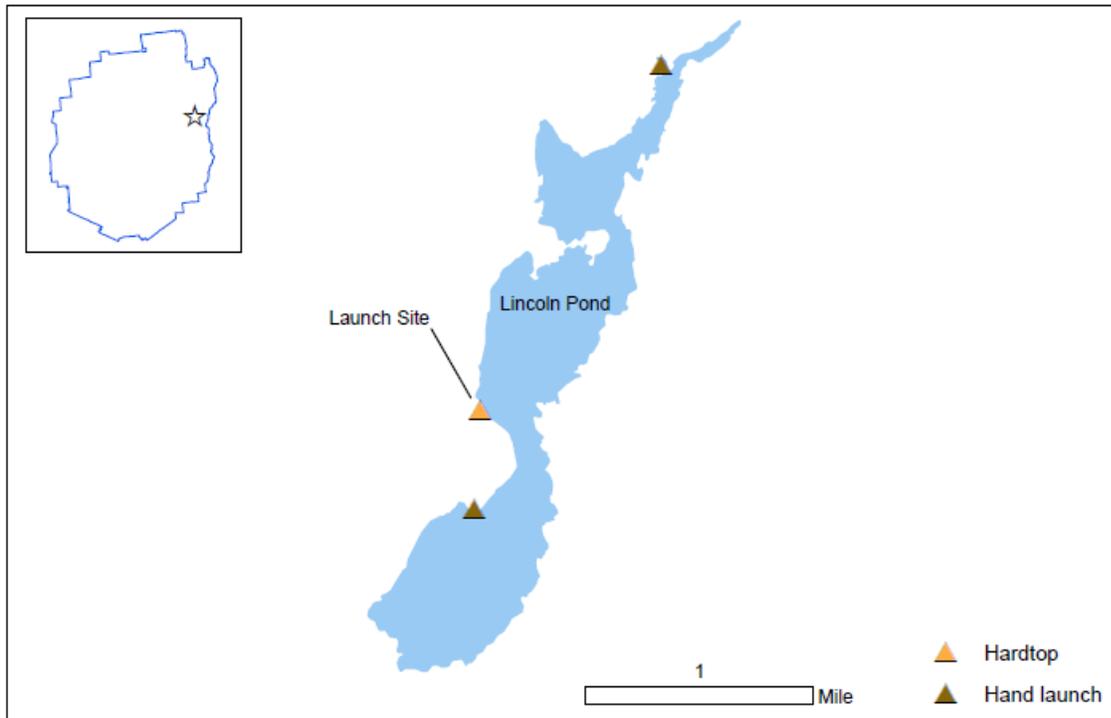


Figure 53. Location map for Lincoln Pond and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 17 plant beds were mapped in the Lincoln Pond covering 124.8 acres, representing 19.3% of surface water. The most abundant aquatic plant taxa found were *Myriophyllum spicatum*, *Potamogeton ampifolius*, and *Nitella sp.* The least abundant aquatic plant taxa found were *Elodea nuttallii*, *Utricularia intermedia*, and *Potamogeton robbinsii*. (Figures 54-55). A total of 57 rakes were tossed, of which 33 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Nitella sp.*, *Myriophyllum spicatum*, and *Potamogeton ampifolius*. The least abundant aquatic plant taxa returned by the rake tosses were *Potamogeton gramineus*, *Elodea nuttallii*, and *Najas sp.*

*Myriophyllum spicatum*, Eurasian water-milfoil was found in all beds mentioned above.

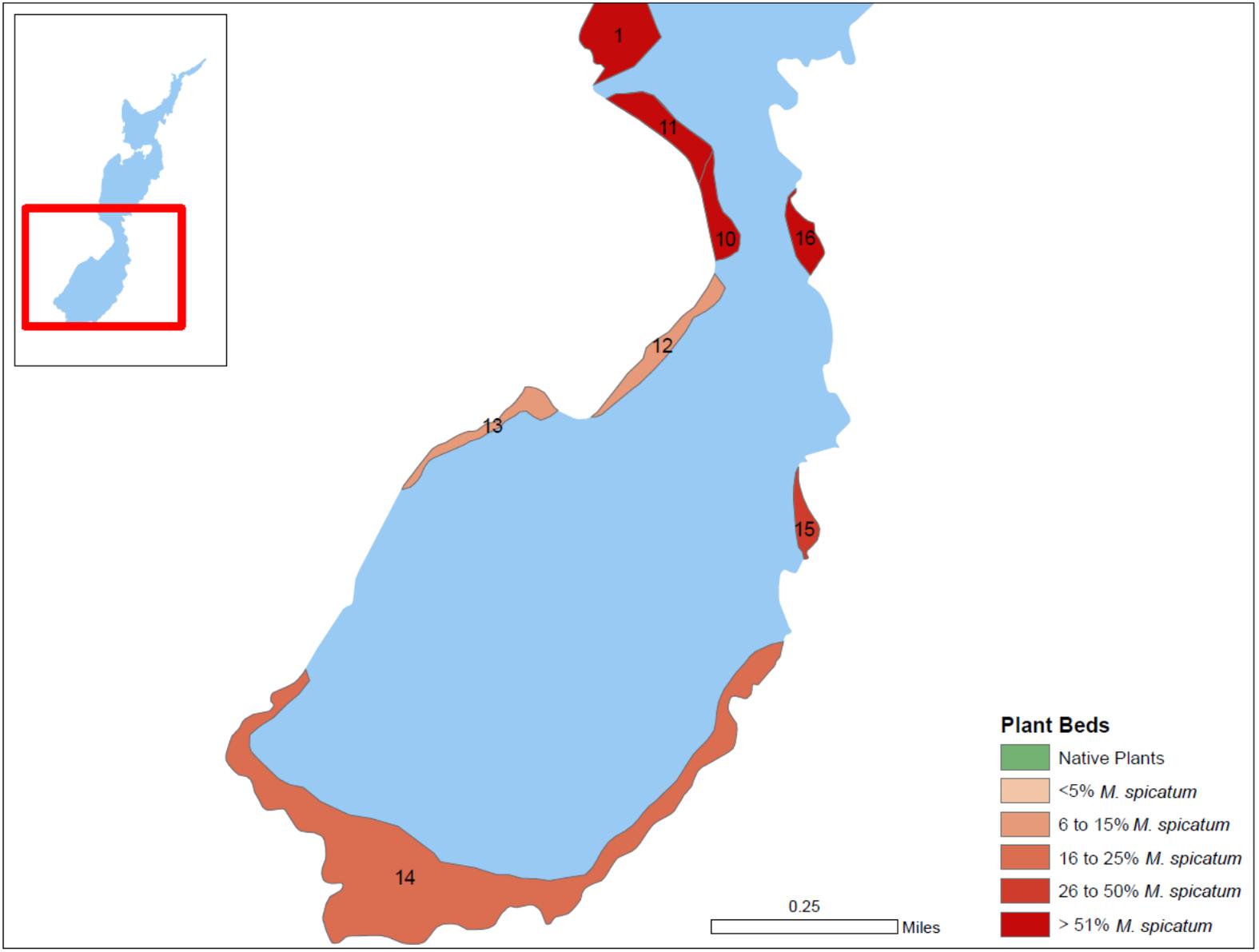


Figure 54. *M. spicatum* map for Lincoln Pond South. Bed IDs correspond with table 19, supplemental data.

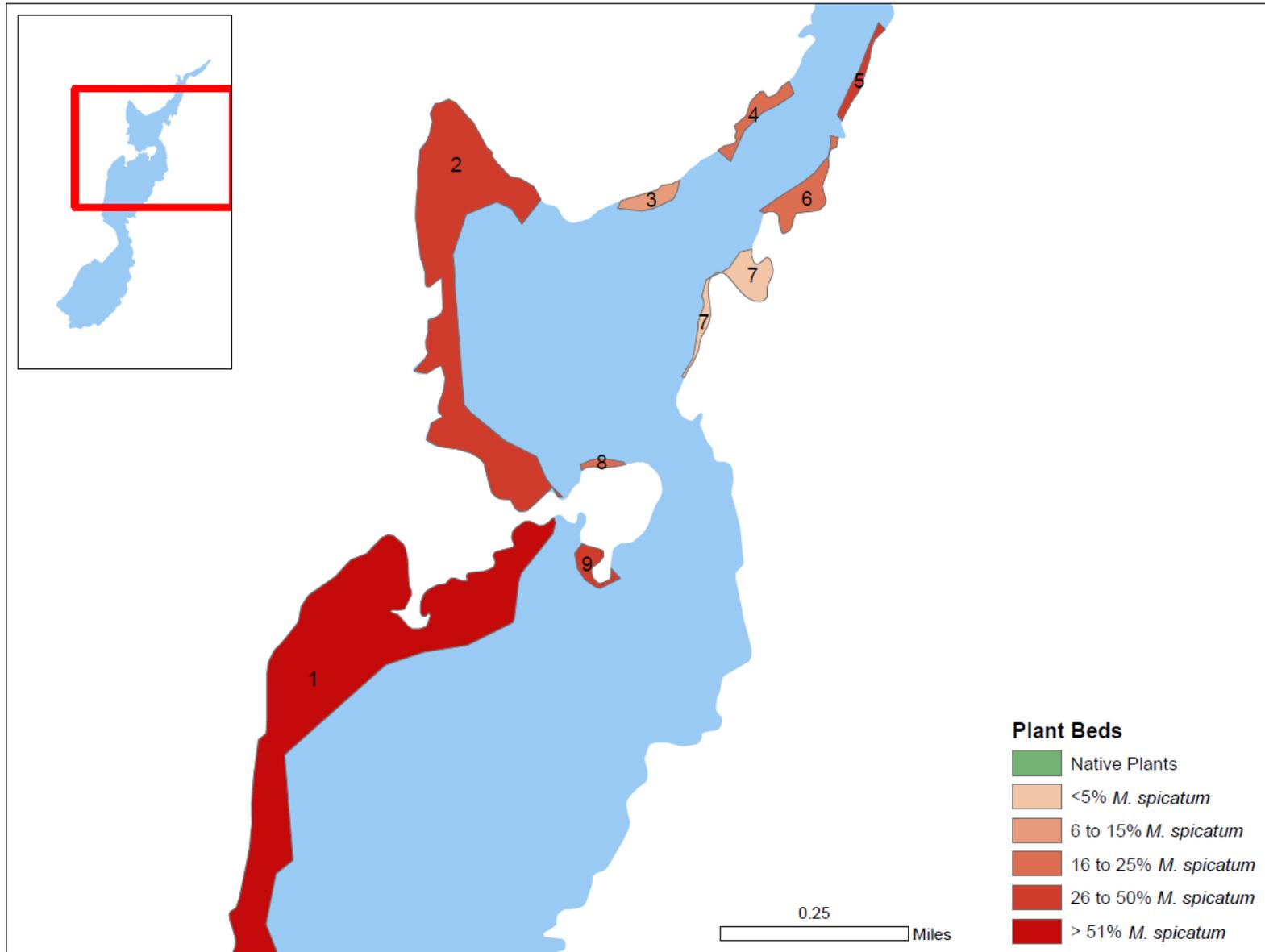


Figure 55. *M. spicatum* map for Lincoln Pond North. Bed IDs correspond with table 19, supplemental data.

## Mason Lake

Mason Lake is a 104 acre lake found in the Town of Lake Pleasant, Hamilton County, nestled in the Upper Hudson watershed.

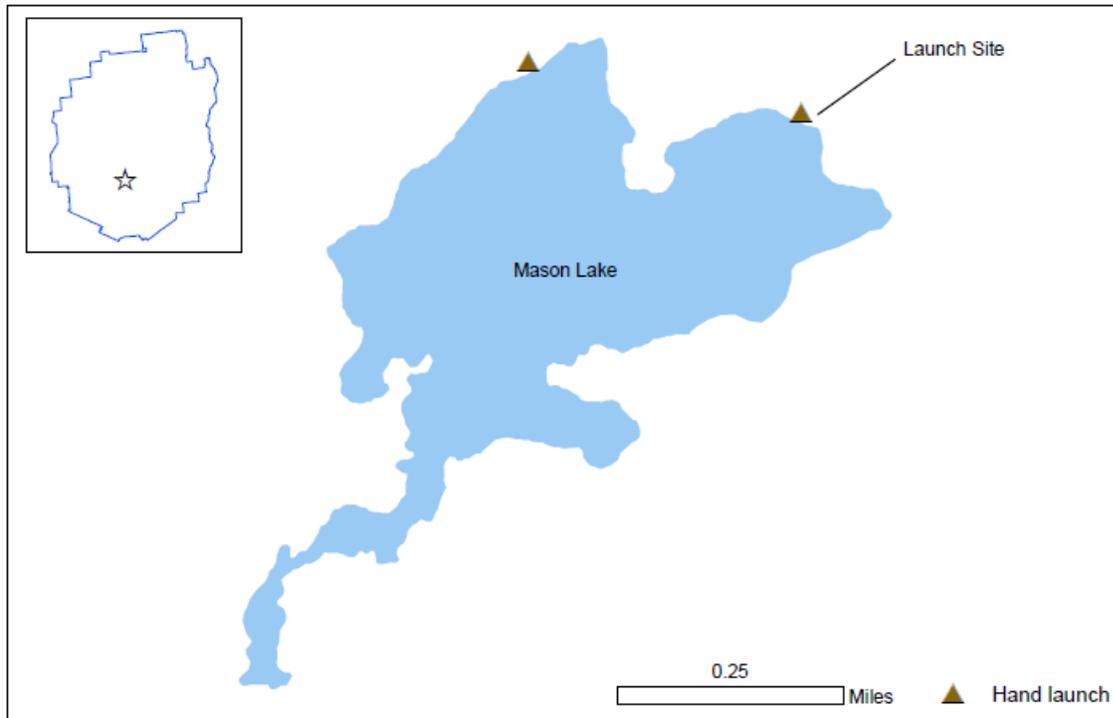


Figure 56. Location map for Mason Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 7 plant beds were mapped in the Lake Harris covering 28.4 acres, representing 28.1 % of surface water. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Potamogeton ampifolius*, and *Nymphaea odorata*. The least abundant aquatic plant taxa found were *Potamogeton pussilus*, *Utricularia purpurea*, and *Nitella sp.* (Figure 57). A total of 26 rakes were tossed, of which 9 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Eriocaulon sp.*, *Potamogeton ampifolius*, and *Nymphaea odorata*. The least abundant aquatic plant taxa returned by the rake were *Brasenia schreberi*, *Eleocharis parvula*, and *Najas sp.*

No AIS were found in Mason Lake.

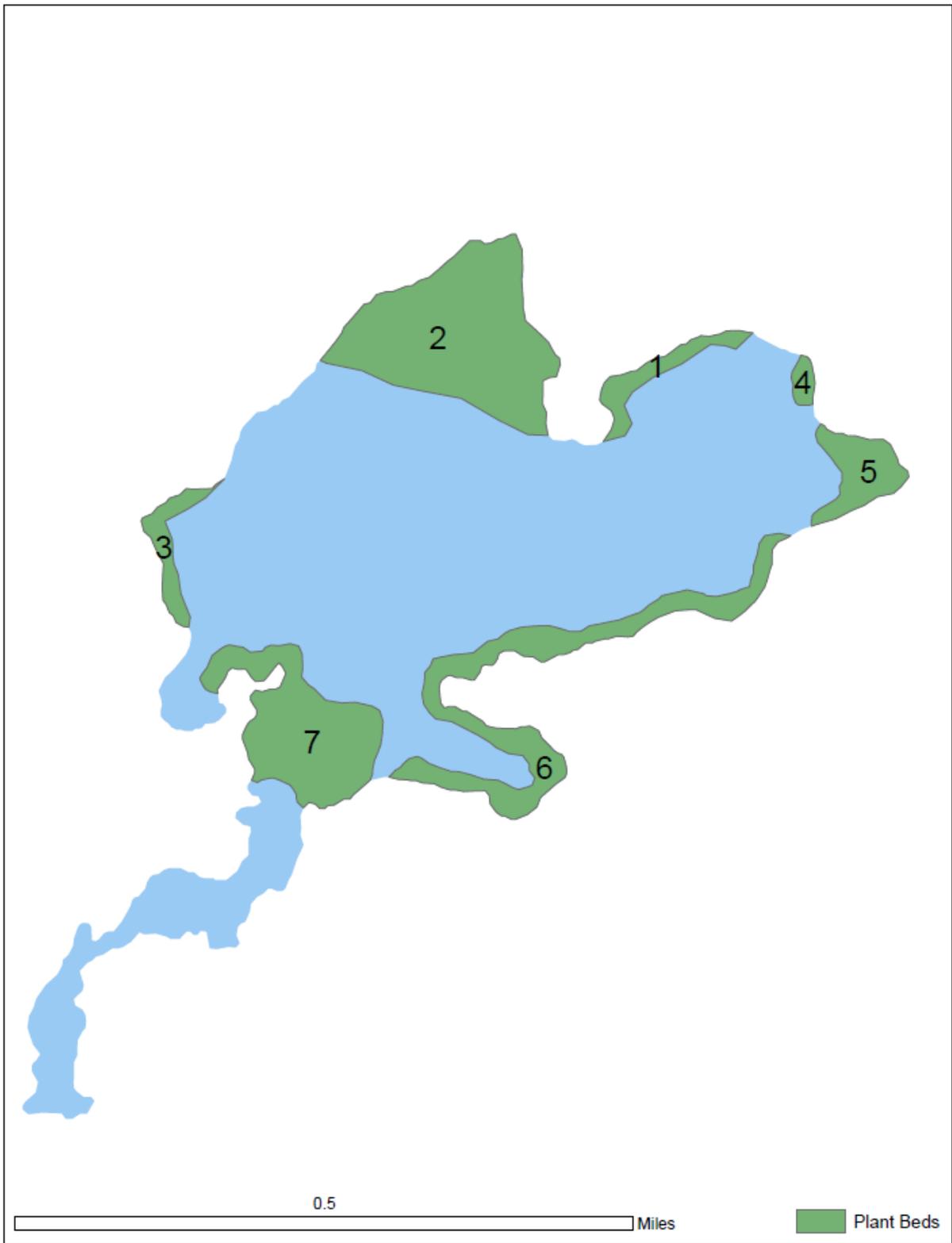


Figure 58. Bed map for Mason Lake. Bed IDs correspond with Table 20, supplemental data.

