DARRIN
Fresh Water Institute

Lake George, New York
Adirondack Field Station at Bolton Landing

Cossayuna Lake
Aquatic Plant Survey – 2016

Prepared By

Lawrence Eichler
Research Scientist

Darrin Fresh Water Institute
5060 Lakeshore Drive
Bolton Landing, NY 12814
(518) 644-3541 (voice) (518) 644-3640 (fax)
eichll@rpi.edu

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TABLE OF CONTENTS

List of Tables

List of Figures

Background

Quantitative aquatic plant surveys were undertaken for Cossayuna Lake, New York as part of a cooperative effort between the Darrin Fresh Water Institute and the Cossayuna Lake Improvement Association. The aquatic plant survey was designed to provide baseline data on aquatic plant distribution and to evaluate a treatment program based on lake level drawdown, herbicide application and mechanical harvesting to control Eurasian watermilfoil (*Myriophyllum spicatum*) and Curly-leaf Pondweed (*Potamogeton crispus*). The Point-Intercept Rake Toss method presently required by NYS DEC for Tier III Lakes was employed.

The project was designed to obtain data to evaluate current aquatic plant management efforts and review potential new strategies. The assessment will generate the information necessary to: 1) review effectiveness of aquatic plant management efforts, 2) meet selected permit requirements and 3) provide data for comparison of post-treatment conditions to prior survey information.

Introduction

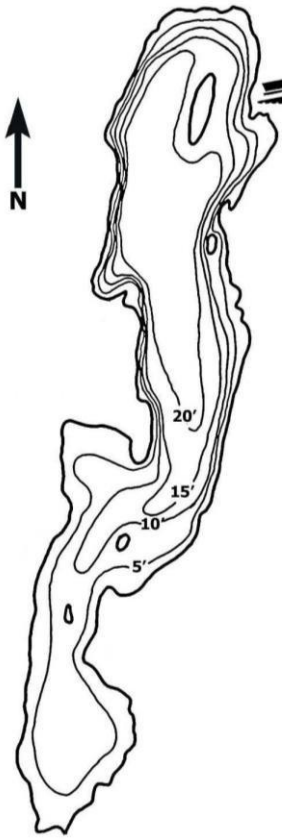


Figure 1. Bathymetric (depth) map of Cossayuna Lake.

Cossayuna Lake is located in the central portion of Washington County in the Towns of Argyle and Greenwich. Elevations within the watershed range from 495 feet above sea level at the surface of the lake to 900 feet at the highest elevations. The lake has a surface area of 776 acres and a rolling watershed of 7,467 acres. It drains via Whittaker Creek to the Battenkill and ultimately the Hudson River. The lake has a maximum depth of 8.0 meters (26 feet) and a mean depth of 3.1 meters (10 feet). Typical of lakes in the temperate region, it is dimictic, exhibiting both summer and winter thermal stratification. Located on the southern margin is the only outlet which is dammed and used to maintain the level of the lake. The lake is best classified as eutrophic which indicates that nutrients necessary for dense growth of algae and subsequently the myriad of organisms that feed on these plants, are available.

Dense growth of native aquatic plants has been reported for many years in Cossayuna Lake. In 1970, a management program keyed to winter drawdown, mechanical harvesting and herbicide treatments for aquatic plant control was initiated under the auspices of the Cossayuna Lake Improvement Association. Eurasian watermilfoil (*Myriophyllum spicatum*) was first verified in Cossayuna Lake in 1975, and is currently the dominant aquatic plant species. Eurasian watermilfoil is found from the water's edge to water depths of 3.0 meters (10 feet) and reaches its maximum abundance in water depths

of 1.0 to 2.0 meters (3 to 7 feet). Dense growth of Eurasian watermilfoil covered 150 acres of Cossayuna Lake in 1998, or about 19% of the surface area of the lake. Nearly annual 'spot' treatments with Aqua Kleen (2,4-D) were employed from the mid-1980's through 2009 with a Sonar (fluridone) treatment included in 1996. After several years with exclusively mechanical harvesting, herbicide treatments with Sculpin G (2,4-D) were initiated in 2013 and supplemented with Aquathol K (Endothall) since that time. The Aquathol K (Endothall) was included to address expansion of curly-leaf pondweed growth following management of Eurasian watermilfoil. Spot treatments have also been replaced with treatment of larger plots to improve lake-wide control. Refinements in the mechanical harvesting program have also yielded more efficient operation and better control of native nuisance plant and algae growth.

Surveys of aquatic plants in Cossayuna Lake were conducted in 1932 (Muenscher, 1933), 1948 (NYSDEC Fisheries), 1992 (CSLAP, 1992) and 1998 (Eichler et al. 1998). The species lists for the four surveys are quite different. Historical surveys of Cossayuna Lake indicate a greater diversity of aquatic plants than is currently seen. Muenscher (1933) observed 29 species of aquatic plants in Cossayuna Lake. Five aquatic plant species were reported in 1992, while the 1998 survey reported 15 species. Between the four surveys, a total of 33 species of aquatic plants are reported for Cossayuna Lake. The dominant plants in 1998 were Eurasian watermilfoil, coontail, curly-leaf pondweed, Robbins pondweed, and duck celery. In 1998, species richness was below average for lakes of this type in New York State, potentially due to the invasion by Eurasian watermilfoil. Case histories from throughout the US and Canada indicate a loss of species diversity following invasion by Eurasian watermilfoil.

Methods

Species List and Herbarium Specimens. As the lake was surveyed, the occurrence of each aquatic plant species observed was recorded and adequate herbarium specimens collected. The herbarium specimens were pressed, dried, and mounted (Hellquist 1993) at the Darrin Fresh Water Institute Laboratory in Bolton Landing, NY, where they became part of the permanent collection.

Point Intercept Survey. The frequency and richness of aquatic plant species were evaluated using a point intercept (rake toss) method (Madsen 1999). At each grid point intersection, all species located at that point were recorded, as well as water depth. Species were located by a visual inspection of the point and by deploying a rake to the bottom, and examining the plants retrieved. A differential global positioning system (DGPS) was used to navigate to each point for the survey observation. Point intercept plant frequencies

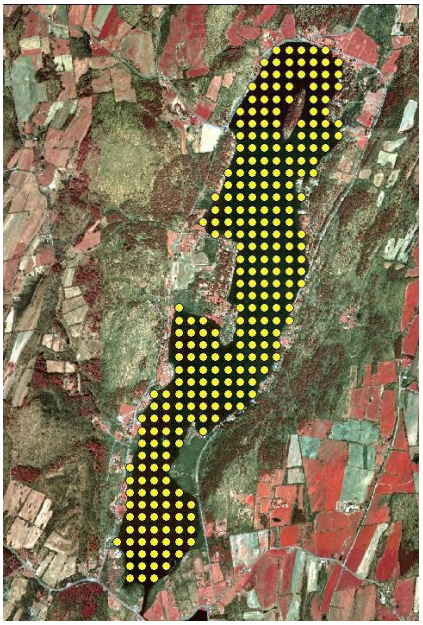


Figure 2. Distribution of survey points for Cossayuna Lake.

were surveyed on September 13, 2016, at the time of maximum aquatic plant abundance. Based on a 100 meter grid and excluding some points outside the littoral zone, we surveyed a total of 150 points (Figure 1). The point intercept method allows a large number of discrete observations in a short period of time facilitating statistical analysis and comparisons. Point intercept methods also allow for production of distribution maps for all species.

Results and Discussion

A list of species observed for Cossayuna Lake is provided in Table 1. A total of 22 species were observed, with 20 collected in the point intercept survey. Of these, one group are macroscopic alga, or charophytes (*Chara/Nitella*), three are floating-leafed species (*Nuphar, Nymphaea* and *Trapa*), three are floating (*Lemna* and *Spirodela*), six are emergent species (*Eleocharis, Sparganium, Polygonum, Scirpus, Typha* and *Pontederia*) and the remaining 9 are submersed. This high diversity suggests a healthy aquatic plant population at the present time. None of these species is on the New York State Rare Plant list (Young, 2010). A native plant species, Coontail (*Ceratophyllum demersum* L.), dominated the plant community, present throughout the littoral zone with the largest area of dense growth at the deep margin of plant growth.

Table 1. Aquatic plant species present in Cossayuna Lake.

