



**CUTL Minnesota - Mille Lacs
Pilot Research Project**

Final Report

PROJECT SUMMARY



Figure 1: Mille Lacs Dive Planning with CUTL Team

Project Objective:

Conduct pilot research on Mille Lacs Lake to investigate the level of submerged litter under the surface of the lake to gauge the degree of impact it has currently, and better understand what further remediation is needed.

Objectives:

- Identify areas around Mille Lacs that may be subject to more litter due to human activity, wind patterns and other factors that could contribute to higher levels of litter accumulation.
- Collect all submerged litter and GPS mark heavy lift litter items, hot spots, and unknown or historical objects.
- Assess underwater habitat and plant species to document any new threats from aquatic invasive species.
- Categorize all collected litter by material type and use to display our results of litter collected during pilot research

PROJECT METRICS

- Weight Removed (lbs.): 369
- Dry/sorted weight removed (lbs.): 343.7
- Items Removed: 196 items
- Total Dive Days: 7 days
- Total Cleanup Dives: 12 dives
- Air Cylinders Used: 15 cylinders
- Volunteers to Date: 9 volunteers
- Volunteer Hours: 315



Figure 2: Diver mesh litter bags



Figure 3: Plastic litter in hand

NON-COLLECTION ITEMS

Aside from removing small litter items our team also identified items/areas of interest called non-collection items using GPS location, photo collection, item description. These items can consist of heavy lift litter items, algal-blooms, aquatic invasive species, hot spots, or 'unknown items' that could be historical artifacts.

- **Total non-collection items: 3**

- **Heavy Lift: 1**

- *Heavy lift items= Large or heavy items that would require additional equipment to remove safely.*

- **Hot Spot: 2**

- *Hot Spot: Areas identified that have a large amount of litter which may merit a re-cleaning of the site*

- **Unknown = 0**

- **Aquatic Invasive Species & Algalblooms**

- *Our organization has written separate pages within this report discussing these factors.*

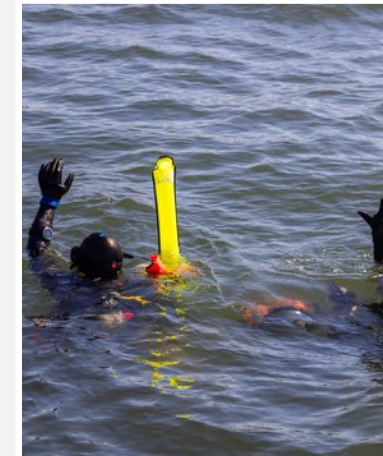


Figure 4: Divers in Mille Lacs

Figure 5 + 6: Heavy lift litter items

AQUATIC INVASIVE SPECIES

Clean Up The Lake's program for aquatic invasive species (AIS) surveillance was designed to help run surveys on the presence of aquatic invasive species during litter cleanups and environmental projects. During dives, our teams seek to identify new infestations in an effort to prevent spread. When the CUTL AIS surveillance program runs simultaneously with litter cleanup, our goals are to identify, sample and report on any signs of potential new AIS in the area.

Upon arrival to Mille Lacs, Clean Up The Lake had done research with the MPCA and DNR to better understand the extent of aquatic invasive species present in Mille Lacs. Upon arrival our organization was made aware of the presence of the **banded mystery snail, chinese mystery snail, eurasian watermilfoil, curly leaf pondweed, the spiny water flea, zebra mussels** and some other species..

Conclusion: CUTL observed all the different types of AIS mentioned above in bold throughout their project. CUTL divers did not observe any new threats of AIS, not already known by existing agencies.

Recommendation: Clean Up The Lake would recommend that state and local agencies continue with monitoring, control and awareness programs currently in place. Agencies should also consider increasing education and awareness efforts to ensure locals and visitors are aware that motorized and non motorized vessels and equipment that go into Mille Lacs Lake should be clean drain dry before users go into other bodies of water, to help mitigate the spread of aquatic invasive present in Mille Lacs to other bodies of water throughout the state and beyond.

