



Chinese Mystery Snail on Aquatic Plants in Clearwater Lake on July 15, 2021

Starry Stonewort Searches for Clearwater Lake, Wright County, Minnesota, 2021

Survey Dates: July 15 and September 14, 2021

Prepared for:
Clearwater Lake Property Owners



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Starry Stonewort Searches for Clearwater Lake, Wright County, Minnesota, 2021

Summary of the 2021 searches: Three staff from Blue Water Science, surveyed 6 boat accesses on July 15, 2021 (Figure 1). A combination of rake sampling (375 rake samples) and scuba diving (a total of 5.5 search hours) were conducted (Table 1). No starry stonewort was observed at any location.

On September 14, 2021 two staff from Blue Water Science surveyed 6 boat accesses. A combination scuba diving and snorkling was (a total of 4.0 search hours) conducted (Table 1). No starry stonewort was observed at any lake access location.

At the conclusion of 2021 growing season, no starry stonewort at major lake access areas had been observed.

Table 1. Individual site data for the starry stonewort searches in 2021.

	Representative Rake Sampling and Diving	Starry Stonewort (SSW)	Aquatic Plant Notes	Bottom Conditions
July 15, 2021				
1. Black Pool Access	71 rake samples 60 minutes of diving	No SSW found	Milfoil present, coontail common nearshore, lilies, cattails, and wild rice common	Mostly silty sand, some rocks
2. Bob's Bay Access	70 rake samples 90 minutes of diving	No SSW found	Coontail dominant out to 16 feet. Lilies common. Filamentous algae common	Organic sediments and silty sand
3. Highway 24 Private Access	68 rake samples 50 minutes of diving	No SSW found	Milfoil common, coontail abundant, chara common.	Mostly sand with some gravel
4. Clearwater Forest Access	60 rake samples 40 minutes of diving	No SSW found	Water celery common, chara present, milfoil present	Organic sediments with some silty sand
5. Maple Hills West Access	41 rake samples 60 minutes of diving	No SSW found	Abundant plant growth, milfoil, coontail, chara, whitestem present.	Shallow landing, silty sand
6. Clearwater East Access (Kilbury)	65 rake samples 30 minutes of diving	No SSW found	Chara abundant in shallows, coontail common	
September 14, 2021				
1. Black Pool Access	30 minutes of diving	No SSW found	Turbid water, wild rice dying back	turbid water, silty
2. Bob's Bay Access	50 minutes of diving	No SSW found	limited plant growth, limited habitat for SSW	Sand, gravel, cobble in landing area
3. Highway 24 Private Access	30 minutes of diving	No SSW found	Chara present, diverse plant community	Deep water, clear
4. Clearwater Forest Access	45 minutes of diving	No SSW found	CLP abundant, chara present	sand/gravel around landing area. Transitions to silt
5. Maple Hills West Access	40 minutes of diving	No SSW found	Abundant plant growth, good diversity	shallow access
6. Clearwater East Access (Kilbury)	45 minutes of diving	No SSW found	Abundant and dense chara. Suitable habitat for SSW	shallow access

