



Starry Stonewort in Long Lake, Kandiyohi County, Minnesota, on July 17, 2023

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# Starry Stonewort Management in Long Lake, Kandiyohi County, Minnesota, 2023

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June 22, 2023: Starry Stonewort Discovered in Long Lake  
July 17, 2023: Starry Stonewort Delineation  
July 27, 2023: Treatment with Copper Sulfate and Endothall  
August 14, 2023: Starry Stonewort Assessment and Hand Pulling  
August 23, 2023: Treatment with Komeen Descend  
September 11, 2023: Starry Stonewort Assessment and Hand Pulling

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# **Starry Stonewort Management in Long Lake, Kandiyohi County, Minnesota, 2023**

Long Lake (MnDNR ID: 34-006600) is a 325 acre lake located in Kandiyohi County, Minnesota. Starry stonewort was confirmed by the MnDNR on June 22, 2023 at the public access on the west end of Long Lake (Figure 1).

**SSW Delineation on July 17, 2023:** A meandering survey with 83 points combined with scuba searching by two divers was conducted in an area of a known starry stonewort community at the west public access of Long Lake on July 17, 2023. A map of the starry stonewort (SSW) locations and a treatment area were prepared (Figure 2). Edges of the starry stonewort mat were determined with GPS and SSW was estimated to cover over 2,500 square feet with a large mat with a bed thickness up to 2 feet at about 400 square feet located at the end of the boat ramp pad. A number of clumps were scattered in the area as well. SSW was found in 8 to 14 feet of water (Figure 2).

A SSW treatment area of 0.51 ac was delineated for an algaecide treatment which was conducted on July 27, 2023.

**SSW Treatment on July 27, 2023:** Copper sulfate and endothall were applied within the 0.51 acre treatment area on July 27, 2023.

**SSW Assessment on August 14, 2023:** A meander survey that sampled 59 points with a rake was combined with a scuba inspection. Results showed partial SSW control on the August 14, 2023 assessment. Fairly good SSW control was observed in 6 to 8 feet of water but poor control was observed from 8 to 15 feet of water (Figure 2). Algaecide control was estimated at 20% of the observed SSW.

**SSW Removal by Hand Pulling on August 14, 2023:** After the SSW assessment, handpulling by scuba was also conducted within the treatment area in 8 to 15 feet of water (Figure 2). An estimated 270 pounds of SSW or about 24 cubic feet of vegetation were removed.

On August 14, all SSW was at least 6 feet or greater from the surface and was unlikely to be fragmented by boat props.

**SSW Treatment on August 23, 2023:** Komeen Descend was applied within the 0.51 acre treatment area on August 23, 2023.

**SSW Removal by Hand Pulling on September 11, 2023:** After the SSW assessment, hand pulling by scuba was also conducted within the treatment area out to 15 feet of water. An estimated 30 pounds of SSW or about 24 cubic feet of vegetation were removed. All SSW that was observed was removed. However, it is likely some SSW stalks could still be present.

**Conclusions and Recommendations:** Because this was a new infestation, aggressive control was implemented in 2023.

Based on what is known at this time, starry stonewort (SSW) appears contained within a 0.51 acre area at the west end public access of Long Lake. At the access treatment area SSW was found from 4 to 17 feet of water depth. Because of the steep drop-off in the treatment area, algaecide applications may not be making significant contact SSW, resulting in only partial SSW control.

In 2024, an initial SSW delineation should occur in late June or early July followed by an algaecide treatment. In another month, hand removal followed by an algaecide treatment should occur. A final inspection should occur in early autumn. This is similar to the approach taken in 2023.

**Table 1. Summary of treatments and hand removal.**

Date	Delineation	Hand Removal	Treatment
June 22, 2023	SSW confirmed in Long Lake by MnDNR.		
July 17, 2023	0.51 ac	No removal due to SSW fragmenting concerns by handpulling.	
July 27, 2023			0.51 ac copper sulfate and endothall
August 4, 2023	0.51 ac	270 lbs removed	
August 23, 2023			0.51 ac Komeen Descend
September 11, 2023	0.51 ac	30 lbs removed	