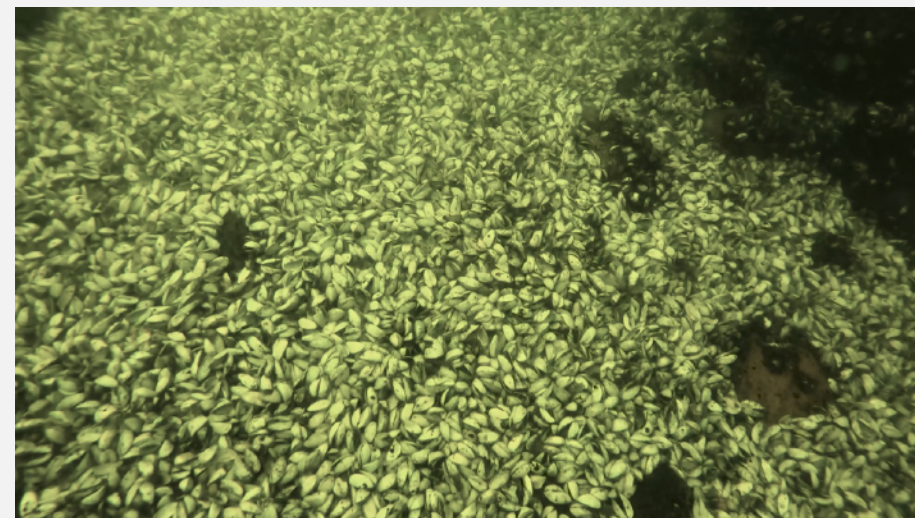


Figure 7: Mille Lacs lakebed covered in zebra mussels



Figure 8: Objects under Mille Lacs covered in zebra mussels

ALGALBLOOM OBSERVATIONS

Clean Up The Lake's program for reporting algal bloom observations during their projects have three important stages.

First, our organization does preliminary research in each lake we operate to investigate any historical records regarding the presence of cyanobacteria or cyanotoxins in the lake (IE: HABS or harmful algalbloom). This is important to ensure the safety of our volunteer dive teams and also to better understand the possible algae in the area.

Second, our volunteer divers and surface support teams will photo and video document any and all algae or algal-blooms seen during the dives to send off to local or state waterboards and/or HAB specialists.

Third, in instances where we are working with a state waterboard, we will send in observations for them to determine if there may be risks of an algae bloom and they want to conduct further sampling or water monitoring in those areas.

Conclusion with Mille Lacs: During our stage of research, we spoke at length with the Mille Lacs Band of Ojibwe as well as DNR and found out that there was the presence of cyanobacteria in Mille Lacs. Most notably, Nostoc & Gloeotrichia were known to be present.



Figure 9 -11: What is believed to be NOSTOC algae on Mille Lacs

ALGALBLOOM OBSERVATIONS CNTD

Conclusion with Mille Lacs CNTD: Given the complexity of cyanobacteria and the difficulty to predict when cyanotoxins may begin to form, CUTL had strong initial concerns of sending divers into the water without further testing.

To the project's benefit, Perry Bunting from the Band of Ojibwe worked with staff to send water samples from Mille Lacs taken on September 11, 2024 to the NRRI Central Analytical Lab at the University of Minnesota Duluth where Chris Filmstrip PH. D, an Applied Limnologist who specializes in harmful algalbloom ecology was able to confirm the results of the water tests included the presence of cyanobacteria. *Dolichospermum*, *Microcystis*, *Aphanozomenon* were types of cyanobacteria discovered, yet he noted that none of the samples had any form of cyanotoxins or the indicator toxin of microcystin. With these results in hand, the CUTL dive team was able to proceed with dives in Mille Lacs in September 2024.

Despite conducting these pilot research dives, CUTL management would recommend that future dives are either completed later in the fall season once water temperatures lower and blue-green algae levels subside further, or earlier in the summer and spring after snow melt to mitigate the risk of divers being in contact with cyanotoxins.



Figure 9 -11: What is believed to be *Nostoc*, a cyanobacteria, present on Mille Lacs

LITTER CATEGORIZATION

To collect impactful data on litter removed from lake environments we have adopted the United Nations Environmental Programme (UNEP) Marine Litter Categorization standard to produce a nationally recognized data set. This method separates litter into 77 different categories. CUTL with help from UC Davis TERC and Desert Research Institute (DRI) has adapted this system to freshwater litter and created additional categories for a total of 83 litter categories.