Search Locations in 2021

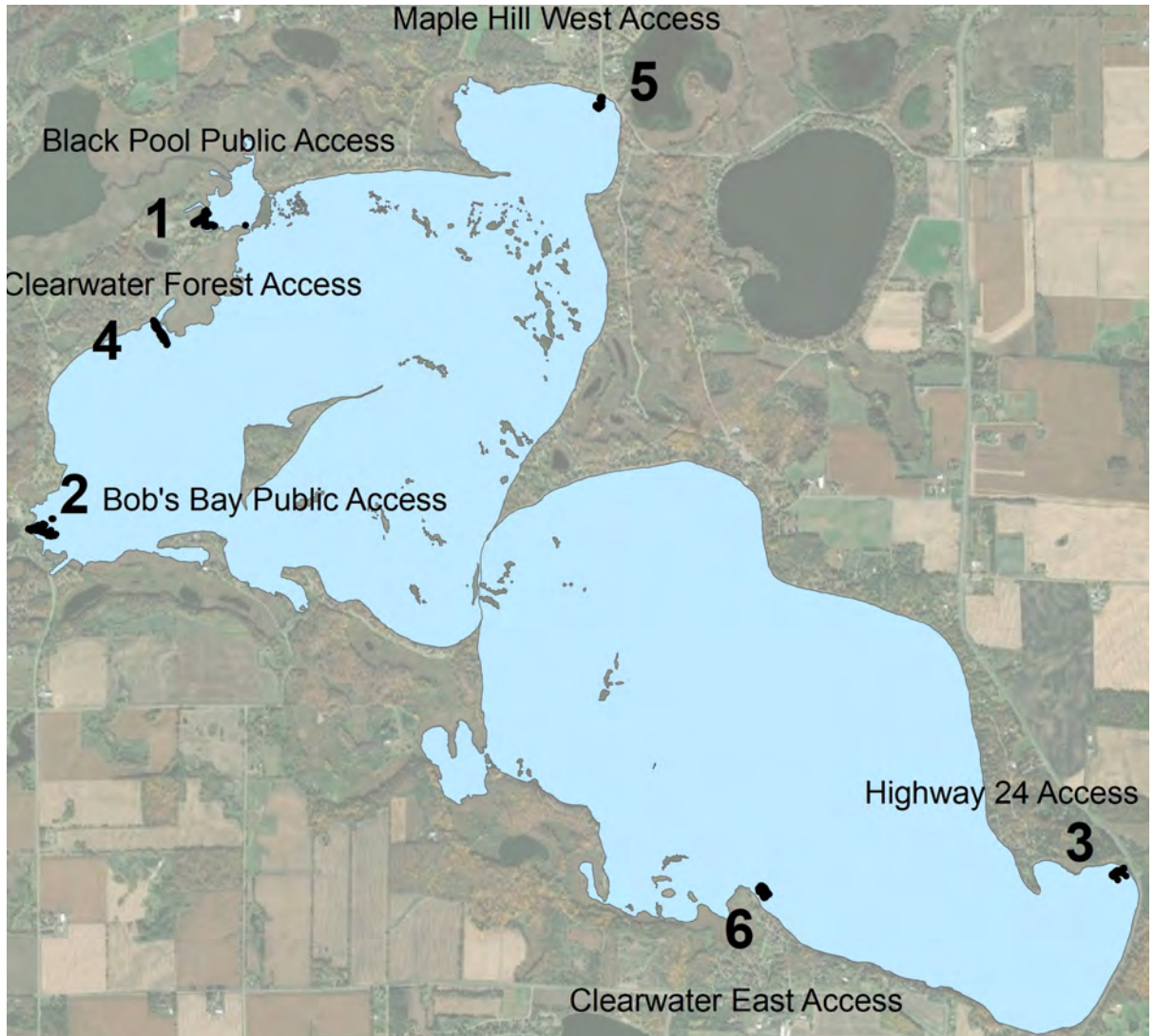


Figure 1. Location of the access search sites.