Scientific Name	Common Name	1932	1992	1998	2016
Brasenia schreberi	water shield	x			
Chara/Nitella	Muskgrass				x
Ceratophyllum demersum	Coontail	x	x	x	x
Eleocharis sp.	spikerush	x			x
Elodea canadensis	waterwort	x	x	x	x
Isoetes echinospora	quillwort	x			
Lemna minor	duckweed			x	x
Lemna trisulca	duckweed				x
Megalodonta (Bidens) beckii	water marigold	x			
Myriophyllum spicatum	Eurasian watermilfoil		x	x	x
Najas flexilis	bushy pondweed	x		x	
Najas guadalupensis	southern naiad				x
Najas minor	brittle naiad				x
Nuphar variegata	yellow water lily	x	x	x	x
Nymphaea odorata	white water lily	x		x	x
Polygonum amphibium	smartweed				x
Pontederia cordata	pickerelweed	x			x
Potamogeton americanus	long-leaf pondweed	x			
Potamogeton amplifolius	broad-leaf pondweed	x			
Potamogeton crispus	curly-leaf pondweed	x	x	x	x
Potamogeton dimorphus	spiral pondweed	x			
Potamogeton epihydrus	Nutall's pondweed	x			

Scientific Name	Common Name	1932	1992	1998	2016
Potamogeton freisii	Fries' pondweed	x			
Potamogeton gramineus	variable pondweed	x			
Potamogeton natans	floating-leaf pondweed	x			x
Stuckenia pectinata	Sago pondweed	x			
Potamogeton praelongus	white-stem pondweed	x			
Potamogeton pusillus	little pondweed	x		x	
Potamogeton richardsonii	Richardson's pondweed	x			
Potamogeton robbinsii	Robbin's pondweed	x		x	
Potamogeton zosteriformes	flat-stem pondweed			x	
Ranunculus sp.	white water crowsfoot	x			
Scirpus sp.	spike rush				x
Sparganium eurycarpum	giant bur-reed	x			x
Spirodela polyrhiza	giant duckweed				x
Trapa natans	waterchestnut				x
Typha sp.	cattail			x	x
Utricularia vulgaris	giant bladderwort	x			
Vallisneria americana	duck celery	x		x	x
Zosterella (Heteranthera) dubia	water stargrass	x		x	x

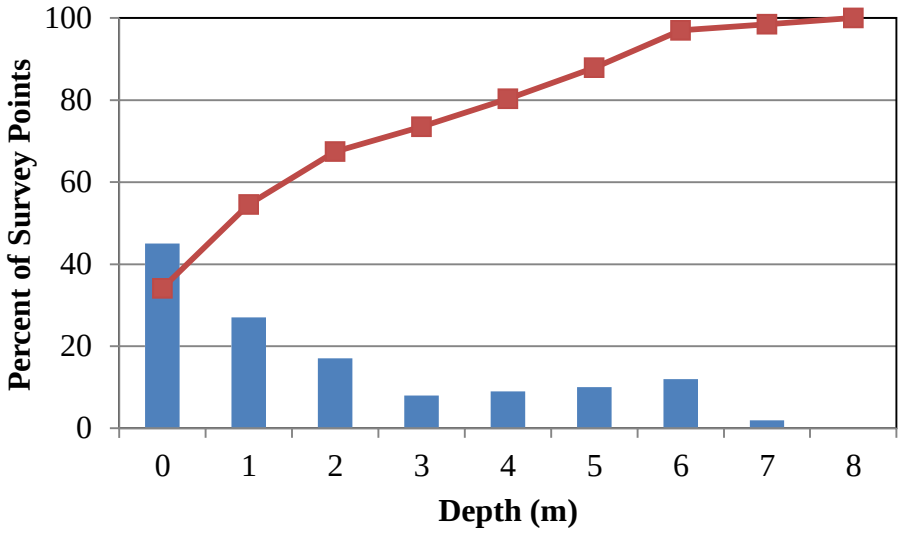
Muenscher (1933) observed 30 species of aquatic plants in Cossayuna Lake. The current survey reported 22 and a similar survey in 1998 (Eichler and Boylen 1998), reported a total of 15 species. Combining all surveys, a total or 40 species have been reported for Cossayuna Lake. Seven newly reported species were observed in 2016, with 2 known to be invasive, brittle naiad and waterchestnut.

Four of the reported species are classified as invasive, including Eurasian watermilfoil, curly-leaf pondweed, waterchestnut and brittle naiad. The limited occurrence of Curly-leaf Pondweed (*Potamogeton crispus*) may be attributed to the timing of the current survey (September), rather than an actual abundance of this species. *Potamogeton crispus* generally reaches peak abundance in June and July, and then undergoes senescence. A hand harvesting effort by lake association members may have kept Waterchestnut (*Trapa natans*) in check since its discovery in 2014. The single sighting for brittle naiad represents the initial reporting of this species in Cossayuna Lake.

Maximum Depth of Colonization

Rooted aquatic plants (macrophytes) were present from the waters' edge to a depth of 4.4 meters (24 feet) defining the littoral zone of Cossayuna Lake, and representing a 1 foot increase from 1998. Several specimens of coontail (*Ceratophyllum demersum*) were reported to a depth of 5.6 meters. Lack of roots on any of these specimens suggests that they may have become detached and drifted into deeper waters. Depth distribution of sampling points (Figure 3) was dominated by depths less than 2 meters representing the shallow fringe of the littoral zone.

Figure 3. Depth Distribution of Cossayuna Lake sampling points in 1 meter depth classes.



Species Richness and Distribution

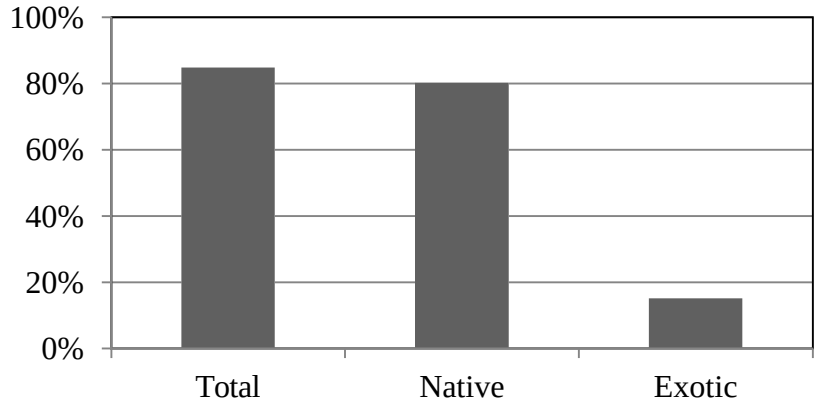
Species richness in Cossayuna Lake was quite high, with a large number of species occurring in more than 5% of survey points (Table 2). Maps of the distribution of all aquatic plant species for Cossayuna Lake are included in Appendix A. A native aquatic plant, coontail (*Ceratophyllum demersum)*, was the most common species in Cossayuna Lake, reported for 64% of survey points. Another native species, waterweed (*Elodea canadensis)* was also common, present in 45% of survey points. Eurasian watermilfoil (*Myriophyllum spicatum*) was widely scattered (13% of survey points) and much less abundant than in 1998. Three other invasive species were present in very limited amounts, curly-leaf pondweed (*Potamogeton crispus,* 5.3% of survey points), brittle naiad (*Najas minor*, 0.8%) and waterchestnut (*Trapa natans*, 0.8%). Brittle naiad, while considered native to New York State by some authors, has a weedy growth habit in shallow waters, often out-competing the common, native *Najas flexilis*. Common native macrophytes species included water stargrass (*Zosterella dubia,* 26% of survey points), duck celery (*Vallisneria americana,* 24%), southern naiad (*Najas guadalupensis,* 10%) and white pond lily (*Nymphaea odorata, 8*%).

Table 2. Percent frequency of occurrence of aquatic plant species in Cossayuna Lake.

Scientific Name	Common Name	Frequency
Chara/Nitella spp	muskgrass	5.3%
Ceratophyllum demersum	coontail	63.6%
Eleocharis sp.	spikerush	0.8%
Elodea canadensis	waterwort	44.7%
Lemna minor	duckweed	1.5%
Lemna trisulca	duckweed	0.8%
Myriophyllum spicatum	Eurasian watermilfoil	12.9%
Najas guadalupensis	southern naiad	9.8%
Najas minor	brittle naiad	0.8%
Nuphar variegata	yellow water lily	3.8%
Nymphaea odorata	white water lily	7.6%
Pontederia cordata	pickerelweed	0.8%
Potamogeton crispus	curly-leaf pondweed	5.3%
Scirpus sp.	rush	1.5%
Sparganium eurycarpum	giant bur-reed	0.8%
Spirodela	giant duckweed	3.0%
Trapa natans	waterchestnut	0.8%
Typha sp.	cattail	0.8%
Vallisneria americana	duck celery	23.5%
Zosterella dubia	water stargrass	25.8%

In 2016, 85% of survey points for Cossayuna Lake supported aquatic plants and 80% supported native species (Figure 4); comparable to 1998, when 94% of survey points for Cossayuna Lake supported aquatic plant species and 89% in the whole lake survey points supported native species. The large number of survey points supporting native plant species suggests that Cossayuna Lake is a prime candidate for recovery of its native plant population following management of Eurasian watermilfoil. For survey points strictly within the littoral zone, depth less than 5 meters, plants were present at 99% of points, with native species present in 95% and exotic species occurring in 19% of points surveyed.

