

Enhancing Priority Invasive Species Management in Cortland County:

Aquatic Invasive Plants Survey

Final Report

Cortland County Soil and Water Conservation District

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Introduction

Aquatic invasive plant surveys were conducted on six lakes in Cortland County, New York as part of the broader PRISM grant. Identifying and mapping of aquatic invasive species (AIS) is critical for early detection and effective management of these species. Early identification while populations are still small allows for the possibility of eradication before populations grow and spread. In addition, accurate mapping allows for targeted management and control efforts. Accurate maps and field sampling efforts also serve as outreach and education tools to lakefront landowners and others.

Original goals of the aquatic invasive plant survey were to 1) survey and map all six lakes within Cortland County for all aquatic invasive plants and 2) conduct focal surveys on Little York Lake for European frogbit (*Hydrocharis morsus-ranae*), and yellow floating heart (*Nymphoides peltata*). However, because the two focal species were not found to occur in Little York Lake during preliminary field work, there was no need to conduct the focal survey of Goal 2. In addition to the species known to be in one or more lakes (Table 1), special attention was given to identification of the following species: Hydrilla (*Hydrilla verticillata*), water chestnut (*Trapa natans*), brittle naiad (*Najas minor*), European frogbit and yellow floating heart. Although not documented in Cortland County lakes, these species are known to occur in lakes in neighboring counties.

Table 1. Aquatic invasive plant species known to occur in Cortland County lakes.

	Known to be Present					
	LYL	Goodale	Skaneateles	Tully	Song	Melody
Eurasian watermilfoil	X	X	X	X	?	X
Variable leaf milfoil		?				
Starry stonewort	X	X		X		X
Curly leaf pondweed	X	X	X	X		
Purple loosestrife	X	X		X	X	X

Methods

Six lakes in Cortland County, Tully, Song, Little York, Goodale, Melody and the Cortland County portion of Skaneateles (Figure 1) were sampled and mapped for aquatic invasive species. Sampling was completed between July 28 and August 19, 2020. When possible, sampling was conducted on a 50m X 50m grid of points created in ArcMap and navigated to using a cellular phone and Google Maps. When cellular service was not available, sampling was conducted on evenly spaced transects through the sampling area using landscape features as landmarks. Sampling points were recorded in the field with a hand-held GPS.

When water depth allowed, sampling was conducted by motor boat with the assistance of volunteer lake association boat owners. In shallow shoreline and wetland areas, sampling was generally conducted by kayak; on Little York Lake a small jon boat with long-tail motor was also used. Sampling at depths greater than 20 feet was not conducted because aquatic plants typically do not occur at these depths in Cortland County lakes.

Surveying consisted of two rake tosses in opposite directions per sampling point following standard protocols (Finger Lakes Institute 2018; NYSDEC retrieved 4/28/20). Along the edge of deep areas, both tosses were off the shallow side of the boat. In addition, the water's surface was examined for invasive species and at shoreline points the shoreline was examined for purple loosestrife.

All aquatic invasive species observed were identified and recorded. Easier to identify native species were also noted; *Potamogeton* and several other native genera were not identified to species. Differentiating native and invasive aquatic species can be challenging. Starry stonewort versus *Chara* and Eurasian watermilfoil, variable leaf milfoil and native milfoils are examples of species that can be difficult to differentiate. Although multiple aquatic plant identification resources were consulted, the most useful were found to be: Borman et al. (1997); Finger Lakes PRISM (2018); Johnson (2013). Starry stonewort identification was confirmed if star-shaped bulbils (stars) were present in the sample. If stars were not able to be located, multiple characteristics were used to differentiate *Chara* and starry stonewort (Table 2). The milfoils were in some cases difficult to differentiate, especially in Tully Lake and especially in differentiating Eurasian watermilfoil and variable leaf milfoil. Identification was more straightforward if growing tips and older material in poor condition were avoided; examining sections of younger but mature stems with leaves in good condition was most effective for differentiating the milfoils. Characteristics used to differentiate these species are described in Table 3.

Species occurrence and GPS point location data were brought into ArcMap to produce occurrence maps.

Figure 1. Cortland County lakes sampled for aquatic invasive species, 2020.