2021 Representative Conditions in Clearwater Lake



Bobs Bay Public Access



Clearwater Forest Access

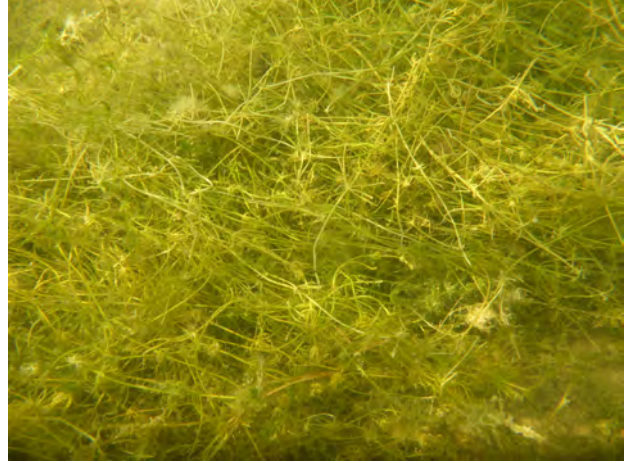


Black Pool Public Access





Maple Hill West Access



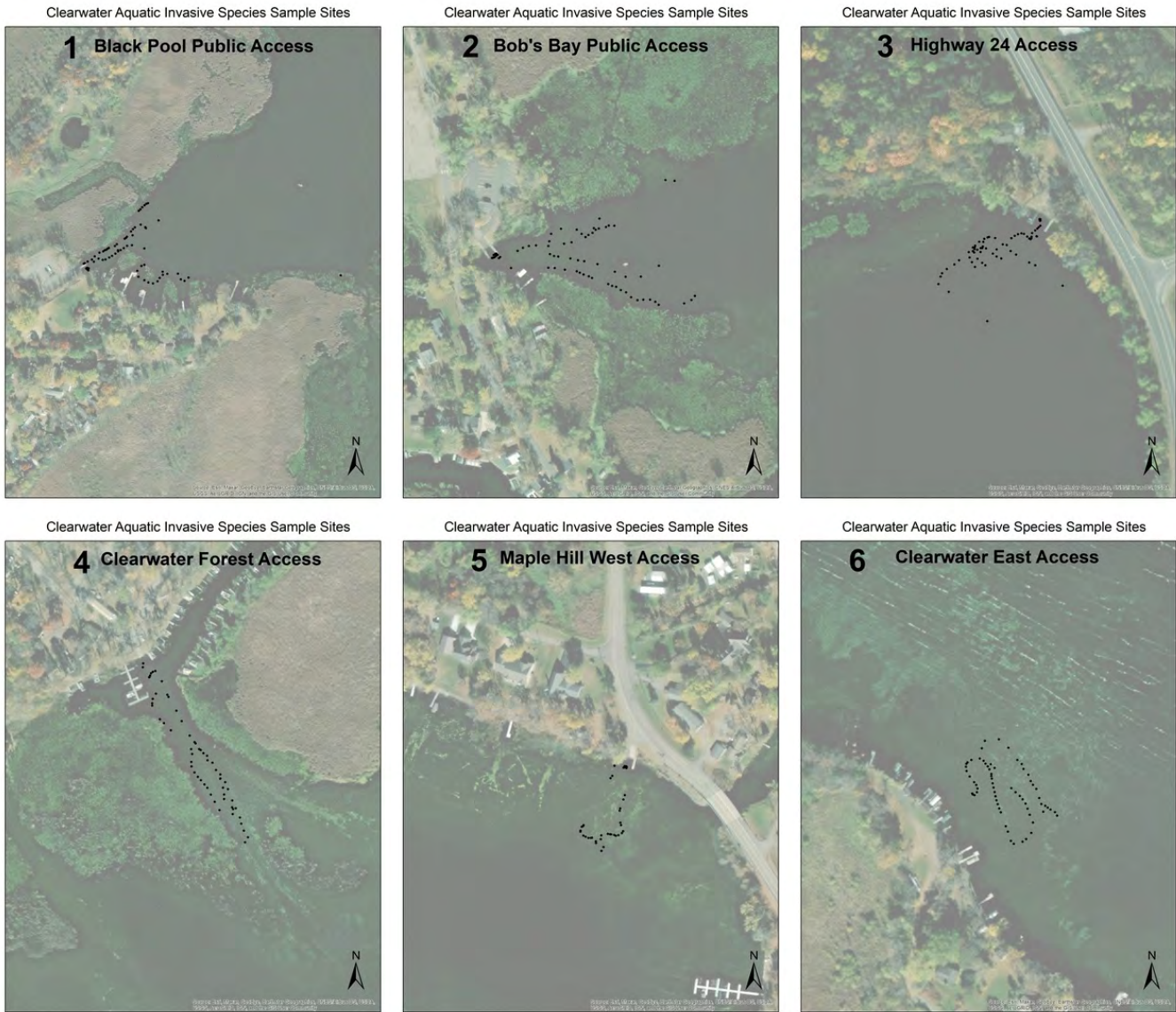
Highway 24 Access



Clearwater East Access



Survey Areas for July 15, 2021



Notes:

