Atjigengingingit Nunatsiavummit palâstikkisajannik atjikasânginnut iniujunut

Comparison of Nunatsiavut plastics to similar places

View from a bluff in Rigolet, 2025. Photo: Alex Bond

Comparison of Nunatsiavut plastics to similar places

Nunatsiavut & Nunavut

↓ Plastic ingestion in iKaluit (Arctic char) is much lower in Nunatsiavut than in Nunavut.

≈ Plastic ingestion in naujaummijuk (northern fulmar) and appait (thick-billed murre) are similar between places

↑ Pitsiulât (black guillemot) from Nunatsiavut have higher plastic ingestion than those of Nunavut

≈ Concentrations of plastics in surface waters are similar between Nunatsiavut and Nunavut

≈ Concentrations of shoreline plastics are similar between Nunatsiavut and Nunavut

Nunatsiavut & Newfoundland

↑ Plastic ingestion in mitet (common eider), ogatuinnait (Atlantic cod) and appait (thick-billed murre) was higher for animals in Nunatsiavut than for animals of the island of Newfoundland

↑ Concentrations of plastics in surface waters are higher in Nunatsiavut than those reported for Newfoundland and Labrador

↓ Nunatsiavut has a lower average concentration of shoreline plastics than the island of Newfoundland

↓ ≈ Nain and Rigolet town areas have lower concentrations of shoreline plastics than St. John's (Quidi Vidi Lake), and are similar to a high plastic-loading beach on Fogo Island

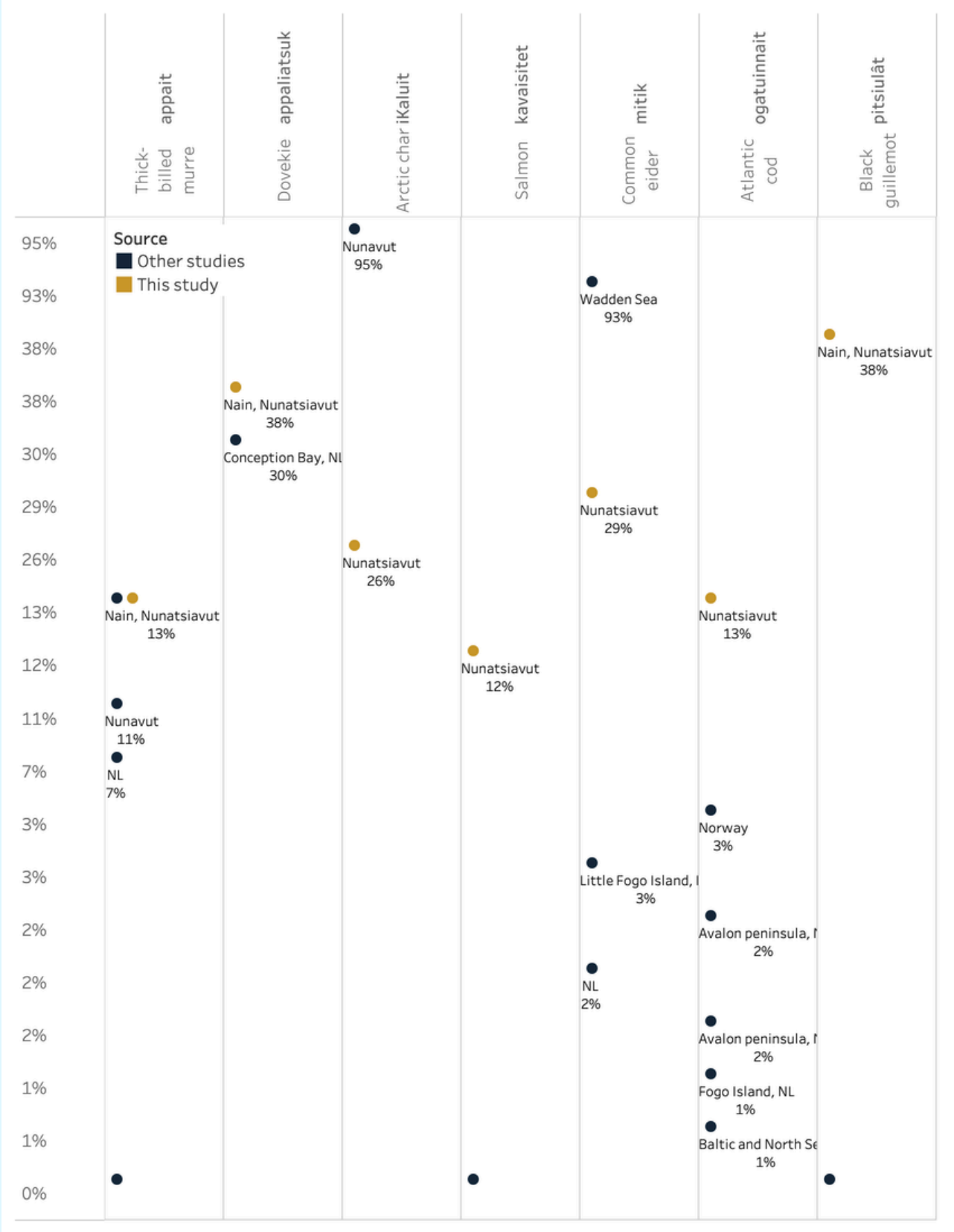
Table 36: Comparison of plastic ingestion figures for key species in Nunatsiavut with other published results