- 9 different **material categories**: plastic, foamed plastic, cloth, glass & ceramic, metal, paper/cardboard, rubber, wood and other.
- Within the material categories there are specific **use categories** which further define the item- there are 83 in total. For example- fishing equipment, foil wrappers, & more.
- We have created templates on sorting tarps that outline each category. After the litter is sorted, we photograph, count, and weigh each category and have done so for all litter collected during the Mille Lacs pilot research project.



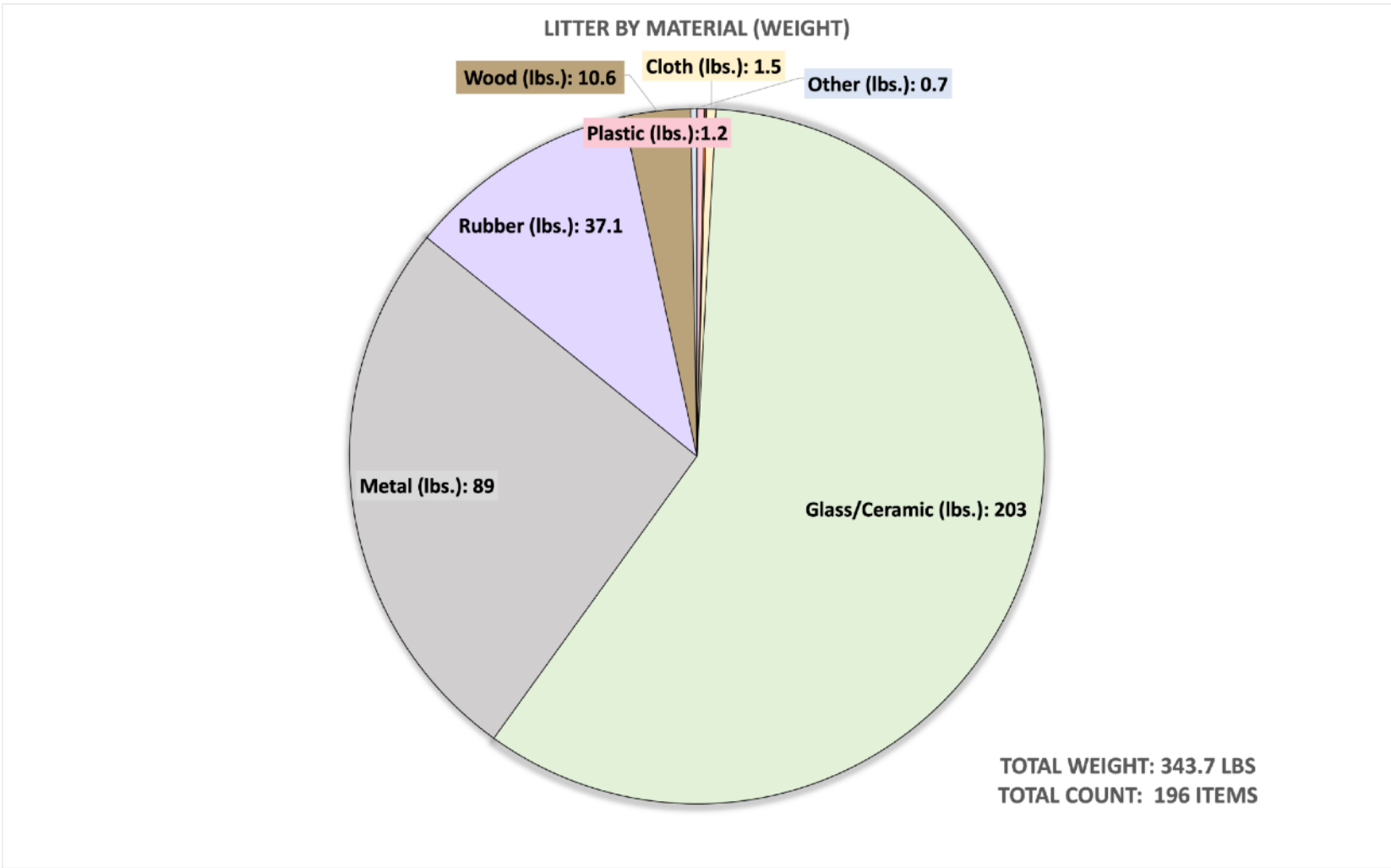
Figure 12: Golf balls from a Mille Lacs dive



