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Sediment Sampling at Hirtles Beach

ATLANTIC CANADA MICROPLASTIC RESEARCH PROJECT

Sediment Results Summary (2018)

LED BY COASTAL ACTION

This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :

Environment and Climate Change Canada
Environnement et Changement climatique Canada

COASTAL ACTION
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PROJECT OVERVIEW

The purpose of the Atlantic Canada Microplastic Research Project (2017-2020) is to determine the quantity of microplastics in 3 near-shore communities of Atlantic Canada (Fig. 1). Data will be used to better inform the conversation and solutions around plastic pollution in the region. The project was funded by Environment and Climate Change Canada and was a partnership with Clean Annapolis River Project (CARP), ACAP Humber Arm, and Dr. Max Liboiron at the Civic Laboratory for Environmental Action Research (CLEAR) out of Memorial University of Newfoundland (MUN). Dr. Max Liboiron was the chief academic advisor on the 3-year project, assisting with project development, methods and protocol, and sampling design. The project included sampling both surface water and beach sediment at all three study locations. The sediment sampling was conducted following CLEAR's methodology. This document contains partial results from the 2018 sediment sampling, and the full report will be available in the fall of 2020.

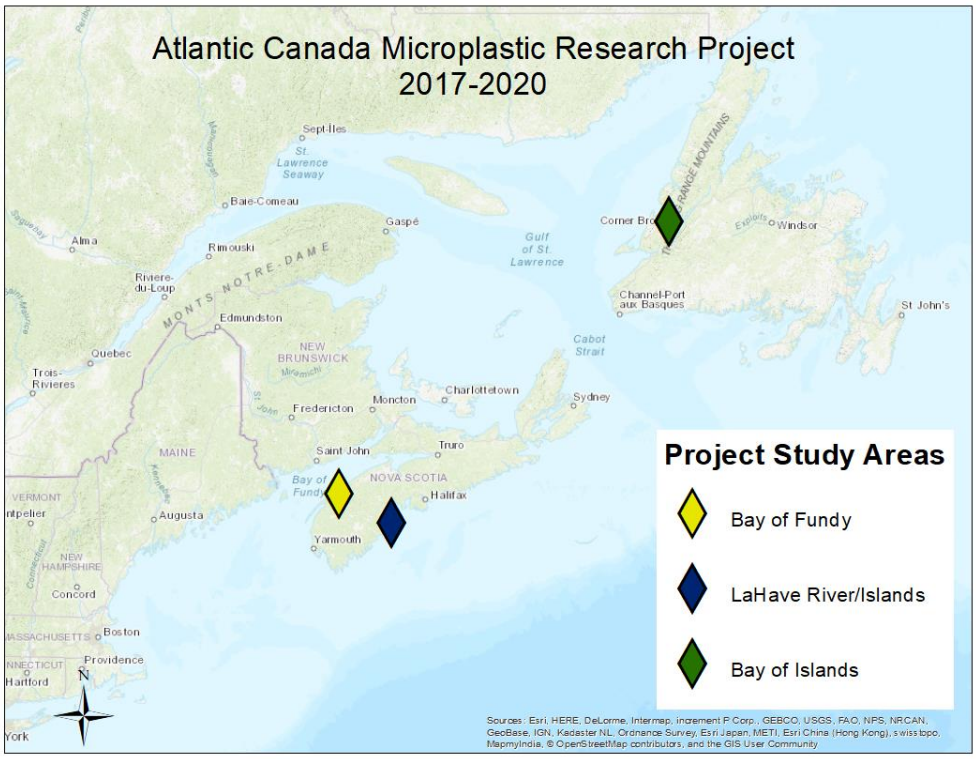

Figure 1. Three near-shore study locations were sampled as part of the project: LaHave River and Islands (Coastal Action), the Bay of Fundy, NS (CARP), the Bay of Islands (ACAP-Humber Arm).

SEDIMENT RESULTS, ALL LOCATIONS

Plastics found in the samples are categorized into 8 types (Table 1) and are classified into 3 size groups: macro (>25 mm), meso (5-25 mm), and micro (<5 mm) (Table 2).

Table 1. Terminology used to describe types of plastic found in samples and used in analysis.

