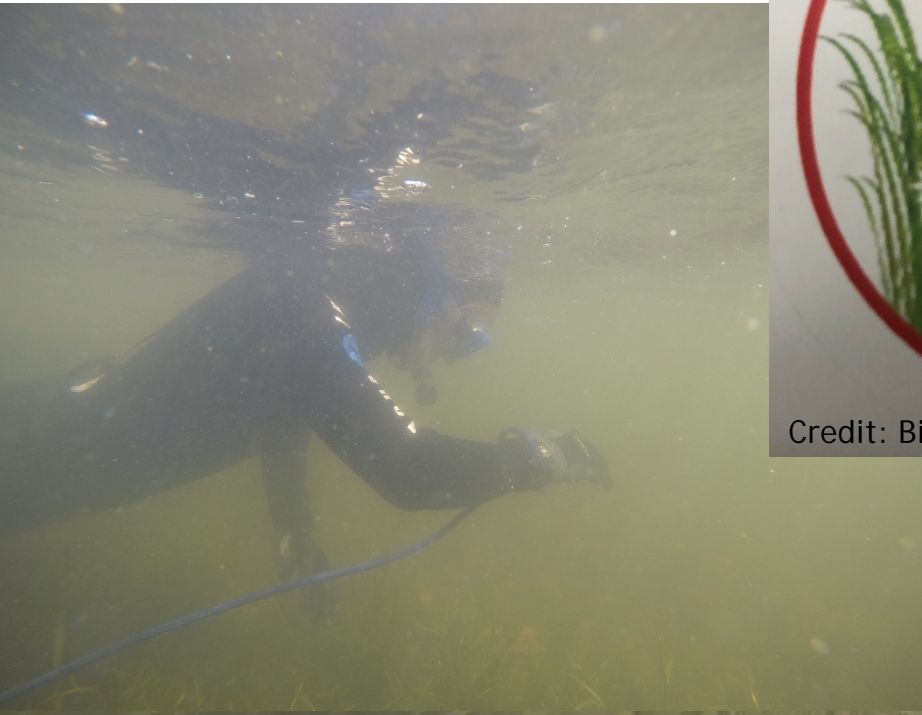


# Starry Stonewort

## Management at Pleasant Lake

Chris Jurek, Invasive Species Specialist  
MN DNR



Credit: Big Lake Community Lake Association



# What is Starry Stonewort?

- ▶ It's a green algae found in the Plant Kingdom
- ▶ Whorls of branchlets, although not diagnostic
- ▶ NO stipulodes, cortification (rough feel), or spine cells in this genus (same as native stoneworts)
- ▶ ONLY male (antheridia) species found in the US
- ▶ Internodes about as long as the branches (making it robust)
- ▶ Star-shaped bulbils



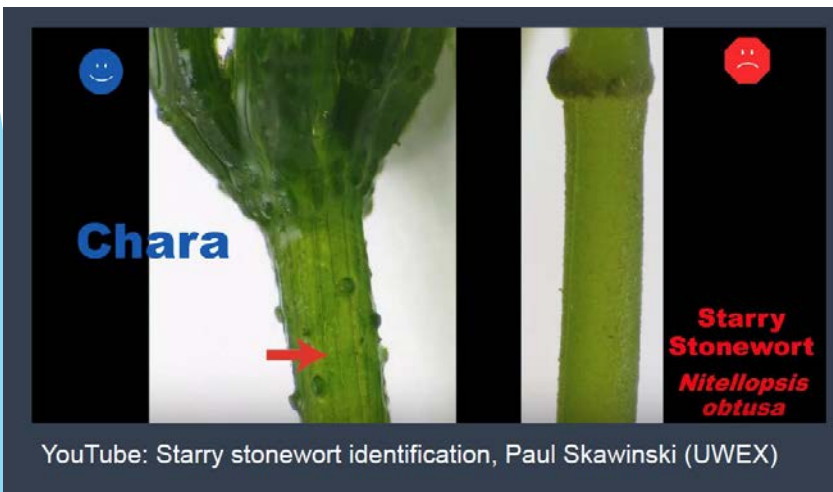
Photo credit: UWSP and Golden Sands RCDC