1. Black Pool: Middle of the landing area deep, milfoil present, coontail common by cattails, white lilies and spatterdock common by wild rice and cattails, wild rice common in front of houses, cattails on one side of landing, no starry stonewort, zebra mussels present but rare.
2. Bob's Bay: Checked out to 16 feet of water depth, coontail dominant, abundant growth, white lilies and spatterdock by shorelines, filamentous algae abundant, no starry stonewort, zebra mussels present but sparse, adults and open shells present.
3. Highway 24: Milfoil common, coontail abundant, chara common, no starry stonewort, zebra mussels present on plants and rock.
4. Clearwater Forest: Shallow channel, milfoil common, white lilies and spatterdock by shorelines, water celery common, chara common but patchy, stringy pondweed common, filamentous algae abundant, no starry stonewort, no zebra mussels observed.
5. Maple Hill: Shallow landing, heavy plant growth, milfoil present, coontail present, chara common throughout landing, stringy pondweed common, whitestem pondweed present, no starry stonewort, zebra mussels present but scarce.
6. Clearwater East: Chara abundant by shore, stringy pondweed common further from shore, coontail common, milfoil present, no starry stonewort, zebra mussels common.

Figure 2. Survey areas for July 15, 2021 (dots on maps 1-6 indicate rake sample location s).

Survey Areas for September 14, 2021

September 14, 2021



Notes:

1. Black Pool: turbid water, poor SSW habitat, wild rice dying back, chara rare.
2. Bob's Bay: limited SSW habitat, sand, gravel/cobble in landing area, few zebra mussels (1 live - not attached).
3. Highway 24: deep, clear water, chara present, zebra mussels on dock post only otherwise zebra mussels are rare, good SSW habitat, good plant diversity.
4. Clearwater Forest: limited SSW habitat - silty silt, sand/gravel by apron, no zebra mussels observed, curlyleaf was abundant, chara present.
5. Maple Hill: shallow/weedy, chara abundant, plant diversity good, zebra mussels rare, soft calcareous sediments.
6. Clearwater East: shallow, chara abundant - meadows, best SSW habitat, zebra mussels rare on a rock.

Figure 3. Dive and snorkel areas for September 14, 2021 (red markings on map indicate boat launch locations).

Starry Stonewort Identification Tips

INVASIVE **Starry stonewort**
Nitellopsis obtusa

KEYS TO ID

- Long, smooth branchlets are attached in whorls of 5 - 8
- Small, star-shaped bulbils form on clear threads at base of plant and may be found above or below the sediment surface
- Small, orange spheres called antheridia may be visible, these are male reproductive structures
- Typical branchlets are long; can be up to twelve inches
- Can form dense mats in water




LOOKS SIMILAR TO

- Native *Chara* (native)
- Native *Nitella* (native)
- Sago pondweed (native)
- Water stargrass (native)

WHERE TO LOOK

- In shallow, still water and near access

CURRENTLY FOUND

Actual size of bulbils
Below, orange antheridia



Figure 4. [left] Starry stonewort identification page from the University of Minnesota Aquatic Invasive Species Research Center (MAISRC). [right] Starry stonewort from Lake Koronis on July 31, 2017.

NATIVE **Muskgrasses**
Chara spp.

KEYS TO ID

- Stems are typically rough and crunchy
- Thin branchlets form whorls around thin stems
- May produce bulbils, but not star-shaped
- May have musky odor




LOOKS SIMILAR TO

- Starry stonewort (invasive)
- Native *Nitella* (native)
- Sago pondweed (native)
- Water stargrass (native)
- Minnesota has nine *Chara* species

WHERE TO LOOK

- Fully submerged
- Along lake bottoms forming patches called meadows

CURRENTLY FOUND

Rough stems; whorled branchlets



Figure 5. [left] Chara identification page from the MAISRC. [right] Starry stonewort looks a lot like some growth forms of chara. Starry stonewort was not observed in Clearwater Lake in 2021. The photo is chara from Clearwater Lake.

Rapid Response Plan for Starry Stonewort

Starry stonewort (SSW) has not been found in Clearwater Lake at the end of 2021. If SSW is found a rapid response plan has a number of steps (Table 2).

Table 2. Tasks and assignments for an early detection and rapid response program for Clearwater Lake, Wright County, Minnesota.