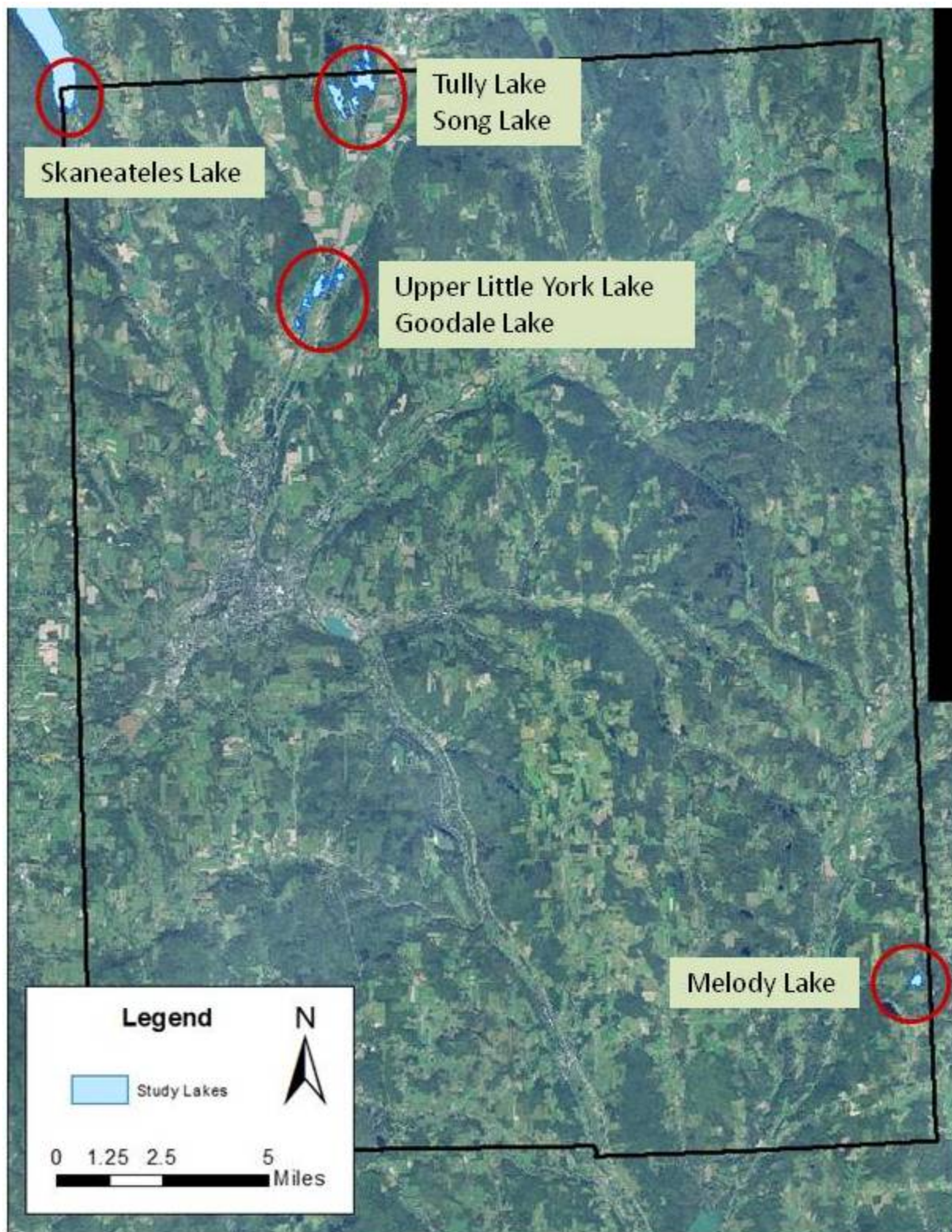


Table 2. Characteristics used to differentiate starry stonewort and native macroalgae.

	Starry stonewort	<i>Chara</i>	<i>Nitella</i>
Stars (star-shaped bulbil)	yes	no	no
Stem color/crusty?	rich dark green/no	paler whitish green/yes	/no
Stem feel	smooth	rough	smooth
Stem length	longer	short	short
# branchlets at whorls	~6	6-16	6-8
Garlicky musky smell when crushed	no	yes	no
Sound when crushed	yes, audible pop	no	
Appearance from above	rangy, messy, tangled, predominantly horizontally	small tidy "florets" standing vertically	

Table 3. Characteristics used to differentiate Eurasian watermilfoil, variable leaf milfoil and native milfoils.

	EWM	VLM	Native milfoils
# leaves/node	only ever 4	4-6	3-6
leaflet pair count	14-20	5-14	5-12
appearance underwater	stringy, wispy	frightened cat's tail, thick, bushy	
leaf spacing	longer	shorter	
leaves out of water	floppy	floppy	stiff
stem, tips, shoots color	red/brown	green	green
leaf tip shape	blunt	rounded	

Results

Approximately 500 acres of lake were surveyed on Song, Goodale, Upper Little York and Melody lakes and the Cortland County portions of Tully and Skaneateles lakes. Seven aquatic invasive plant species and approximately 20 native species were observed across the area sampled (Table 4, Figures 2-6). Native species lists are not exhaustive as they were not the target of this study and were only noted incidentally as encountered during sampling. Aquatic invasive species observed are discussed by lake below.

Table 4. Aquatic invasive species and native species detected during sampling, 2020.