Animal	Location	Sample size	FO%	Source
iKaluit (Arctic char)	Iqaluktuuttiaq (Cambridge Bay), Nunavut	22	95%	Hamilton et al. 2024
	Nunatsiavut	**347**	**26%**	**Our study**
Mitet (Common eider)	Wadden Sea	42	93%	Bange et al. 2023
	Nunatsiavut	**24**	**29%**	**Our study**
	Island of Newfoundland	48	2%	English et al. 2015
	Nunatsiavut	24	**4%**	**Our study, harmonized**
	Fogo Island, NL	216	1%	Holland et al. 2016
Naujaummijuk (Northern fulmar)	**Labrador Sea, Nunatsiavut**	**10**[b]	**90%**	**Provencher et al., 2018**
	Prince Leopold Island, Nunavut,	9	89%	Poon et al., 2017
	Svalbard, Norway	40	88%	Trevail et al., 2015
	Nunavut	25	80%	Provencher et al., 2009
	Labrador Sea, Nunatsiavut	**70**	**79%**	**Avery Gomm et al., 2018**
	Qikiqtarjuaq, Nunavut	29	72%	Baak et al., 2020
	Qaqulluit, Nunavut	27	56%	Bourdages et a., 2021
	Davis Strait, Nunavut	42	36%	Mallory et al., 2006
	Devon Island, Nunavut	102	31%	Mallory, 2008
Pitsiulât (Black guillemot)	**Nunatsiavut**	**32**	**22%**	**Our study**
	Nunatsiavut	32	**3%**	**Our study, harmonized**
	Nunavut	51	0%	Baak et al. 2020 & 2024
Ogatuinnait (Atlantic cod)	**Nunatsiavut**	**68**	**13%**	**Our study**
	Norway	302	3%	Bråte et al. 2016
	Avalon Peninsula, NL	1,010	2%	Liboiron et al. 2019
	Fogo Island, NL	216	1%	Saturno et al. 2020
	Baltic/North Sea	81	1%	Rummel et al. 2016
Appait (Thick-billed murre)	**Nunatsiavut**	**40**	**13%**	**Our study**
	Nunavut	30	13%	Bourdages et al. 2021
	Nunavut	186	11%	Provencher et al. 2010
	Nunatsiavut	**40**	**8%**	**Our study, harmonized**
	Island of Newfoundland	32	7%	Bond et al. 2013
	Nunavut	30	0%	Baak et el. 2020

0%	1-24%	25-49%	50-74%	75-100%

Only studies with a sufficient sample size appear in the table above.
Harmonized means that we matched the other study in terms of the smallest plastics they measured (our asre often smaller) and whether or not they included microfibres. Basically, we alter our data so it is more comparable to their data. Many studies listed above examine large microplastics (greater than 1 mm in size, compared to greater than 0.25 mm in this study), and thus report lower figures for plastic ingestion.
Currently, no other published studies investigate in plastic ingestion in natânnavait (Turbot/Greenland halibut/Reinhardtius hippoglossoides). There two studies of plastic ingestion in natset (Ringed seals), but their methods differ and are not comparable, een when we harmonize. Most notably, they did not report quality assurance measures that allow validation of a null finding [a finding of zero], though the Jardine at al. (2023) had excellent quality assurance for microfibre contamination.

Figure 67: Comparison of plastic ingestion (%FO) by animals from Nunatsiavut to studies in nearby places



Two of the Nunatsiavut studies have smaller sample sizes (appaliatsuk / Dovekie n=8, kavaisitet / Salmon study, n=17), but all others have 20 or more. Different studies have slightly different cut off sizes for plastics, or quality assurance, but we only included studies here that we determined were comparable methodologically. See Table tktk for more details.