Terminology	Definition
Microfibers	Microfibers are thinner and kinked compared to threads - usually from synthetic fabrics
Threads	Threads are thick filaments, such as fishing line
Fragments	Hard plastic fragments, though they can be flexible
Foam	Such as Styrofoam - bounces back to the touch, has air pockets
Film	Sheet plastics, such as plastic bags. However, not synonymous with plastic bags
Microbeads	Small spheres from cosmetics
Pellets	Industrial pre-production pellets, or nurdles
Named item (Macro)	If an item is large in size (macro plastic) and can be identified, i.e. cigarette butt, which is technically many hundreds of thousands of microfibers
Total plastics	Total number of plastics in a trawl sample

Table 2. Total plastics found in sediment at sampled sites in Lunenburg (5 sites, sampled June through August 2018 by Coastal Action) and Bay of Fundy (3 sites, sampled June through August 2018 by CARP). Analysis completed by CLEAR. Size classifications for plastics are macro (>25 mm), meso (5-25 mm), and micro (<5 mm).

Location	Site	Macro	Meso	Micro	Total Plastics
LaHave, NS	1 – Crescent	0	5	20	25
	2 – Hirtles	0	10	38	48
	3 – Moshers	5	7	22	34
	4 – Oxners	1	3	10	14
	5 – Rissers	8	6	26	40
	Total	14	31	116	161
Bay of Fundy, NS	1 – Cornwallis	2	14	46	62
	2 – Port Royal	0	9	99	108
	3 – Smith's Cove	0	2	35	37
	Total	2	25	180	207

At the LaHave location, Hirtles Beach sediment samples had the most plastic, followed by Rissers Beach (Table 2; Fig. 2). In the Bay of Fundy, Port Royal sediment samples had the most plastic, with other sites having greater than 50% less plastic (Table 2; Fig. 2). For sizing, microplastic composed the largest proportion of total plastics in all sampled areas (Fig. 2).

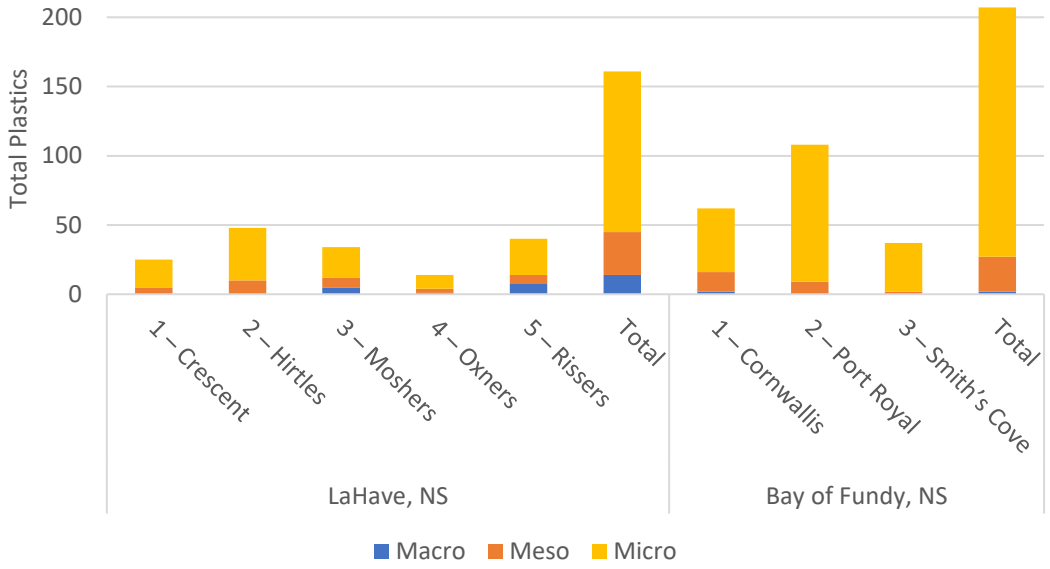

Figure 2. Graph showing total plastics found in sediment at sampled sites in Lunenburg (5 sites, sampled in June through August 2018 by Coastal Action) and Bay of Fundy (3 sites, sampled in June through August 2018 by CARP). Analysis completed by CLEAR Laboratory. Size classifications for plastics are macro (>25 mm), meso (5-25 mm), and micro (<5 mm).