## North Lake

North Lake is a 422.4 acre lake found in the Town of Ohio, Herkimer County, nestled in the Black River watershed.

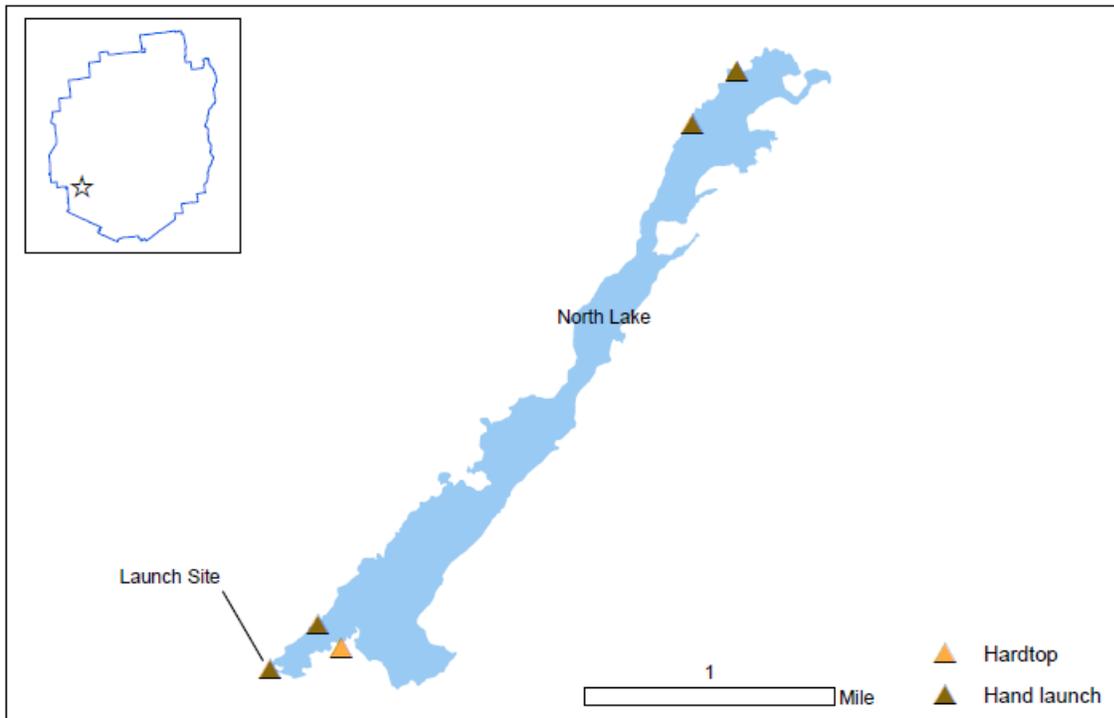


Figure 59. Location map for North Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 24 plant beds were mapped in the Lake Harris covering 31.9 acres, representing 7.5 % of surface water. The most abundant aquatic plant taxa found were *Eleocharis parvula*, *Potamogeton pusillus*, and *Utricularia purpurea*. The least abundant aquatic plant taxa found were *Isoetes sp.*, *Sagittaria graminea*, and *Potamogeton zosteriformis* (Figure 60-61). A total of 48 rakes were tossed, of which 14 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Utricularia purpurea*, *Eleocharis parvula*, and *Potamogeton pusillus*. The least abundant aquatic plant taxa returned by the rake were *Potamogeton natans*, *Myriophyllum farwellii*, and *Utricularia minor*.

No AIS were found in North Lake.

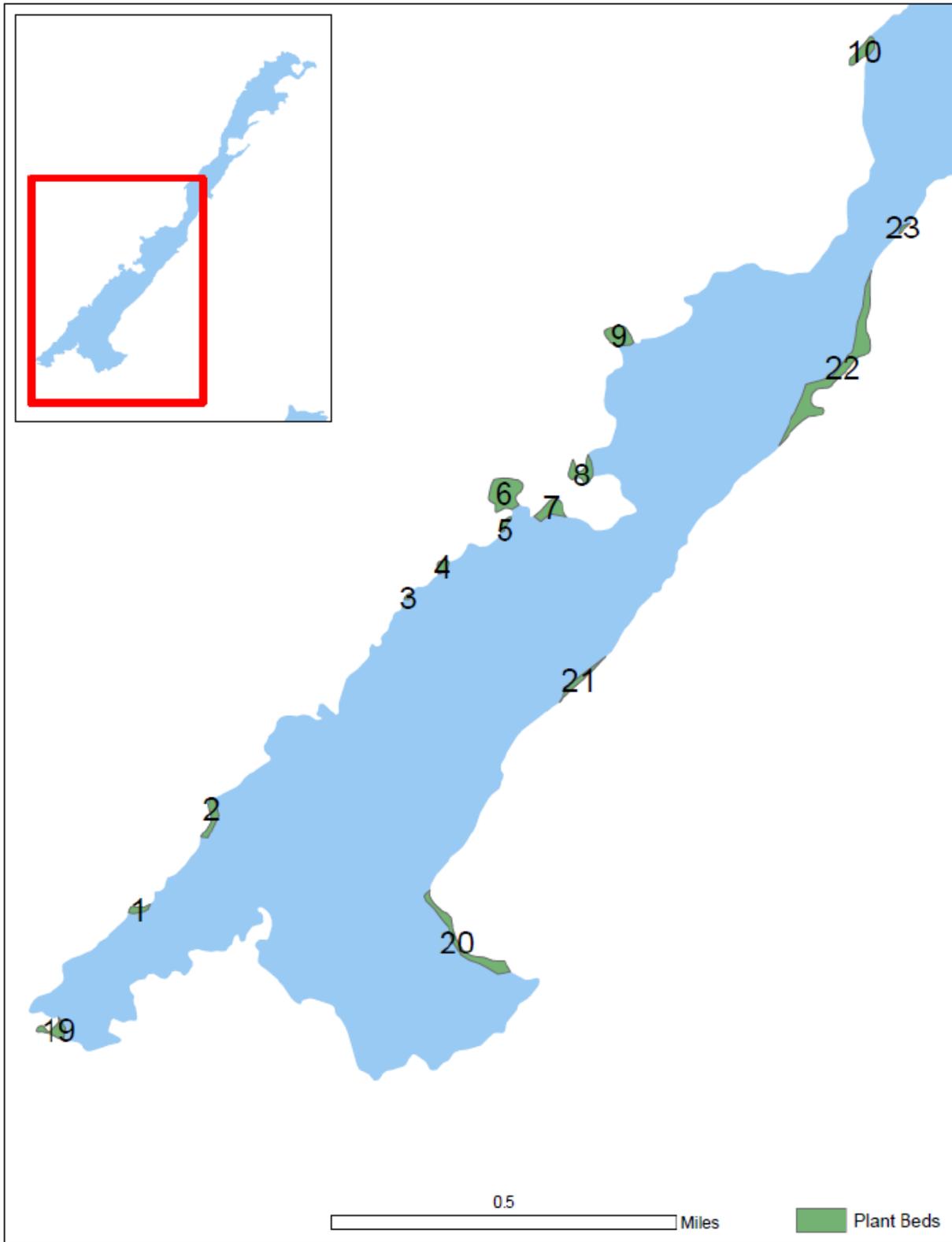


Figure 60. Bed map for North Lake South. Bed IDs correspond with Table 21

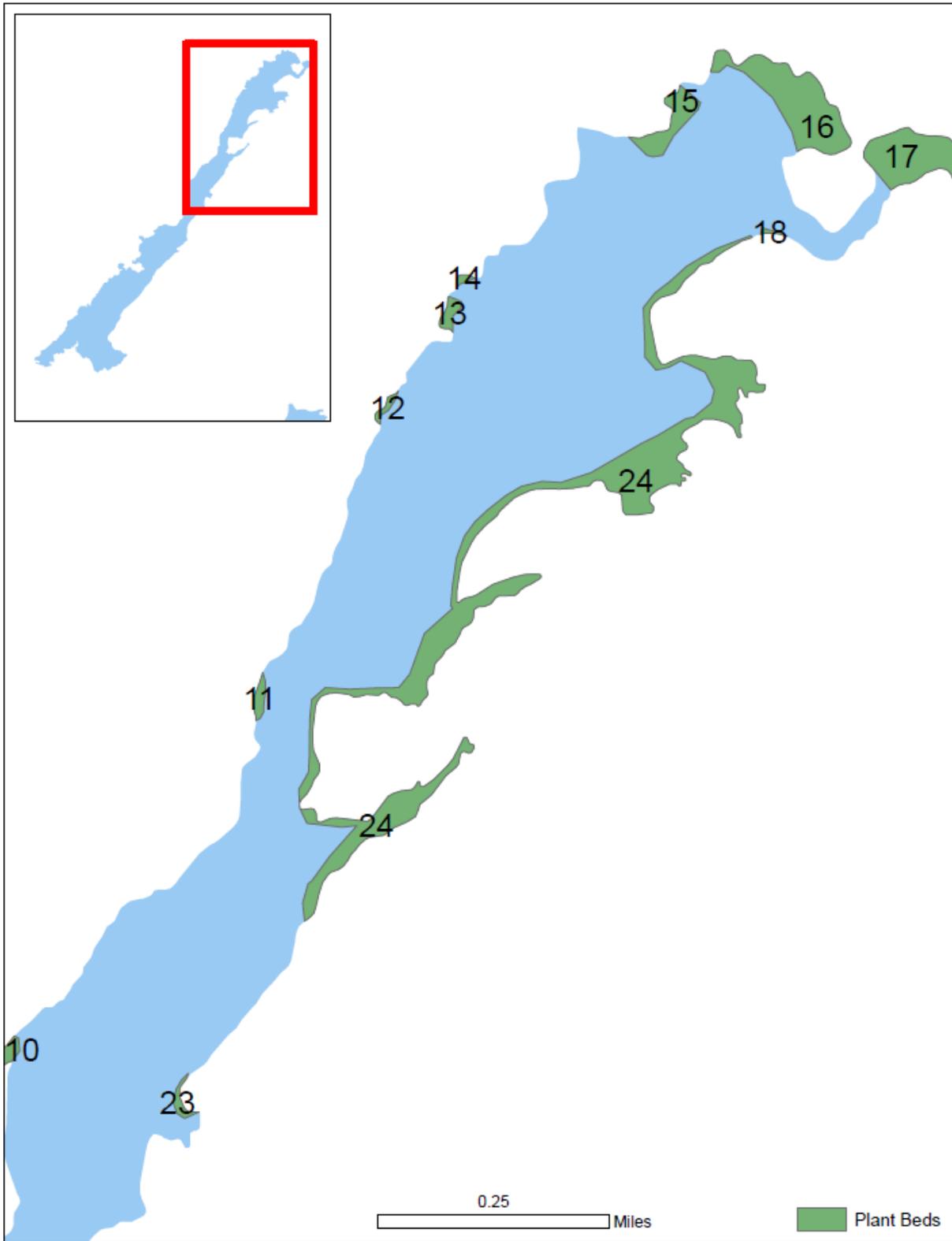


Figure 61. Bed map for North Lake North. Bed IDs correspond with Table 21

## Oxbow Lake

Oxbow Lake is a 306.5 acre lake found in the Town of Lake Pleasant, Hamilton County, nestled in the Sacandaga watershed.

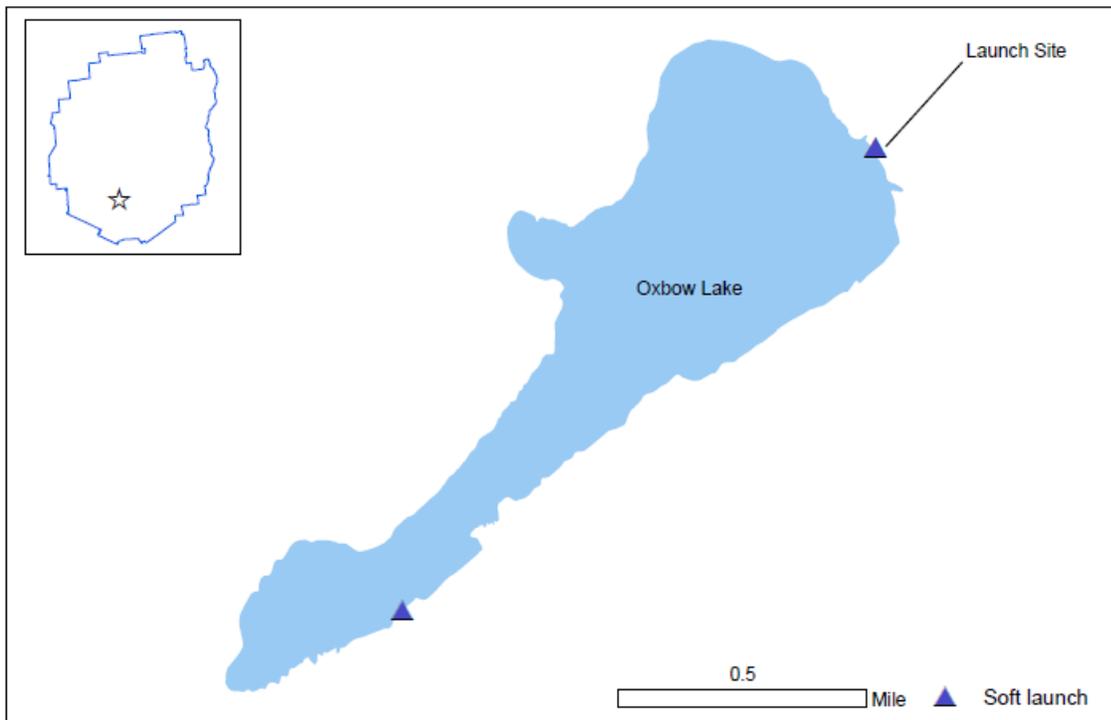


Figure 62. Location map for Lake Harris and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 4 plant beds were mapped in the Oxbow Lake covering 127.7 acres, representing 42.7 % of surface water. The most abundant aquatic plant taxa found were *Potamogeton robbinsii*, *Brasenia schreberi*, and *Potamogeton ampifolius*. The least abundant aquatic plant taxa found were *Ceratophyllum demersum*, *Myriophyllum tenellum*, and *Potamogeton alpinus* (Figure 63). A total of 58 rakes were tossed, of which 46 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Potamogeton robbinsii*, *Najas sp.*, and *Nymphaea odorata*. The least abundant aquatic plant taxa returned by the rake were *Utricularia intermedia*, *Utricularia vulgaris*, *Potamogeton epihydrus*.

No AIS were found in Oxbow Lake.



Figure 63. Plant bed map for Lake Harris. Bed IDs correspond with Table 22, supplemental data.

## Paradox Lake

Paradox Lake is an 897.4 acre lake found in the Town of Schroon, Essex County, nestled in the Upper Hudson watershed.