Nunatsiavut has much lower plastic ingestion in iKaluit (Arctic char) compared to Nunavut: There is one study on iKaluit (Arctic char) from Iqaluktuuttiaq (Cambridge Bay), Nunavut, but the sample size is too small for a strong study (22 fish) (Hamilton et al. 2024). Nonetheless, we include a comparison here because the results differ greatly from Nunatsiavut.

Nunatsiavut	Iqaluktuuttiaq
26%	**95%**
of iKaluit (Arctic char) ingested plastic, with an average of **less than 1 particle/each**	of iKaluit (Arctic char) ingested plastics, with an average of **11 plastics/each**

The study from Iqaluktuuttiaq (Cambridge Bay) also looked at all industrially-made materials that iKaluit (Arctic char) ate, including non-plastic microfibres from clothing, and found 95% of fish had ingested plastics and/or industrial cellulose (like cotton from jeans) with an average of 22 particles ingested by each fish. Only one of their 22 iKaluit (Arctic char) did not eat any plastic or anthropogenic fibres. We record but do not usually include industrial cellulose in our studies, but we have the data so we can bring it in for comparison. When we include all plastic and industrial cellulose particles in our analysis so our study matches the Hamilton et al. (2024) methods, 33% of Nunatsiavut iKaluit (Arctic char) ate plastics, and they ingested less than one particle per fish on average. While the Hamilton et al. (2024) study looked at slightly smaller plastics than we did, matching up sizes between studies eliminates only 5 particles from the Hamilton et al. (2024) study, and the results remain comparable.

iKaluit being prepared during a research trip in the Tongait (Torngat) Mountains, 2020. Photo: Paul McCarney.

Plastic ingestion in naujaummijuk (northern fulmar) is similar between birds from Nunatsiavut and Nunavut. A study by southern-based researchers found that 79% of seventy naujaukkijuk (northern fulmar) from the Labrador Sea had ingested plastics, which falls in the middle of other fulmar studies in the Arctic (Figure 67). Some naujaummijuk studies from Nunavut are much lower (31% and 36% of birds), however these are studies from 2006 and 2008, and the problem is getting worse over time.

Plastic ingestion in appait (thick-billed murre) in Nunatsiavut it similar to Nunavut. We found that 13% of appait (thick-billed murre) had ingested plastics, the same rate that Bourdages et al. (2021) reported for appait in Nunavut. There are other studies of appait from Nunavut that report lower plastic ingestion figures (0%–11%, see Table 36).

Max Liboiron and Katrina Anthony plucking a partridge, 2025. Photo: Paul McCarney.

Comparing plastic ingestion with studies in the literature needs to be done with care, as many variables will affect how and what is reported. Quite often, detection limits (the minimum size of plastic that a study's methods are able to reliably detect) are different. **Because the detection limit is quite small in our study (0.25 mm), we are often comparing to studies who do not include plastics as small as what are included in this study.** This can make it look like animals in other places are eating less plastics, when in all likelihood, animals that had eaten only small plastics (below the study's detection limit) were not included in the frequency of occurrence (FO%) statistic.

Table 37 accounts for this by adjusting our plastic ingestion statistics based on various detection limits used by the studies we are comparing our results with. After adjusting the FO% based on detection limit, the broad conclusions remain the same, but the size of the difference becomes less dramatic. For example, **plastic ingestion in pitsiulât (black guillemot) from Nunatsiavut is still higher than that of pitsiulât in Nunavut**, but the FO% for the birds in Nunatsiavut becomes nearly three time lower (from 38% to 13%) when we remove the plastics smaller than 1 mm that were not measured by the Nunavut study we are comparing to.

Plastic ingestion in ogatuinnait (Atlantic cod), mitet (common eider) and appait (thick-billed murre) is higher in this study than in studies on the island of Newfoundland. Again, studies we are comparing our results with have larger detection limits (0.5 to 1 mm). Adjusting for this, the general conclusions remain the same, but the difference between Nunatsiavut and the island of Newfoundland lessens for ogatuinnait and mitet. Appait in this study had not ingested any plastics smaller than 1 mm, so our results compare well with Bond et al. (2013) no matter the detection limit.