LAHAVE RIVER ESTUARY, NOVA SCOTIA

Sampling by Coastal Action

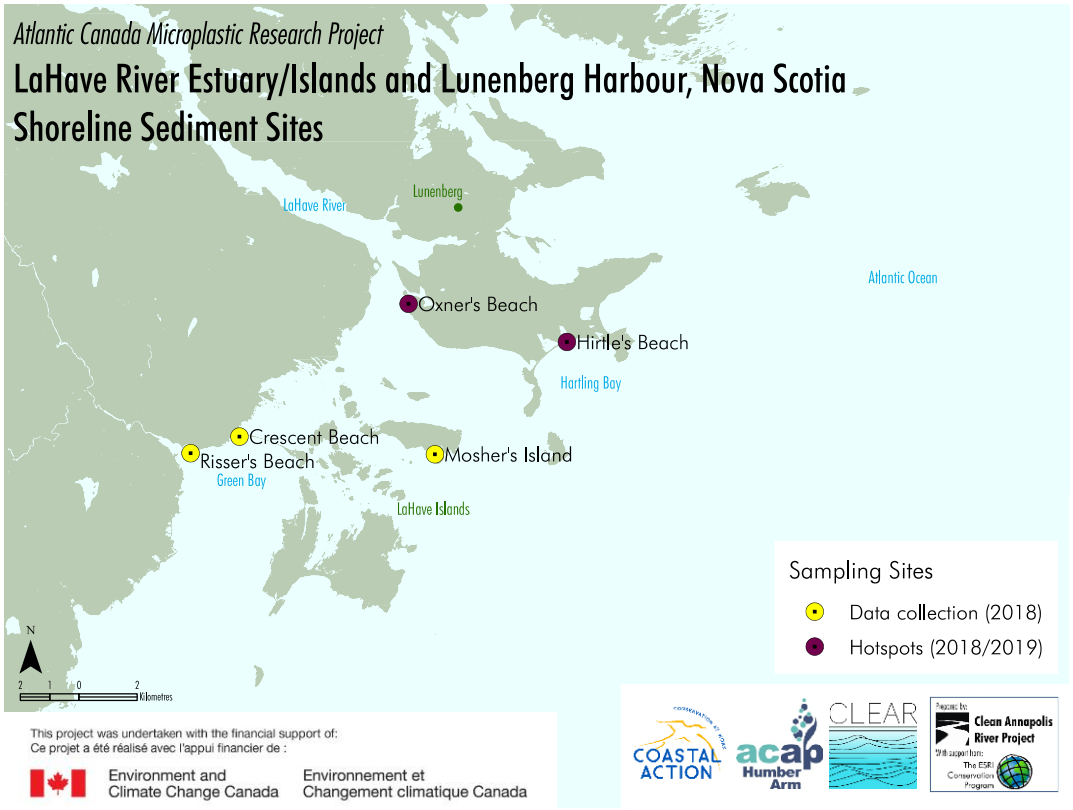

Figure 3. Map of sediment sampling sites in LaHave River Estuary/Islands and Lunenburg taken in August 2018 and Fall of 2019 by Coastal Action.

Sediment sampling in LaHave River Estuary/Islands and Lunenburg Harbour occurred in August of 2018 at 5 different sites. All sites had plastic fragments, microfibers and threads present in the samples (Table 3). Hirtles Beach had the most amount of threads in comparison to other sites (Table 3), composing 35% of all threads found, however the other sites were comparable in quantities. Rissers Beach sediment samples had the most microfibers in comparison to other samples (Table 3), composing 55% of all microfibers found.

Table 3. Breakdown of plastic type found in sediment at each site in Lunenburg, summarized by category. Samples were collected by Coastal Action in June through August of 2018, analysis completed by CLEAR Laboratory.

Site	Film	Foam	Fragments	Microbeads	Microfibers	Pellets	Threads	Named Items	Total Plastics
1 – Crescent	1	1	4	0	4	0	15	0	25
2 – Hirtles	3	3	11	0	4	0	27	0	48
3 – Moshers	0	8	11	0	4	0	11	0	34
4 – Oxners	0	1	5	0	1	0	7	0	14
5 – Rissers	0	0	5	0	16	0	18	1	40
Total	4	13	36	0	29	0	78	1	161

Threads (48%), plastic fragments (22%), and microfibers (18%) made up most of the total plastics found (Fig. 4).