Figure 4. Cossayuna Lake frequency of occurrence summaries for point intercept sampling points.

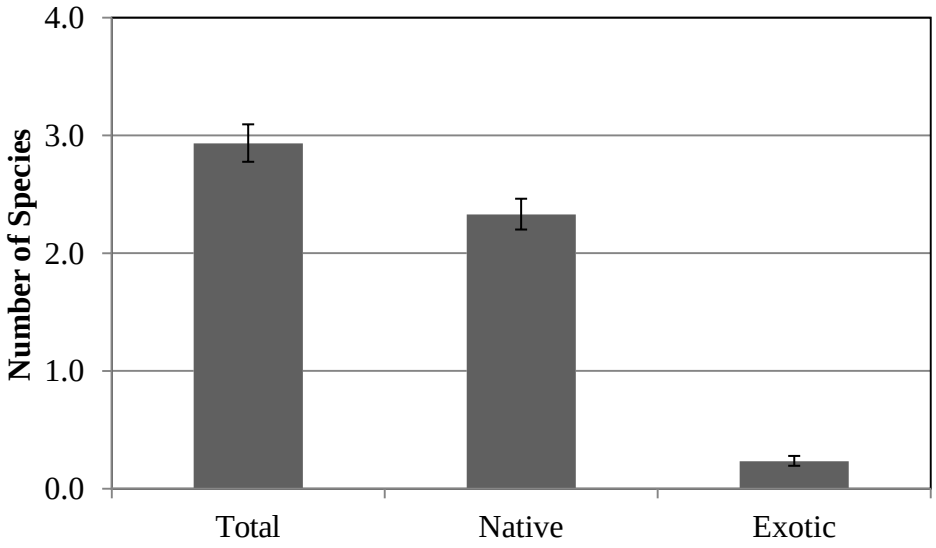


Species richness results for the point intercept survey are presented in Table 3 and Figure 5. Whole lake species richness was 2.44 ± 0.16 species per survey point, comparable to other moderately productive lakes within our region. For survey points exclusively within the littoral zone (depths less than 5 meters) species richness was 2.93 ± 0.16 species per sample and the shallow end of the littoral zone (depths less than 2 meters) yielded 3.63 ± 0.18 species per sample point.

Table 3. Cossayuna Lake species richness for the point intercept survey of 2016.

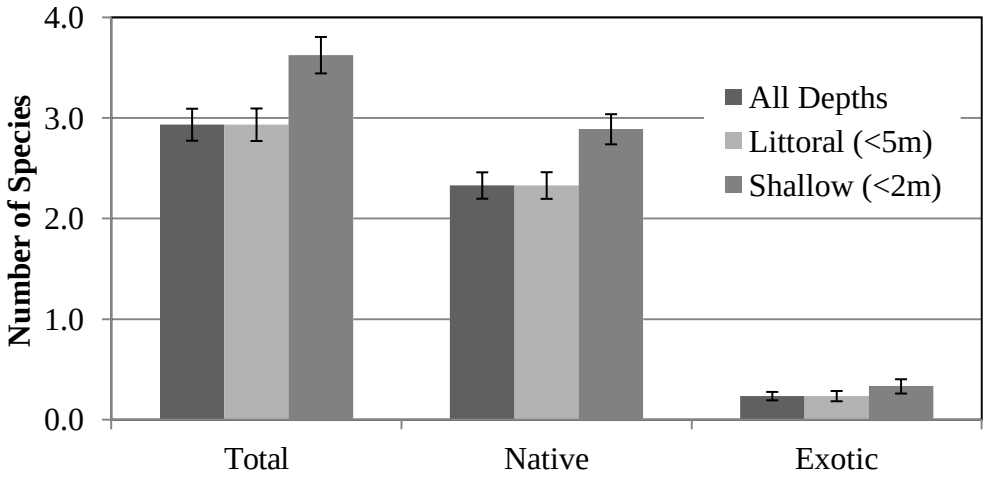
Plant Grouping	Water Depth Class	Statistic	2016
Native plant species	Whole Lake (all depths)	Mean	1.91
		N	132
		Std. Error	0.13
	Points with depths <5m	Mean	2.33
		N	106
		Std. Error	0.13
	Points with depths <2m	Mean	2.89
		N	72
		Std. Error	0.15
All plant Species	Whole Lake (all depths)	Mean	2.44
		N	132
		Std. Error	0.16
	Points with depths <6m	Mean	2.93
		N	106
		Std. Error	0.16
	Points with depths <2m	Mean	3.63
		N	72
		Std. Error	0.18

Figure 5. Cossayuna Lake littoral zone species richness comparison. Error bars are standard error of the mean.



As expected, species richness in the littoral zone and its shallow fringe was higher than whole lake species richness (Figure 6). Lack of a Eurasian watermilfoil canopy in water depths less than 2 meters may also allow for greater species richness. The negative impact of a canopy of Eurasian watermilfoil on species richness of native plants has been well documented (Madsen et al. 1989; 1991). Conversely, species richness increases in areas where Eurasian watermilfoil growth is reduced (Boylen et al. 1996).

Figure 6. Cossayuna Lake species richness by depth. Error bars are standard error of the mean.



Summary

A quantitative aquatic plant survey was undertaken for Cossayuna Lake, Washington County, New York as part of a cooperative effort between the Darrin Fresh Water Institute and the Cossayuna Lake Improvement Association. The survey was designed to 1) produce data comparable to a survey conducted in 1998, 2) provide additional baseline data on aquatic plant distribution and 3) evaluate a treatment program based on lake level drawdown, herbicide application and mechanical harvesting to control Eurasian watermilfoil (*Myriophyllum spicatum*). The Point-Intercept Rake Toss method presently required by NYS DEC for Tier III Lakes was employed.

Historically, surveys of aquatic plants in Cossayuna Lake were conducted in 1932 (Muenscher, 1933), 1948 (NYSDEC Fisheries), 1992 (CSLAP, 1992) and 1998 (Eichler et al. 1998). The species lists for the four surveys are quite different. Historical surveys of Cossayuna Lake indicate a greater diversity of aquatic plants in the past. Muenscher (1933) observed 29 species of aquatic plants in Cossayuna Lake. Five aquatic plant species were reported in 1992, while the 1998 survey reported 15 species. The current survey reported 22 species, with seven newly reported species. Combining all surveys, a total or 40 species are reported for Cossayuna Lake. This high diversity suggests a healthy aquatic plant population at the present time. None of these species is on the New York State Rare Plant list (Young, 2010).

Even prior to the introduction of Eurasian watermilfoil, aquatic plant growth was recognized as a nuisance. In 1970, a management program keyed to winter drawdown, mechanical harvesting and herbicide treatments for aquatic plant control was initiated under the auspices of the Cossayuna Lake Improvement Association. Eurasian watermilfoil (*Myriophyllum spicatum*) was first verified in Cossayuna Lake in 1975, and is currently one of the dominant aquatic plant species. In addition to Eurasian watermilfoil, three other invasive species are found in Cossayuna Lake, curly-leaf pondweed, waterchestnut and brittle naiad. The limited occurrence of curly-leaf pondweed (*Potamogeton crispus*) may be attributed to the timing of the current survey (September), rather than an actual abundance of this species. *Potamogeton crispus* generally reaches peak abundance in June and July, and then undergoes senescence. A hand harvesting effort by lake association members may have kept Waterchestnut (*Trapa natans*) in check since its discovery in 2014. The single sighting for brittle naiad (*Najas minor*) in 2016 represents the initial reporting of this species in Cossayuna Lake.

In August of 2016, the aquatic plant community of Cossayuna Lake included 22 species, with 20 collected in the point intercept survey. Of these, one group are macroscopic alga, or charophytes (*Chara/Nitella*), three are floating-leafed species (*Nuphar, Nymphaea* and *Trapa*), three are floating (*Lemna* and *Spirodela*), six are emergent species (*Eleocharis, Sparganium, Polygonum, Scirpus, Typha* and *Pontederia*) and the remaining 9 are submersed. This high diversity suggests a healthy aquatic plant population at the present time. Lake-wide aquatic plants were found to occur in 85% of all survey points and 99% of survey points in the littoral zone. The large

number of points supporting native plant species, 95% of survey points within the littoral zone, suggests that Cossayuna Lake is a prime candidate for recovery of its native plant population following management of Eurasian watermilfoil.