Figure 13: Fishing equipment from Mille Lacs dives

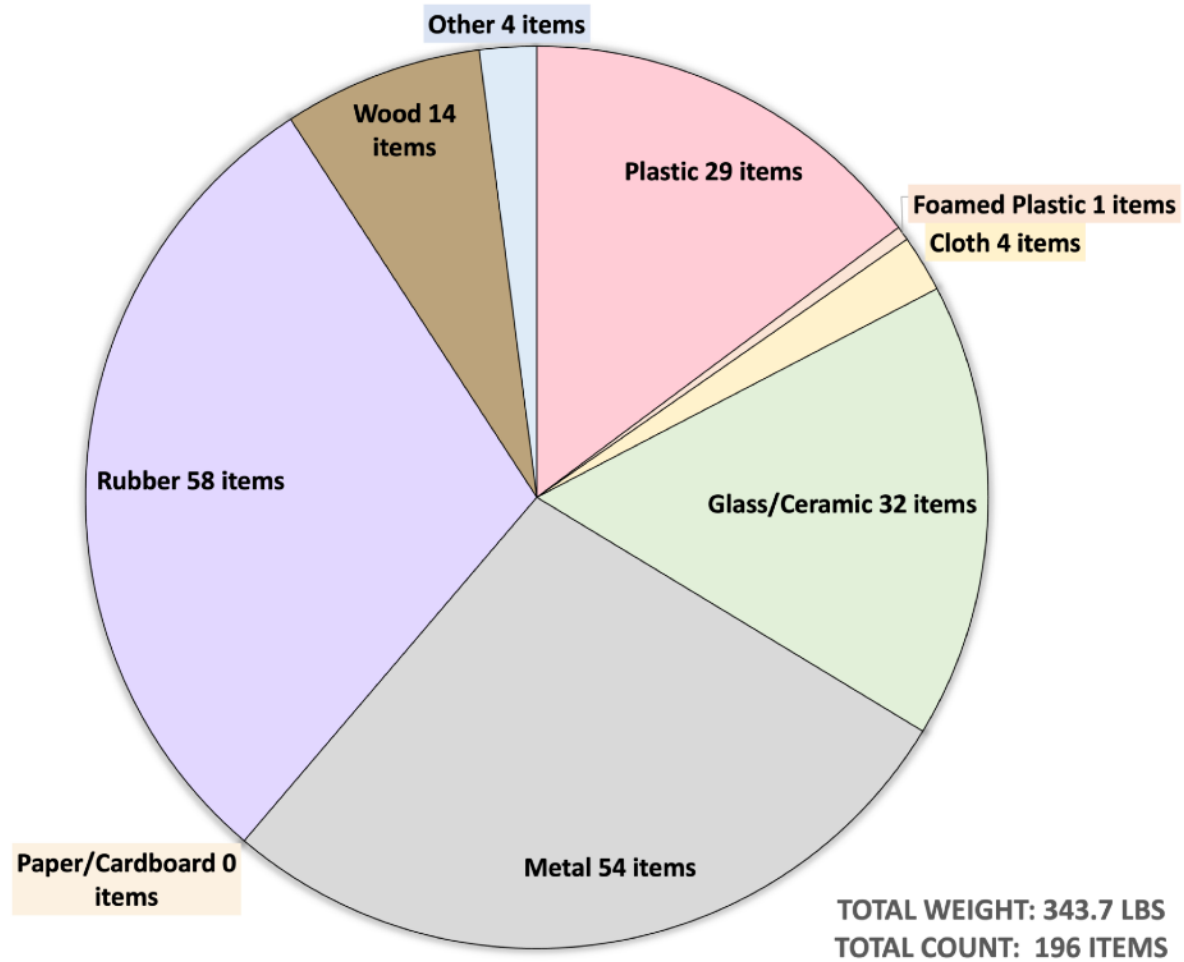
PROJECT TOTALS – CATEGORY SPECIFIC

Material Type	Total Weight (lbs)	Total Count (#)
Plastic	1.2	29
Foam Plastic	0.3	1
Cloth	1.5	4
Glass/Ceramic	203.0	32
Metal	89.0	54
Paper/Cardboard	0.0	0
Rubber	37.1	58
Wood	10.6	14
Other	1.0	4
TOTALS	343.7	196



LITTER BREAKDOWN
– TOTAL WEIGHT

LITTER BY MATERIAL (COUNT)



LITTER BREAKDOWN
- TOTAL COUNT

Dive sites

The team successfully completed 12 cleanups, and two ROV scouting dives in Mille Lacs.

All dive sites are shown on the map. Sites marked with a green pin indicate ROV Survey sites.

(*GIS Files & Specific GPS Locations Available Upon Request*)