Photo credits: Scott Brown



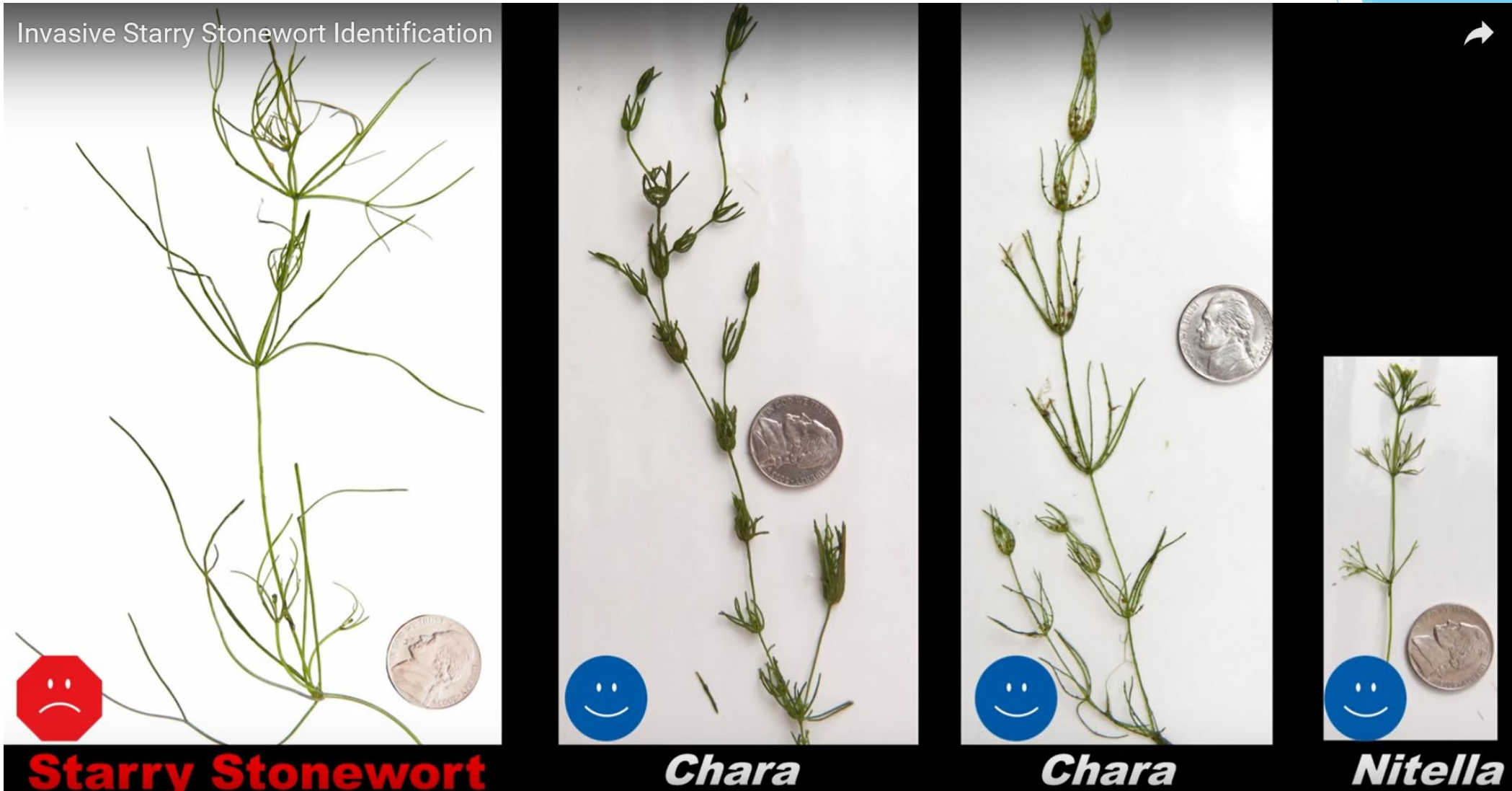
Photo credits: Paul Skawinski



YouTube: Starry stonewort identification, Paul Skawinski (UWEX)