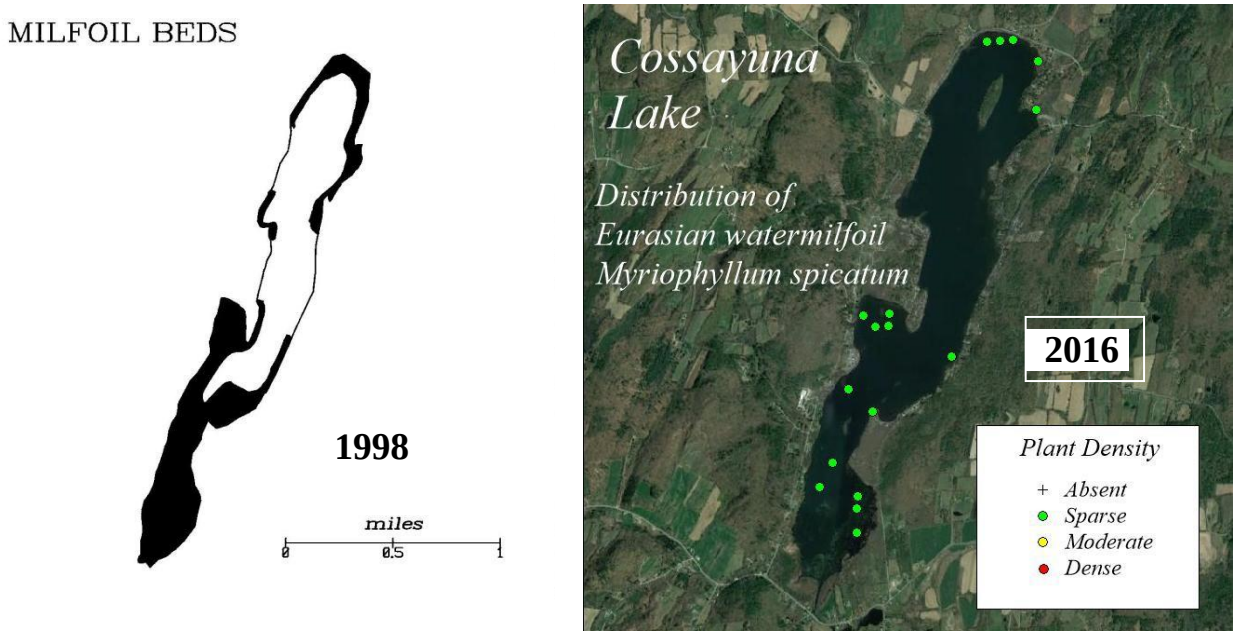


Figure 7. Distribution of Eurasian watermilfoil (*Myriophyllum spicatum*) growth in Cossayuna Lake in 1998 and 2016.

Exotic species, dominated by Eurasian watermilfoil, were clearly abundant in 2016 (26% of littoral survey points). Eurasian watermilfoil was the most common invasive species in the aquatic plant community of Cossayuna Lake, reported in 13% of all survey points (Figure 7). Curly-leaf pondweed was also quite common, ranked ninth by relative abundance (5% of all survey points). Waterchestnut was represented by a single plant which was removed during the 2016 survey. Native species were also quite abundant. Coontail, (*Ceratophyllum demersum*) was the most abundant native species, occurring in 64% of survey samples. A number of other native species were also commonly observed; including waterweed (*Elodea canadensis*, 45% of survey points), water stargrass (*Zosterella dubia*, 26 %), duck celery (*Vallisneria americana*, 24%), southern naiad (*Najas guadalupensis*, 10%) and white pond lily (*Nymphaea odorata*, 8%). In 1998 and again in 2016, Eurasian watermilfoil was among the most common plant species, covering 19% of the lake surface are in 1998 and present in 13% of survey points in 2016. Eurasian watermilfoil was the most abundant plant species in 1998, but declined to fifth most abundant by 2016.

With this diversity and distribution of native species, the test for treatment selectivity should be sensitive to a number of species, and native plant restoration in areas formerly inhabited by Eurasian watermilfoil appears to be rapid following management efforts. Whole lake species richness was 2.44 ± 0.16 species per survey point, comparable to low elevation eutrophic (productive) lakes within our region. For example, species richness in 2015 for Saratoga Lake was 2.46 ± 0.11 and Lake Hadlock was 2.31 ± 0.19 species per survey point.

The littoral zone or maximum depth of colonization by aquatic plants was calculated to extend to a depth of 4.4 meters based on plant distribution data and represents an increase of 0.7 meters from 1998. Suppression of canopy formation through mechanical harvesting may have allowed for light penetration and thus the survival of native plant species in areas of dense Eurasian watermilfoil growth. Reduced Eurasian watermilfoil density in shallow waters as a result of winter draw-down and ice scouring may also provide areas for colonization of native species resistant to winter draw-down or by another invasive species such as brittle naiad, a prolific seed producer.

Management of nuisance levels of aquatic plants in Cossayuna Lake has been based on winter lake level drawdown, mechanical harvesting and herbicide application. Periodic drawdown of the lake has been practiced since the 1930's, while mechanical cutting/harvesting was initiated in the 1970's to control growth of native species and herbicide applications employed to control Eurasian watermilfoil. Mechanical harvesting is generally considered a short-term (within a growing season) management tool designed to remove plants interfering with recreational access to lake waters. While declines in aquatic vegetation in the long term (more than 1 year) have been reported for this technique, it is generally considered to be effective only in the short term. In evaluations conducted in 1982 in Saratoga Lake, regrowth of Eurasian watermilfoil to pre-harvest levels was generally observed within 30 days (Hardt et al 1983). While long-term reductions in Eurasian watermilfoil abundance have not been reported, benefits of mechanical harvesting may include reduced canopy formation of both Curly-leaf pondweed and Eurasian watermilfoil. Lack of canopy formation allows light penetration to the lake bottom, which in turn permits an understory of native aquatic plant species to survive.

Differences in the distribution of dense growth of Eurasian watermilfoil were observed, and there appears to be a long-term decline in Eurasian watermilfoil in Cossayuna Lake, primarily at the south end of the lake. Changes in the distribution of Eurasian watermilfoil can generally be attributed to reduced abundance in the shallow end of its depth range and increased abundance at the deep margins of growth. Shallow water reductions are most likely the result of winter drawdown and resultant ice scouring. The expansion of Eurasian watermilfoil at the deep margin of its growth can be related to increasing water clarity. Mechanical harvesting efforts to date appear to have improved recreational access to the open waters of the lake through reduction of near surface growth of Eurasian watermilfoil. Given the limited control for Eurasian watermilfoil at the current time, residents may wish to consider other control options. Two other options are biocontrol agents and selective herbicides. Biocontrol agents for Eurasian watermilfoil include plant eating fish (e.g. grass carp) and insect predation (e.g. weevils or moth

larvae). Grass carp have a number of limitations, including the inability to control their feeding behavior, the need to contain them in the lake and a tendency for them to consume non-target plants before resorting to invasive species. The difficulty of securing the lake outlet probably precludes the use of grass carp in Cossayuna Lake. While insect based biocontrol has promise, the logistics of their deployment have left many test cases with ambivalent results. Biocontrol agents, while promising, are experimental at the present time. Chemical or selective herbicide application offers a possible alternative for Eurasian watermilfoil control in Cossayuna Lake. The extent of Eurasian watermilfoil growth in Cossayuna Lake necessitates consideration of selective herbicides and the lake management plan has included herbicides for many years. There are a number of herbicides on the market which can be used for Eurasian watermilfoil management. The most commonly used and/or recommended include Renovate (triclopyr) and Sonar (fluridone). New York State requires that these chemical herbicides be applied by a licensed applicator. The lake association may wish to contact an applicator and get cost estimates on various applications. The information contained in this survey should allow for fairly specific price quotations. All herbicides contain label restrictions for applications rates, proximity to drinking water intakes, contact restrictions for swimming, and toxicity for species other than those targeted. The applicator should be able to provide this type of information. Contacting several applicators in order to get the best price and possibly differing points of view is recommended. Longevity of control should also be considered, with most herbicide treatments providing control for 2 to 5 years before additional treatments are required.