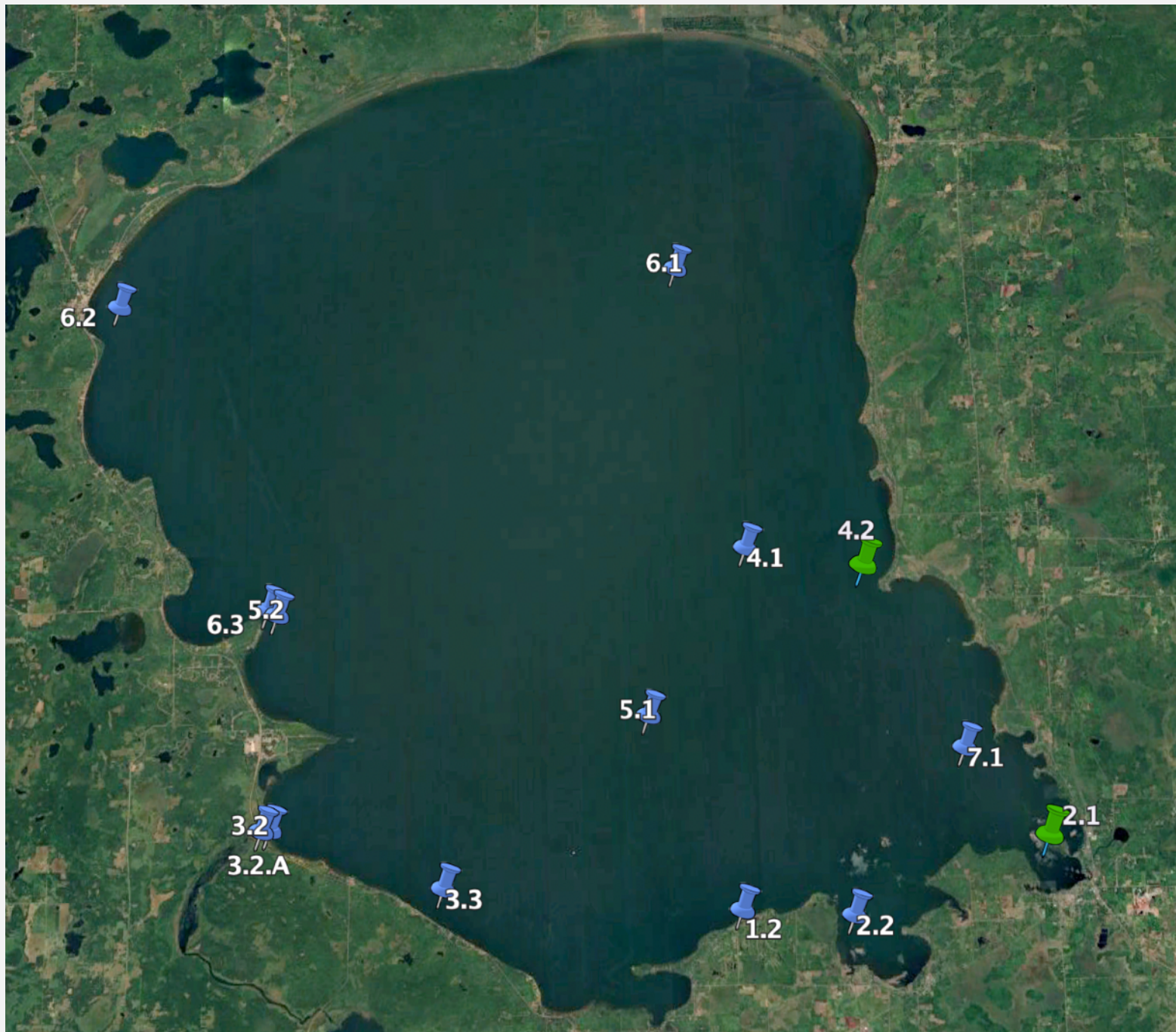


Figure 14: CUTL dive site locations

A Lake Wide Sample

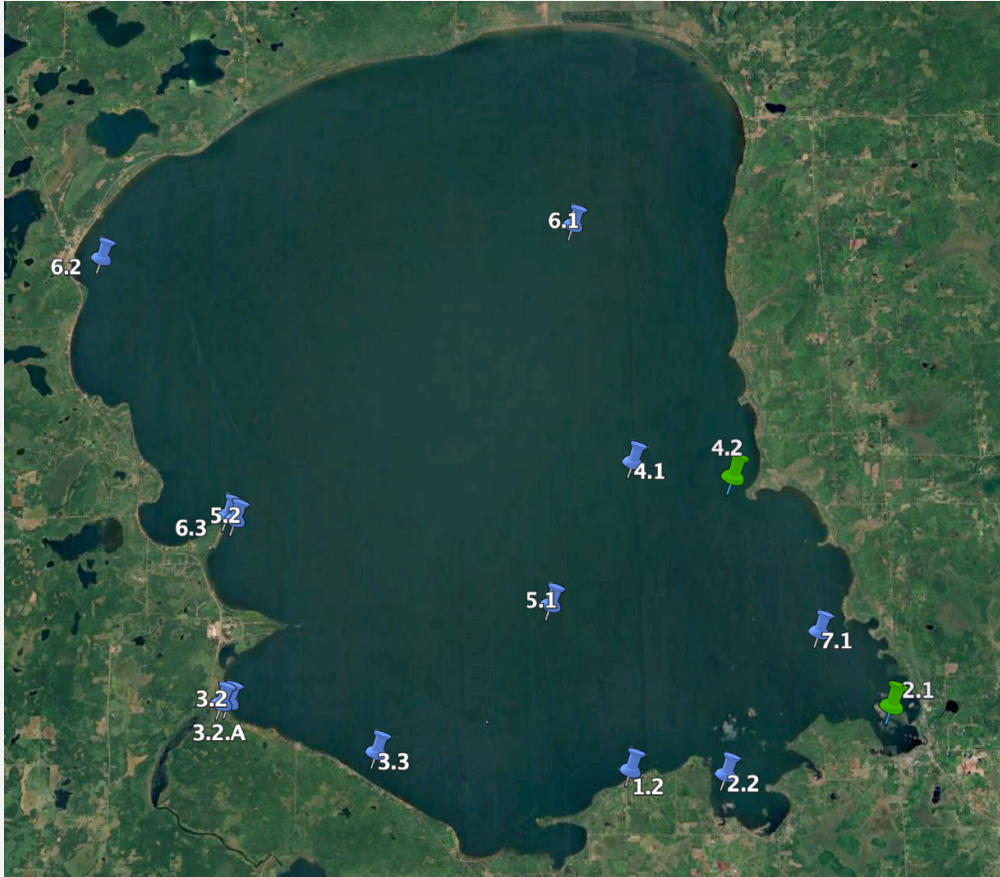


Figure 14: CUTL dive site locations

Our organization worked with local agencies, local fishermen and others to determine possible accumulation zones. Our dive teams assessed a variety of silty, rocky and mixed substrates. We ran surveys in commercial and residential zones near shore, as well as in the most popular fishing areas and even recreational areas where people float & recreate in the summer. We feel confident that our sample represents an extremely thorough investigation into submerge litter in Mille Lacs.