Table 37: Comparison of plastic ingestion (FO%[a]) figures between comparable Northern studies, separated by size of ingested plastics

Animal	Location	Sample size	FO%: >0.25mm	FO%: >0.5mm	FO%: >0.8mm	FO%: >1mm	Source
Mitet (Common eider)	**Nunatsiavut**	**24**	**29%**	**25%**	**25%**	**21%**	**Our study**
	Wadden Sea	42	93%				Bange et al. 2023[b]
	NL	48				2%	English et al. 2015
	Little Fogo Island	40		3%			Holland et al. 2016
Pitsiulât (Black guillemot)	**Nunatsiavut**	**32**	**38%**	**22%**	**16%**	**13%**	**Our study**
	Nunavut	51				0%	Baak et al. 2024
	Nunavut	3				0%	Poon et al. 2017
	Nunavut	20				0%	Baak et al. 2020
Ogatuinnait (Atlantic cod)	**Nunatsiavut**	**68**	**13%**	**9%**	**7%**	**6%**	**Our study**
	Baltic/North Sea	81		1%			Rummel et al. 2016
	Avalon peninsula, NL	1,010				2%	Liboiron et al. 2019
	Fogo Island, NL	216				1%	Saturno et al. 2020
Appait (Thick-billed murre)	**Nunatsiavut**	**40**	**13%**	**13%**	**13%**	**13%**	**Our study**
	Nunavut	30			13%		Bourdages et al. 2021
	Nunavut	30			0%		Baak et al. 2020
	NL	32				7%	Bond et al. 2013
	Nunavut	10				0%	Poon et al. 2017
Kavaisitet (Atlantic salmon)	**Nunatsiavut**	**17**	**12%**	**6%**	**6%**	**6%**	**Our study**
	Campbellton, NL	69				0%	Liboiron et al. 2019
Appaliatsuk (Dovekie)	**Nunatsiavut**	**8**	**38%**	**38%**	**25%**	**25%**	**Our study**
	Conception Bay, NL	171				30%	Avery-Gomm et al. 2016

Each FO% column in the table above represents the proportion animals that ingested plastics greater than a certain size (as per the detection limit of studies we are comparing to). Only studies that explicitly described their detection limit/cutoff size are listed in this table. Studies with small sample sizes are greyed out.

[a]FO% stands for Frequency of occurrence, the main Western scientific measure for plastic ingestion that measures the percentage of animals in the sample that have eaten at least one plastic.

[b]Bange et al. (2023) had a detection limit of 0.3 mm. For the purposes of this table, their results are included under FO% for plastics larger than 0.25 mm.

Another important factor when comparing our results with other studies, is whether the studies we are comparing with looked at the entire gut, or gastrointestinal tract. Other Northern studies of natset (ringed seals) only looked for plastics in the stomach, excluding intestines.

In this study, 16% of seals from Nunatsiavut had plastic in their stomach, higher than those of Nunavut and Northwest Territories, where no plastic was found. Seals digest their food quickly, this data can only tell us about what seals ate very recently before they were hunted and cannot provide a full picture of plastic ingestion when plastics tend to spend more time in the intestine. When including intestines, the proportion of seals that had eaten plastic in this study jumps from 16% to 43%. Of the 177 plastics recovered from seals in this study, 132 (75%) were recovered from the intestines (figure tktk). This reinforces the idea that plastics are likely spending more time in the intestines than in the stomach, and that checking the entire gastrointestinal tract is crucial when reporting numbers on plastic ingestion for animals.

Table 38: Comparison of the proportion of natset (ringed seal) with plastics in their stomachs between Nunatsiavut and other Northern studies

Animal	Location	Sample size	FO%[a]	Cutoff size[b]	Source
Natsik (Ringed seal)	**Nunatsiavut**	**149**	**16%**	**0.250**	**Our study**
	Nunavut	135	0%	0.425	Bourdages et al. 2020
	Northwest Territories	10	0%	0.080	Jardine et al. 2023