## Whorls are not diagnostic of starry stonewort



**Starry stonewort**  
*Nitellopsis obtusa*  
(Non-native)  
(Actual size)

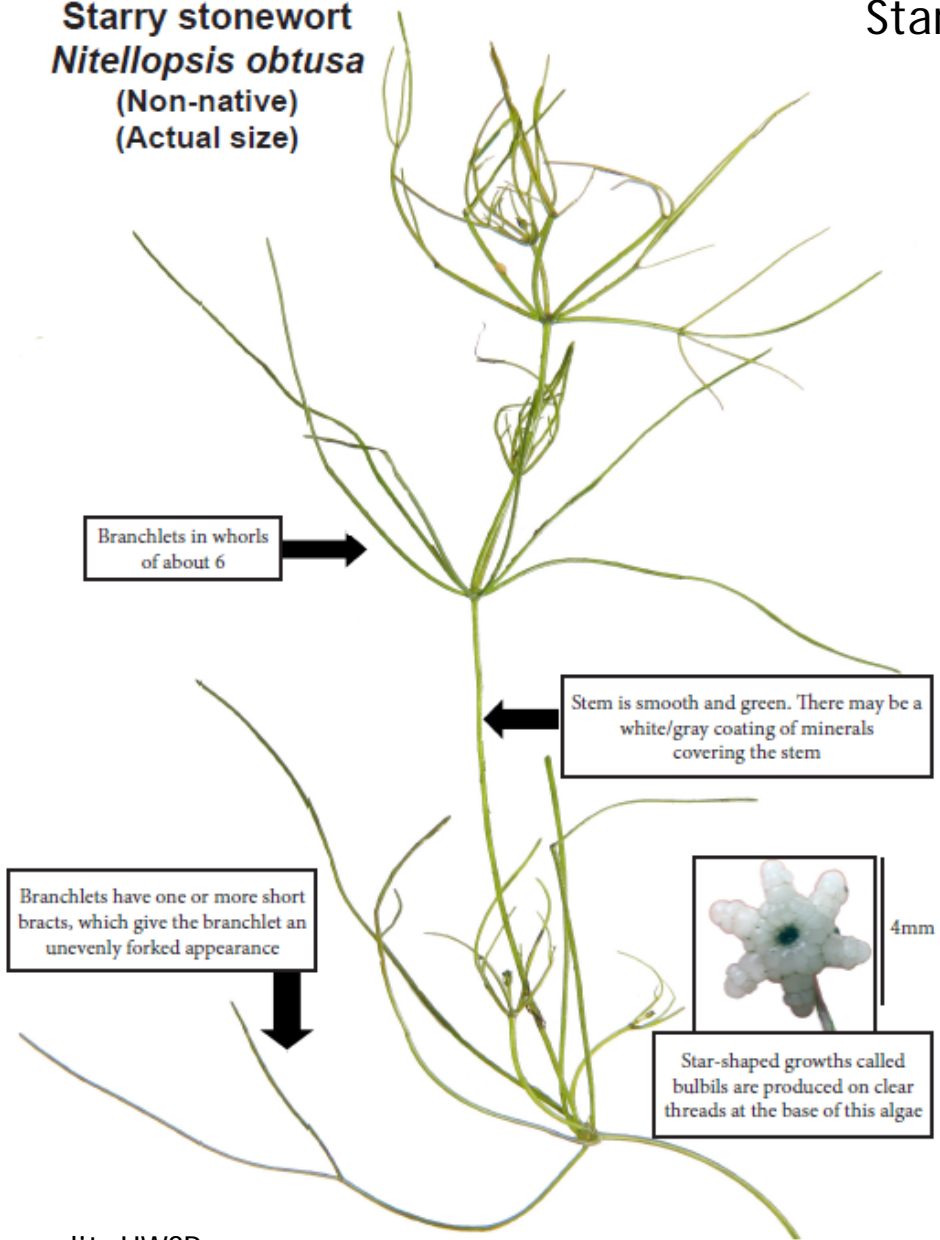


Photo credit: UWSP



# Success with Hand- Pulling at Pleasant Lake



Pre and post management photos of starry stonewort taken by Chris Jurek (MN DNR) using a GoPro underwater camera. Steve McComas with Blue Water Science conducted hand removal via scuba diving on 31 Aug 2018 in Pleasant Lake, Wright County (86025100).

