

Starry Stonewort: A Serious Threat to Michigan's Lakes



Starry stonewort. If you are a lakefront property owner somewhere downstream of the St. Lawrence Seaway, you may have heard the name at some point in the past decade. Having spent the summer on lakes across Oakland County MI with MiCorps volunteers for the [Cooperative Lakes Monitoring Program's](#) Exotic Aquatic Plant Watch, I have been struck by the damage caused by this invasive large algae from Eurasia. Starry stonewort is arguably among the most disruptive invasive species to find its way into the Great Lakes region since the introduction of zebra mussels. In fact, it likely was introduced the same way, carried in the ballast water from ships engaging in transatlantic trade. So what is it, why is it so problematic, and how do we deal with it?

What is starry stonewort?

In order to answer the latter two questions, we must first understand what starry stonewort is. *Nitellopsis obtusa*, also known as starry stonewort, is a member of the Characeae family of algae. The charoids are an interesting

family, considered a missing link between microscopic algae and more advanced forms of plant life. In Michigan, the charoid you are probably most familiar with is called Chara, or muskgrass. This is the crunchy, garlic-scented mat commonly found near docks and mingling with other lake weeds. Although it is neither crunchy nor smelly, starry stonewort is a cousin of muskgrass and the two algae share many similarities.

The lack of crunchiness and smell are two ways we can distinguish starry stonewort from muskgrass, but in order to definitively identify it we have to look for the tiny white star-shaped structures called bulbils (*pictured right*) for which it is named after. The star-shape is unique to starry stonewort, and the bulbils can usually be found close to the sediment attached to fishing line-like threads called rhizoids. The bulbils are a part of starry stonewort's reproductive strategy. They are essentially hardy spores, designed to get buried in the sediment and sprout new starry stonewort several years later.

Starry stonewort reproduces aggressively. Tiny fragments of the algae can generate entirely new mats of starry stonewort, and the fragments can be easily spread, whether stuck to an unwashed boat or on the underside of a duck's feather. Lastly, starry stonewort can be found at greater depths than most native aquatic plants. It has been recorded growing three meters high in nine



A pair of star-shaped bulbils used to identify starry stonewort. Image: New York State Dept of Environmental Conservation.

meters of water, whereas most plants are limited to a depth of less than five meters.

What impact does it have on lakes?

Starry stonewort fulfills a similar role in the ecosystem as its native cousin muskgrass but it is how they differ which accounts for the damaging impacts of starry stonewort. They both prefer the alkaline lakes common to Michigan and cover lakebeds in dense mats, sometimes even coexisting with one another in the same mat. Muskgrass beds are great shelter for tiny fish, making it prime spawning grounds for many fish and great habitat for smaller species. On the other hand, native fishes actively avoid starry stonewort. Therefore, as starry stonewort spreads, available fish habitat shrinks.

Both muskgrass and starry stonewort filter out nutrients from the water column and stabilize the sediment. However, because it grows at greater depths than muskgrass, starry stonewort can cover more area and fill more volume in the lake, potentially filtering out too many nutrients and choking the sediment.



Look familiar? This is a typical clump of starry stonewort collected during the Exotic Aquatic Plant Watch on Woodruff Lake in Oakland County.

This can deprive native flora and fauna of nutrients and trap toxic substances in the sediment.

Starry stonewort is an aggressive competitor for space, and while muskgrass can coexist with it, other native aquatic plants such as eelgrass, pondweeds, and watermilfoils are pushed out of its territory. Even other aggressive invasive species such as Eurasian watermilfoil and curly-leaf pondweed are unable to compete. Only unrooted floating plants, namely coon tail and bladderwort, appear to coexist peacefully with starry stonewort.

The aggressive and damaging characteristics of starry stonewort are not just problematic for the lake ecosystem, but also for the lives of lakefront property owners. When left unmanaged, starry stonewort can reach the water's surface, becoming a significant obstacle for motorized boats and paddlers alike. Even in deeper water, detached chunks of starry stonewort can float along the surface, posing further danger to propellers as well as a trip-hazard to waterskiiers. Recreational fishers are likely to notice the impact of starry stonewort on fish populations, although the exact consequences have yet to be determined.

CLMP volunteers Alicia and Dwight inspect a plant sampling rake for starry stonewort on Lake Louise in Oakland County.



These recreational obstacles in combination with the ecological damage being caused may lead to further indirect consequences, including economic impacts such as reduced lakefront property values and costs associated with boat repair and environmental restoration.

As Huron River Watershed Council's Lake Monitoring Intern, I have had the opportunity to visit over thirty lakes across Oakland County this summer, and have personally witnessed the extent and severity of the starry stonewort invasion in southeastern Michigan. Starry stonewort has been found in the wide majority of these lakes in all stages of invasion. Lake Sixteen in Orion Oaks County Park appeared nearly pristine, until sharp-eyed volunteer William Maass pointed out a patch of starry stonewort below the dock as we disembarked for the day. Mr. Maass reached out to the county and with any luck that patch can be eliminated before it can spread throughout the lake. On the other side of the coin, starry stonewort had come to dominate virtually the whole volume of Eagle Lake in Waterford Township, making the shallow lake nearly unnavigable.