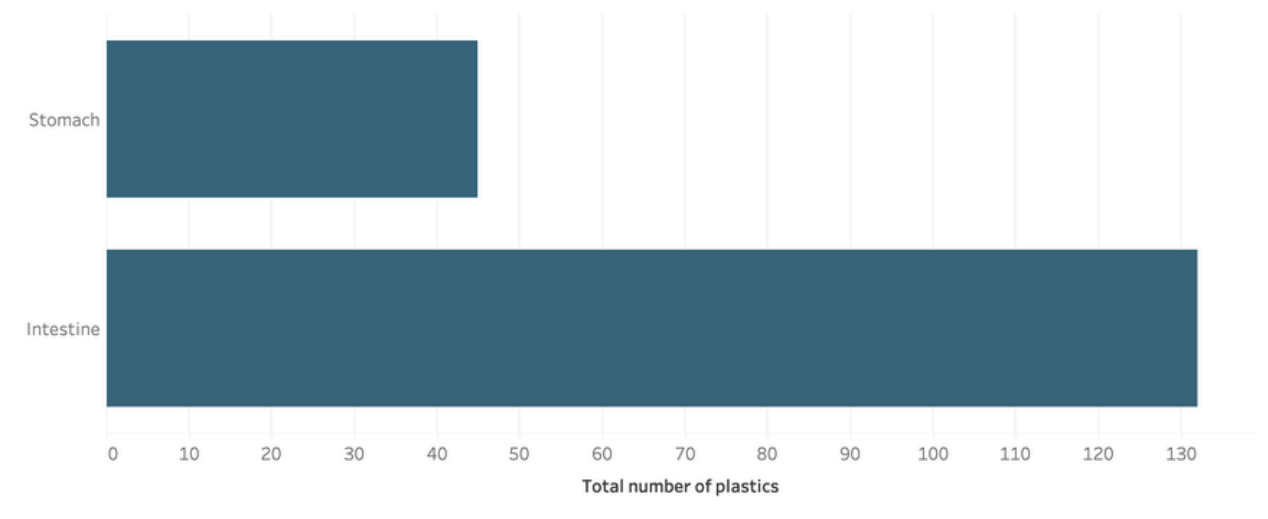
0%	1-24%	25-49%	50-74%	75-100%

Sample sizes too small for an informative comparison are greyed out

[a]FO% stands for Frequency of occurrence, the main Western scientific measure for plastic ingestion that measures the percentage of animals in the sample that have eaten at least one plastic.

[b]Cutoff size refers to the detection limit of the study, or the smallest size of plastic that is recoverable by the methods

Figure 68: Location of plastics in natset (ringed seal) gastrointestinal tracts



Nunatsiavut has an average concentration of plastics in surface water in the Arctic: The average concentration of plastics in surface water in Nunatsiavut is similar to Nunavut, higher than the island of Newfoundland (mainly the west coast), and lower than Greenland, Norway, and the Chukchi Sea. The highest concentrations of plastics in water are around the wharf in Maggovik (Makkovik).

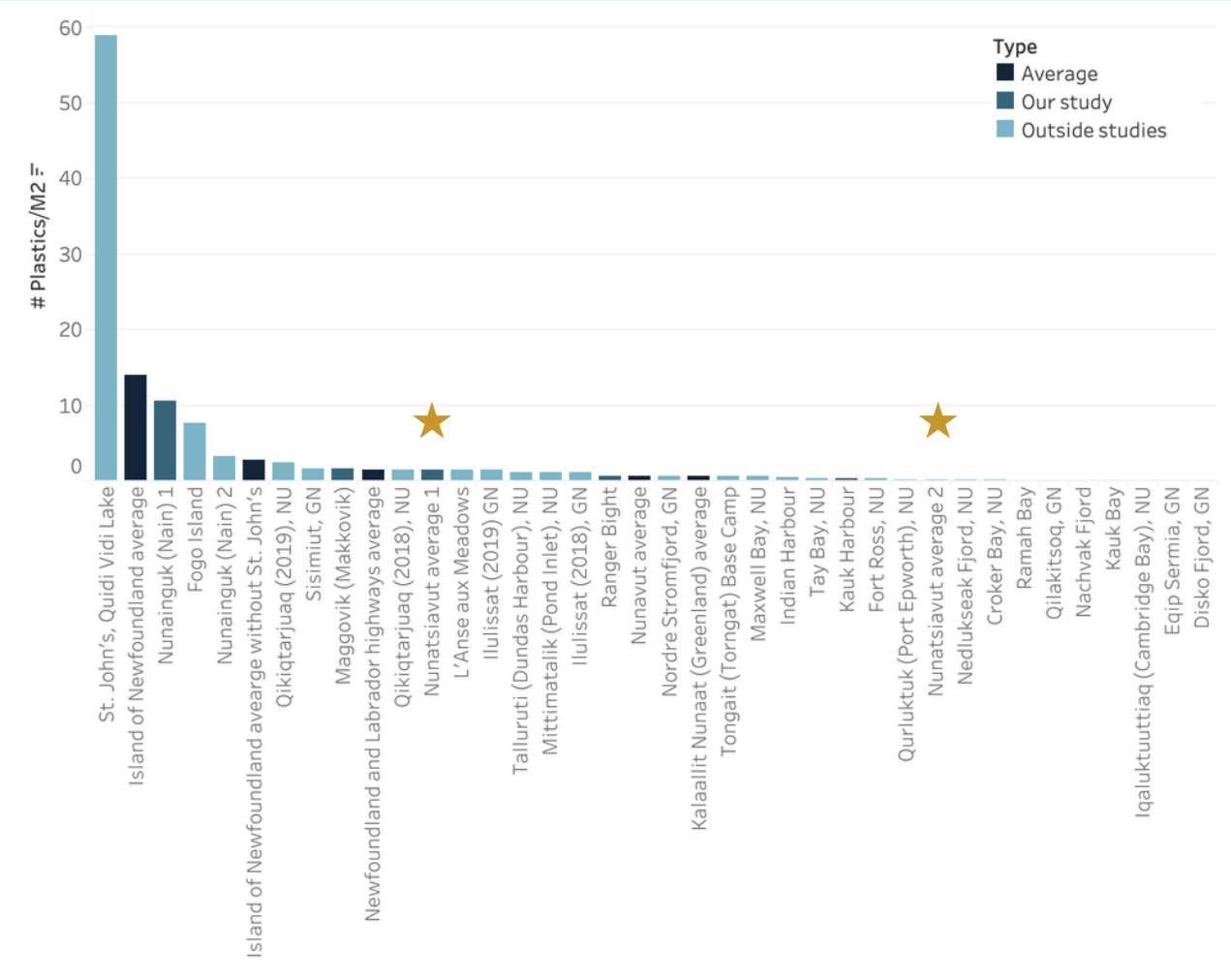
Table 39: Comparison of concentrations of plastics in surface water between Nunatsiavut and nearby waters