	Lake					
	Song	Tully	Goodale	ULYL ¹	Skaneateles ¹	Melody
Aquatic Invasive						
Starry stonewort <i>Nitellopsis obtusa</i>		X	X	X	X	
Eurasian watermilfoil <i>Myriophyllum spicatum</i>		X	X	X	X	
Variable leaf milfoil <i>Myriophyllum heterophyllum</i>			X	X		
Curly leaf pondweed <i>Potamogeton crispus</i>			X		X	
Brittle naiad <i>Najas minor</i>	X					
Purple loosestrife	X	X	X	X		
Native²						
Northern watermilfoil <i>Myriophyllum sibiricum</i>	X					
Muskgrass <i>Chara</i> sp.		X	X	X	X	
<i>Nitella</i> sp.	X					
Dwarf stonewort <i>Nitella tenuissima</i>	X					
White water buttercup <i>Ranunculus aquatilis</i>	X	X	X		X	
Eel grass <i>Vallisneria americana</i>	X	X		X	X	
Yellow pond lily <i>Nuphar advena</i>	X	X	X	X		
White water lily <i>Nymphaea odorata</i>	X	X	X	X		
Slender naiad <i>Najas flexilis</i>	X	X	X		X	X
Water cress <i>Rorippa aquatica</i>	X					
<i>Elodea</i> sp.		X	X	X	X	
Coontail <i>Ceratophyllum demersum</i>		X	X	X	X	
Bladderwort <i>Utricularia vulgaris/macrorhiza</i>			X	X		
<i>Potamogeton</i> spp.	X	X		X	X	X
Filamentous algae	X					X
Soft-stem bulrush <i>Schoenoplectus tabernaemontani</i>		X				
<i>Equisetum</i> sp.		X		X		
Water meal <i>Wolffia columbiana</i>			X			

1 ULYL = Upper Little York Lake, Skan = Skaneateles Lake

2 Native species lists are not complete; occurrences were noted only opportunistically

Tully Lake – Eurasian watermilfoil (NYSDEC 2019a), curly leaf pondweed (Nemecek and Mueller 1998; Caves 2019; NYSDEC 2019a), starry stonewort (Caves 2019; NYSDEC 2019a) and purple loosestrife (CCSWCD 2004) have previously been identified in Tully Lake. In this study we found Eurasian watermilfoil, starry stonewort and purple loosestrife but did not observe curly pondweed (Figure 2). Of the 123 points sampled, 2% had no AIS, 44% had one AIS species and 54% had two AIS species. Of the points sampled, 91% had starry stonewort and 61% had Eurasian watermilfoil. Purple loosestrife was observed at 6 shoreline points.

Eurasian watermilfoil and starry stonewort were found throughout the lake and largely overlapped in distribution. Differences in occurrence appear to be associated with depth; Eurasian watermilfoil tended not to occur at shallower sites that did have starry stonewort. Starry stonewort was observed at both deeper and shallow sites and appeared almost ubiquitous

in Tully Lake. Purple loosestrife was observed at the head and mouth of St. Charles Bay and near the end of Cummings Point Road.

Song Lake – Although Eurasian watermilfoil may have been identified in Song lake in the past (SWCD 2004), it was not found by Caves (2019) or in this study. At the 82 points sampled, only two aquatic invasive species were found (Figure 3). One was a very small fragment of brittle naiad at one sample point in the northeast corner of the lake. This species has not previously been identified in Song Lake. The other species was purple loosestrife, observed at one sampling point along the northwest shoreline.

Lake cress (*Rorippa aquatica*) is a protected species listed as threatened in the State of New York (6 CRR-NY 193.3). In this study it was widespread throughout Song Lake although concentrated on the western shoreline. It was observed at 24% of the 82 points sampled. However, many observations were of floating propagules that do not represent established plants or necessarily the spatial origin of established plants. Lake cress has several methods of reproduction, one of which is gemmipary, where young plants develop from specialized buds at the base of the petiole on the parent body. These young plants are capable of maturing into fully functional clones of the parent plant when detached from the stem (Gabel and Hess 2000). These propagules may have originated near or north/northwest of collected locations due to wind fetch, but the location of established source plants remains uncertain.

Goodale Lake - Eurasian water milfoil, curly leaf pondweed, starry stonewort and purple loosestrife were known to occur in Goodale Lake (CCSWCD 2004). In this study, five aquatic invasive plant species were identified (Figure 4), including the species previously known from this lake, plus variable leaf milfoil. Variable leaf milfoil does not appear to have been documented in Goodale Lake previous to this study. Of the 54 points sampled, 30% had no AIS, 59% had one AIS species, 10% had two AIS species and 2% had three AIS species. Of the points sampled, 59% had starry stonewort and 11% had variable leaf milfoil. Eurasian watermilfoil and curly leaf pondweed occurred at fewer than 10% of the points sampled (Table 4). Purple loosestrife was observed at 19 shoreline points.