	Clearwater Lake Property Owners	Volunteers	Stearns and Wright Counties	MnDNR	Others	Treatment Contractor	BWS
1. Early Detection							
1.1. Create website information.	X						
1.2. Designate contact person.	X						
1.3. Conduct training session for volunteer searchers.	Jun	Jun					Jun
1.4. Conduct monthly targeted searches (Apr-Oct).	X						X
1.5. Press release if SSW is found.	X			X			
2. Rapid Response Assessment							
2.1. Conduct an initial exploratory search after the first report of a starry stonewort observation.				X			X
2.2. Organize and train lake resident searchers for a full search effort.	X						X
2.3. Conduct an expanded targeted search with diving (if needed).	X	X		X			X
3. Rapid Response Action							
3.1. Meet to determine treatment options.	X		X	X	X	X	X
3.2. Close public access, if necessary.	X		X	X	X		
3.3. Treat area with copper sulfate.						X	
3.4. Evaluate treatment.				X			X
3.5. Report all findings and results.	X			X			X



Figure 6. Rapid response assessment for zebra mussels in Christmas Lake in 2014. Some of the same approaches are used for starry stonewort.

Zebra Mussel Conditions in Clearwater Lake

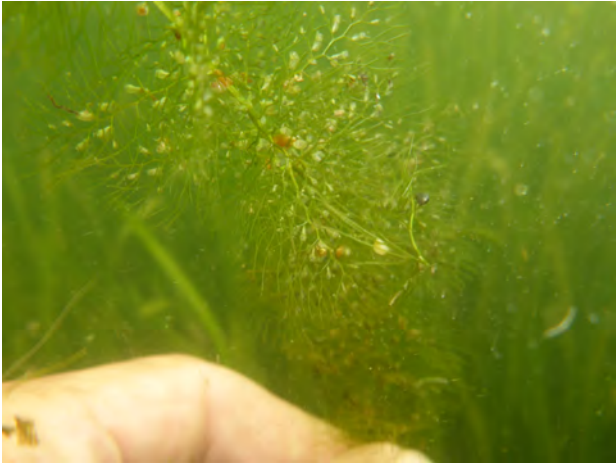


July Conditions: Adult zebra mussels were found growing on objects discarded in the lake.



September Conditions: Zebra mussels were found attached to aquatic plants and submerged substrate in Clearwater Lake in 2021.

Representative Aquatic Plants in Clearwater Lake



Bladderwort



Chara



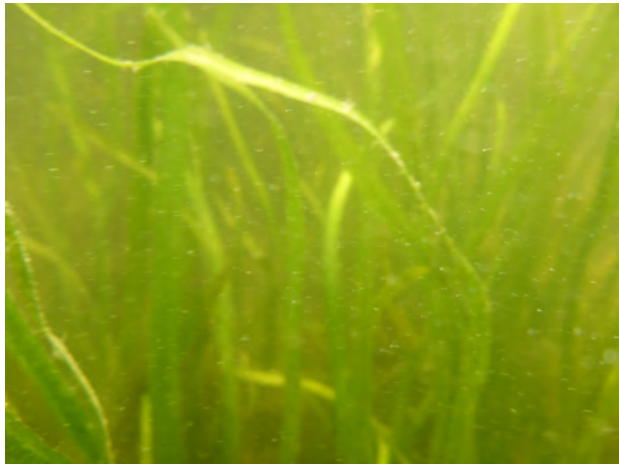
Coontail



Elodea



Naiads and water celery



Water celery

Representative Aquatic Plants in Clearwater Lake



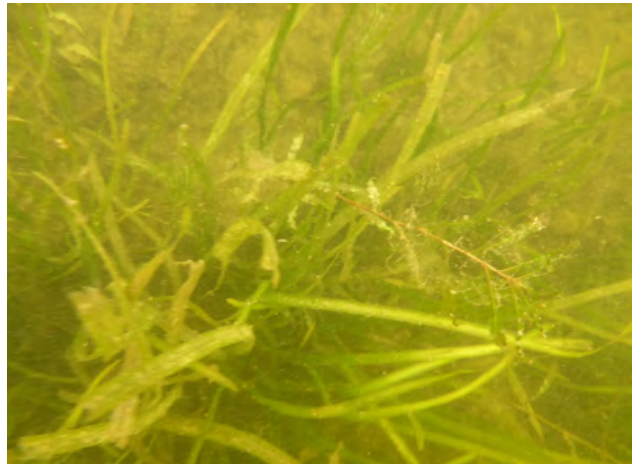
Water lilies



Coontail



Northern watermilfoil



Water celery