**Figure 1. Location of starry stonewort in Long Lake in 2023 (red polygon).**

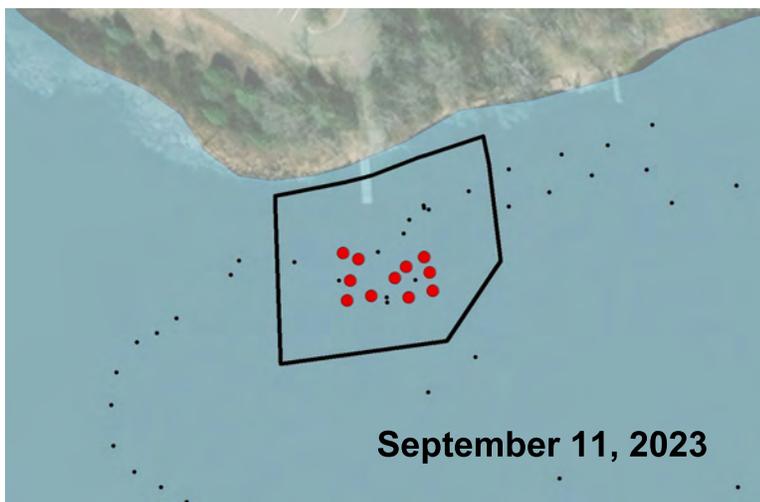
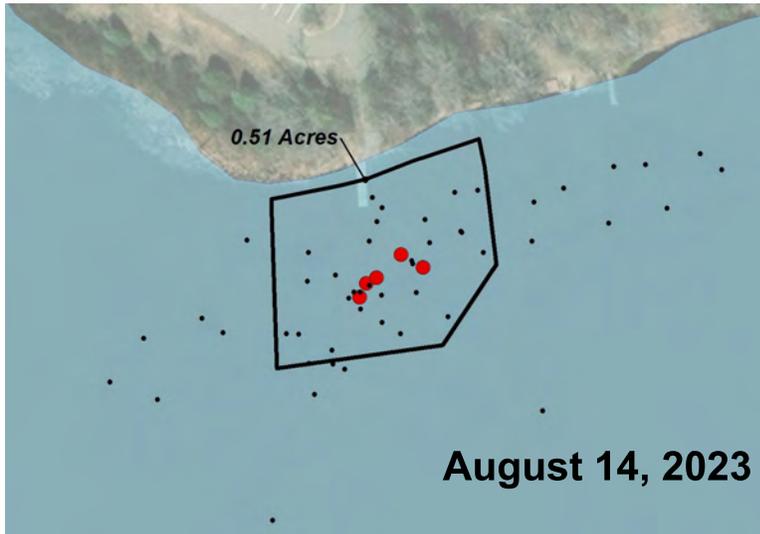


Figure 2. [top] Locations of SSW sampled in Long Lake on July 17, 2023. A treatment area of 0.51 acres was delineated for a copper treatment. [middle] Locations of SSW sampled with a rake in Long Lake on August 14, 2023. Scuba diving found additional SSW. [bottom] Locations of SSW sampled in Long Lake on September 11, 2023.

## SSW Post Treatment Conditions on August 14, 2023 After Applying Copper Sulfate and Endothall on July 27, 2023



Figure 3. [top row] In water less than 8 feet deep, chara was damaged (left) and starry stonewort was inactivated (right). [bottom row] Starry stonewort was relatively unimpacted in deeper water from 8 to 15 feet.

## SSW Hand Removal Results on August 14, 2023



Figure 4. [top row] After the assessment survey, SSW was hand pulled and placed in mesh bags (left). One of the advantages of hand pulling is the ability to remove bulbils (the stars) which are attached to rhizoids which in turn are anchored in the sediments (right).

[bottom row] A total of 270 pounds of vegetation was removed (left) and an estimated 24 cubic feet by volume was collected and disposed in a ditch area upland from the lake at the end of the landing access parking lot.

The end result was In the lake treatment area, much of the starry stonewort was removed with a combination of algaecides and handpulling, but some SSW was still present in the treatment area.

## SSW Hand Removal Results on September 11, 2023 Following a Treatment on August 23 with Komeen Descend

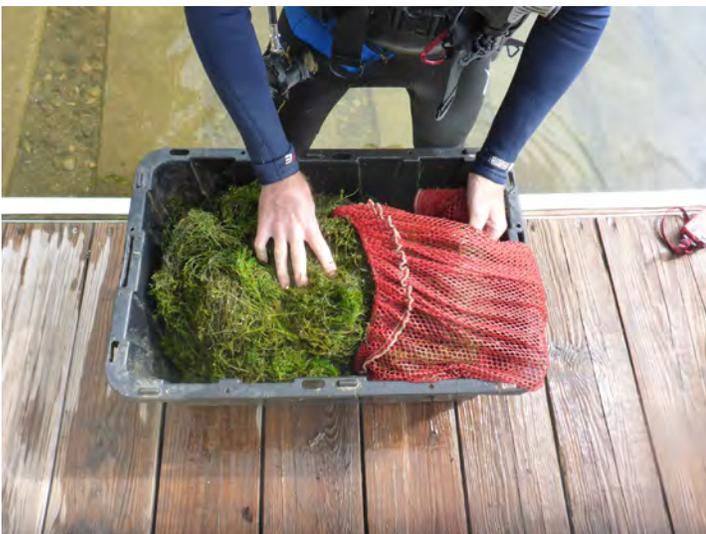


Figure 5. Starry stonewort hand removal was conducted on September 11, 2023 after a herbicide treatment conducted on August 23, 2023. Thirty pounds of starry stonewort was removed from Long Lake on September 11, 2023.