Eurasian water milfoil was found in multiple locations, generally in deeper water. Variable leaf milfoil was found at multiple locations along the south shore of main waterbody. Starry stonewort was found throughout the lake except at deeper locations on the east side. Curly leaf pondweed was found only in the general vicinity of the inlet to the lake. Purple loosestrife was found at many locations along the north and west sides of the lake.

Upper Little York Lake - Eurasian water milfoil, variable leaf milfoil, curly leaf pondweed, starry stonewort and purple loosestrife (CCSWCD 2004; Beckwith et al. 2015; NYSDEC 2019b) were known to occur in Upper Little York Lake. In this study, of the 115 points sampled, 10% had no AIS species, 78% had one AIS species, 7% had two AIS species and 4% had three AIS species (Figure 5). We did not detect curly leaf pondweed in Upper Little York Lake. Of the 115 points sampled, 86% had starry stonewort, 12% had variable leaf milfoil and 9% had Eurasian watermilfoil. Purple loosestrife was observed at 3 shoreline points.

Starry stonewort was observed throughout Upper Little York Lake. Sample sites where it was not detected tended to be on the deeper fringe of the area sampled. Eurasian watermilfoil was not detected frequently in Upper Little York Lake and tended to be concentrated at the inlet from Goodale Lake and in the shallow bay on the east side toward the outlet. Variable leaf milfoil was somewhat more common than Eurasian water milfoil and tended to occur along the north, east and southeast shorelines of the larger open portion of the lake and including the areas of the public boat ramp and the inlet from Goodale Lake. Purple loosestrife occurred in only two areas, midway along the northeastern shoreline and in the northern neck as the larger open portion tapers into the narrower channel to the south.

Skaneateles Lake – Eurasian watermilfoil and curly leaf pondweed were known to occur in Skaneateles Lake (Baston 1975; NYSDEC 2019c). In this study, of the 57 points sampled, 44% had no AIS, 46% had one AIS species and 11% had two AIS species (Figure 6). In addition to the species known to occur in Skaneateles Lake, starry stonewort was also found in the southern end of Skaneateles Lake. This appears to be the first documentation of starry stonewort in this lake. Starry stonewort, Eurasian watermilfoil and curly leaf pondweed were observed at 40%, 25% and 2% of the points sampled, respectively.

Eurasian watermilfoil was distributed throughout the area sampled except for the portion to the north in Onondaga County. Starry stonewort was found throughout the sampling area but distribution was largely along the south shore concentrated in shallower areas and along the northern edge of the area sampled, in Onondaga County. Curly leaf pondweed was located on the Tompkins/Cortland County line just outside the northwest corner of Cortland County.

Melody Lake – Eurasian watermilfoil has been documented in Melody Lake in the past (CCSWCD 2004; MLA 2015; NYSDEC 2019d; Melody Lake Association retrieved 3/25/21). However, in this study, no aquatic invasive plants were identified at the points sampled. In addition, very few native aquatic plants were found throughout the sampling area. Grass carp appear to be consuming most of the native and non-native aquatic plant material available.

Figure 2. Aquatic invasive species found in Tully Lake, Cortland County in 2020.