Location	Sample size	# plastics/m^2	#plastics/ hockey rink[b]	Source
Hopedale (Agvitok), Nunatsiavut	12	0.003	5	Our study
Saglek, Nunatsiavut, 2022	3	0.009	15	Our study
Saglek, Nunatsiavut, 2021	5	0.014	22	Our study
Maggovik (Makkovik), Nunatsiavut	7	0.028	44	Our study
Saglek, Nunatsiavut 2020	5	0.003	5	Our study
Ramah Bay, Nunatsiavut[a]	1	0.000	0	Liboiron et al. 2020
Nunainguk (Nain), Nunatsiavut[a]	1	0.009	16	Liboiron et al. 2020
Indian Island, Nunatsiavut[a]	1	0.007	12	Liboiron et al. 2020
Nunatsiavut average	**51**	**0.008**	**12**	**All of the above**
Newfoundland and Labrador[c]	18	0.005	9	Liboiron et al. 2020
Nunavut	8	0.010	18	Liboiron et al. 2021
Southwest Greenland	4	0.026	46	Liboiron et al. 2021
Svalbard, Norway	15	0.045	79	Hanninen et al. 2021 & Carlsson et al. 2021
Bering sea	1	0.091	161	Mu et al., 2019
Chuki sea	1	0.230	406	Mu et al., 2019

There are many more studies of plastics in surface water than those referenced here, but to ensure comparability with our study we only included studies that used a similar size range of netting for their study (between 200-425um). From our own study, we only included places were we were sure an average was a valid metric.
Greyed-out text indicates studies with too few samples to have strong results.
[a] These results are likely lower due to the method, since samples were processed outside of a lab and may have missed plastics that would have been found in a laboratory setting.
[b] It is difficult, even for scientists, to imagine what 0.007plastics/m^2 looks like, so we have provided the same measure, but zoomed up to the more understandable size of an NHL regulation-sized hockey rink. It's much easier to understand what 12 plastics in a hockey rink looks like.
[c] This figure includes a few samples from Labrador as well as many from around the island of Newfoundland.

Overall, Nunatsiavut has a lower concentration of plastics on shorelines compared to Nunavut, Kalaallit Nunaat (Greenland), and the island of Newfoundland. Shorelines in town centres (like in Nain and Rigolet) had plastic concentrations that are higher than nearby Arctic and sub-Arctic regions, even rivaling figures on the island of Newfoundland.