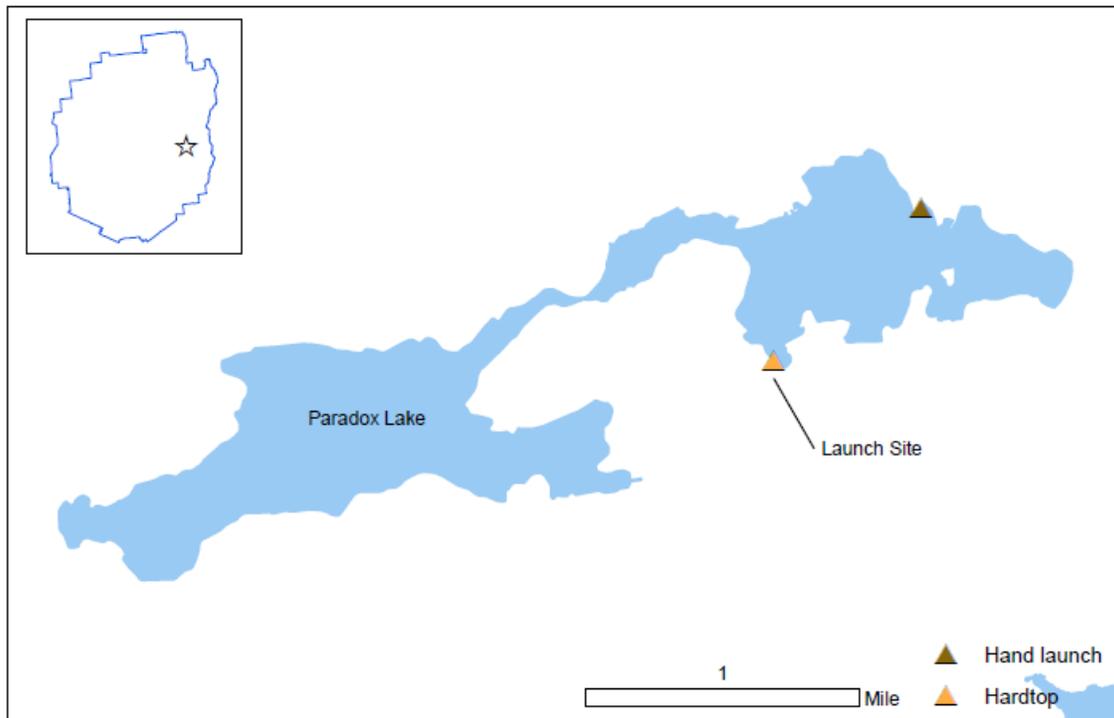


Figure 64. Location map for Paradox Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 35 plant beds were mapped in the Paradox Lake covering 76.4 acres, representing 8.5 % of surface water. The most abundant aquatic plant taxa found were *Nymphaea odorata*, *Brasenia schreberi*, and *Potamogeton ampifolius*. The least abundant aquatic plant taxa found were *Potamogeton pusillus*, *Najas sp.*, and *Potamogeton pusillus*. (Figures 65-). A total of 75 rakes were tossed, of which 32 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Potamogeton robbinsii*, *Eleocharis parvula*, and *Isoetes sp.* The least abundant aquatic plant taxa returned by the rake were *Potamogeton natans*, *Myriophyllum spicatum*, and *Vallisneria americana*.

*M. spicatum* was found in 7 beds, covering 10.3 acres, representing 13.5 % of total bed area. *P. crispus* was found in 1 bed, covering 0.9 acres, representing 1.2 % of total bed area (Figure 73-74)

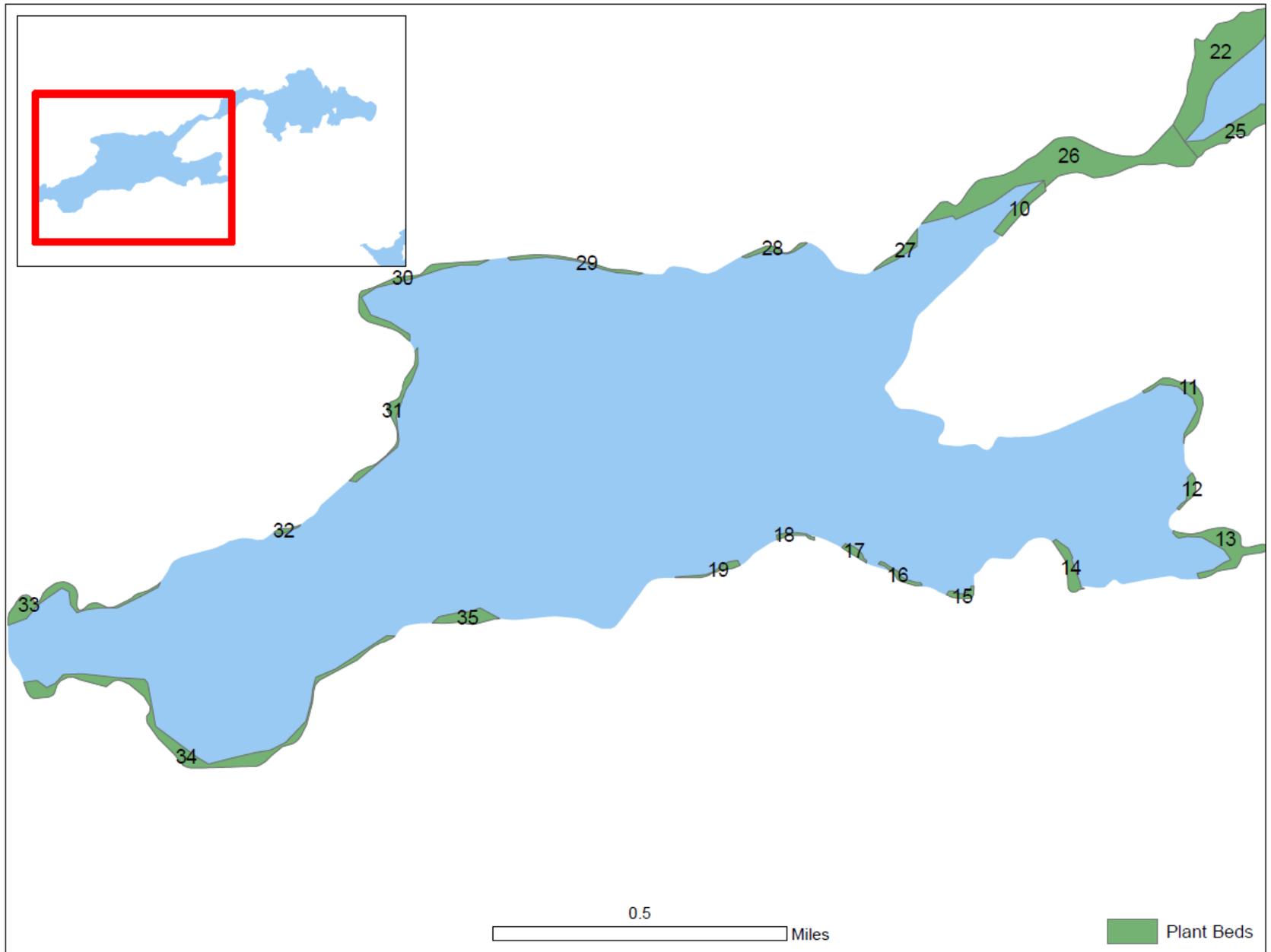


Figure 65. Plant bed map for Paradox Lake West. Bed IDs correspond with Table 23, supplemental data.

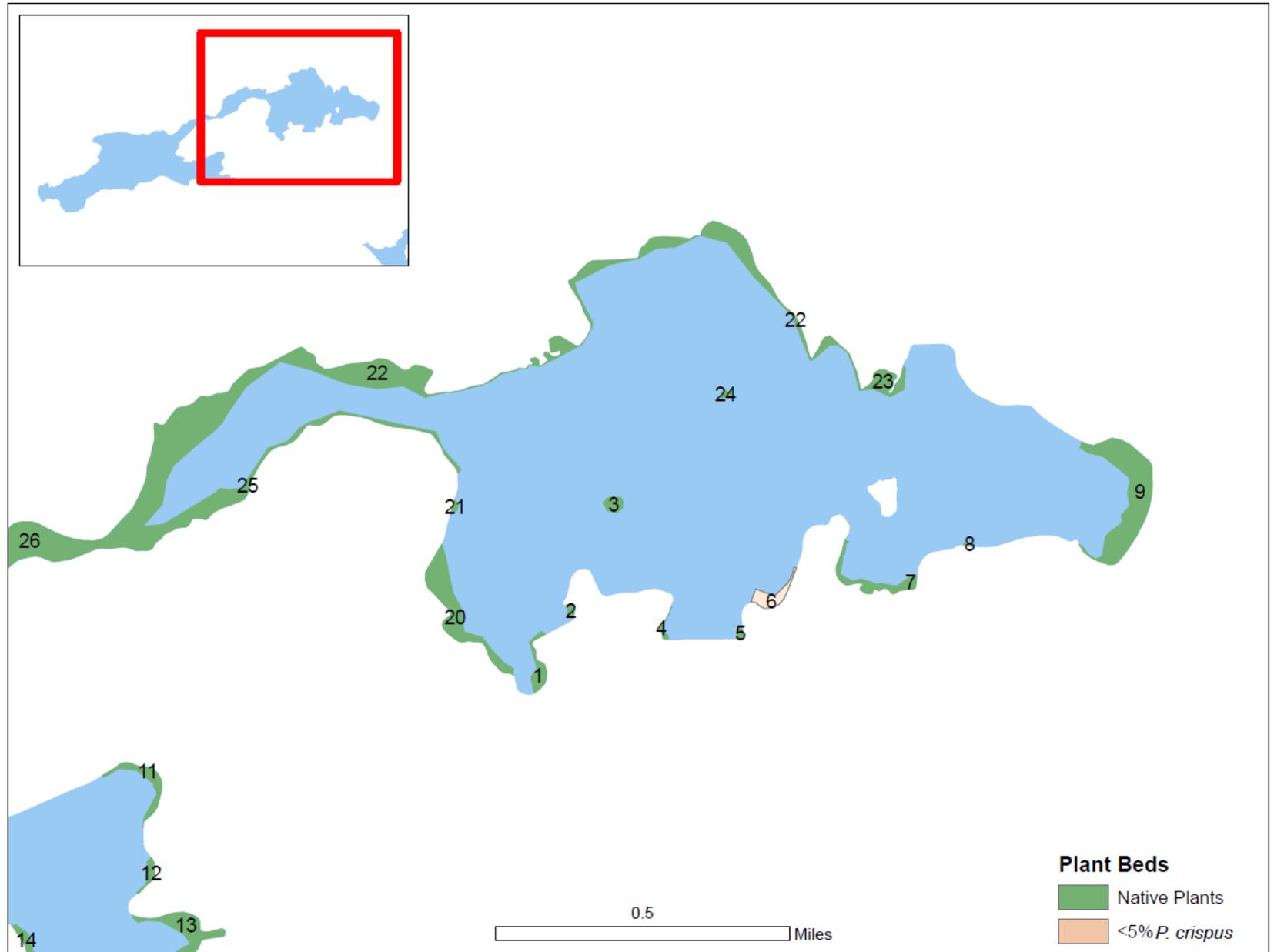


Figure 66. *P. crispus* map for Paradox Lake East. Bed IDs correspond with Table 23, supplemental data.

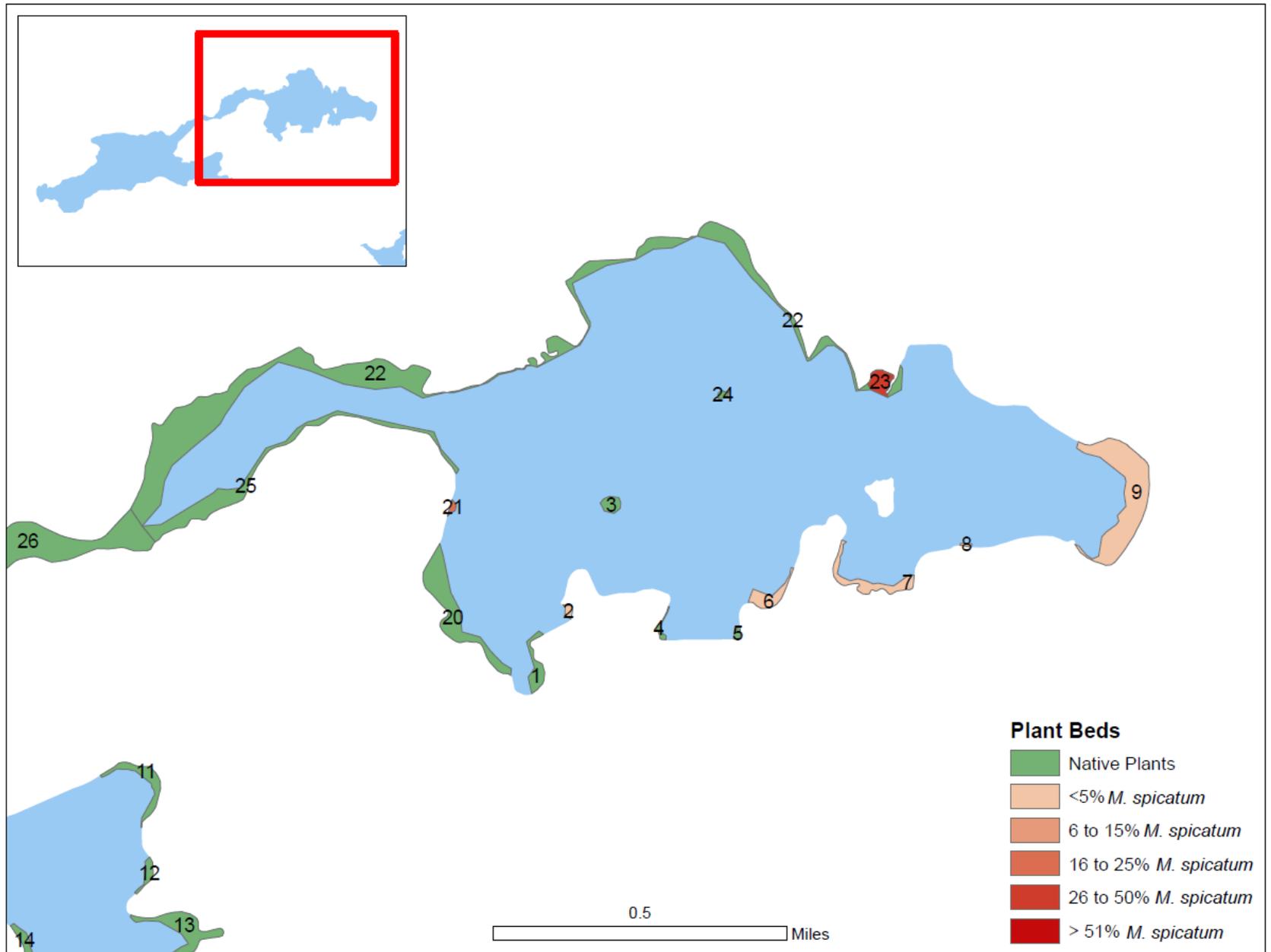


Figure 67. *M. spicatum* map for Paradox Lake East. Bed IDs correspond with Table 23, supplemental data.

## Peck's Lake

Peck's Lake is a 1,396.1 acre lake found in the Town of Bleecker, Fulton County, nestled in the Mohawk watershed.