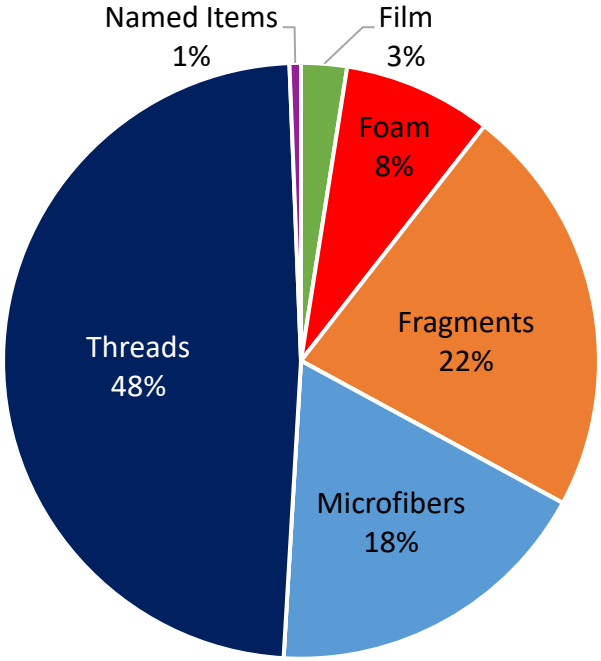

Figure 4. Proportion of plastics found in all sediment samples in Lunenburg: film 3%, foam 8%, fragment 22%, microbeads 0%, microfibers 18%, pellets 0%, threads 48%, and named items 0%. Samples were collected by Coastal Action in June through August of 2018, analysis completed by CLEAR Laboratory.

ANNAPOLIS BASIN, BAY OF FUNDY, NOVA SCOTIA

Sampling by Clean Annapolis River Project (CARP)

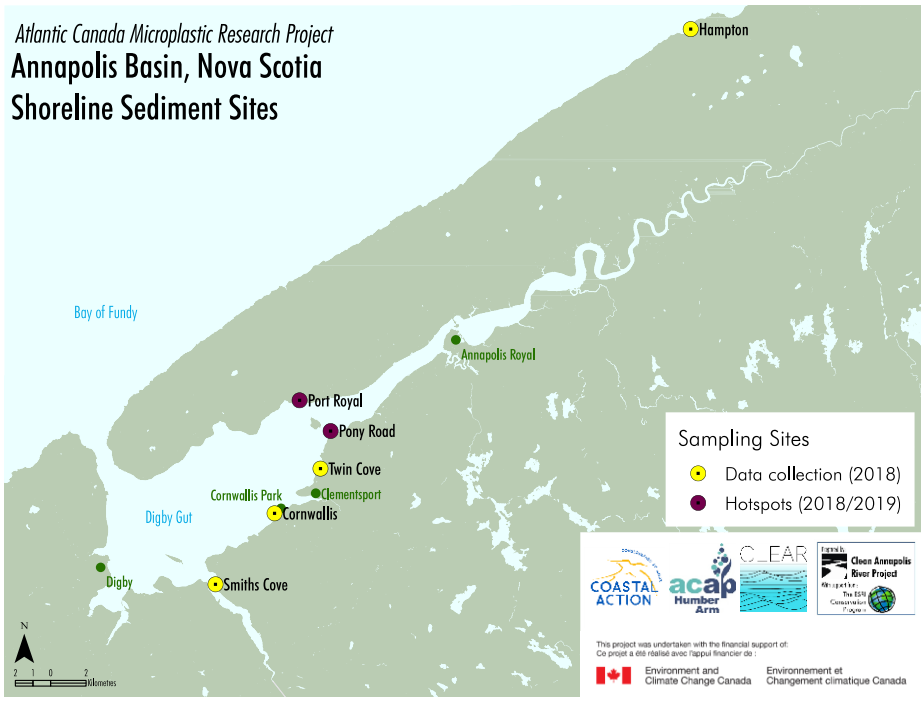

Figure 5. Map of sediment sampling sites in the Bay of Fundy taken in the summer of 2018 and 2019 by Clean Annapolis River Project (CARP).

Sediment sampling in the Bay of Fundy occurred June through August of 2018 at 3 different sites. All sites had plastic fragments, microfibers and threads in their samples (Table 4). Port Royal sediment samples had the greatest number of fragments in comparison to other sampled sites, composing 60% of all fragments found.

Table 4. Breakdown of plastic type found in sediment at each site in the Bay of Fundy, summarized by category. Samples were collected by CARP in June through August of 2018, analysis competed by CLEAR Laboratory.