Figure 69: Comparison of concentrations of plastics on shorelines in and near Nunatsiavut, 2017-2022

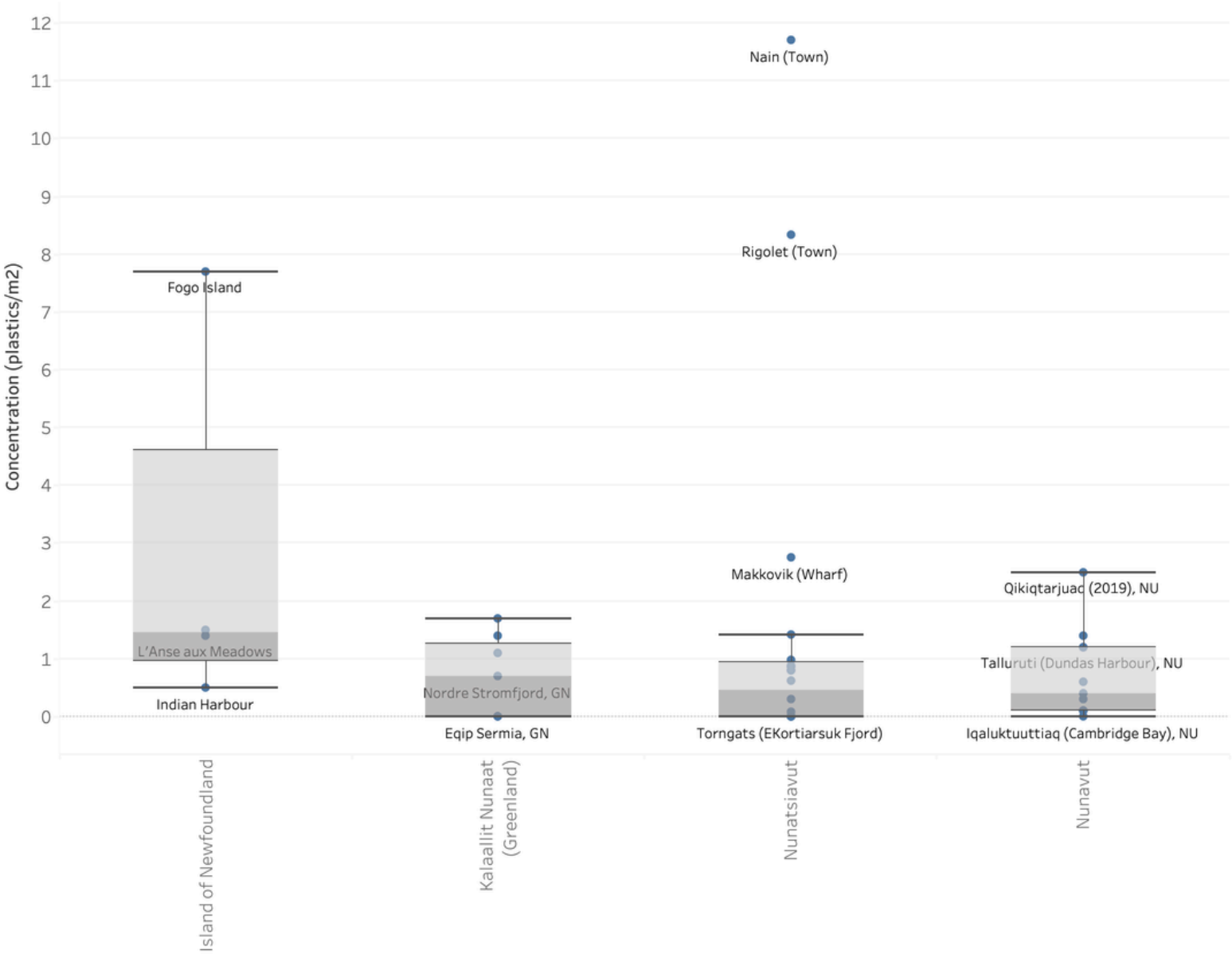


Averages are in dark blue, while individual locations are in lighter blues. There are two averages for Nunatsiavut, both marked with star. The higher average comes from our study, which includes more sites in communities such as Nunainguk (Nain) and Maggovik (Makkovik), while the lower average is from a study by Mallory et al. (2021), which contained a higher number of remote areas. This is another reminder that averages have limitations, which is why we show data for each place as well as averages. See Table 40 for full citations.
* Calculated based on reported average and percent plastics.
Note that the specific shoreline on Fogo Island is in Joe Batt's Arm, a known high-loading beach, which accounts for the high concentration of plastics.