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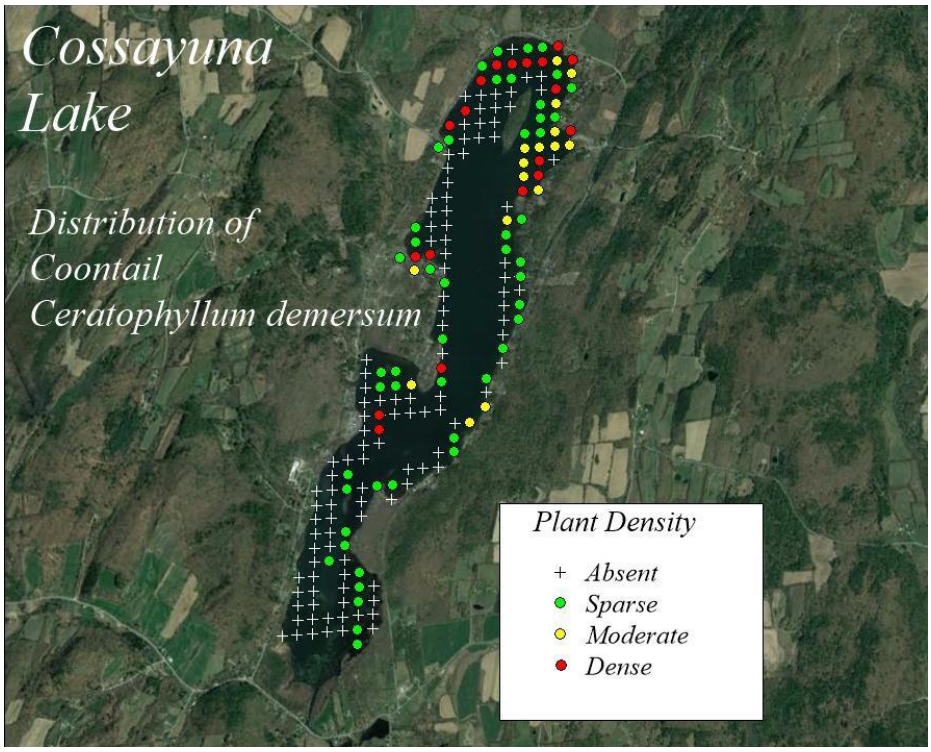
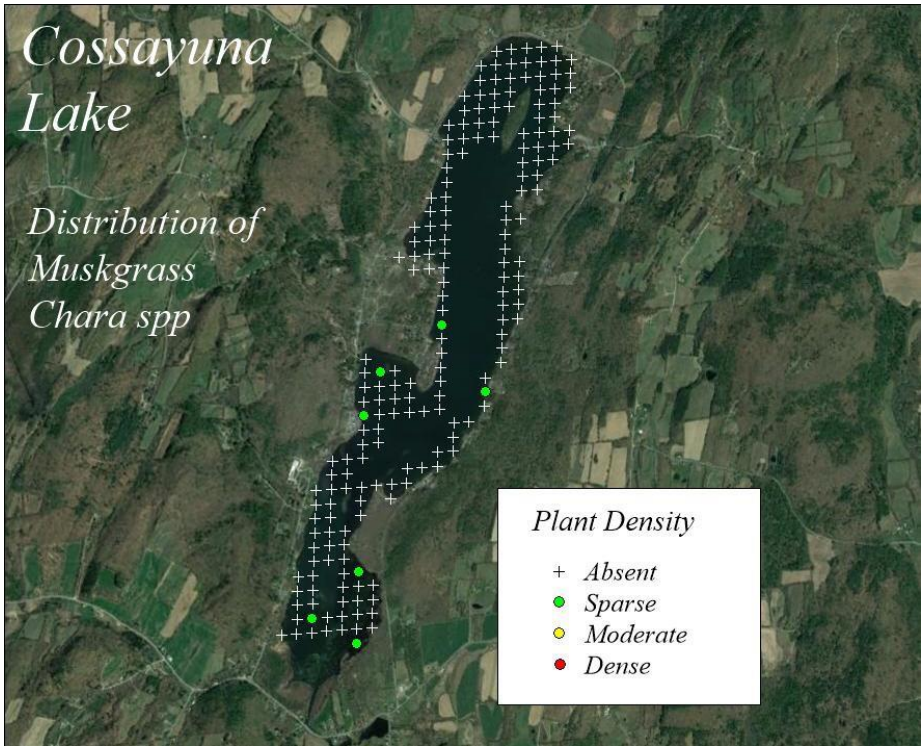
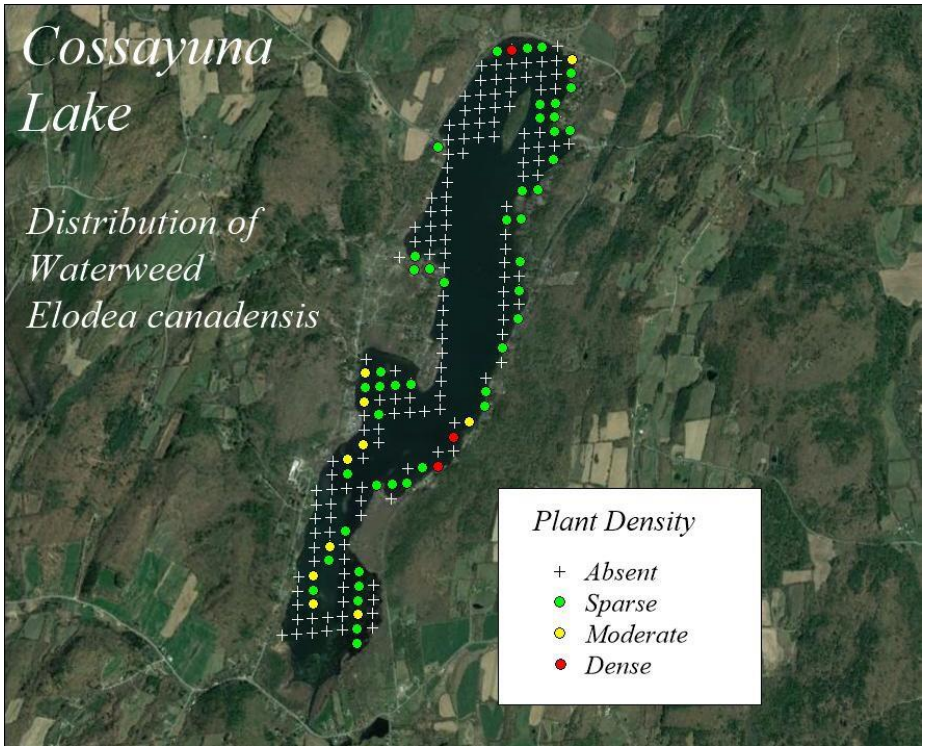
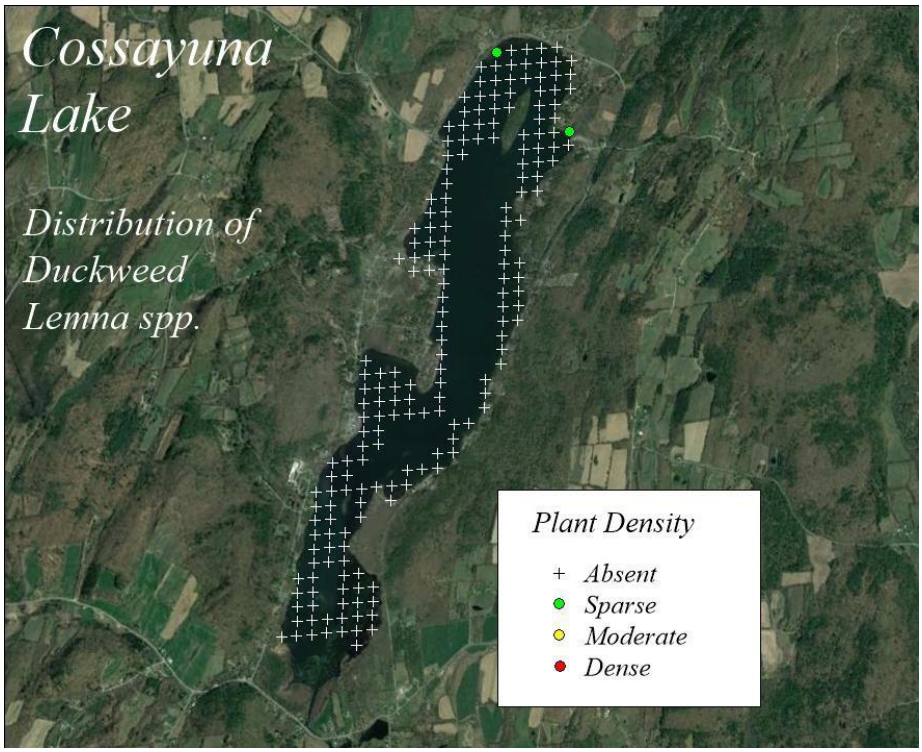
Appendix A