Site	Film	Foam	Fragments	Microbeads	Microfibers	Pellets	Threads	Named Items	Total Plastics
1 – Cornwallis	16	1	34	0	7	0	4	0	62
2 – Port Royal	2	1	99	0	3	0	3	0	108
3 – Smith's Cove	0	0	32	0	4	0	1	0	37
Total	18	2	165	0	14	0	8	0	207

Plastic fragments (80%) made up most of the total plastics in Bay of Fundy sediment sites (Fig. 6).

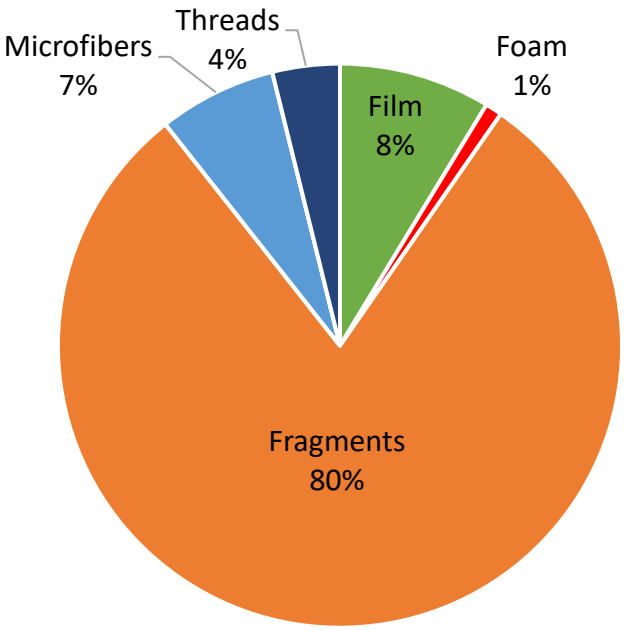

Figure 6. Proportion of plastics found in all sediment samples in the Bay of Fundy: film 8%, foam 1 %, fragment 80%, microfibers 7%, microbeads 4%, pellets 0%, threads 4%, and named items 0%. Samples were collected by CARP in June through August of 2018, analysis competed by CLEAR Laboratory.

BAY OF ISLANDS, NEWFOUNDLAND

Sampling by ACAP Humber Arm

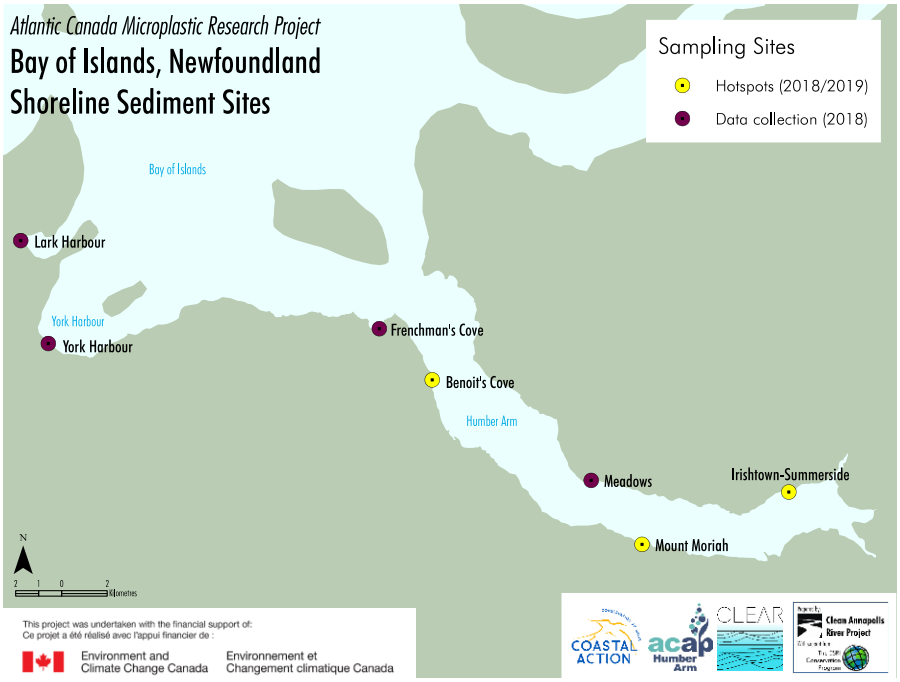

Figure 7. Map of sediment sampling sites in the Bay of Islands, Newfoundland, taken in summer of 2018 and 2019 by ACAP Humber Arm.

Data will be available in Fall of 2020.