

Sikuk, sputnik,
ammalu imak
imijauKattajuk

Ice, snow, and
drinking water



Plastics and anthropogenic particles in ice

We found more plastics in ice than in snow or drinking water. This is likely because there are more plastics in the ocean than in freshwater sources to get caught in ice when it freezes.

This aligns with the fact that the only freshwater ice core (from Trouser Lake) had the fewest number of plastics. Darrel Lyall asked this question—whether there were more or fewer plastics in freshwater than marine water. This is why we went to Trouser Lake to see!

Table 29: Concentration of plastics in ice near Nain

Place	#plastics	Total # waste items	Avg. size plastic (mm)	Standard Deviation	Median size plastic (mm)
Satosaak Island	22	25	0.29	0.26	0.24
Taktok Island	23	24	0.38	0.71	0.20
TikKoatokak Bay	50	52	0.35	0.55	0.23
Trouser Lake	6	7	0.46	0.50	0.19
Total	101	108	0.37	0.51	0.22

Many of these samples came from another research project on ice salinity that the Nunatsiavut Government was carrying out, which did not require the volume of ice (or water) to be recorded. Since volume is required for concentration calculations, we only report counts here. Lana Vultea processed all samples as part of their Master's project.



There is not a clear pattern of where plastics appear in the ice core. While patterns might emerge with more samples, we can't tell if there are trends in Nunatsiavut based on our data. Other studies also show conflicting data on whether there are patterns in how plastics freeze into ice, so maybe we would find no trends even with more data.

The particles we found in ice were smaller than those from animals, but generally a bit larger than particles from drinking water and freshwater sources.



Top left: Liz Pijogge shows Mannasse (sp) Pijogge and Paul McCarney how to work the ice corer. Top right: Liz displays an ice core. Bottom left: Liz drills holes in each core section to take their temperature. Photos: Max Liboiron. Bottom right: Max Liboiron measures and cuts the core into sections. April 2024. Photo: Liz Pijogge

Palâstikkisajait ammalu ilimanattut inunnit pisimajut aputinnejunut

Plastics and anthropogenic particles in snow

When we look for plastic in snow, ice, and drinking water, we are looking for plastic much smaller than those we can find in marine waters or in animals. Since we are capable of finding even smaller plastic, we expect to find more.

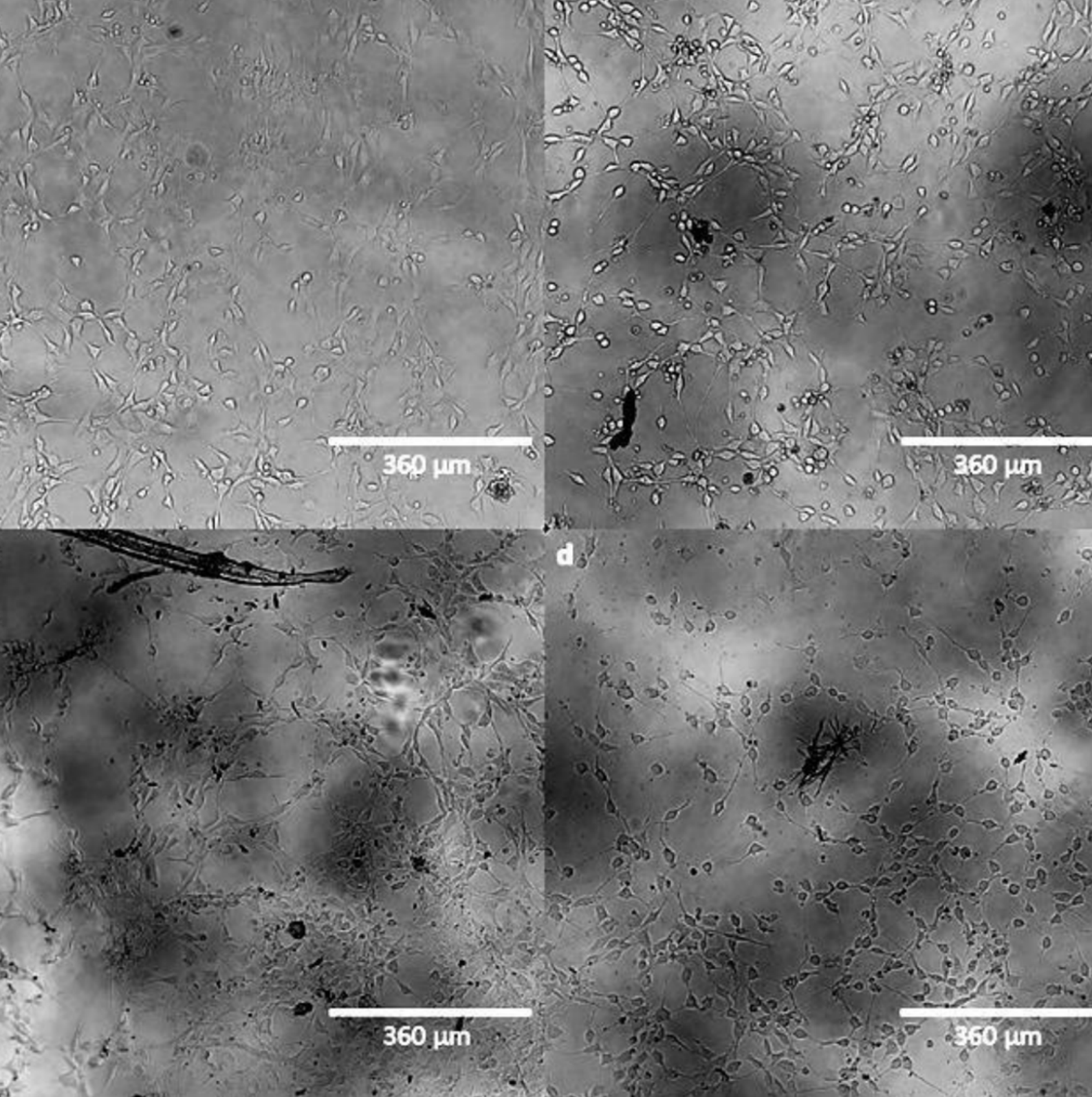
In snow, we found only two plastics across six samples, and 8 anthropogenic particles all together. While we did find one longer microfibre, the rest of the particles were very small (less than 1mm on their longest side).