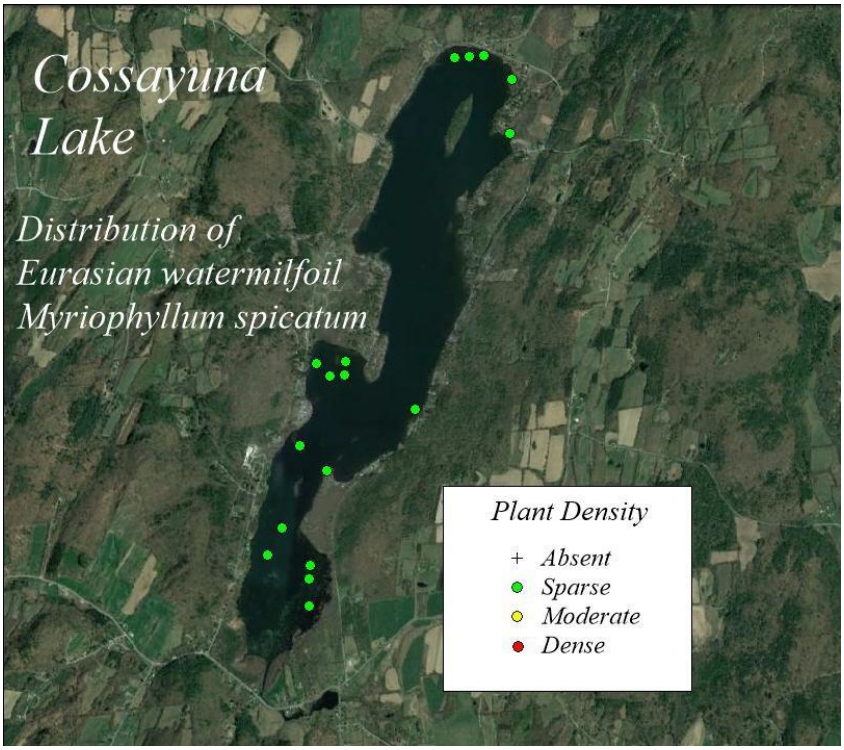
Cossayuna Lake Aquatic Plant Distribution Maps

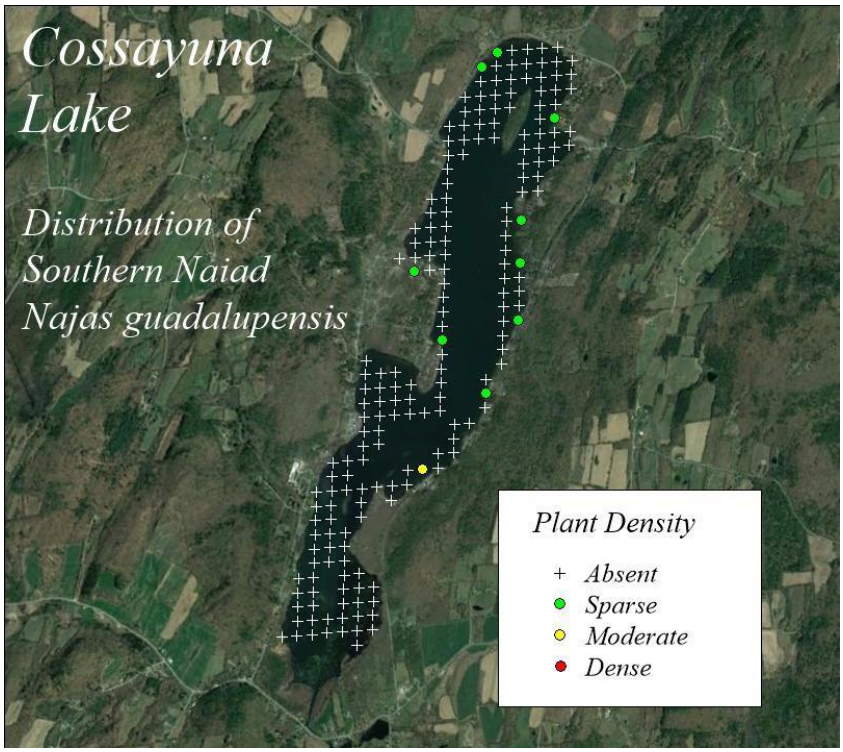

Cossayuna Lake
Distribution of Coontail Ceratophyllum demersum
Plant Density
Absent
Sparse
Moderate
Dense

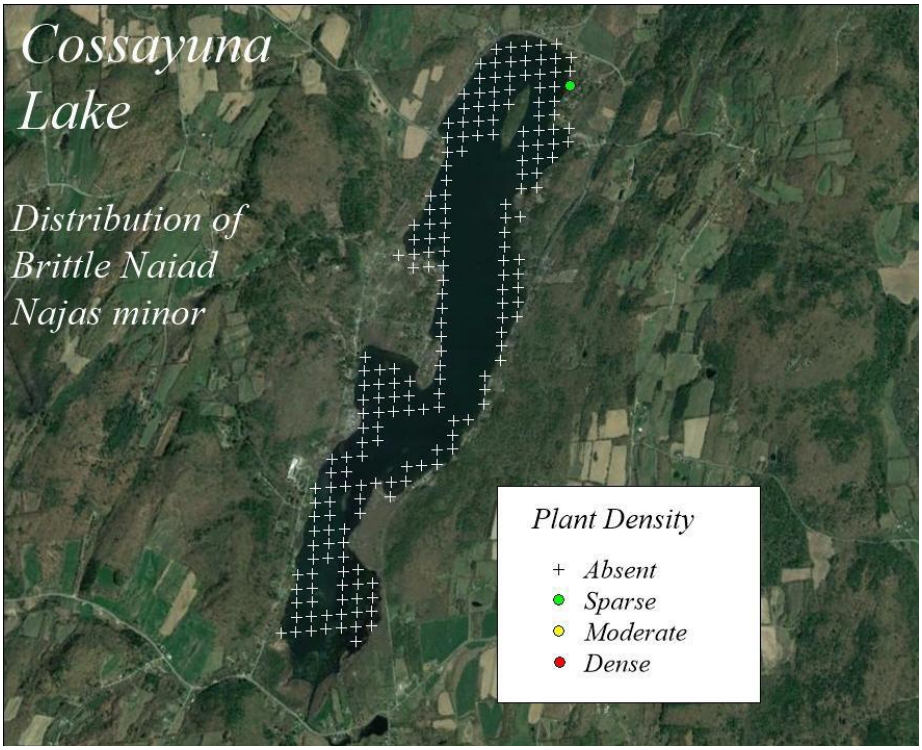

Cossayuna Lake
Distribution of Muskgrass Chara spp
Plant Density
Absent
Sparse
Moderate
Dense

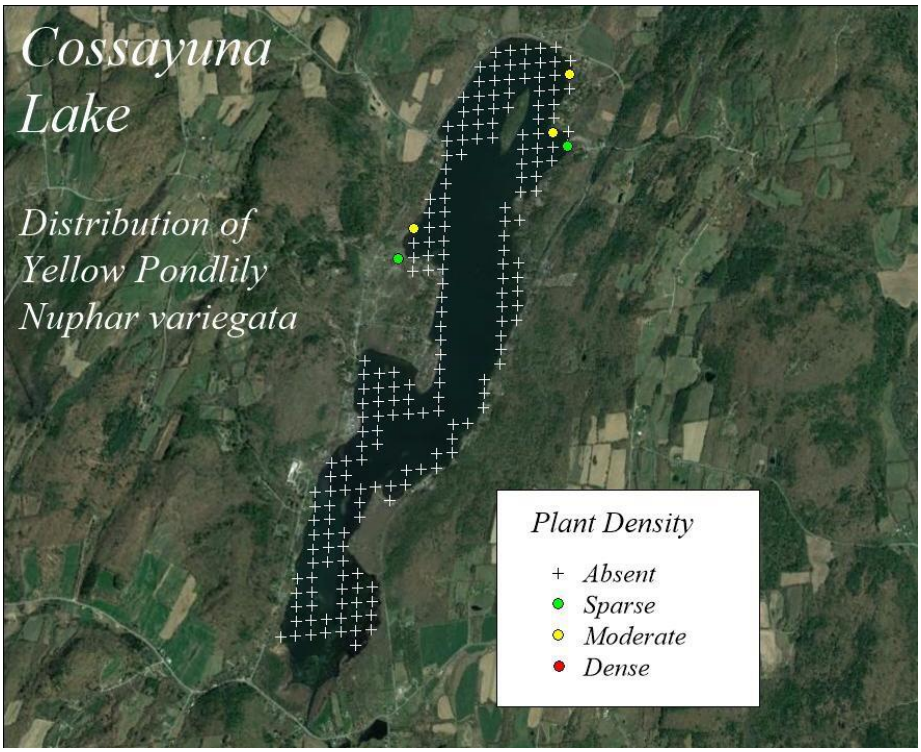

Cossayuna Lake
Distribution of Waterweed Elodea canadensis
Plant Density
Absent
Sparse
Moderate
Dense