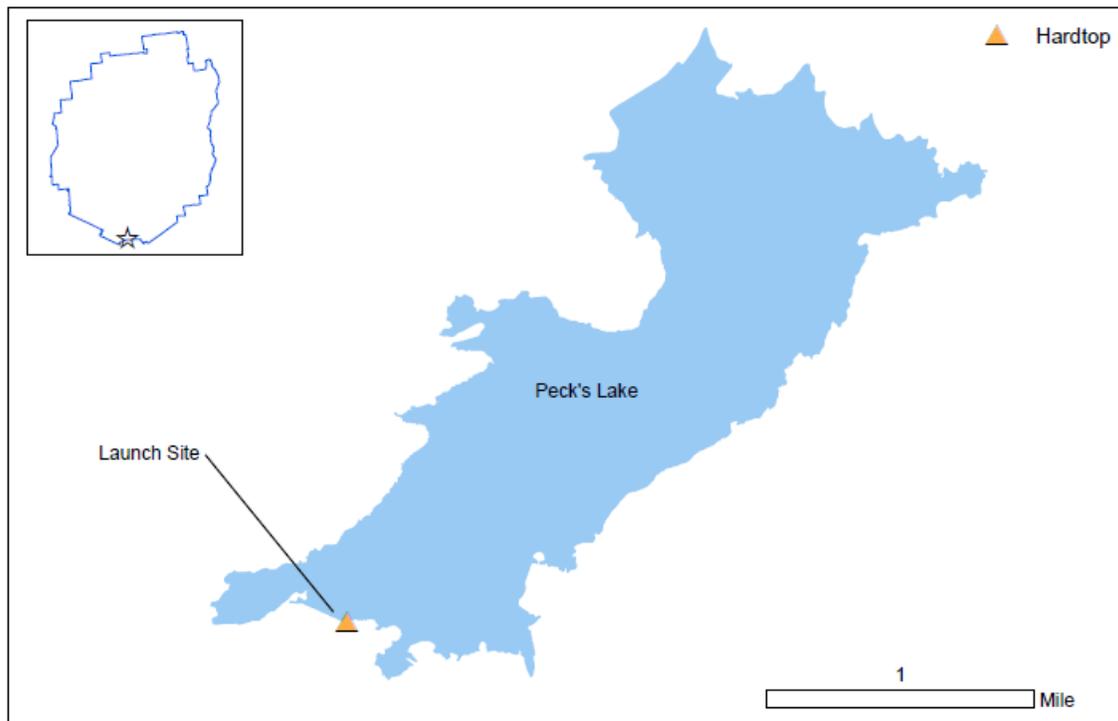


Figure 68. Location map for Peck's Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 36 plant beds were mapped in the Peck's Lake covering 31.4 acres, representing 2 % of surface water. The most abundant aquatic plant taxa found were *Potamogeton ampifolius*, *Potamogeton epihydrus*, and *Myriophyllum heterophyllum*. The least abundant aquatic plant taxa found were *Elodea nuttallii*, *Najas sp.*, and *Potamogeton gramineus*. (Figures 69-70). A total of 60 rakes were tossed, of which 6 returned plant specimens. The rake returned a total of 3 species *Potamogeton ampifolius*, *Myriophyllum heterophyllum*, and *Najas sp.*

Two AIS were found during the survey: *Myriophyllum heterophyllum* (Variable leaf watermilfoil) and *Bythotrephes longimanus* (spiny waterflea). *M. heterophyllum*, was found in 8 beds, covering 25 acres, representing 79.6 % of total bed area. *B. longimanus*, spiny waterflea, was found in a plankton sample.

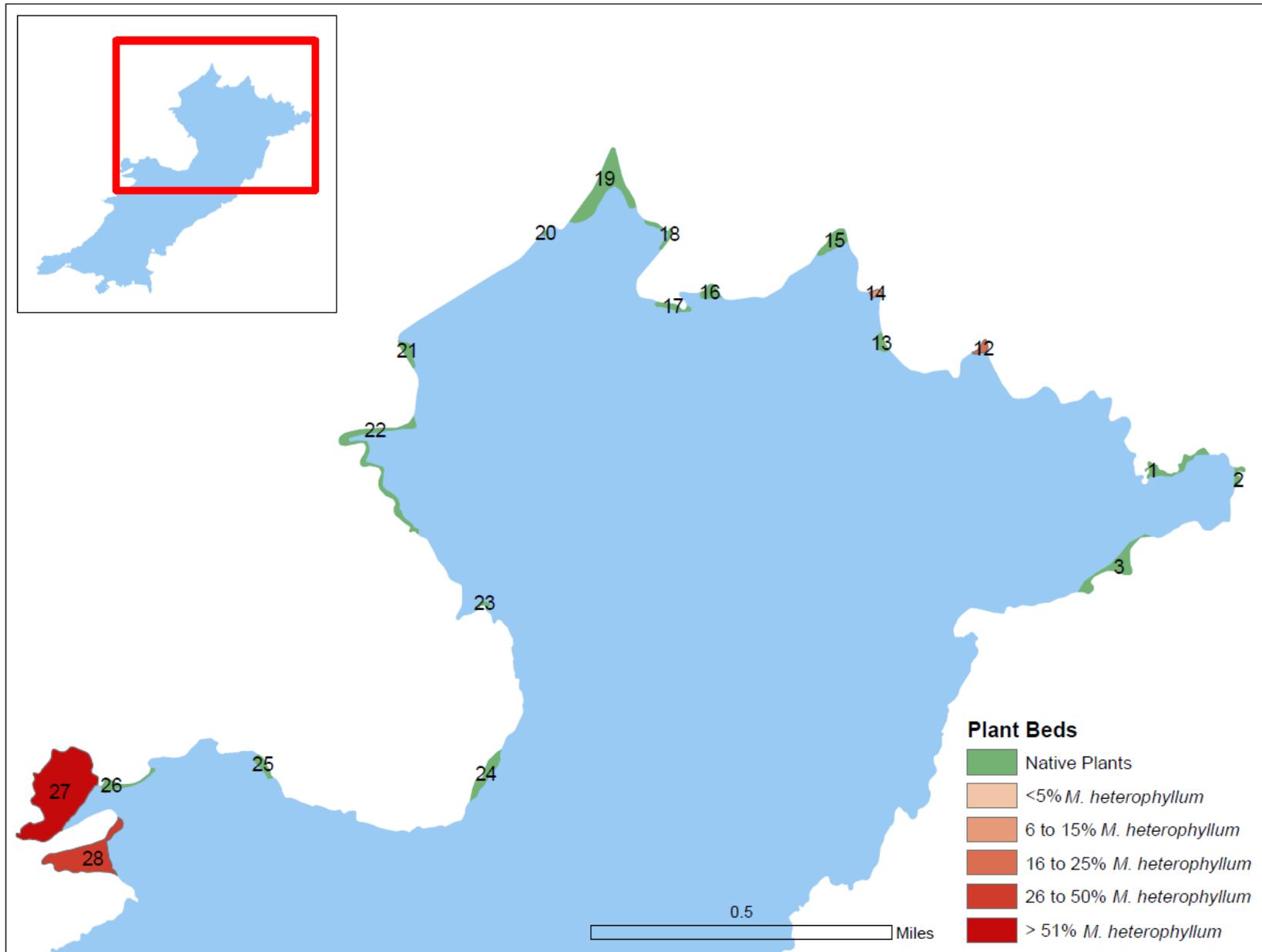


Figure 71. Aquatic plant bed map for Peck's Lake North. Bed IDs correspond with Table 24, supplemental data.

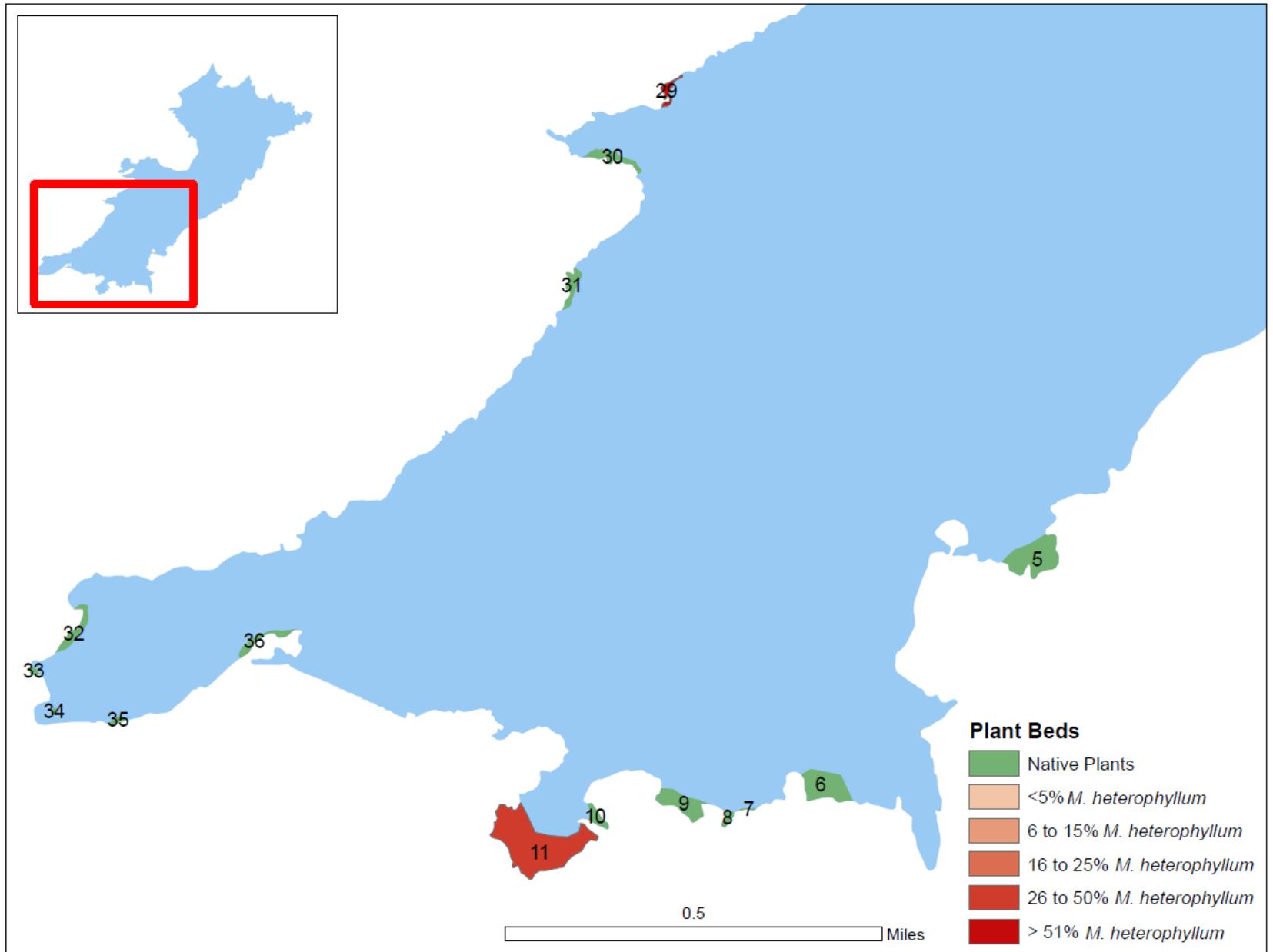


Figure 72. Aquatic plant bed map for Peck's Lake South. Bed IDs correspond with Table 24, supplemental data.

## Pine Lake

Pine Lake is a 177.2 acre lake found in the Town of Caroga, Fulton County, nested in Mohawk watershed.

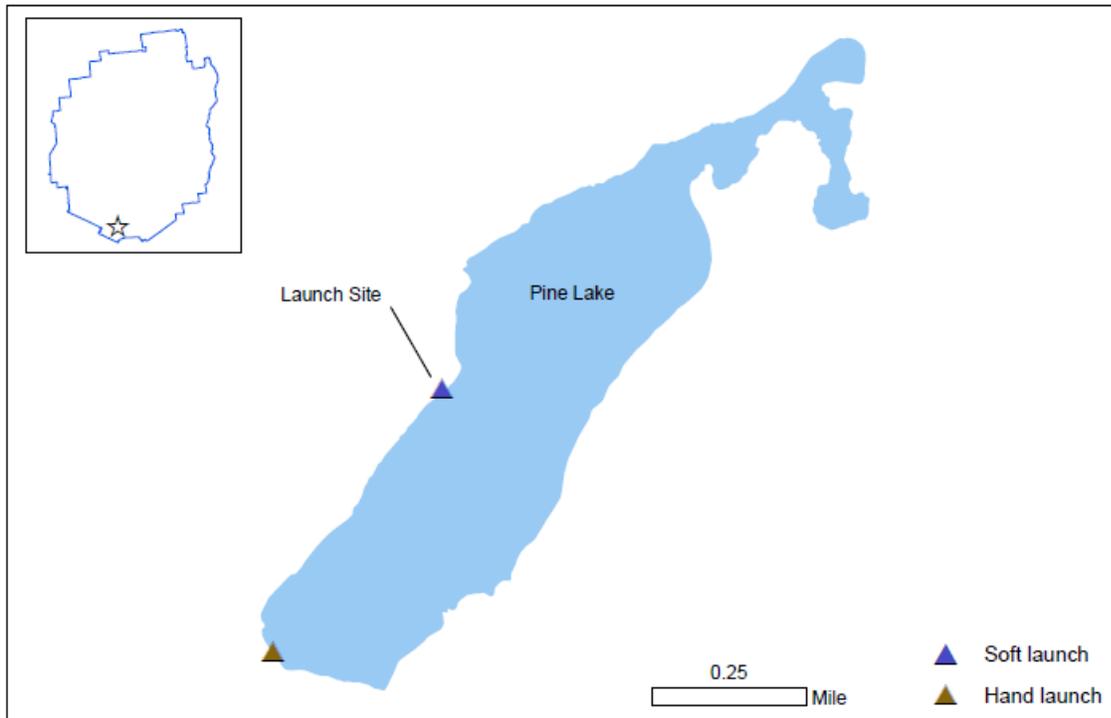


Figure 73. Location map for Pine Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 9 plant beds were mapped in the Pine Lake covering 24.3 acres, representing 13.7 % of surface water. The most abundant aquatic plant taxa found were *Nymphaea odorata*, *Eleocharis parvula*, and *Brasenia schreberi*. The least abundant aquatic plant taxa found were *Potamogeton natans*, *Sparganium sp.*, and *Utricularia intermedia* (Figure 74). A total of 41 rakes were tossed, of which 21 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Eleocharis parvula*, *Utricularia purpurea*, and *Utricularia vulgaris*. The least abundant aquatic plant taxa returned by the rake toss were *Nymphoides cordata*, *Brasenia schreberi*, and *Nymphaea odorata*.

No AIS were found in Pine Lake.

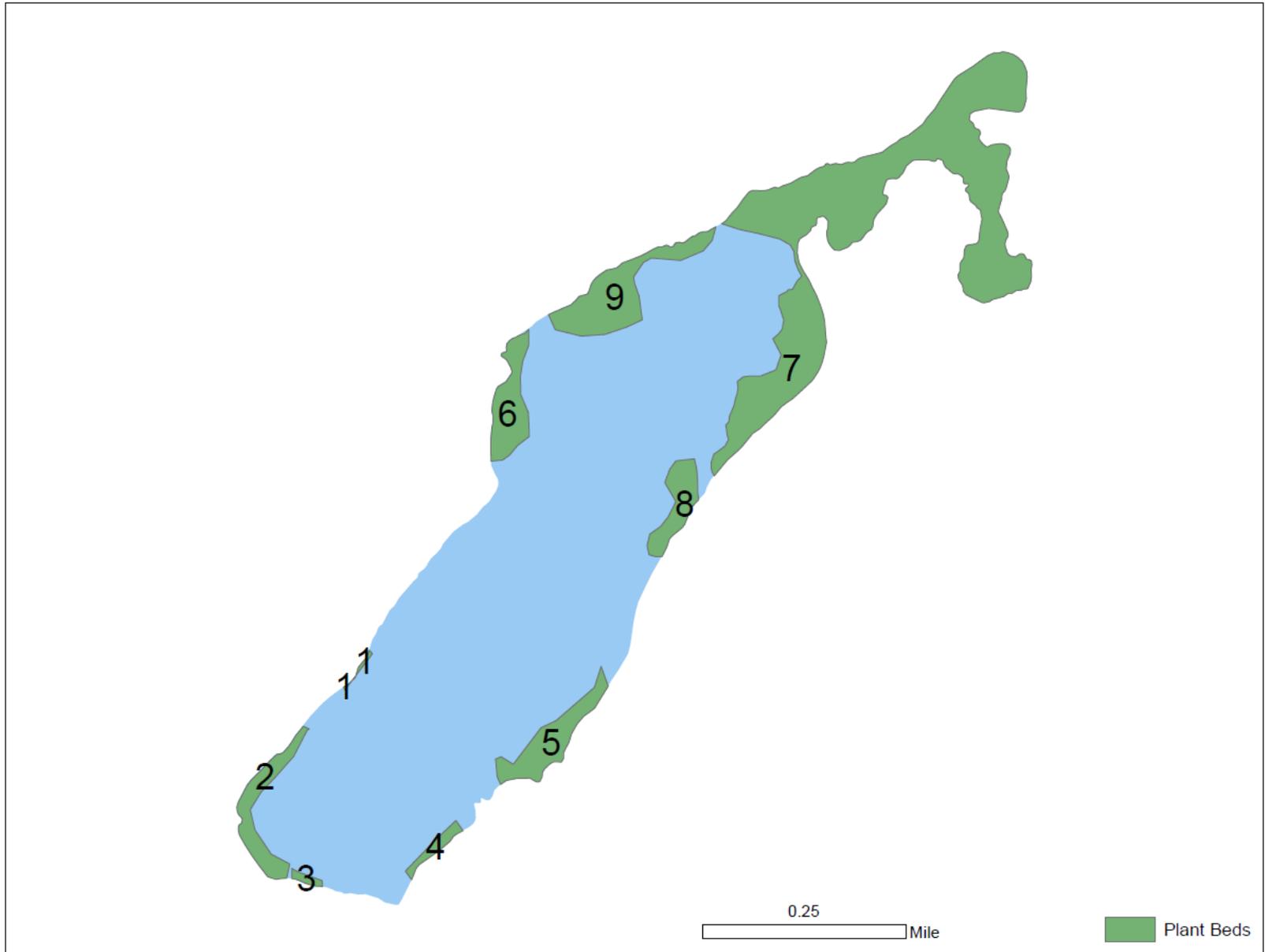


Figure 75. Plant bed map for Pine Lake. Bed IDs correspond with Table 25

## Piseco Lake

Piseco Lake is a 2811 acre lake complex found in the Town of Caroga, Fulton County, nested in the Mohawk watershed.

