# Starry Stonewort: A Primer on an Aggressive, Invasive Species

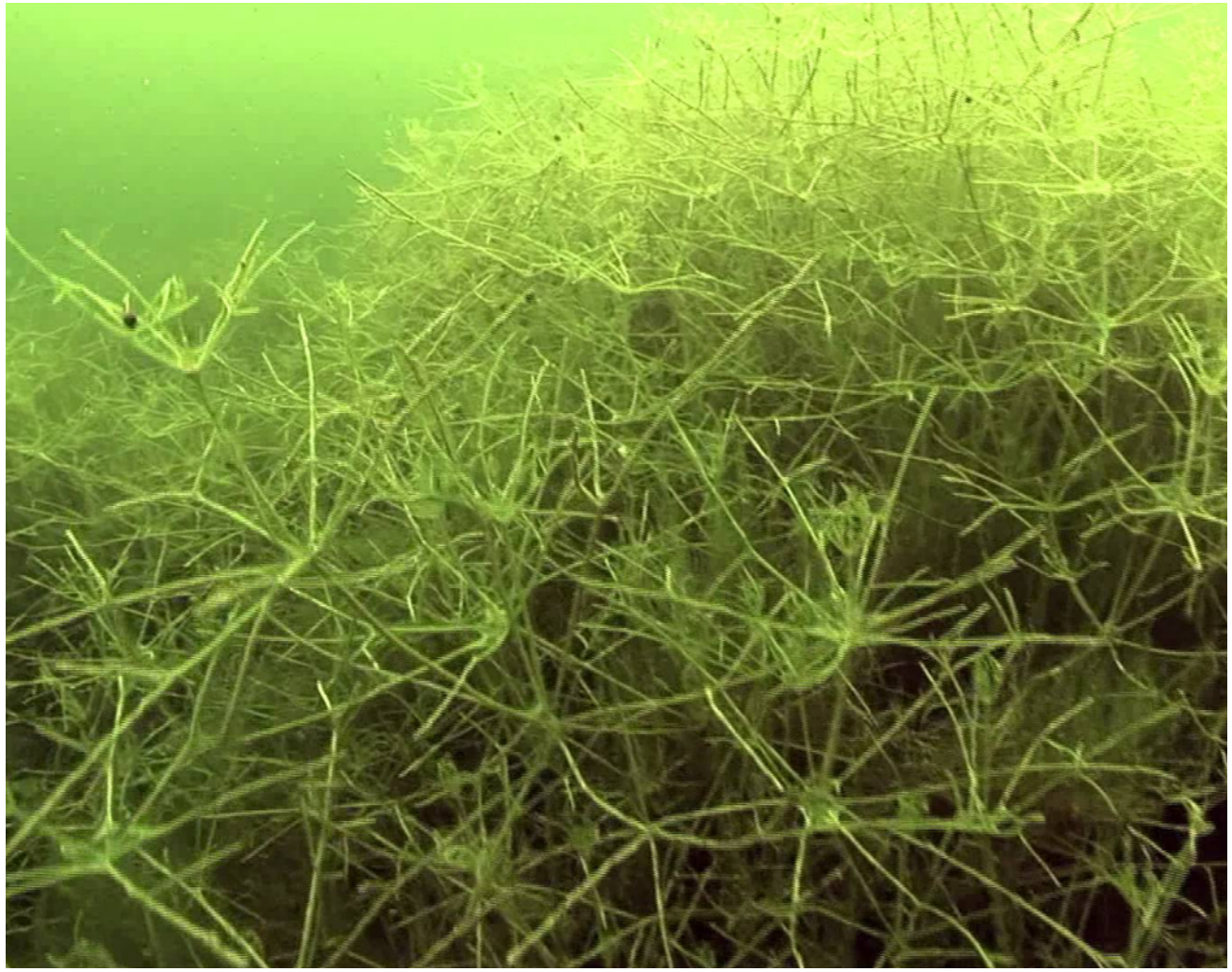
- An ancient plant like macro alga which forms large, dense mats. It grows in water from 0.5>10m in depth. Depth of the mats can be 3m.
- Mats can be so dense they impede boating or paddling. At the peak of the growing season, late July to late September, they appear like hill-like mounds under the surface of the water.
- It is anchored by clear filaments which produce small, white, star shaped bulbils. The bulbils are reproductive structures and organs for hibernation. It is the bulbils which make this alga so difficult to eradicate.
- All starry stonewort in N. America is male. This means it is spread by fragmentation and the dispersal of the bulbils.