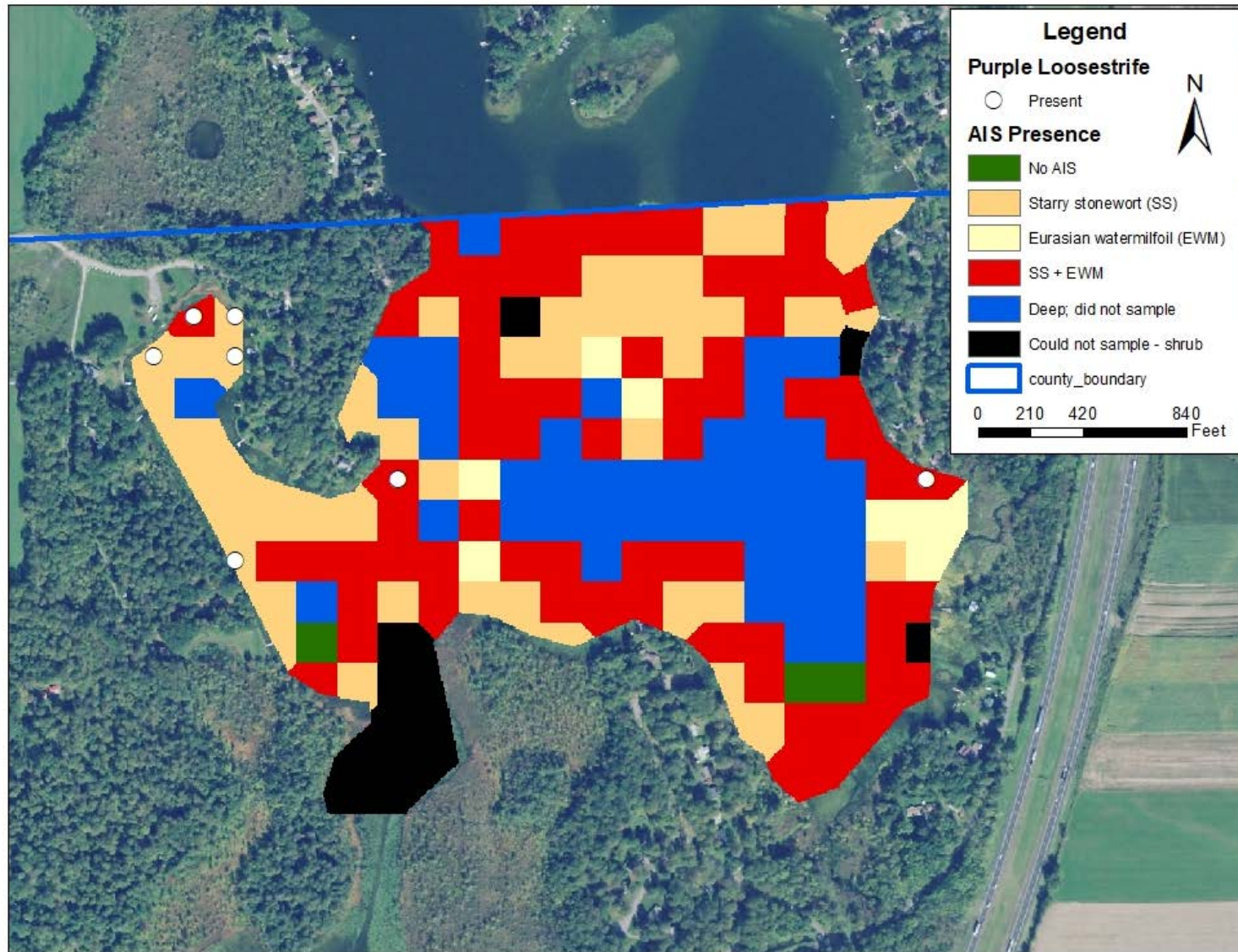


Figure 3. The only aquatic invasive species, brittle naiad, found in Song Lake, Cortland County in 2020.