# Overview of Pleasant Lake Management: Hand-pulling and copper applications

- ▶ Pleasant Lake was the first lake in Minnesota to use both copper treatment and hand removal via scuba diving to remove starry stonewort.
  - ▶ **2018- Initial: 25 sq. feet of SSW**
    - ▶ one hand-pull, one copper treatment (cutrine plus)
  - ▶ **2019- By early Sept.: 1 sq. foot of SSW**
    - ▶ 4 hand-pulls, 4 copper treatments (cutrine plus)



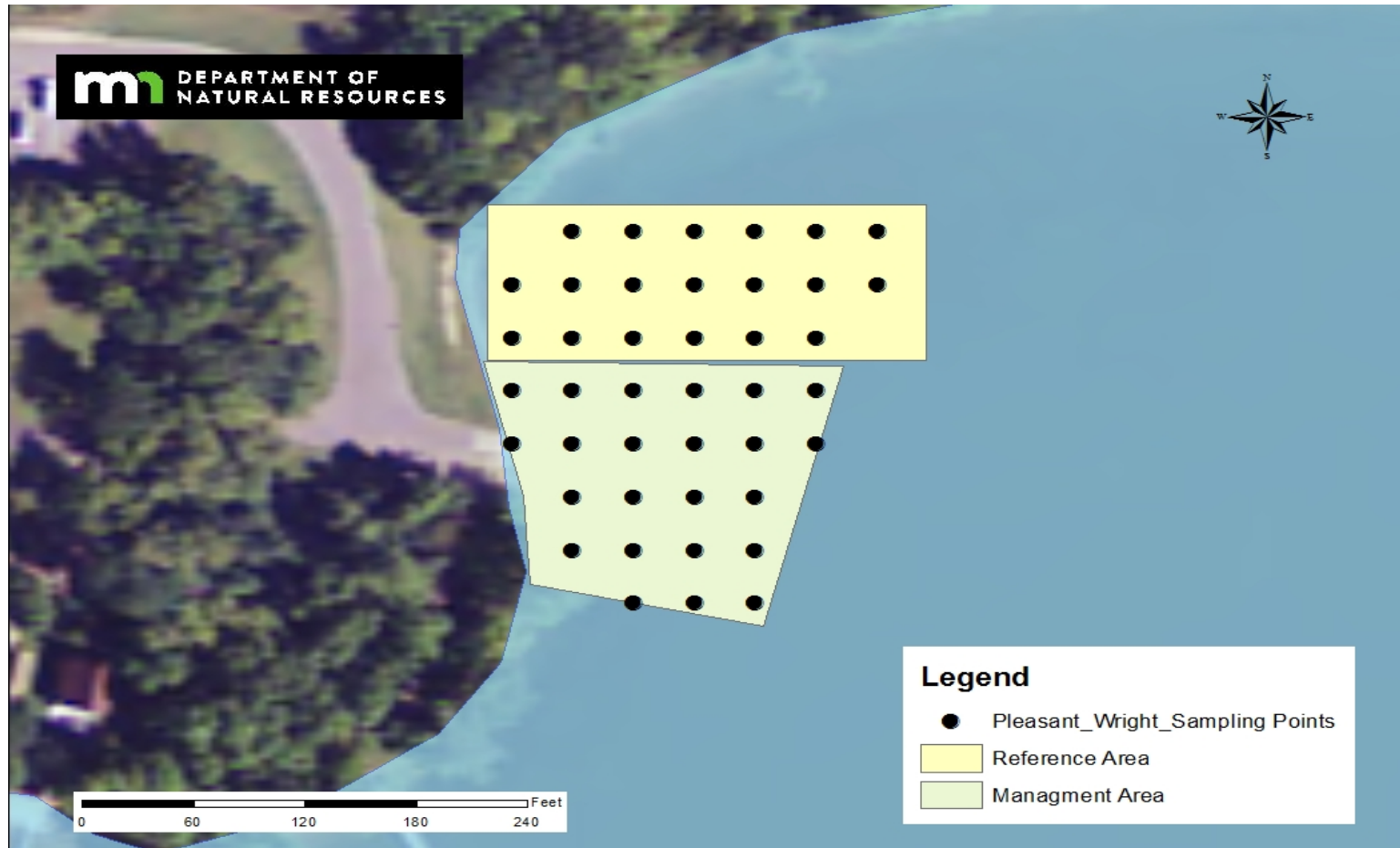


# Methods for monitoring used at Pleasant

- ▶ Point-intercept grid
  - ▶ 23 points within 0.5 acres
  - ▶ Reference area added in 2019
    - ▶ adjacent to treatment area
  - ▶ Not the best tool with sparse populations
    - ▶ detection level too low
- ▶ Estimated biomass removed- added in 2019
  - ▶ Best tool so far
- ▶ Underwater snorkel or scuba surveys
  - ▶ Measured perimeter
  - ▶ Documentation of height
  - ▶ Recorded present/ absent