On my lake visits, it was common to have to tear thick chunks of starry stonewort from propellers

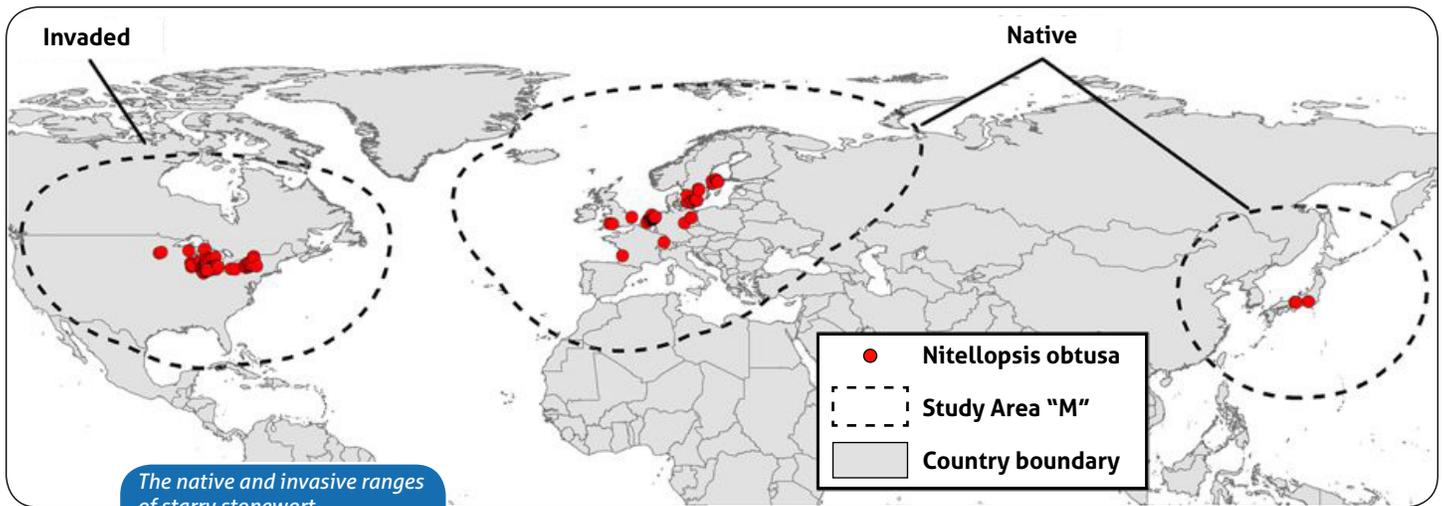
and carefully steer around pillows of starry stonewort in what should have been open water. However, not all volunteers knew which plant had been giving them so many headaches. We surveyed volunteers and found that 50% of volunteers who identified starry stonewort during the Exotic Aquatic Plant Watch had not previously been aware of its presence. This is startling since starry stonewort is the most commonly found invasive aquatic plant in Oakland County, according to the same survey. That our proactive and scientifically-engaged volunteers are only learning about it now is an ominous indication of the awareness gap amongst Michigan's lakeside communities.

How do we deal with it?

Armed with understanding of what starry stonewort is and why it's dangerous, we can now take a critical look at the options we have for combating the invasion. First, foremost, and always, the best management is prevention and early detection. Thorough boat washing practices when taking a boat from lake to lake can lower the chances that starry stonewort fragments will be carried from an infested lake to a pristine lake. Consistent monitoring for starry stonewort around docks and inlets may give you the opportunity to eradicate a lone patch of starry stonewort before it can establish itself.

Once established, the prospects of managing starry stonewort become somewhat grimmer. There are three primary methods of management that are used in treating invasive and nuisance weeds: physical, chemical and biological. Biological control is when another organism, say a stonewort eating beetle, is introduced to destroy the invasive plant. Unfortunately, no biological controls for starry stonewort are known.

Physical management is removal by hand or by harvester. Physical methods are controversial because



the resulting fragments of starry stonewort can be carried by wave or current, potentially spreading starry stonewort even further across a lake basin or into an outflowing stream. Hand harvesting is impractical for anything but the smallest dockside patch of starry stonewort, but the decision to use a harvesting machine to manage starry stonewort is difficult. The machines are rather expensive and the sheer biomass of starry stonewort means harvesters are filled to capacity quickly, making for an arduous process.

Chemical treatments are also complicated. As an algae, common copper and endothall based algaecides are effective against starry stonewort but can only penetrate the upper layers of well-established mats. This combined with the persistence of the bulbils in sediment even after treating starry stonewort means that known chemical treatments cannot eradicate it. Instead, algaecides are used to “haircut” starry stonewort, keeping it low in the water column and out of the way of recreational lake users. Chemical treatments are always used with caution, because the chemicals run the risk of damaging beneficial and native organisms in the lake as well.

So our management options are clearly not perfect. That doesn’t mean that we are doomed to accept the starry stonewort invasion.

Although it has been identified in Michigan since the 80s, it has only been recognized as a worrisome invasive within the past decade. Scientists are beginning to pay attention as the starry stonewort invasion spreads. The more we learn about how starry stonewort behaves and what makes it tick, the better shot we have at effective management. Further research may help to track its spread and improve our ability to prevent it, as well as discover which combination of management options can be used to effectively eradicate it or at least minimize its damaging impacts.

If you are a Michigan lakefront property owner and you discover starry stonewort below your dock, take action and study it! Find out where on your lake it is growing, and where it isn’t. Perhaps take the extra step and alert the riparians downstream of you in your chain of lakes, who are at great risk. Consider joining the MiCorps Cooperative Lakes Monitoring Program. Volunteers who enroll in the program are given the tools and training necessary to better understand the ecology of their lake and which invasive species may be lurking within.

Surprisingly, starry stonewort is ironically scarce in its native ranges in Europe and Asia. It is officially listed as endangered in the United Kingdom and recognized

as becoming increasingly rare in Germany and Japan, where it is known as an indicator of high water quality. In its native range it coexists peacefully with the other plants and animals which it has evolved alongside for millennia. It is only because of human intervention that starry stonewort is so damaging. This algae was accidentally introduced to a foreign environment where it does not exist in a natural balance. It is everyone’s responsibility to take action and find ways to prevent the spread of starry stonewort.

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