# Identifying Characteristics

- The branchlets and stem are very thin (like heavy fishing line) and have a crisp texture.
- Whorls of long, narrow branchlets in groups of 4 to 6 coming off of main shoots.
- Orange reproductive structures (male) occur at branchlet nodes.
- The branches are anchored to the sediment by a clear filament which produce small, white, star shaped bulbils.
- **The small, white, star-shaped bulbils are the distinguishing feature that gives it the name starry stonewort.**

# Dense Mat

The long stems and branchlets become entwined to form dense mats.



Hill-like mounds covering a section of the Lost Channel on Stoney Lake, Sept. 2018

# Introduction and Spread in Invasive Range

- Native range: Northern Eurasian – from Spain to Japan.  Native range has expanded with climate change
- Introduced into North America through the St. Lawrence River, 1974.
- Michigan – now in 27 bodies of water
- New York State -14 bodies of water
- Minnestota – confirmed in 13 lakes
- Also in Pennsylvania, Indiana, and Ohio (Lake Erie)
- 2016 – officially confirmed in Presqu'ile Bay, Lake Ontario – first noted date in American publications/websites

# Kawartha Infestation

- Official reports: Lake Scugog, Lake Simcoe, Lake Couchiching
- An email (Sept. 2018) from Dr. Eric Sager, from Trent University stated:
  - “I think we don’t fully appreciate how extensive the growth of starry stonewort is throughout the Kawarthas. We’ve seen it in Upper and Lower Buckhorn, Trent River, Pigeon, Chemong . . . Just about anywhere we look.
- Severn River/Trent Canal, just passed Lock 42 to Sparrow Lake – saw it last week

# So it is no surprise that starry stonewort is on Ston(e)y Lake

- So far starry stonewort has been identified in only 2 areas on Stoney Lake
    - In the area between Fairy Lake Island and the mainland known as the Lost Channel – and the bays on either end.
        - The bay closest to St. Peter's contains one cottage
        - The bay closest to Burleigh contains 3 cottages, and a dock for an island cottage
        - None of these cottages can avoid boating through it to get to their docks. Two are water access only
    - On Wednesday I did some sampling in an adjacent bay and found starry stonewort there as well.

    - The second and more concerning area is Gilchrist Bay – specifically the bays containing Little's Marina, Pine Vista Resort, and Wildfire Golf. From the map put out by ASLC a couple years ago there are about 8 affected cottages. The marina with its busy boat traffic is by far the biggest concern as a source for further infestations.

# Potential Impact

- **Starry stonewort can spread at a rate that is both impressive and alarming**
  - Potentially we could be dealing with this in more and more areas.
- **What does this mean to the lake environment?**
  - **Reduced biodiversity** – starry stonewort can outcompete native species. It also outcompetes other invasives such as Eurasian watermilfoil. It does this by making it difficult for other plants to receive light. As well, the mass of starry stonewort acts as a benthic barrier accumulating phytotoxins that make the sediment inhospitable for other plant growth.

  - No studies that I can find have quantified the change in biodiversity but there is a lot of anecdotal support for this. From what we've seen ourselves, sections of the channel which were full of a multitude of aquatic vegetation are now exclusively starry stonewort. The bay behind Wildfire is also now largely starry stonewort as well. This is a research gap that researchers, particularly in the US, are now trying to close.

  - **Can degrade fish spawning habitat and can impede fish movement.**
  - This may be especially true for sunfish and bass that spawn in dense native Chara. (US geological survey, Nonindigenous aquatic species database 2019) WWW.nas.er.usgs.gov
  - Mats which reach the surface mean that fish are blocked from passing through an area
  - A decline in fish could mean a decline in birds and mammals that eat them. Our loons, herons, osprey and mink are at risk. A habitat full of SS will also be difficult for turtles.