## Pleasant Lake, Wright Co: North PWA- Monitoring Site



Pleasant Lake, Wright County (DOW # 86025100)  
Point-intercept Monitoring Grid





## Results: Plant Survey Metrics inside Treatment Area (copper) at Pleasant Lake

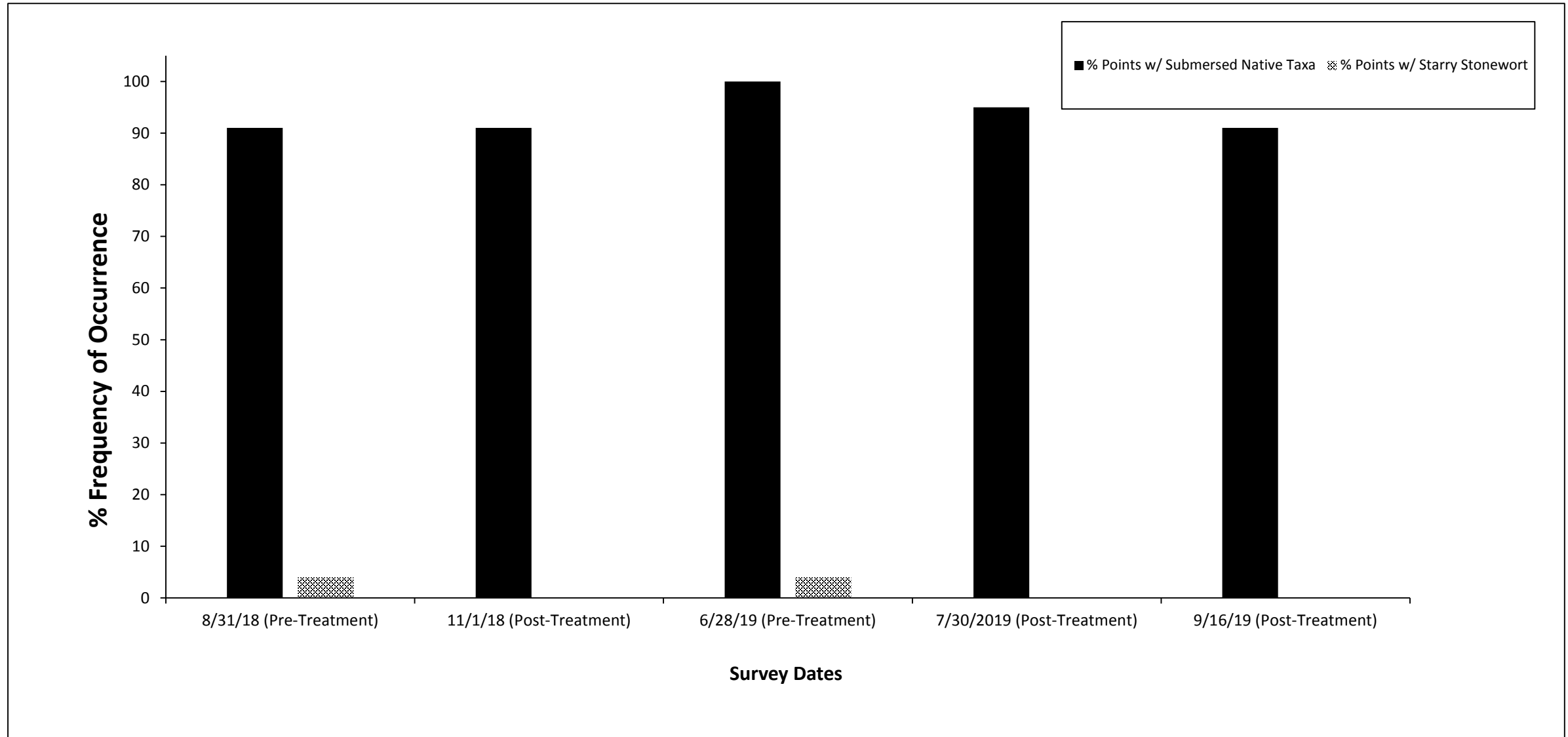
Survey Metrics	8/31/18 (Pre-Treatment)	11/1/18 (Post-Treatment)	6/28/19 (Pre-Treatment)	7/30/2019 (Post-Treatment)	9/16/19 (Post-Treatment)
Surveyor	Blue Water Science	Blue Water Science	MNDNR	MNDNR	MNDNR
Total # Points Sampled	23	23	23	21	22
Max Depth of Growth (95%) in feet	7	7	6.5	6.6	7
# Point in Max Depth Range	23	23	21	18	18
Max Depth of Starry Stonewort (feet)	6	0	5.3	0	0
# Points in Littoral (0-15 feet)	23	23	23	21	22
% Points w/ Submersed Native Taxa	91	91	100	95	91
Mean Submersed Native Taxa/ Point	3.7	3.5	3.9	3.7	3.1
Mean Density of Submersed Native Taxa	1.1	1.1	1.2	1.1	1
# Submersed Native Taxa	13	11	16	13	13
% Points with Starry Stonewort	4	0	4	0	0
Mean Density of Starry Stonewort	1	0	1	0	0