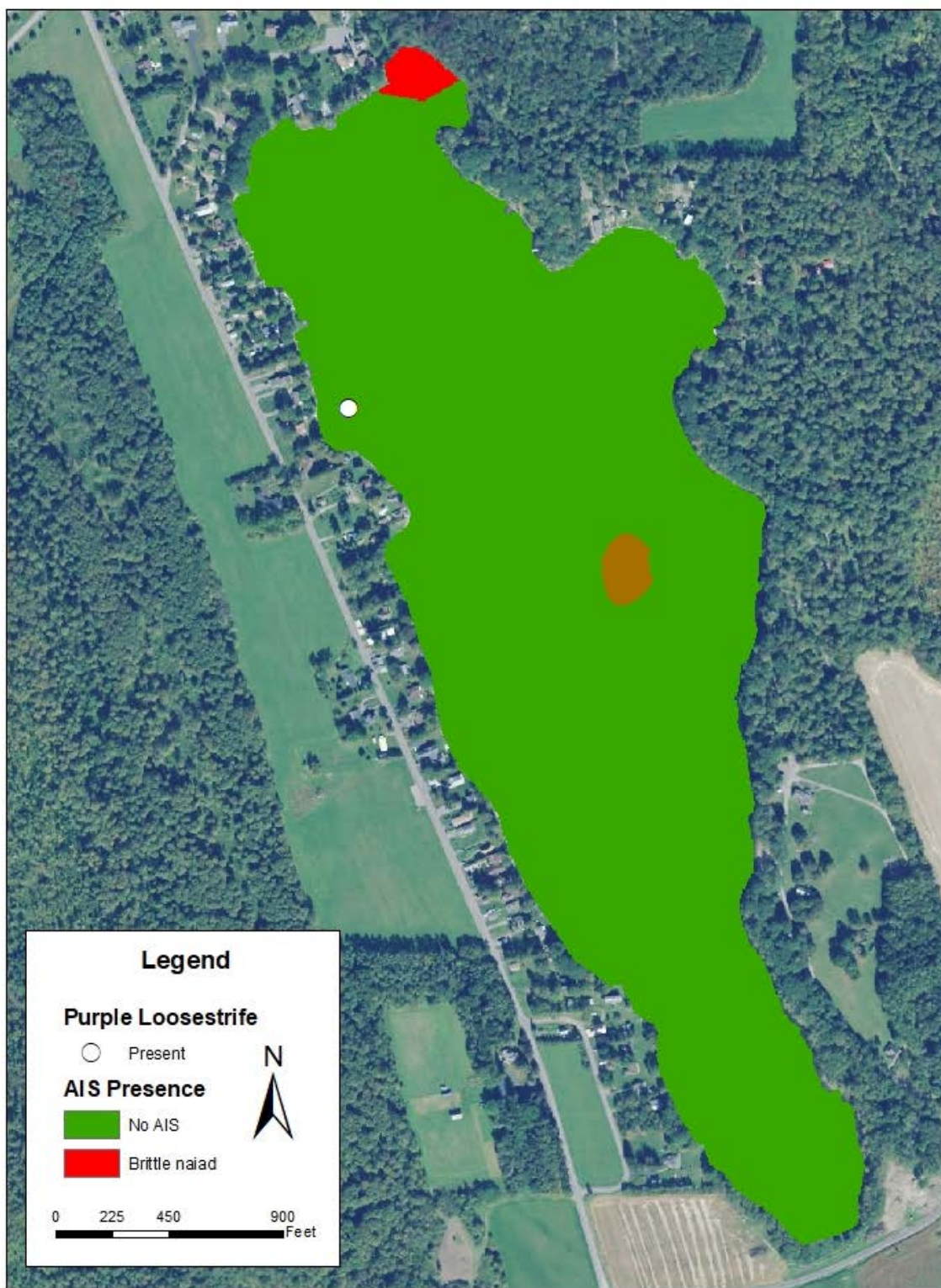


Figure 4. Aquatic invasive species found in Goodale Lake, Cortland County in 2020.

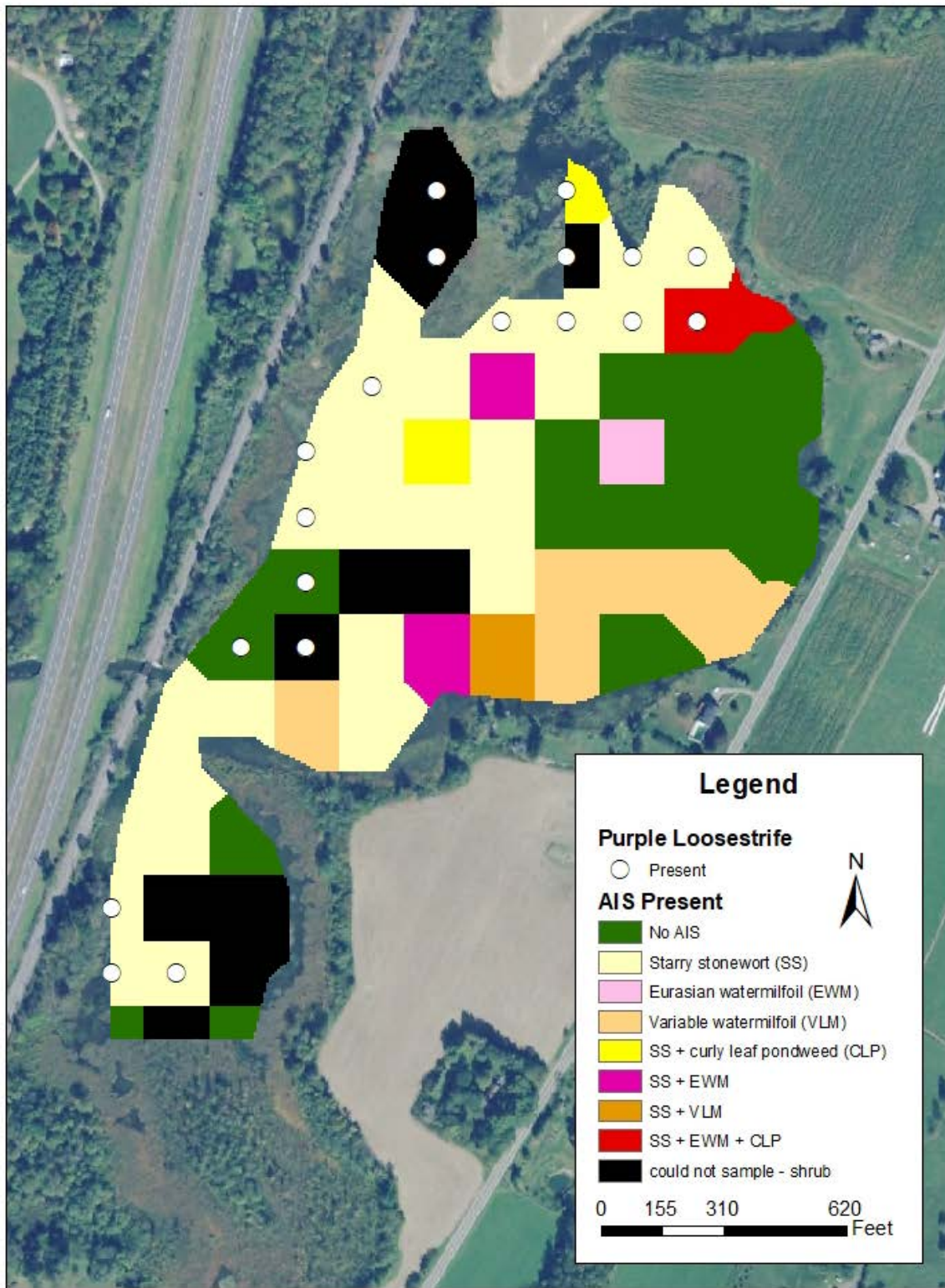


Figure 5. Aquatic invasive species found in Little York Lake, Cortland County in 2020.