Conclusion on Mille Lacs Submerged Litter Issues

- CUTL anticipated large litter loads in the rocky reef areas of Mille Lacs, but at the end of the project was surprised to find much lower levels of submerged litter accumulation in Mille Lacs.
- Most of the litter removed (*and likely the types of litter that collects at the bottom of Mille Lacs*) consisted of heavier material types such as metal, ceramics and heavy materials.
- Due to the lower depths of Mille Lacs and the high winds and large wave action, much of the lightweight submerged litter such as plastics, aluminum cans, fishing lines, and shotgun shells, among other litter types are likely pushed to shore by wind and wave action.
- The lack of steep drop offs around the shoreline of Mille Lacs, and the gradual depth changes support the theory that litter is transported by the elements and is not getting caught nearshore and therefore has the opportunity to arrive at the surface, on shoreline beaches.
- Local shoreline cleanup efforts have likely played a significant role in removing much of the litter that at one point in time, may have been submerged litter. Locals should continue shoreline and beach cleanups at Mille Lacs.

Recommendations for Next Steps:

- Given the deposit of litter into the ice during winter seasons, this ice may be trapping litter and pushing it to shore during 'ice-out'. CUTL would recommend **shoreline cleanups during the spring season** to reduce litter not only on the shore but to prevent that litter from degrading in shallow or nearshore waters.
- CUTL would recommend nearshore cleanups in spring or late fall timelines when algalbloom conditions are confirmed by professionals to not be a concern. These **nearshore cleanups** could be in **shallower bays, using snorkelers** and individuals who could use hip-waders to clean up any submerged litter found in nearby bays, launches & busy areas.
- CUTL would propose either MPCA or another local non profit **consider working further with CUTL on our strategic partner program**. This would include CUTL staff working to develop a local team to continue these underwater monitoring efforts, clean ups, education, and more on Mille Lacs and other lakes across Minnesota. We would suggest a meeting in Winter 2024-2025 to discuss next steps with interested parties.

MEDIA & AWARENESS

- The following are some media stories from our work on Mille Lacs that helped generate awareness on the issue:

- [Minnesota Public Radio \(MPR\)](#)
- [KARE 11 TV News](#)
- [KSTP 5 TV News](#)
- [Brainard Dispatch Newspaper](#)
- [KSTP 5 News Written Story](#)
- [Star Tribune Newspaper](#)
- [Message Media News](#)
- [Outdoor News](#)
- [The Daily Item News](#)
- [South Tahoe Now](#)



Figure 15: A media day with local journalists from Minnesota on the surface of Mille Lacs

MEDIA ASSETS FOR AGENCIES

- Here are some links for access to both photo and video BROLL for any immediate needs:

-[Photography](#)

-[Video BROLL](#)



Figure 16: Film equipment on the dive boat on Mille Lacs

Please note if anyone is in need of more BROLL or Photography assets we have these available upon request.

Future Series To Be Released

- What Lies Beneath is a new documentary-series that is produced by CUTL's media department known as "Make A Difference Media". Our media team seeks to produce professional content that helps promote awareness of environmental issues around the world.
- This series "What Lies Beneath" has 5 episodes spanning lakes from California, to Nevada, and Minnesota. The release date is scheduled for Q1 of 2025 and all partners from this project will be informed and provided content.



Figure 17: Cinematographer capturing environmental work at Mille Lacs in September 2024

49 VOLUNTEERS

Madio Wallner - *captain*

Shawn Louth - *diver*

Jenna Johnson - *diver*

Ludo Fekete - *diver*

Colin West - *captain*

Gary Schiltz - *captain*

Ann Brucciani Lyon - *boat support*

Amanda Jones - *diver*

Annika Kimme - *boat support*

40+ students from Isle Schools - *litter sorters*

PROJECT PARTNERS



Minnesota Pollution
Control Agency



MILLE LACS AREA
COMMUNITY FOUNDATION