## Plant Frequency Occurrence inside Treatment Area at Pleasant Lake

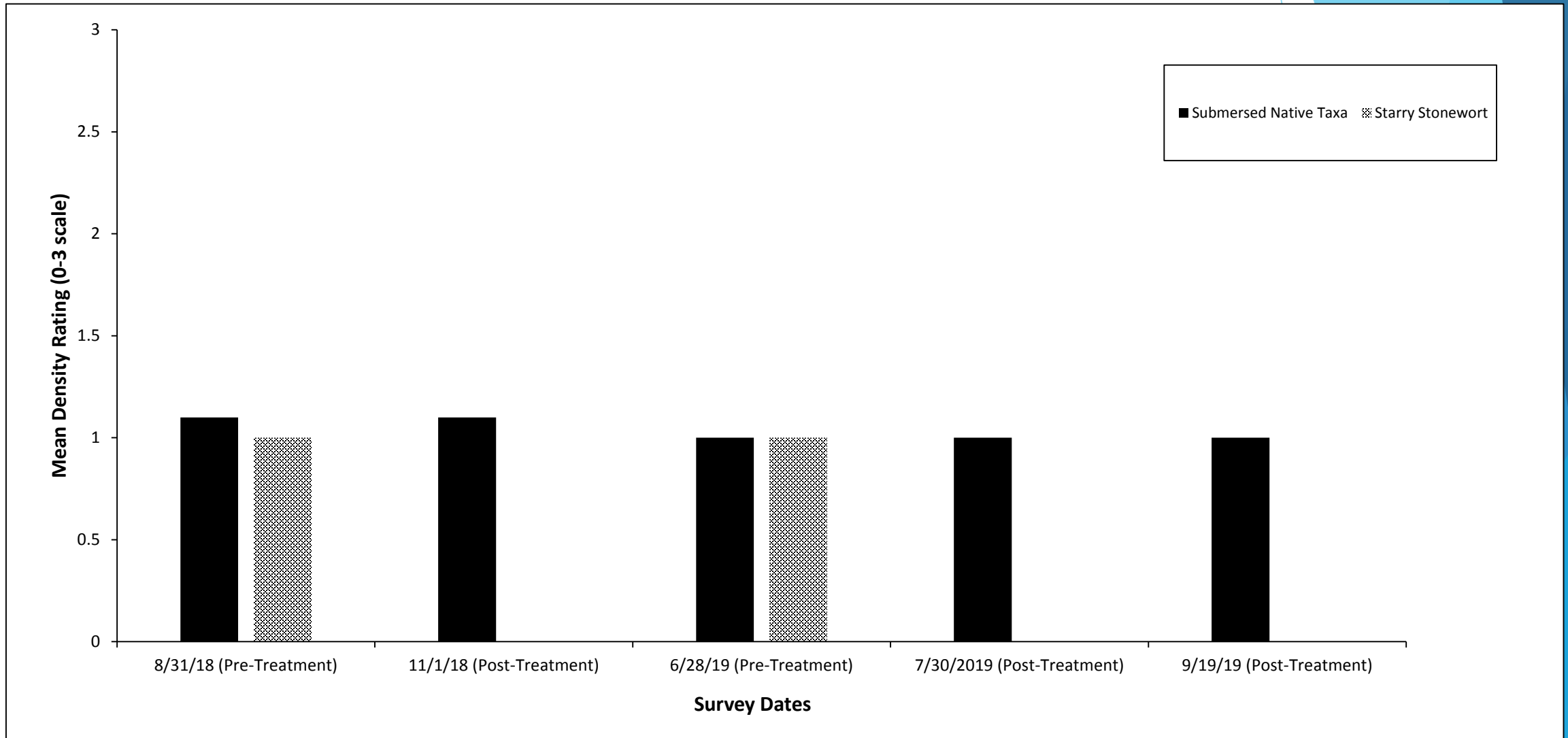
Taxonomic Name	Common Name	31 Aug 2018 (Pre- management)	1 Nov 2018 (Post- management)	28 June 2019 (Pre- management)	30 July 2019 (Post- management)	19 Sep 2019 (Post- management)
<b>SUBMERSED PLANTS</b>						
<i>Nitellopsis obtusa</i> *	Starry stonewort*	4	0	4	0	0
<i>Potamogeton crispus</i> *	Curly leaf pondweed*	4	0	39	5	5
<i>Ceratophyllum demersum</i>	Coontail	22	52	39	52	27
<i>Bidens beckii</i>	Marigold	17	52	48	33	45
<i>Chara</i> sp.	Muskgrass	39	35	26	5	5
<i>Elodea canadensis</i>	Canada waterweed	0	0	4	0	0
<i>Heteranthera dubia</i>	Water stargrass	9	17	17	14	23
<i>Lemna triscula</i>	Forked Duckweed	1	1	22	14	23
<i>Myriophyllum sibiricum</i>	Northern milfoil	48	48	57	24	9
<i>Najas</i> sp.	Naiad species	74	13	13	5	0
<i>Nitella</i> sp.	Nitella species	0	0	0	0	5
<i>Potamogeton freisii</i>	Fries' pondweed	0	0	13	0	0
<i>Potamogeton richardsonii</i>	Claspingleaf pondweed	22	26	30	43	68
<i>Potamogeton</i> spp.	Narrowleaf pondweed	4	0	52	5	0
<i>Potamogeton zosteriformis</i>	Flatstem pondweed	17	4	35	38	23
<i>Ranunculus</i> sp.	Buttercup	9	0	17	5	5