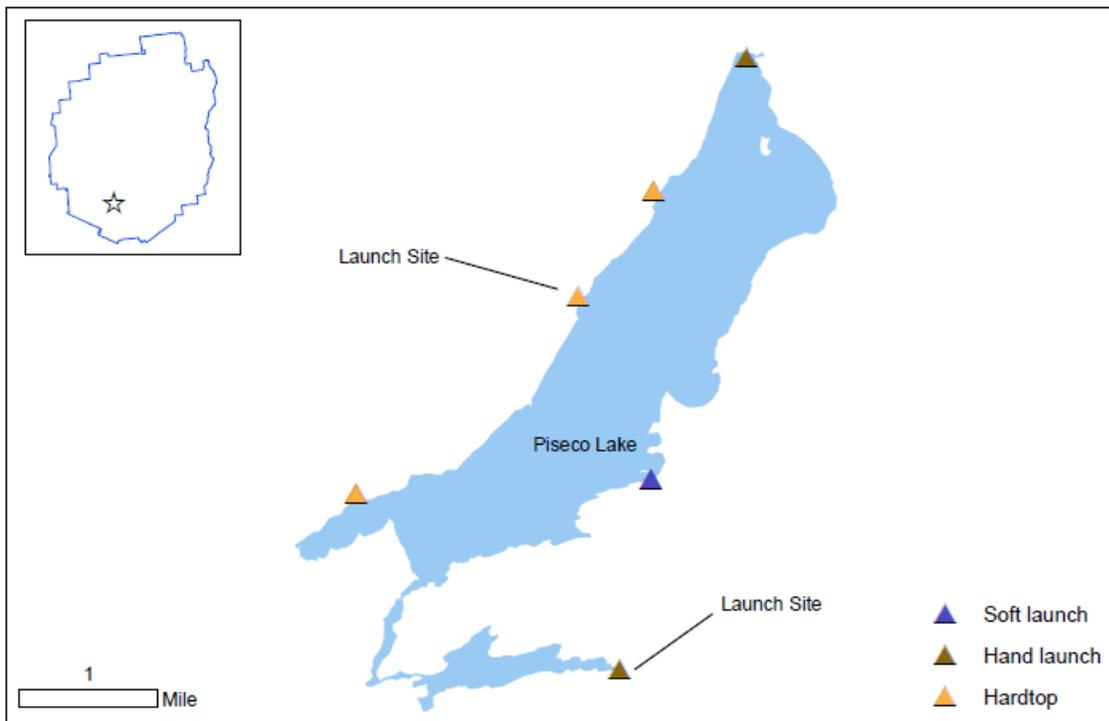


Figure 76. Location map for Piseco Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 33 plant beds were mapped in Piseco Lake covering 214 acres of surface water, 7.6% of the lake area. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Brasenia schreberi*, and *Nymphaea odorata*. The least abundant aquatic plant taxa found were *Ceratophyllum demersum*, *Potamogeton praelongus*, and *Myriophyllum alterniflorum*. (Figure 77). A total of 116 rakes were tossed, of which 39 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Nymphoides cordata*, *Sparganium sp.* and *Eleocharis parvula*. The least abundant aquatic plant taxa returned by the rake were *Potamogeton natans*, *Ceratophyllum demersum*, and *Myriophyllum alterniflorum*).

One AIS was found during the survey: *Bythotrephes longimanus* (spiny waterflea). The plankton tow returned 4 *Bythotrephes longimanus* individuals.

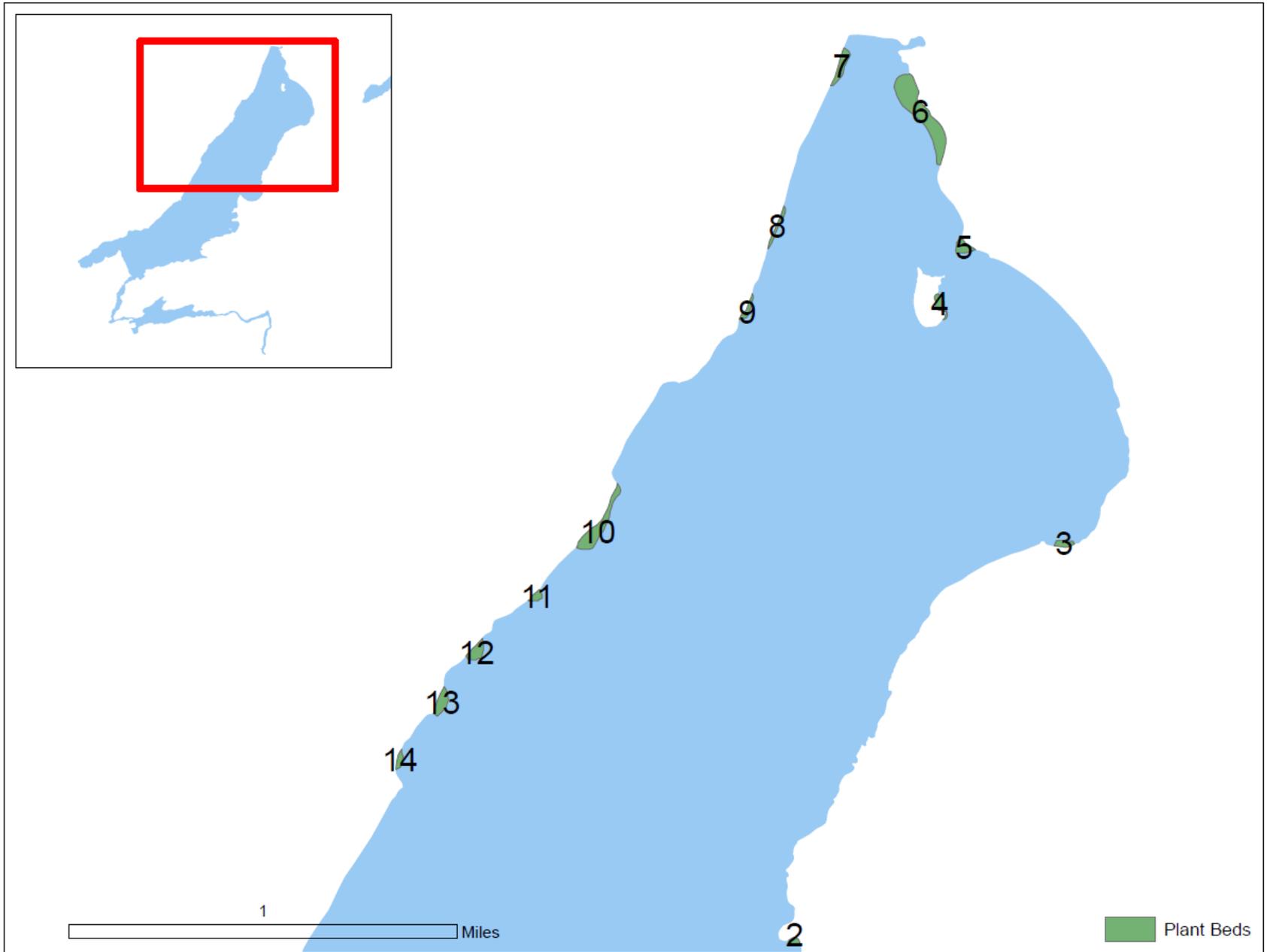


Figure 77. Aquatic plant bed map for Piseco Lake North. Bed IDs correspond with Table 26, supplemental data.

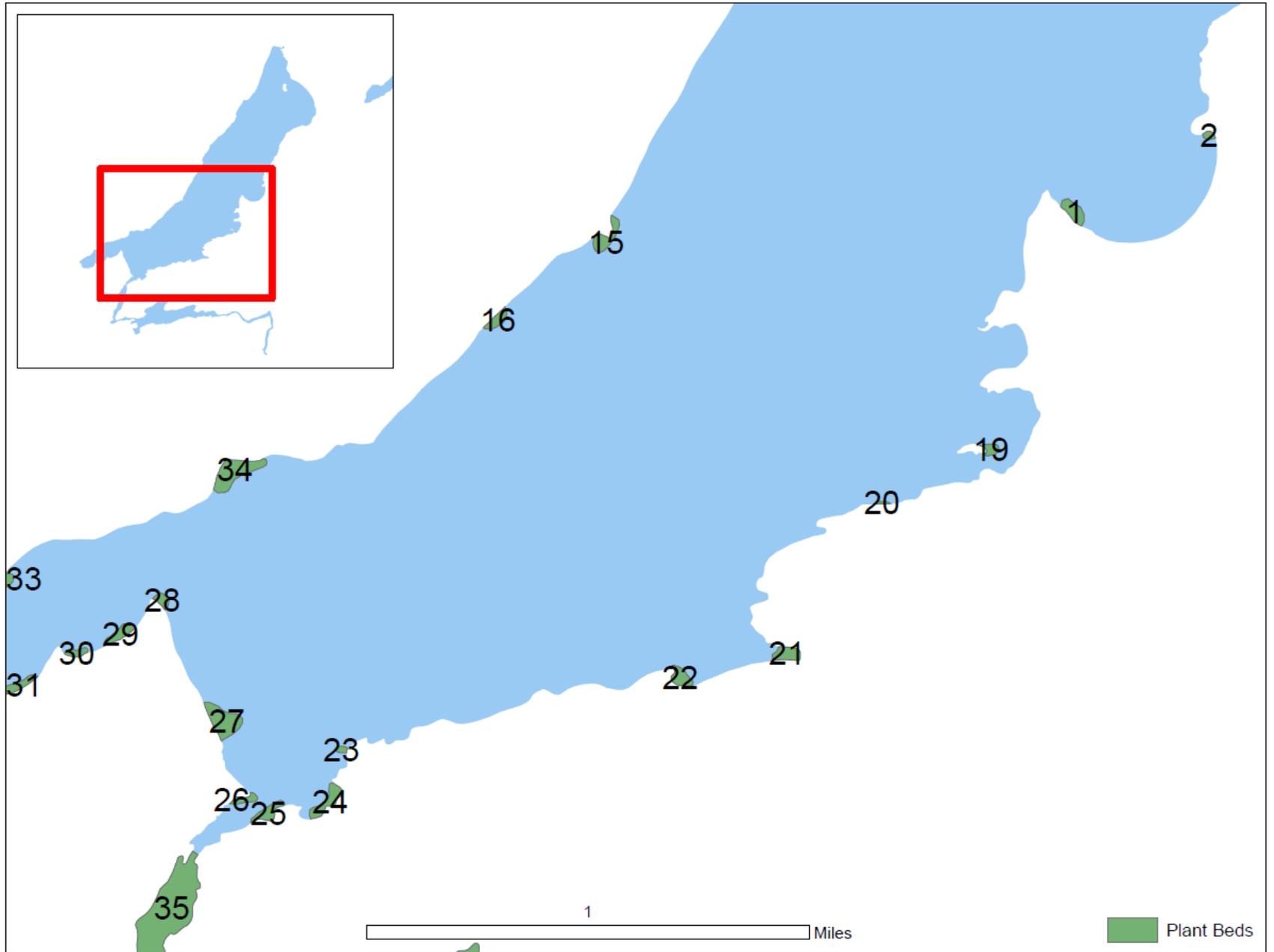


Figure 78. Aquatic plant bed map for Piseco Lake South. Bed IDs correspond with Table 26, supplemental data.

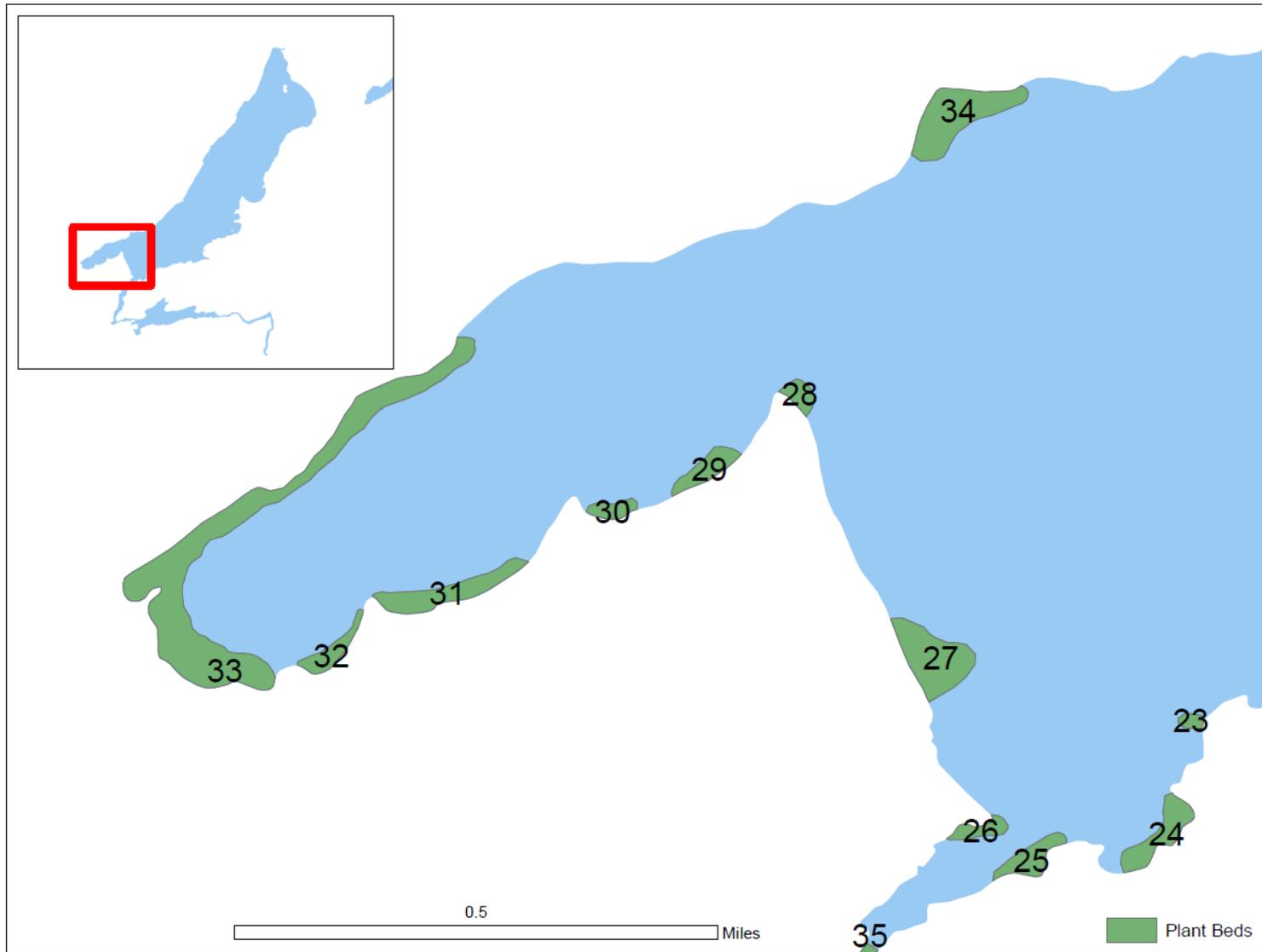


Figure 79. Aquatic plant bed map for Piseco Lake West. Bed IDs correspond with Table 26, supplemental data.