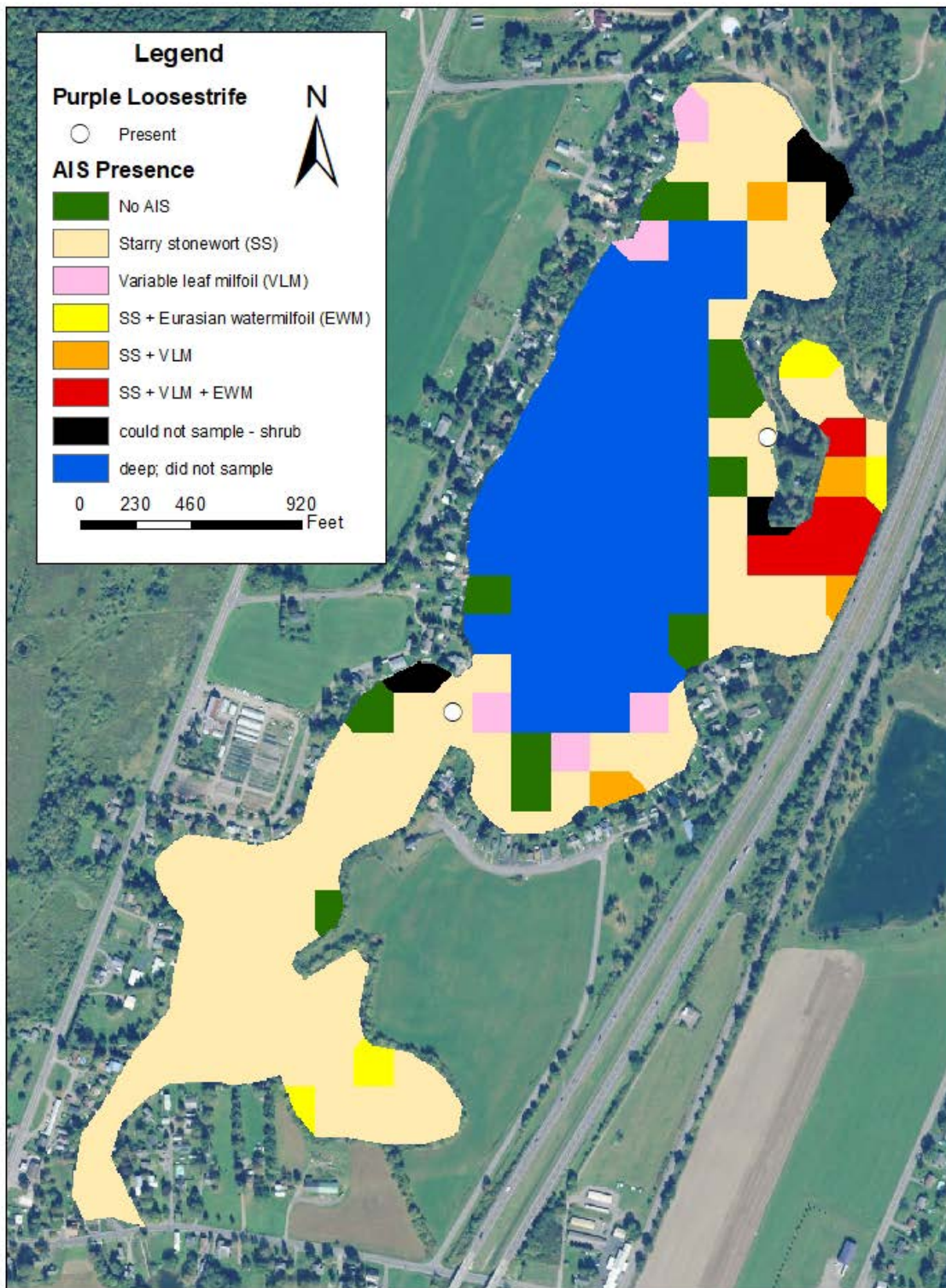
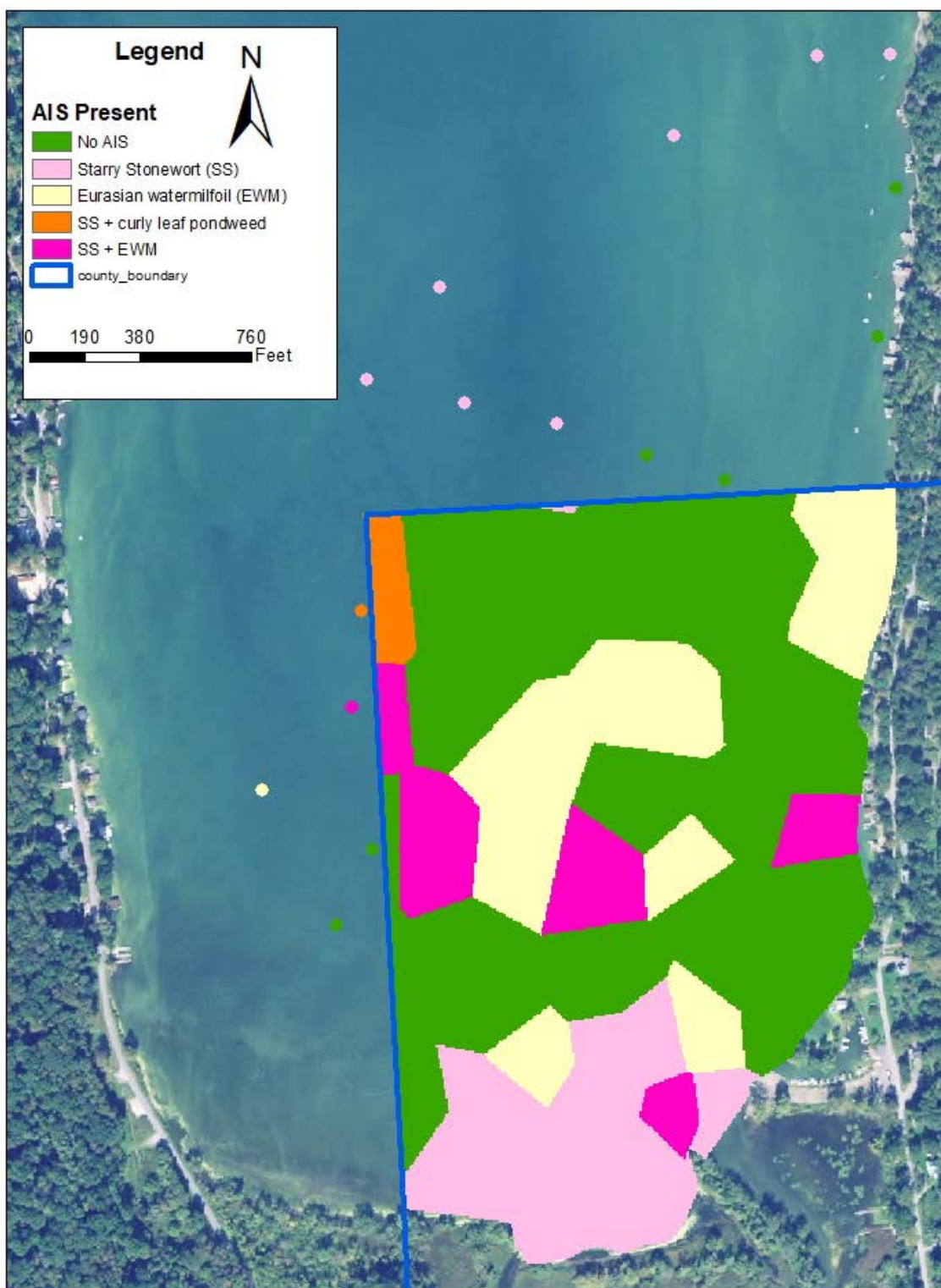


Figure 6. Aquatic invasive species found in Skaneateles Lake, Cortland County in 2020.



Conclusions and Management Recommendations

All aquatic invasive species known to occur per lake were located during plant surveys (Figures 2-6) with the exception of Eurasian watermilfoil in Song Lake and Melody Lake and curly leaf pondweed in Tully Lake and Upper Little York Lake.

In addition, two exotic plant species were found that were not known to occur: starry stonewort was widespread in the sampling area in the southern end of Skaneateles Lake and brittle naiad was found at one sampling point in Song Lake.

Management recommendations based on our findings include:

- Release of a biocontrol for purple loosestrife on Goodale Lake,
- Conduct additional surveys and evaluate control options for brittle naiad in Song Lake,
- Consider herbicide treatment methods used to control Eurasian watermilfoil and starry stonewort in 2019 and 2020 on Upper Little York Lake for application to other lakes in the County,
- Survey the remainder of Skaneateles Lake outside Cortland County for starry stonewort and consider management options,
- Continue to survey these lakes to assess treatment efficacy and for early detection of novel species.

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