<i>Stuckenia pectinata</i>	Sago pondweed	22	22	9	24	14
<i>Utricularia</i> sp.	Bladderwort species	4	9	4	29	9
<i>Vallisneria americana</i>	Water celery	78	70	22	95	77



## Plant Frequency of Occurrence inside Treatment Area at Pleasant Lake



## Mean Density of Plants in Treatment Area at Pleasant Lake





# Biomass Removal within One Year at Pleasant Lake, Wright Co.

Biomass Summary	31 Aug 2018	1 July 2019	24 July 2019	19 Aug 2019	26 Sept 2019	8 October 2019
Total Biomass Wet Weight (pounds)	NA	11	<1	<1	<1	<1

Hand-pulling performed by Steve McComas (Blue Water Science)  
MN DNR used wet-weight biomass measurements to estimate amount removed



# Summary of Starry Stonewort at Pleasant Lake

- ▶ Effective at decreasing % occurrence and abundance of SSW
- ▶ Starry stonewort has not spread within lake
- ▶ No impacts to native aquatic plants
- ▶ From 2018 to 2019, the perimeter of the infestation decreased from 25 sq. feet to 1 sq. foot.
- ▶ Re-growth likely occurring from bulbils
- ▶ Copper treatments are likely not necessary into the future based on post-hand pulling snorkel surveys
  - ▶ Copper may be used for any remaining fragments that remain





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