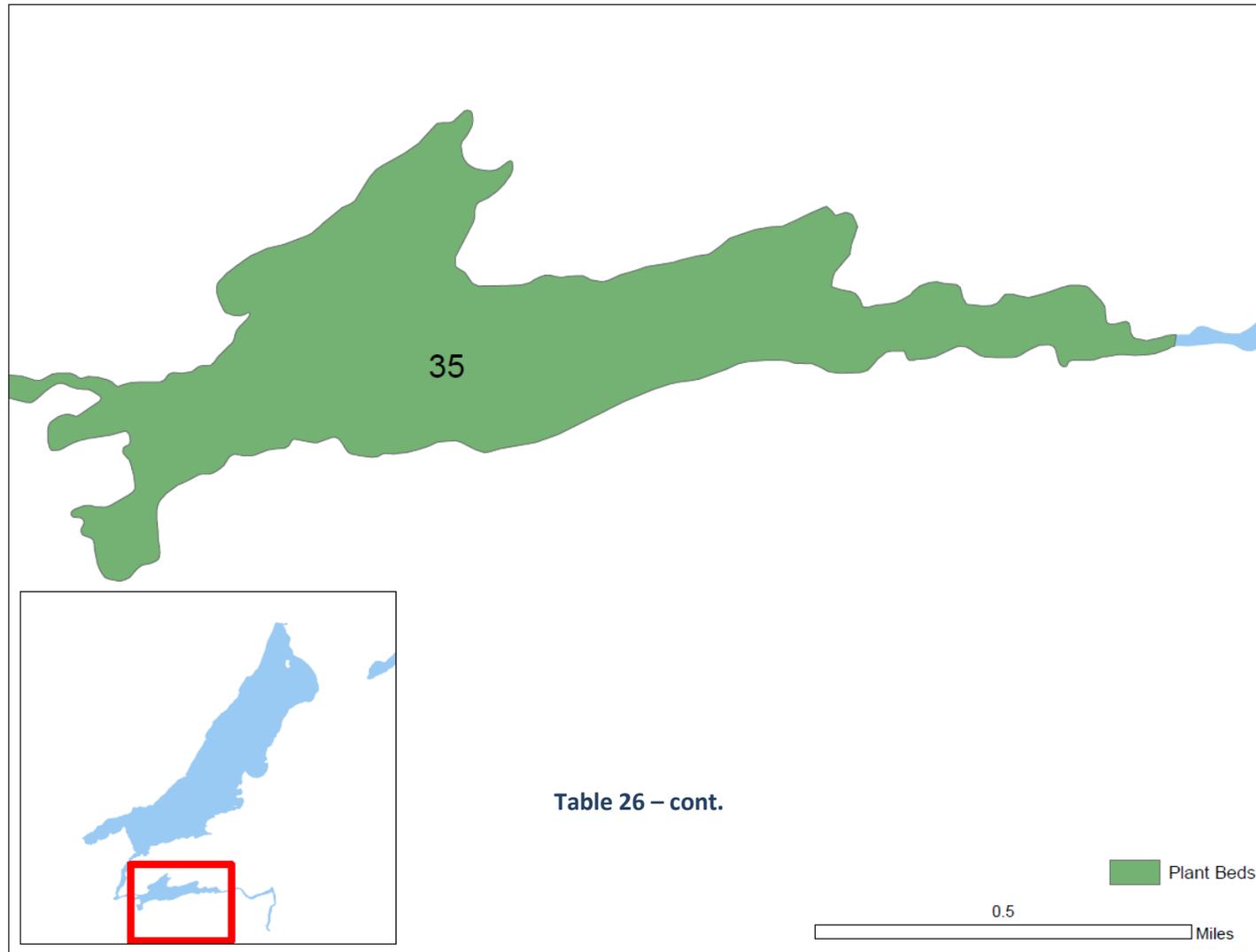


Figure 80. Aquatic plant bed map for Piseco Lake Outlet. Bed IDs correspond with Table 26, supplemental data.

## Putnam Pond

Putnam Pond is a 282.9 acre pond found in the Town of Ticonderoga, Essex County, nestled in the Lake Champlain watershed.

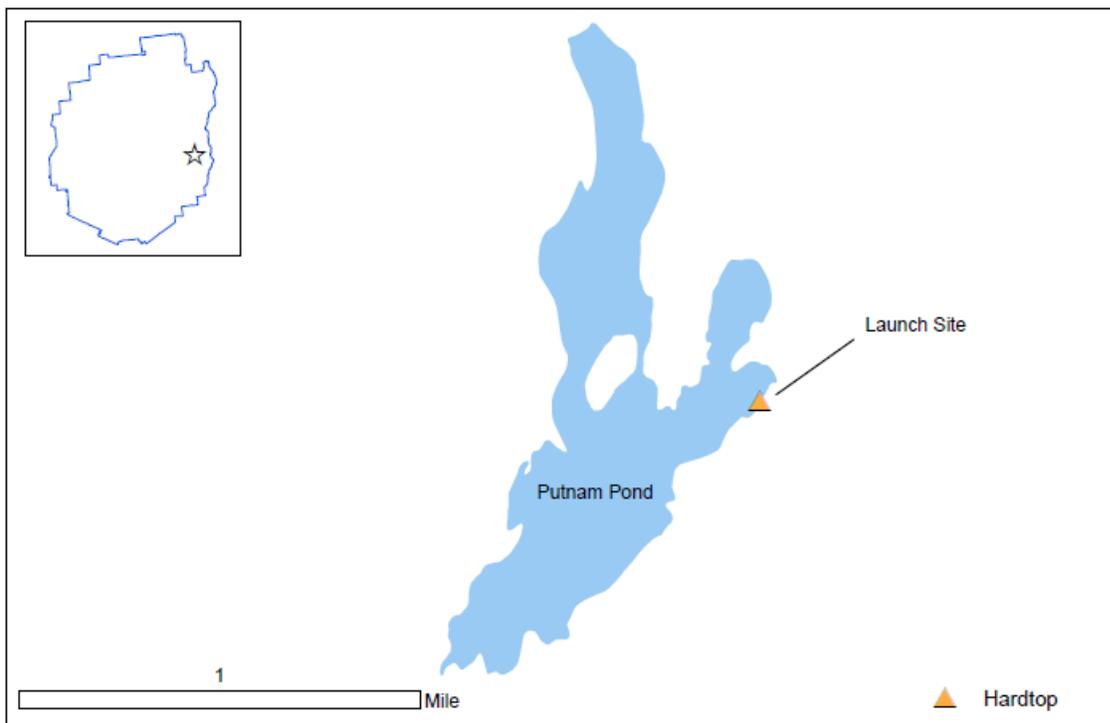


Figure 81. Location map for Putnam Pond and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 14 plant beds were mapped in the Putnam Pond covering 197.9 acres, representing 70% of surface water. The most abundant aquatic plant taxa found were *Brasenia schreberi*, *Eriocaulon sp.*, and *Nymphaea odorata*. The least abundant aquatic plant taxa found were *Isoetes sp.*, *Vallisneria americana*, and *Potamogeton gramineus*. (Figure 82). A total of 34 rakes were tossed, of which 20 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Utricularia purpurea*, *Eleocharis parvula*, and *Nitella sp.* The least abundant aquatic plant taxa returned by the rake were *Utricularia minor*, *Potamogeton ampifolius*, and *Elodea nuttallii*.

One AIS was found during the survey: *Myriophyllum spicatum* (Eurasian water-milfoil). *M. spicatum* was found in 8 of the 14 beds covering 175.3 acres, representing 88.7% of all beds (Figure 99, table 26).

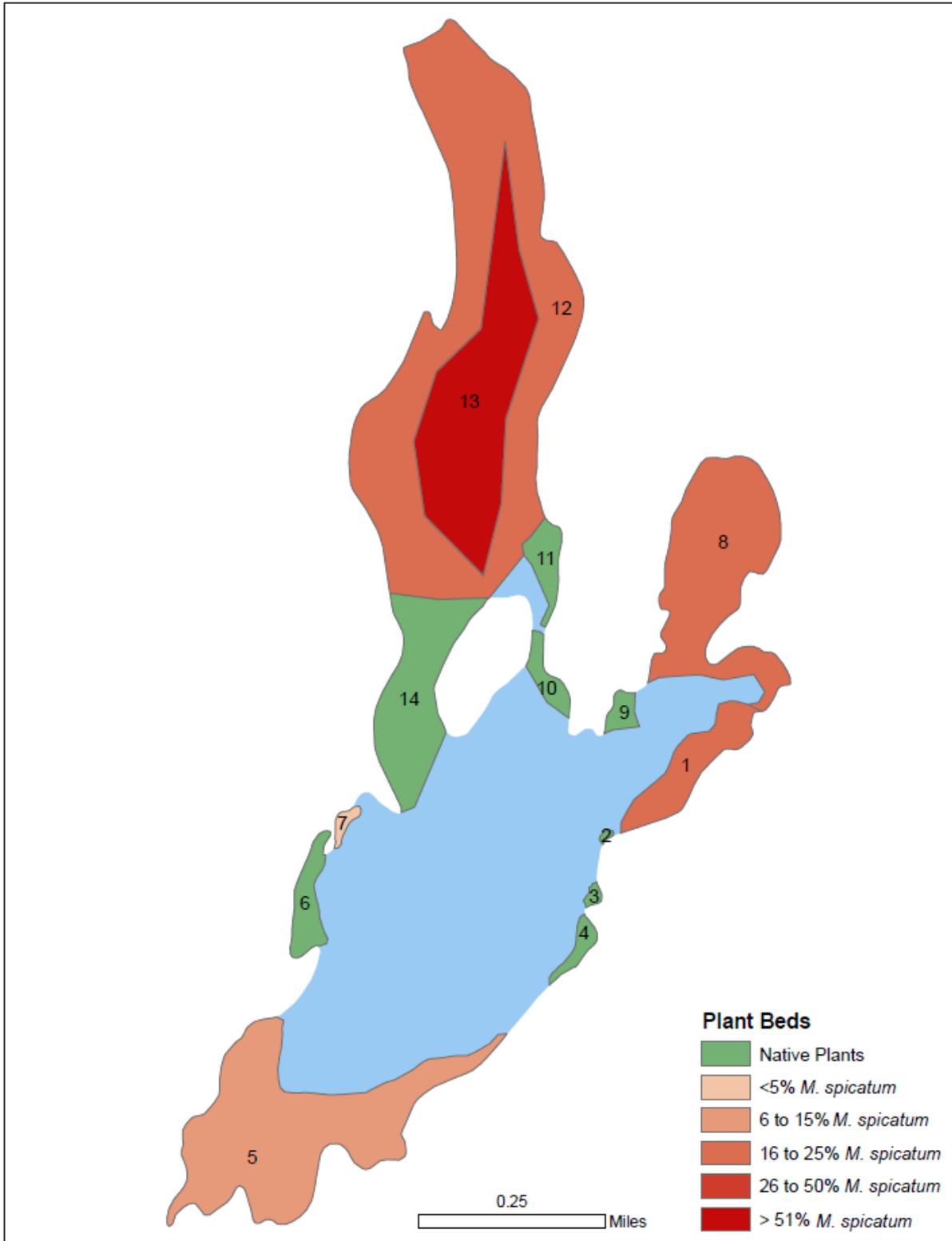


Figure 82. Aquatic plant bed map for Putnam Pond, bed IDs correspond with table 27.

## Pyramid Lake

Pyramid Lake is a 166.8 acre lake found in the Town of Schroon, Essex County, nested in the Upper Hudson watershed.

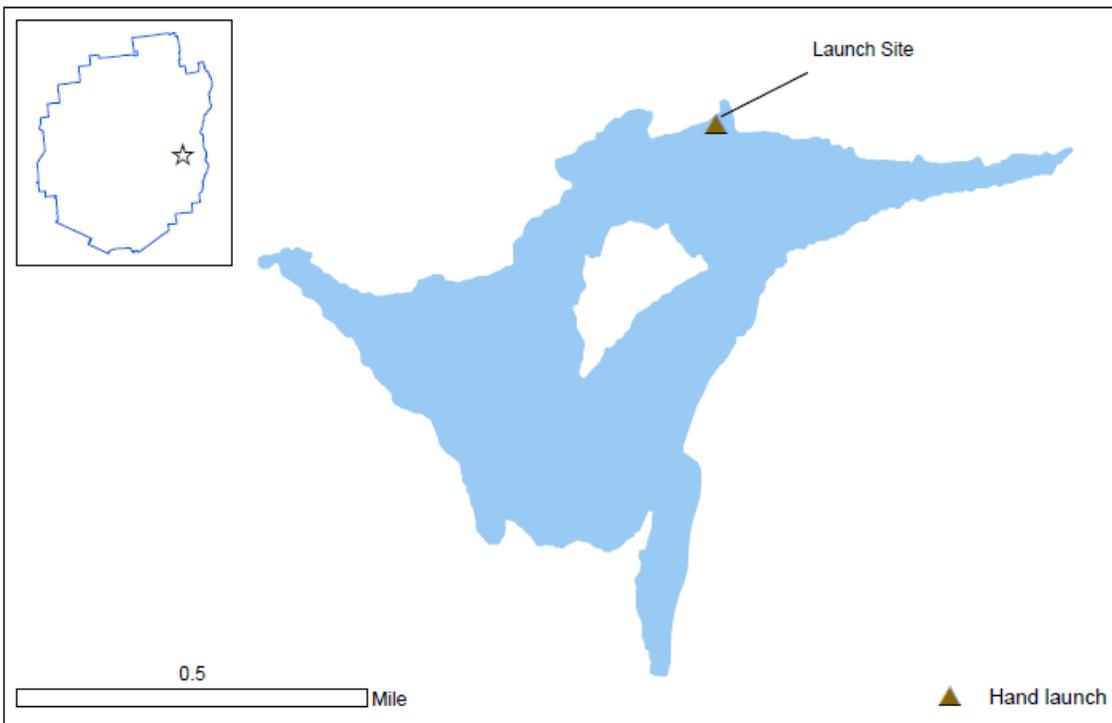


Figure 83. Location map for Pyramid Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 12 plant beds were mapped in the Pyramid Lake covering 15.8 acres, representing 9.5 % of surface water. The most abundant aquatic plant taxa found were *Potamogeton epihydrus*, *Najas sp.*, and *Nymphaea odorata*. The least abundant aquatic plant taxa found were *Utricularia vulgaris*, *Nymphoides cordata*, and *Potamogeton pusillus* (Figure 84). A total of 16 rakes were tossed, of which 5 returned plant specimens. The rake returned only two aquatic plant taxa, *Najas sp.* and *Potamogeton epihydrus*.

No AIS were found in Pyramid Lake.

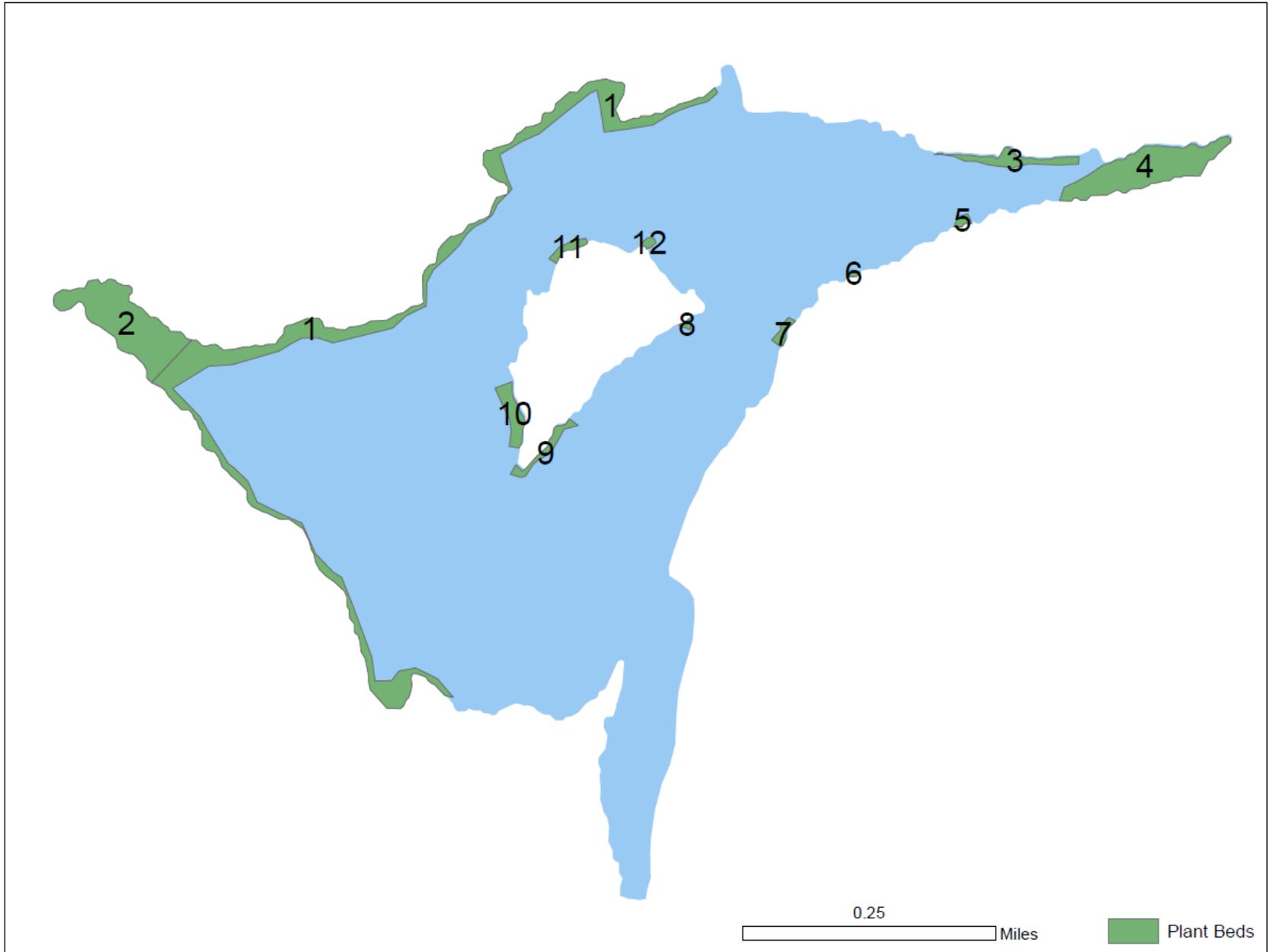


Figure 85. Plant bed map for Pyramid Lake. Rake IDs correspond with Table 28, supplemental data.