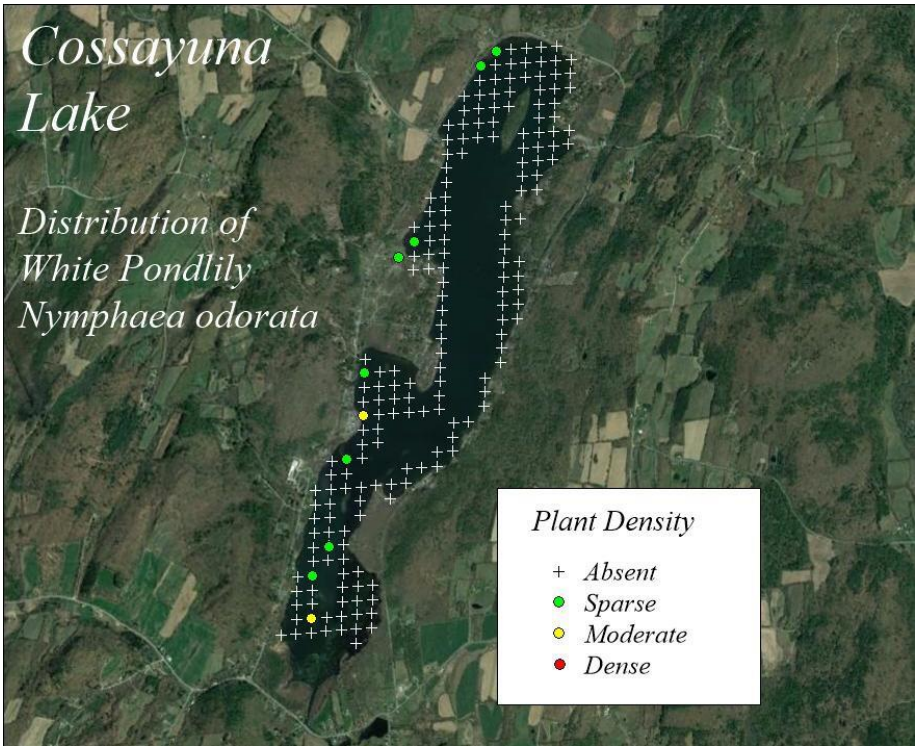

Cossayuna Lake
Distribution of Duckweed Lemna spp.
Plant Density
Absent
Sparse
Moderate
Dense

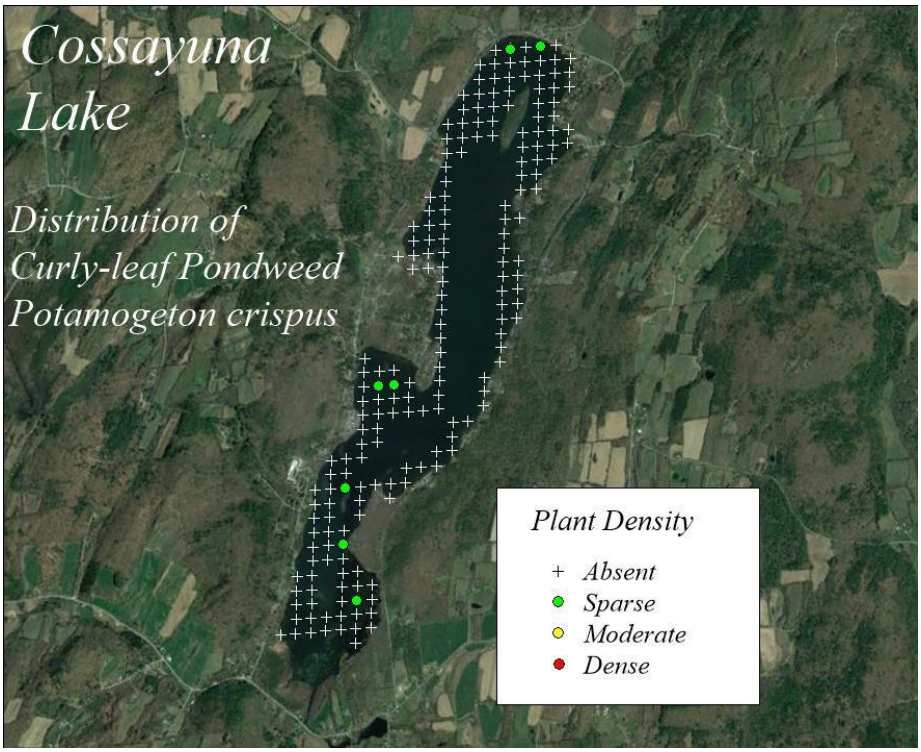

Cossayuna Lake
Distribution of Eurasian watermilfoil Myriophyllum spicatum
Plant Density
Absent
Sparse
Moderate
Dense

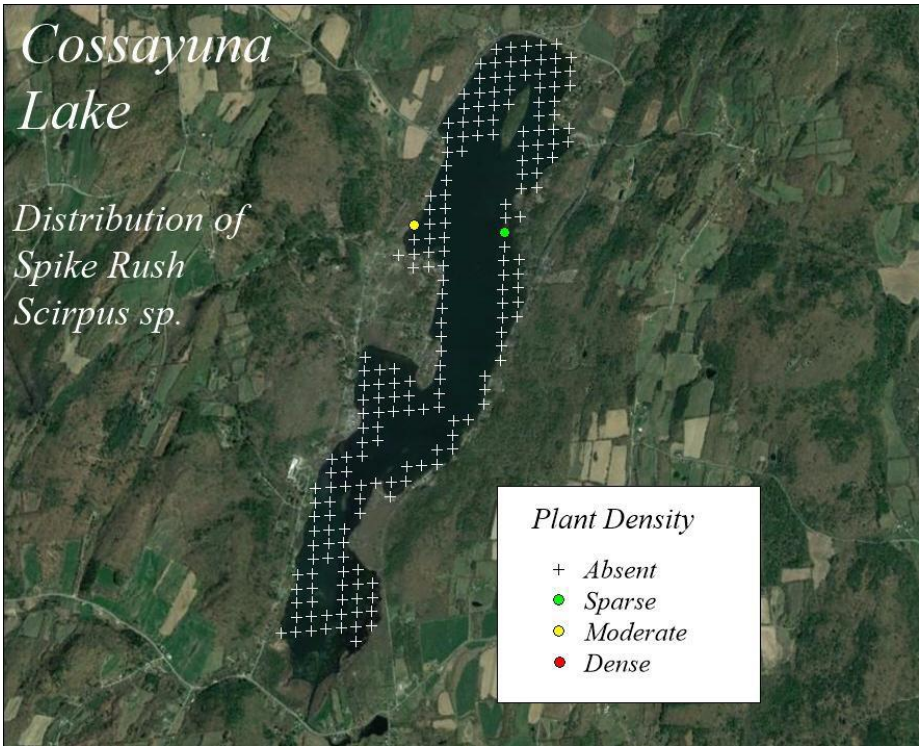

Cossayuna Lake
Distribution of Southern Naiad Najas guadalupensis
Plant Density
Absent
Sparse
Moderate
Dense

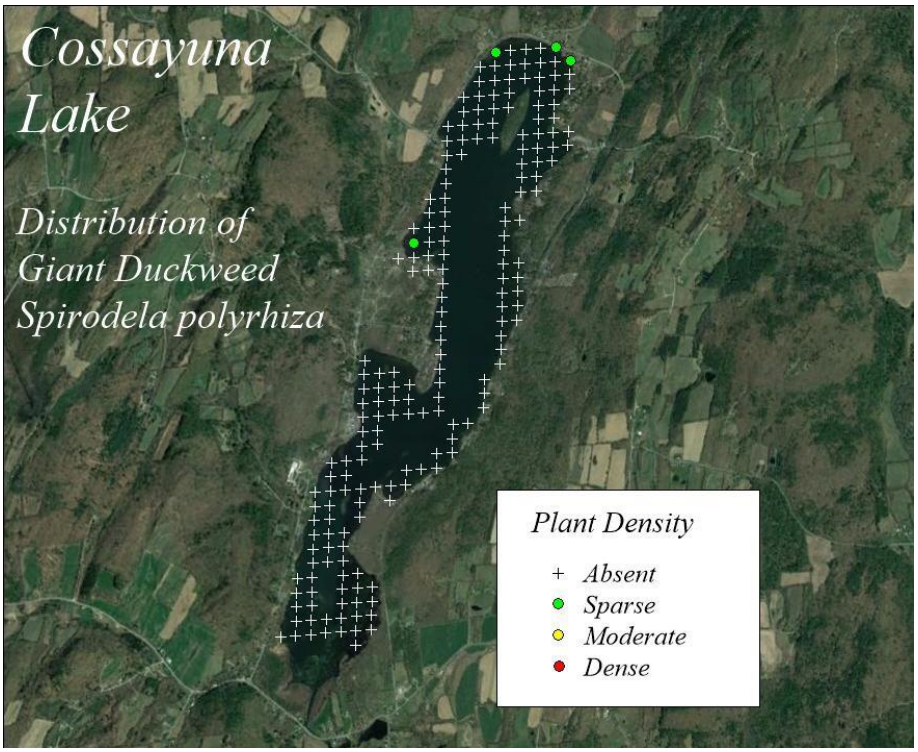

Cossayuna Lake
Distribution of Brittle Naiad Najas minor
Plant Density
Absent
Sparse
Moderate
Dense