Table 30: Concentrations of plastics in snow around Nain, 2020

Place	Sample ID	% plastic	Concentration of plastics n/L	Number of all waste items	Concentration of all items n/L	Description
Rhodes Island, Nain	NG2020-NAINSNOW-001	2	13.3	2	13.3	1 microfibre from clothing, 1 piece of epoxy
Rhodes Island, Nain	NG2020-Snow-002	0	0.0	0	0.0	
Rhodes Island, Nain	NG2020-Snow-003	0	0.0	1	4.8	Metal
Nain, near airstrip	NG2020-NAINSNOW-005	0	0.0	0	0.0	
Trouser Lake, Nain	NG2020-Snow-010	0	0.0	3	15	Cellulose microfibrs (like cotton)
Trouser Lake, Nain	NG2020-NAINSNOW-012	0	0.0	0	0.0	

Max gathers snow from skidoo tracks outside of Nain while Liz supervises, 2023. Photo: Frederic Dwyer-Samuel. Right: Carla Pamak sampling snow in the spring near Nain, 2020. Photo: Liz Pijogge.





Microscopic images of cells that were exposed to the concentrated particles from Hopedale snow for 24 hours. The control (top left) had no particles, and the rest had particles from three different locations in Hopedale. The cellular structures are the same in each: happy, healthy cells! Photo: Maan et al. 2025.

Elizabeth Tuglavina collected snow samples in Hopedale from six locations (three samples per place): Dump Pond, Ellen Island, Hopedale town, Berry Road, Black Heads, and Trout Pond. They were tested by collaborator Shan Zou for the toxicity of any particles at the nanoscale ($<1\ \mu\text{m}$). These particles could have been plastics, metals, natural materials, or anything else found in the snow.

Results showed that particle size was consistent across locations while particle concentrations varied (with the highest from Berry Road), but most importantly, **none of the samples showed any toxicity** (Maan et al. 2025).



Top Right: Riley Cotter and Lana Vuleta documenting sampled snow. April 2023. Photo: Max Liboiron
 Top Left: Max Liboiron and Liz Pijogge sampling snow, April 2023. Photo: Frederick Dwyer-Samuel.
 Bottom: This is part of the ice core team. Left to right: Max Liboiron, Debbie Lyall, Frédéric Dwyer-Samuel, Liz Pijogge. April 2023. Photo: Paul McCarney.

Palâstikkisajait tagiunnengitunut iluani Hopedale

Plastics in freshwater in Hopedale

We most often found no plastic in drinking water and fresh water samples. When we did find plastic, they were usually very small, but still large enough to be filtered out by most municipal water filters, which generally filter particles as small as 0.005 mm.

Table 31: Concentration of plastics in freshwater ponds around Hopedale, 2024

Pond sampled ^a	# samples	Samples with no plastic (%)	Median concentration (plastics/L)	Mean concentration (plastics/L)	Smallest size (mm) ^b
Top Pond	6	66.7%	0.00	0.76	0.03
Third Pond	3	66.7%	0.00	1.48	0.01
Bottom Pond	6	66.7%	0.00	0.74	0.01
Shetniq	3	66.7%	0.00	1.48	
US dump site	3	66.7%	0.00	2.22	0.01
Total	21	66.7%	0.00	1.17	0.01

75–100%	^a Elizabeth Tuglavina chose water sample locations. Fresh water samples are from two ponds (Shetniq and the US dumping site). No imiktak water was analyzed for this report. ^b The smallest dimension of the smallest plastic that would determine the filter size required to capture the particle. Plastics in the reservoir included two PET microfibres (like from fleece clothing), two small plastics from paint, one acetate and one urethane fragment (both unknown sources). They were spread across Top, Bottom, and Third Ponds, the three ponds tested.
50–74%	
25–49%	
1–24%	
0%	

Even when we look at each pond individually, we usually don’t find plastic and they are usually very small. We have included the smallest size of plastics here so residents in Hopedale can see the size of filter for drinking water required to keep them out. This may already be in place.

Alex Bond (standing) and Bridget Kakooza (crouching) sampling water and shorelines for the Hopedale ponds, 2024.
 Photo: Laura Crick.



We also tested the water from the Ponds for Total hardness, Zinc, salt, total chlorine, free chlorine, iron, copper, lead, mercury, nitrates, nitrites, sulfates, and fluoride. They were all either at or below the lowest detectable limit.