## Sacandaga Lake

Sacandaga Lake is a 166.8 acre lake found in the Town of Lake Pleasant, Hamilton County, nestled in the Sacandaga watershed.

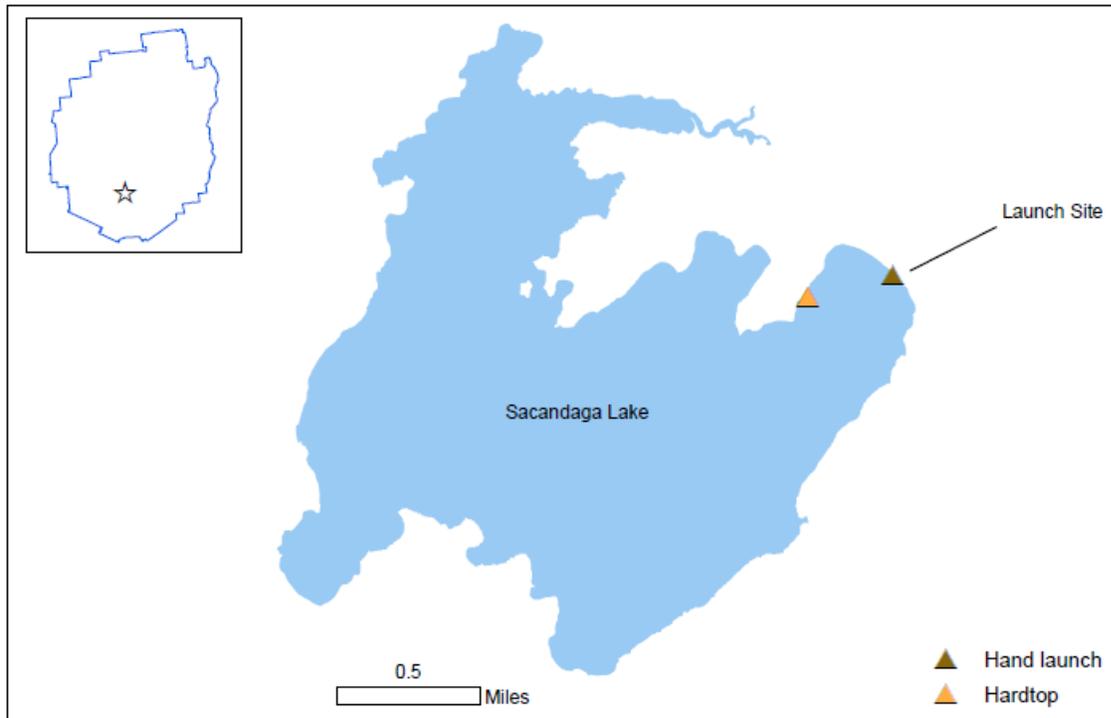


Figure 86. Location map for Sacandaga Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 25 plant beds were mapped in the Sacandaga Lake covering 49.2 acres, representing 9.5 % of surface water. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Nymphaea odorata*, and *Potamogeton ampifolius*. The least abundant aquatic plant taxa found were *Myriophyllum tenellum*, *Myriophyllum alterniflorum*, and *Elodea nuttallii* (Figure 87). A total of 45 rakes were tossed, of which 11 returned plant specimens. The most abundant aquatic plant taxa returned by the rake tosses were *Eriocaulon sp.*, *Eleocharis parvula*, and *Utricularia vulgaris*.

One AIS was found during the survey: *Bythotrephes longimanus* (spiny waterflea). A plankton tow returned 2 specimens of *B. longimanus*.

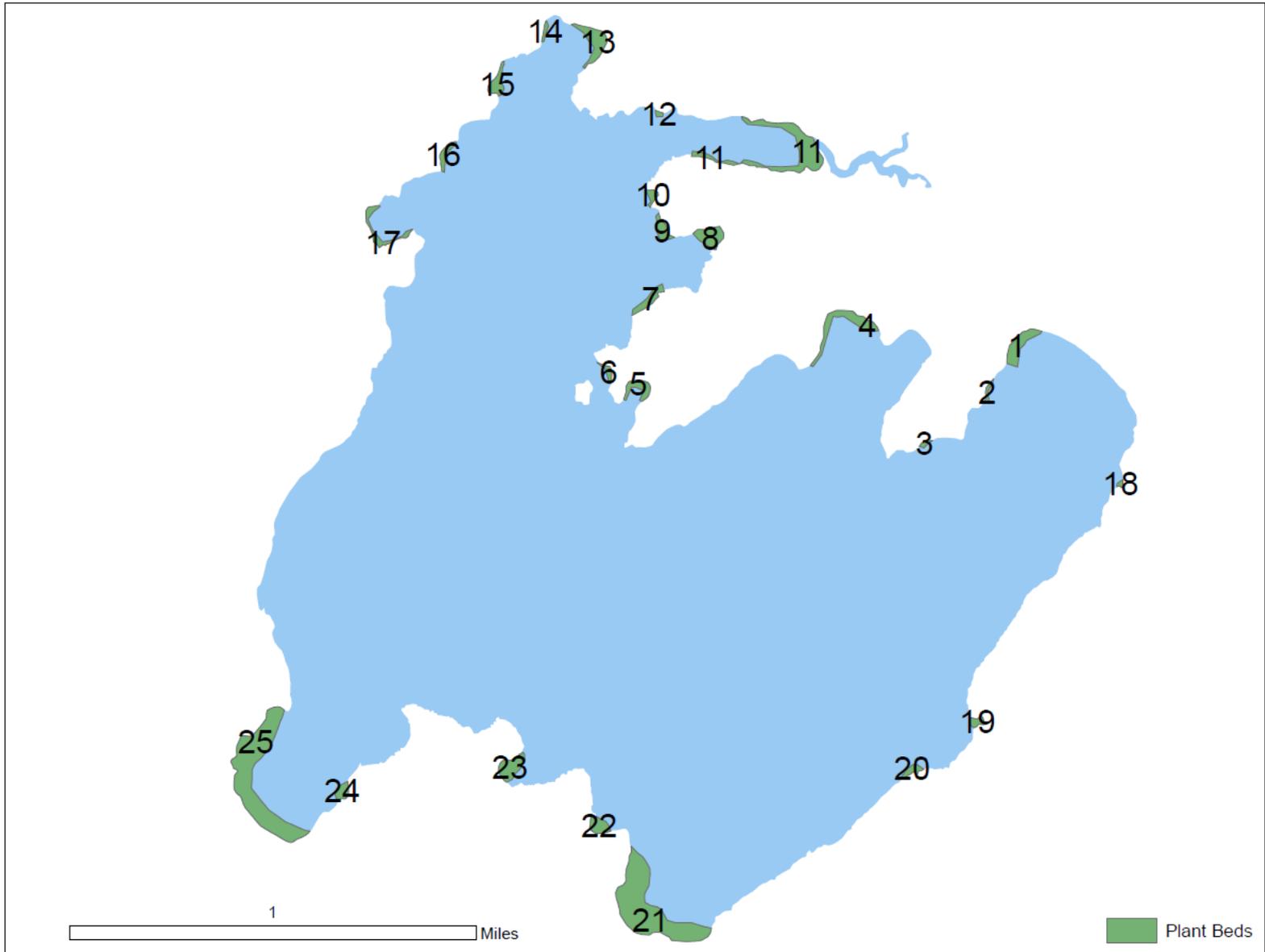


Figure 87. Plant bed map for Sacandaga Lake. Rake IDs correspond with Table 29

## Schroon Lake

Schroon Lake is a 4,272 acre lake found in the Town of Schroon and Chester, Essex and Warren Counties, nested in the Upper Hudson watershed.

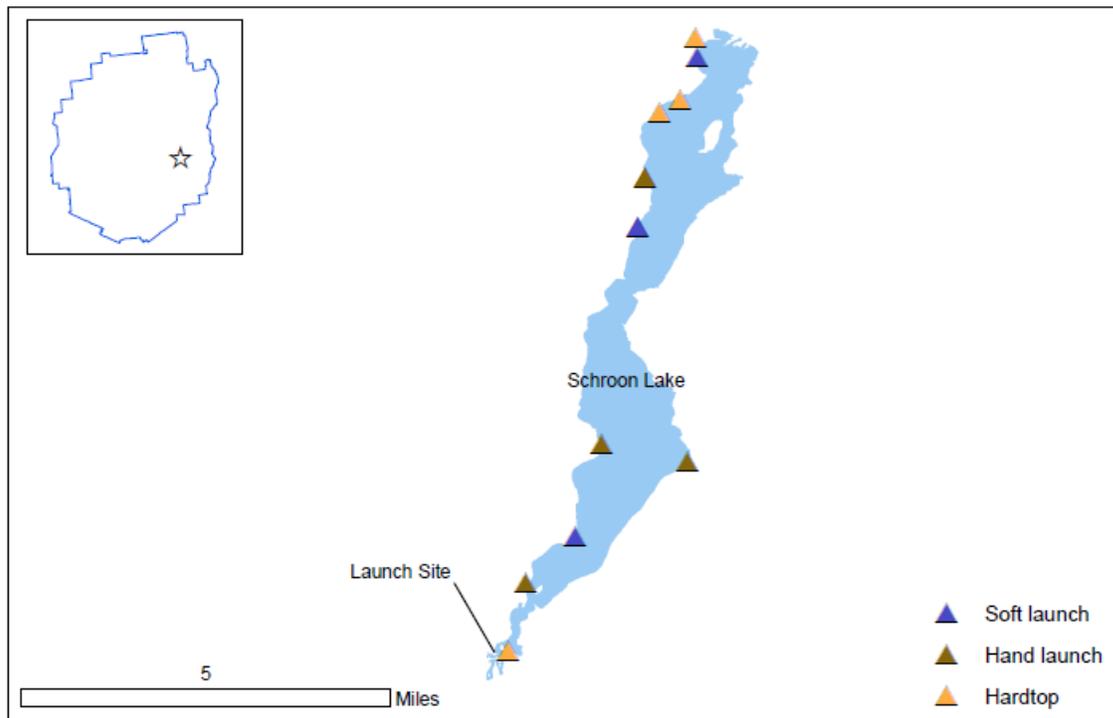


Figure 88. Location map for Schroon Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 44 plant beds were mapped in Schroon Lake covering 275.8 acres of surface water, representing 6.5% of the lake area. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Vallisneria americana*, and *Potamogeton epihydrus*. The least abundant aquatic plant taxa found were *Najas sp.*, *Sparganium sp.*, and *Eriocaulon sp.* (Figure 89-91). A total of 60 rakes were tossed, of which 26 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Nitella sp.*, *Utricularia purpurea*, and *Elodea nuttallii*. The least abundant aquatic plant taxa returned by the rake were *Myriophyllum tenellum*, *Potamogeton praelongus*, and *Potamogeton perfoliatus*.

Two AIS were found during the survey: *Myriophyllum spicatum* (Eurasian watermilfoil) and *Potamogeton crispus* (curly leaf pondweed). *M. spicatum* was detected in 15 plant beds in Schroon Lake covering 122.2 acres, 44.4% of all plant beds. *M. spicatum* is a common AIS in the Adirondacks. *Potamogeton crispus* was detected in 1 plant bed (bed ID 4) covering .3 acres of surface water. No invasive plankton was detected.

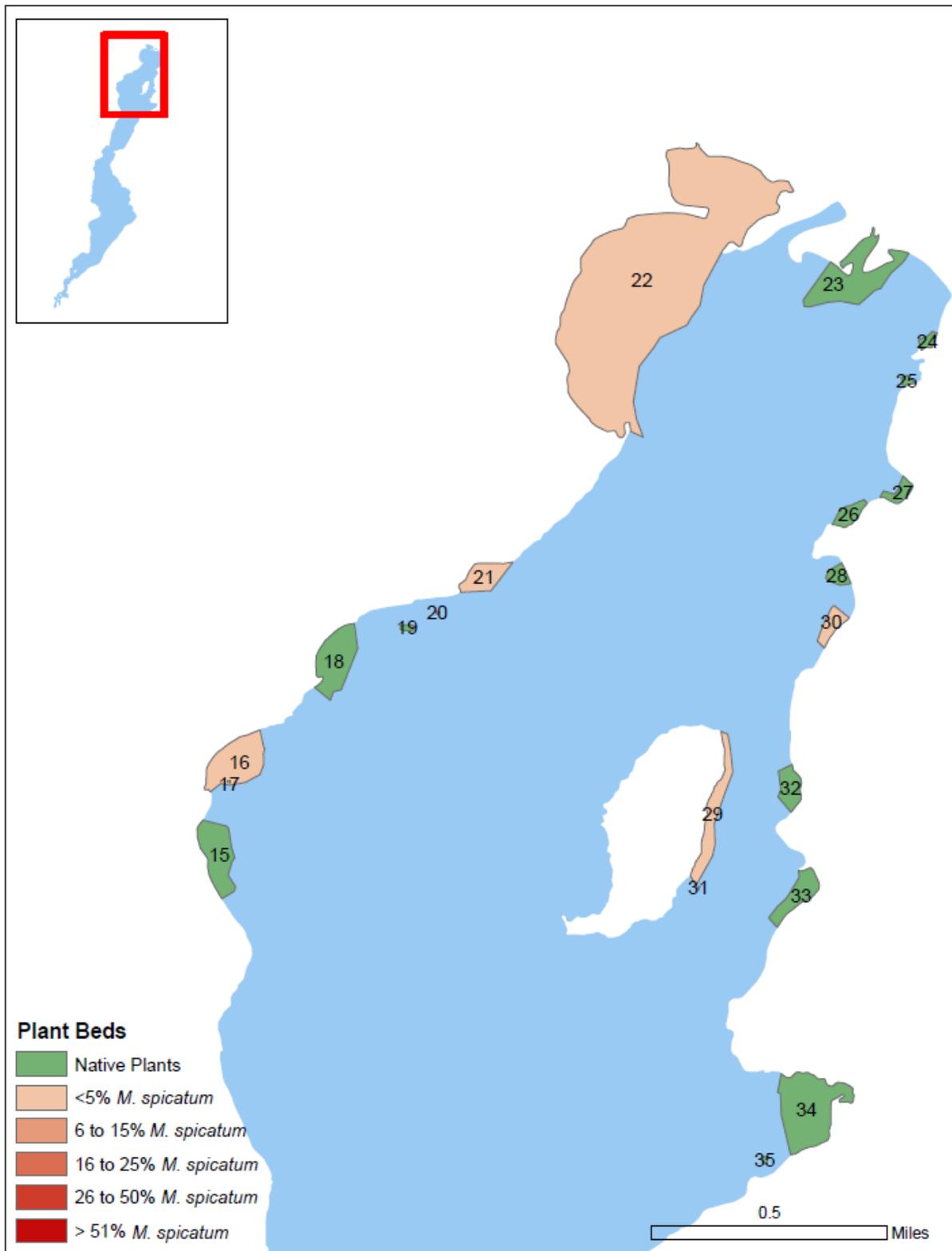


Figure 89. Aquatic plant bed map for Schroon Lake Central. Bed IDs correspond with Table 29, supplemental data.