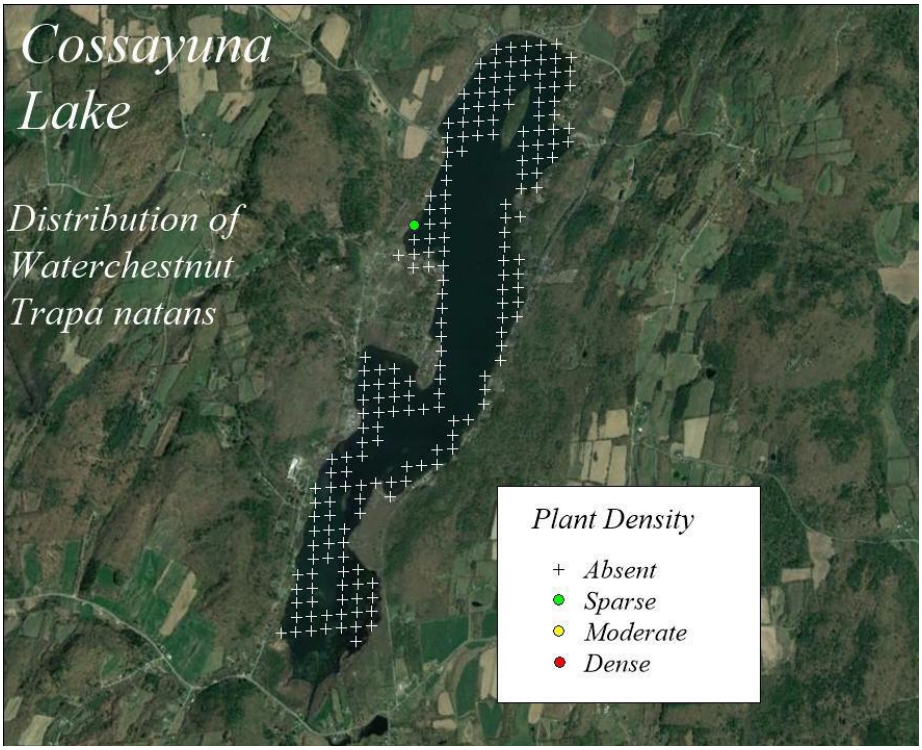

Cossayuna Lake
Distribution of Yellow Pondlily Nuphar variegata
Plant Density
Absent
Sparse
Moderate
Dense

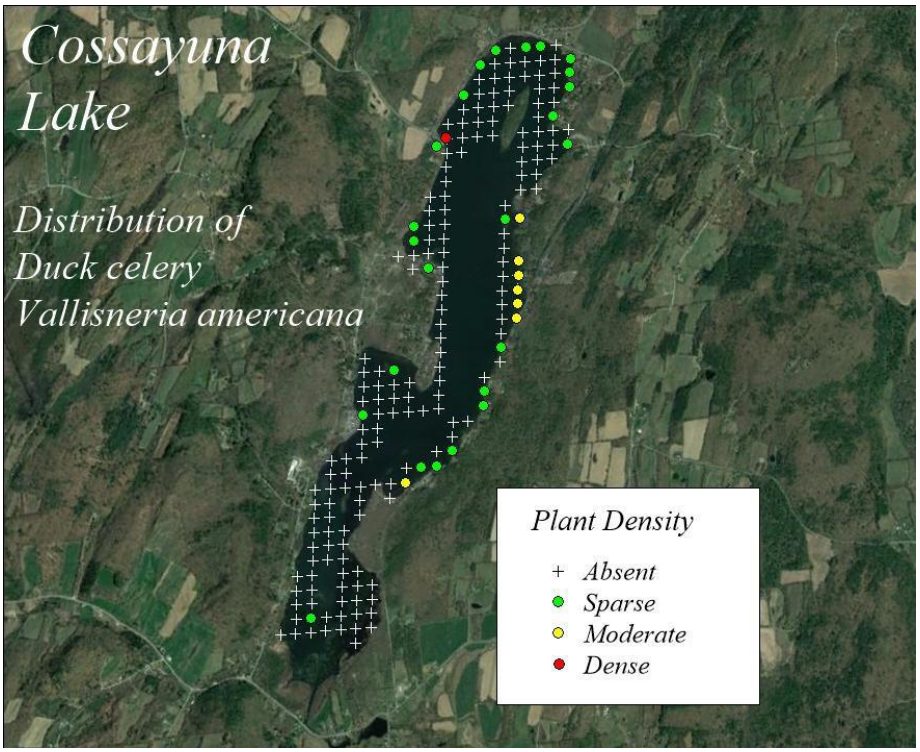

Cossayuna Lake
Distribution of White Pondlily Nymphaea odorata
Plant Density
Absent
Sparse
Moderate
Dense

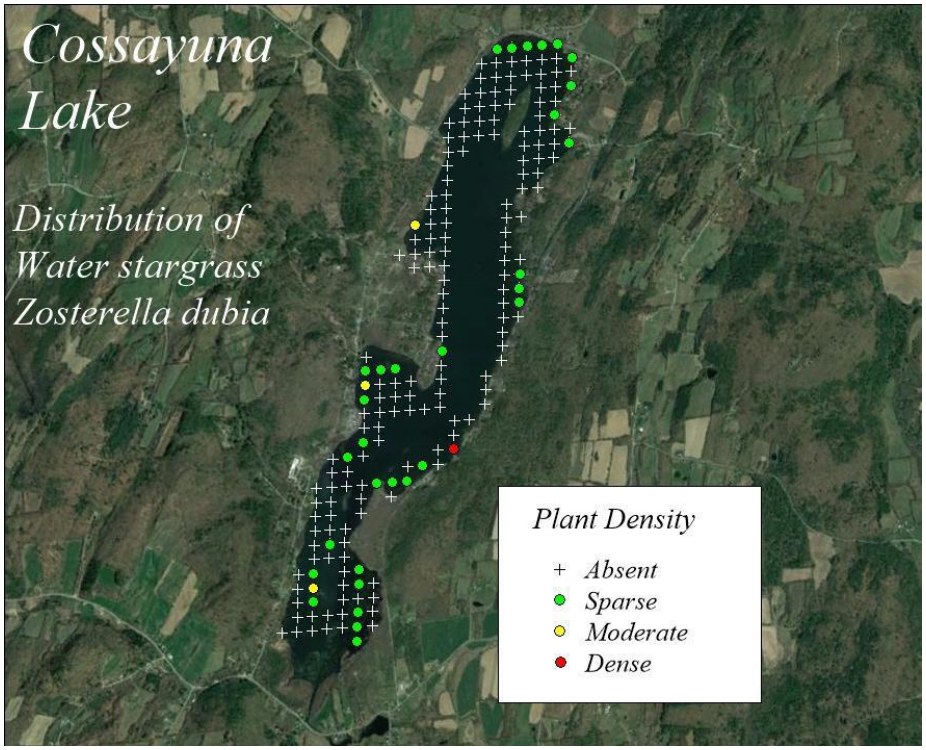

Cossayuna Lake
Distribution of Curly-leaf Pondweed Potamogeton crispus
Plant Density
Absent
Sparse
Moderate
Dense


Cossayuna Lake
Distribution of Spike Rush Scirpus sp.
Plant Density
Absent
Sparse
Moderate
Dense


Cossayuna Lake
Distribution of Giant Duckweed Spirodela polyrhiza
Plant Density
Absent
Sparse
Moderate
Dense


Cossayuna Lake
Distribution of Waterchestnut Trapa natans
Plant Density
Absent
Sparse
Moderate
Dense


Cossayuna Lake
Distribution of Duck celery Vallisneria americana
Plant Density
Absent
Sparse
Moderate
Dense


Cossayuna Lake
Distribution of Water stargrass Zosterella dubia
Plant Density
Absent
Sparse
Moderate
Dense