Table 40: Comparison of concentrations of plastics on shorelines in Nunatsiavut and region, 2017-2025 (does not include non-plastic waste)

Region	Location	Our Study		Comparable Northern studies		
		Sample size	Plastics/ m^2	Plastics/ m^2	Sample size	Source
Nunatsiavut	Hopedale (Town)	85	1.40			
	Hopedale (Total)	226	1.00			
	Makkovik (Wharf)	11	2.80			
	Makkovik (Total)	51	1.10			
	Nain (Town)	5	8.40	3.30	28	Mallory et al. 2021
	Nain (Kauk Bay)	8	0.00			
	Nain (Kauk Harbour)	23	0.30			Mallory et al. 2021
	Rigolet (Town)	12	8.30			
	Rigolet (Total)	91	1.50			
	Torngats (Nachvak)	38	0.08	0.00	12	Mallory et al. 2021
	Torngats (Ramah Bay)	14	0.00	0.00	13	Mallory et al. 2021
	Torngats (Saglek)[a]	184	0.30	0.60	18	Mallory et al. 2021
	Torngats (Total)	271	0.19			
	Nunatsiavut	**675**	**0.80**	**1.00**	**71**	Mallory et al. 2021
Island of Newfoundland	L'Anse aux Meadows			1.40	57	Mallory et al. 2021
	Indian Harbour			0.50	19	Mallory et al. 2021
	Fogo Island[b]			7.70[c]	19	McWilliams et al. 2017
	Quidi Vidi Lake			58.9	22	Oladimeji, 2019 (unpub)
	NL highways average			1.50[c]	231	MMSB 2016
	Newfoundland			**14.00**	**348**	Based on above
	Newfoundland without St. John's			**2.80**	**326**	Based on above
Kalaallit Nunaat (Greenland)	Nordre Stromfjord, GN			0.70	10	Mallory et al. 2021
	Sisimiut, GN			1.70	11	Mallory et al. 2021
	Disko Fjord, GN			0.00	5	Mallory et al. 2021
	Ilulissat (2018), GN			1.10	10	Mallory et al. 2021
	Ilulissat (2019) GN			1.40	5	Mallory et al. 2021
	Eqip Sermia, GN			0.00	7	Mallory et al. 2021
	Qilakitsoq, GN			0.00	5	Mallory et al. 2021
	Kalaallit Nunaat			**0.70**	**53**	Based on above
Nunavut	Qikiqtarjuaq (2018), NU			1.40	10	Mallory et al. 2021
	Qikiqtarjuaq (2019), NU			2.50	8	Mallory et al. 2021
	Port Epworth, NU			0.1	13	Mallory et al. 2021
	Nedlukseak Fjord, NU			0.1	13	Mallory et al. 2021
	Cambridge Bay, NU			0	9	Mallory et al. 2021
	Fort Ross, NU			0.3	15	Mallory et al. 2021
	Pond Inlet, NU			1.2	16	Mallory et al. 2021
	Tay Bay, NU			0.4	11	Mallory et al. 2021
	Dundas Harbour, NU			1.2	10	Mallory et al. 2021
	Croker Bay, NU			0.1	10	Mallory et al. 2021
	Maxwell Bay, NU			0.6	15	Mallory et al. 2021
	Nunavut			**0.7**	**130**	Based on above

Figure 70: Comparison of concentrations of plastics on shorelines in regions close to Nunatsiavut



A box-and-whisker plot (box plot) visually summarizes a dataset's distribution. The boxes represent the interquartile range (IQR) — the middle 50% of the data. Within each box, the light and dark grey shading splits the IQR into two halves: the darker grey is the lower half (Q1 to median), and the lighter grey is the upper half (median to Q3). This helps you quickly see if data is skewed up or down within that middle band.
The horizontal line inside each box marks the median (the most middle number).
Thin vertical "whiskers" extend above and below to show the range of typical (non-outlier) data. Such as Indian Harbour on the Island of Newfoundland.
The blue dots are individual data points that are outliers to the spread. We use this kind of plot because it clearly shows that Nain, Rigolet, and Makkovik town data is very dissimilar to other measurements in the dataset.
As you can see, the island of Newfoundland is very different than the other locations–and this is after we took out Quidi Vidi Lake, which skewed the data enormously because there were so many plastics. The Fogo Island location was chosen for its study because it was a loading beach (a shoreline that collected an usual number of plastics). Greenland, Nunatsiavut, and Nunavut all show low, tight concentrations mostly clustered near 0–2 plastics/m². But you can also see that some of the concentrations in communities in Nunatsiavut are similar to the island of Newfoundland.