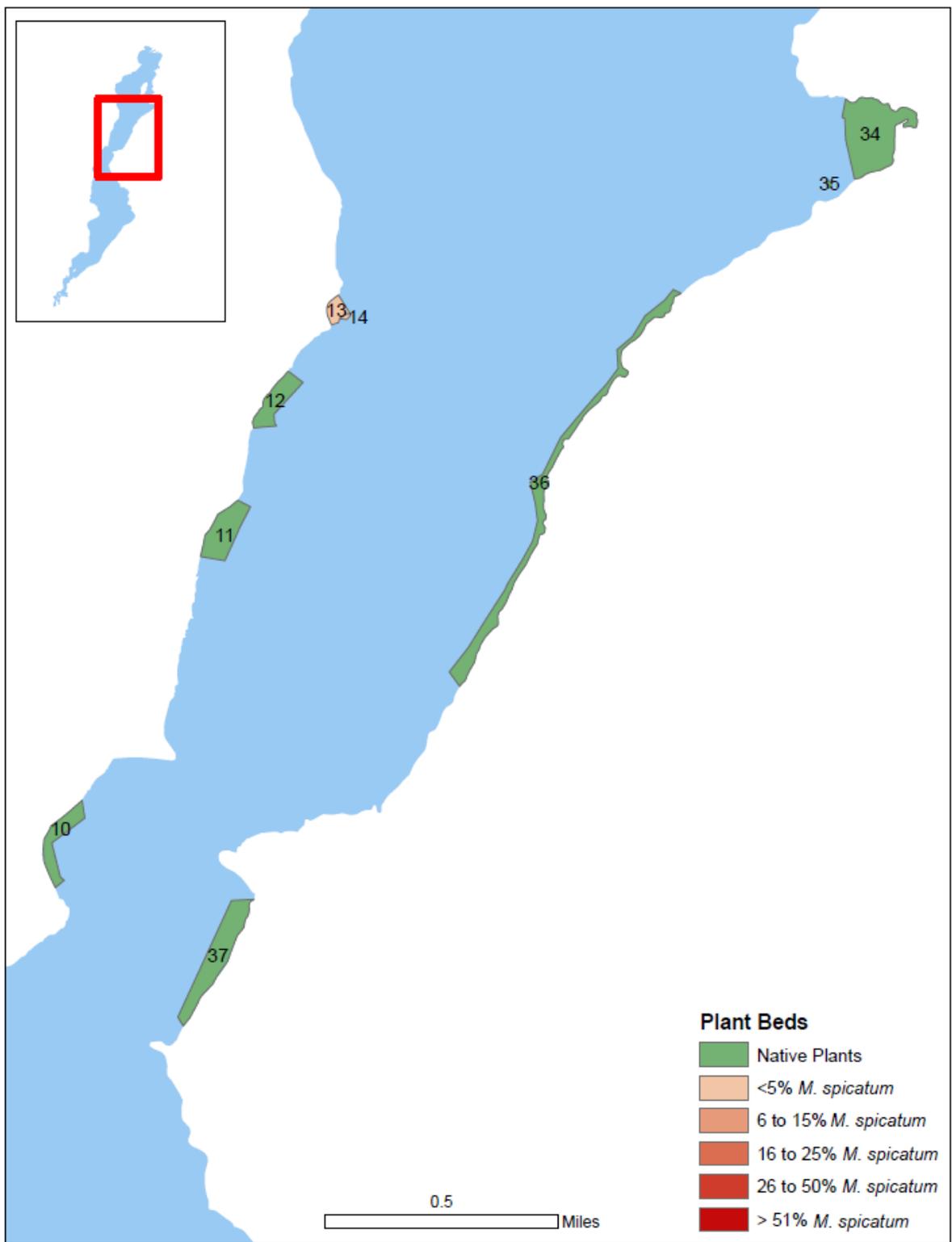


Figure 90. Aquatic plant bed map for Schroon Lake Central. Bed IDs correspond with table 29, supplemental data.

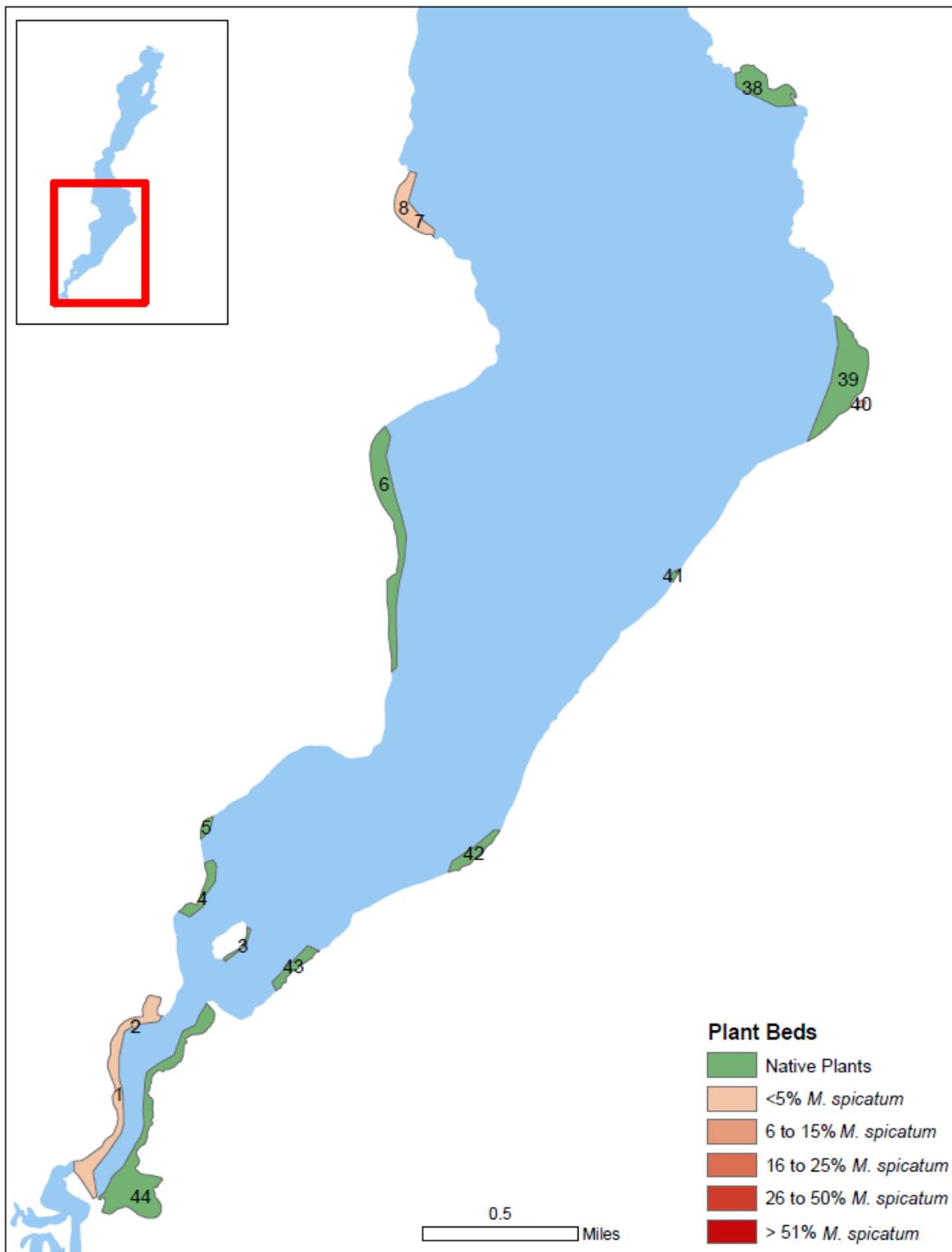


Figure 91. Aquatic plant bed map for Schroon Lake South. Bed IDs correspond with table 30, aquatic plant bed map.

## South Lake

South Lake is a 487 acre lake found in the Town of Ohio, Herkimer County, nested in the Black River watershed.



Figure 92. Location map for South Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 7 plant beds were mapped in the South Lake covering 46.7 acres, representing 9.6 % of surface water. The most abundant aquatic plant taxa found were *Utricularia purpurea*, *Eleocharis parvula*, and *Myriophyllum farwellii*. The least abundant aquatic plant taxa found were *Isoetes sp.*, *Potamogeton pussilus*, and *Vallisneria americana* (Figure 93). A total of 35 rakes were tossed, of which 1 returned plant specimens. The rake returned only two aquatic plant taxa, *Utricularia purpurea* and *Myriophyllum farwellii*.

No AIS were found in South Lake.

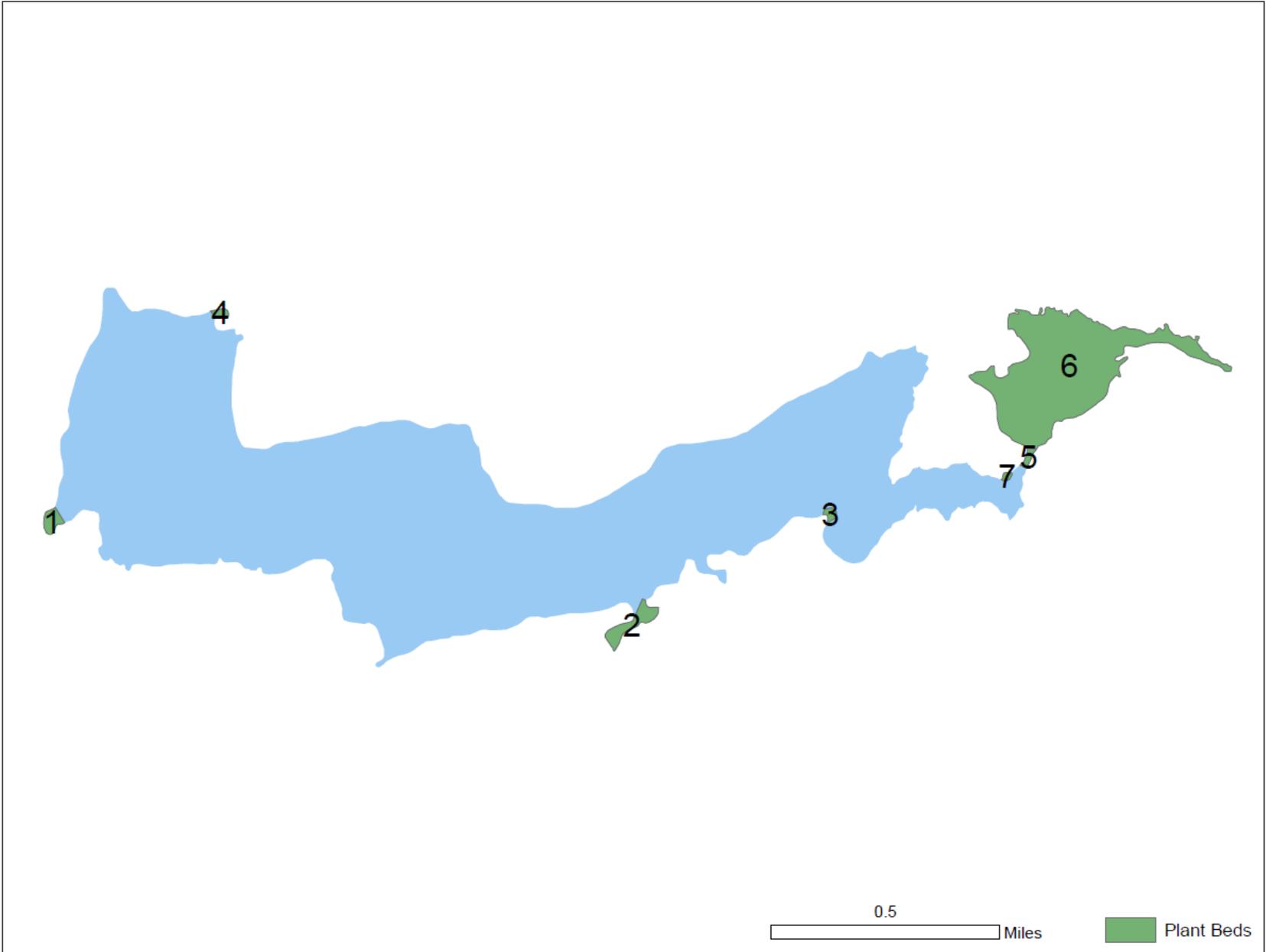


Figure 93. Plant bed map for South Lake. Rake IDs correspond with Table 31.

## Study Site

Thirteenth Lake is a 326.8 acre lake found in the Town of Johnsburg, Warren County, nestled in the Upper Hudson watershed.

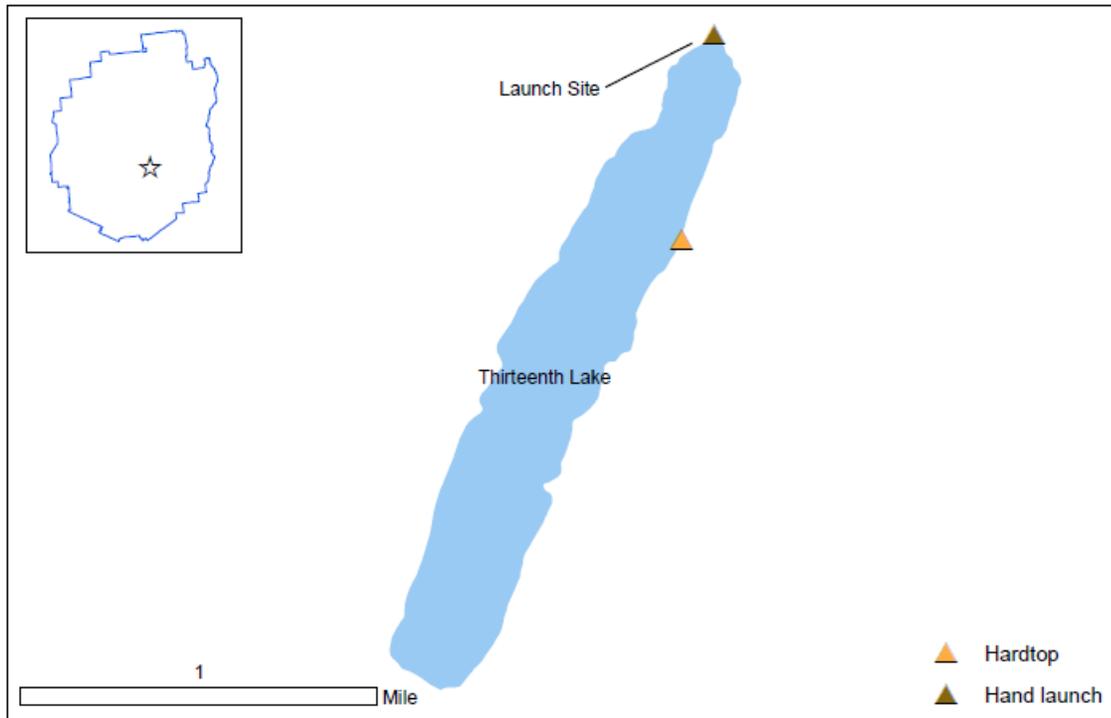


Figure 94. Location map for Thirteenth Lake and location of launch site utilized and locations of other access points, public and private. Soft launches are sites where motor boats can be launched but do not have a cement ramp. Hardtops are sites where motor boats can be launched and do have a cement ramp. Hand launches are sites where access is limited to canoes, kayaks, guide boats, and other small craft.

## Results

A total of 4 plant beds were mapped in the Thirteenth Lake covering 73.8 acres, representing 22.6 % of surface water. The most abundant aquatic plant taxa found were *Eriocaulon sp.*, *Brasenia schreberi*, and *Nymphaea odorata*. The least abundant aquatic plant taxa found were *Sparganium sp.*, *Potamogeton robbinsii*, and *Potamogeton ampifolius*. (Figure 95). A total of 31 rakes were tossed, of which 4 returned plant specimens. The most abundant aquatic plant taxa returned by the rake were *Nitella sp.*, *Utricularia purpurea*, and *Vallisneria americana*. The least abundant aquatic plant taxa returned by the rake were *Utricularia vulgaris*, *Nuphar variegata*, and *Potamogeton variegata*.

No AIS were found in Thirteenth Lake



Figure 95. Plant bed map for Thirteenth Lake. Bed IDs correspond with Table 32.

## Recommendations

The accuracy of the handheld GPS in this study is widely accepted as a spatial standard in aquatic plant survey methodologies (e.g. Hauxwell et al. 2010; Janauer 2003; Nelson, Cheruvellil, and Soranno 2006). Although GPS units with greater accuracy are available, using them in this wet environment is uneconomical. Flowing waters were rarely surveyed this summer, so the error caused by a moving GPS unit was minimal, and in high wind all effort was made to keep the canoe stationary. The abundance data (% cover) may be at risk of precision error when estimated in large beds, to supplement this deficiency stratified grid sampling of beds may be used in future years, but this approach is less time efficient and disrupts the method continuity of the park wide aquatic plant dataset.

## Literature cited

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