# Impact for cottagers and recreational lake users

- Starry stonewort covering your shoreline, dock and swimming areas is a nightmare. Remember, this will happily grow in water up to approx. 10 m, (30ft) deep and will form dense mats that are 3m (9ft) thick.
- Most docks are in much shallower water which means swimming and boating will be a problem. At docks in water less than 9ft deep it may be a dense mat right to the surface. Enjoyment of your waterfront will be limited. This is what's happening in areas of Lake Scugog.
- Fragmentation by boats and further spreading will be hard to avoid.
- SSW at your dock will also likely affect your property value.

# Eradicating this from the lake is not an option.

- Starry stonewort has not been successfully eradicated anywhere. Reports put out by various States and academic researchers all reach the same conclusion. ONCE ESTABLISHED STARRY STONEWORT IS HERE TO STAY
- Harvesting – of various forms will reduce the mats but it will grow back.
  - With any mechanical methods there is also the risk of spreading fragments or bulbils.
- Herbicides/algacides reduced the volume but again it is temporary.
- **The bulbils in the sediment remain viable and will quickly re-sprout.**
- Another problem with both mechanical or chemical treatment is that they are non selective. They also impact native aquatic species as well. This means reduced competition for the SS when it begins to regrow and the loss of habitat for other organism and fish.

# Management

- The conclusion of a study of various control methods carried out by the Minnesota Aquatic Invasive Species Research Center was that:
  - "Where large infestations have established, starry stonewort is likely to persist for the foreseeable future and realistic, sustainable goals should be pursued.
- Those goals are reducing abundance and minimizing risk of spread.

## So what can we do?

- We need to either form a group or work with an existing group to prepare an organized lake community response. This would involve things like fundraising, communications, lobbying various governments and agencies, and volunteer recruitment, etc.
- We can learn from what has been done in various states that have been dealing with this for some time. Minnesota, Vermont, and New York are particularly good at involving their citizens in helping to slow the spread of starry stonewort.

# Actions to slow the spread:

- **Create an awareness/education plan so people on the lake**
  - know what this is
  - where it is,
  - how to minimize the risk of spreading it
  - This would include appropriate signage which we've started working on.
  - It should also include encouragement for people to leave native aquatic plants in place so SS has competition. Discourage large scale "weed" harvesting.

# Actions (cont.)

- **In areas already infested and where boat traffic is unavoidable we could do selective harvesting to create "clean" marked, pathways.**
  - This would likely have to involve both mechanical and hand pulling. Best practices would need to be developed and hopefully volunteer assistance given to help our fellow cottagers.
  - Mechanical harvesting will need to be paid for so we'd have to figure that out. I believe Rama Township on Lake Simcoe pays for mechanical harvesting in Lagoon City, and there is a recent report from the Lake Scugog Stewards that the Trent-Severn Waterway is going to use a company from Peterborough to clean up an area near Port Perry Bay. So that is another avenue to be explored.

# Actions (continued)

- **Areas where boat traffic is not necessary (small secluded bays, Lost Channel ) are quarantined particularly when the SS has reached a height that it can be broken with paddles or props.**
- **An organized survey of high-risk areas should be done**
  - Bays near infested areas
  - All marinas and boat launches – since that's where infestations traditionally start.
  - Check cottage docks of people who dock at or frequent Little's Marina or Wildfire.
- **We need to create a reporting and tracking system for new occurrences**
- **Actively promote "Clean, Drain and Dry" practices to prevent spread to other lakes.**
  - Large Clean, dry and drain signs should be posted at all marinas and boat launches and signs indicating the presence of SS. People need to know why this is important. Not a theoretical precaution but an attempt to stop the spread of an aggressive invasive species.
  - Provide boat wash equipment?
  - Target days where volunteers talk to boaters, help wash boats? (As done in Vermont)
- **Spread the word to other lakes near us and on the Trent Severn – let people deal with this while it is a few small patches. Not once they've got bays full of it.**
  - Unfortunately, our lake was not warned about this when it was known to be in the Trent system at least two years before it was first noticed in the Lost Channel. We need to be better neighbours than that.

# Conclusion

- Starry stonewort is here but if we get organized there are things we can do to help our lake. We can start by implementing some of the practices developed in the US to help slow the spread.
- There is a lot of attention and research happening in the US and now Canada as well. The research is becoming more systematic, emphasizing research gaps like control and management, and actually quantifying the impact.

- **Doing nothing or waiting for an eradication method to be found is not an option**. Starry stonewort has the ability to spread everywhere, quite possibly changing the character of the lake we love.