Waste Capture and Audit of Catch Basin LittaTraps™ in Downtown St. John's, NL

2020-22 Technical Report

Jennifer Blundon,
Northeast Avalon ACAP (Atlantic Coastal Action Program)

June 3, 2022

This project was funded by:
Fisheries and Oceans Canada

Oceans Management Contribution Program to Support Development and Implementation of Oceans Conservation and Management Activities

Table of Contents

LittaTrapsTM Technical report

Background

There is a lack of understanding of the seasonal and spatial variability of inorganic debris, particularly macro-plastics accumulation, in downtown St. John's. Macro-plastics account for the majority of plastic emissions volume into oceans, and therefore warrant further understanding. Downtown St. John's provides an ideal backdrop for this expansion of understanding since it is located at the centre of an urban hub, where over half the province's population lives within the surrounding metro area. The downtown area is a hotspot for pedestrian foot traffic and tourism because of its rich history, local shops, and scenic views of the harbour, Signal Hill, and the iconic jelly bean row housing, among many other attractions. Therefore, an approach that characterizes and quantifies macro-plastics, and their spatial and seasonal variability is a necessary step in understanding the scope of the problem. Collection from multiple storm drain traps (LittaTrapsTM) placed in different locations in downtown St. John's provides insight into the spatial variability of trash accumulation, and a cross-sectional view of down-slope overland migration of debris in the harbour. Multiple sampling periods during the summer, fall, and winter will also help establish seasonal variability, if any, in plastic pollution in downtown St. John's. Furthermore, this project also tests protocols, assessing the feasibility of LittaTrapsTM for use in both research and municipal maintenance work.

a)

b)

Figure 1: LittaTrapsTM are a trash mitigating system designed by Enviropod (a), which is installed within the existing storm drains and collects debris that is washed inside by rain water, thus preventing trash and debris from flowing further into the ocean. (b) Photo of staff member Jennifer Blundon holding a LittaTrapTM Basket downtown St. John's during the May installation

Northeast Avalon Atlantic Coastal Action Program (NAACAP) is a community advocacy group concerned with the health of our watersheds and coastal areas. Formed in 1992 with the support of Environment Canada under the Atlantic Coastal Action Program, NAACAP has a long history of environmental research, advocacy, and action on issues affecting the quality of our natural resources with a particular emphasis on the watersheds and coastal areas of the Northeast Avalon Region.

This project builds on the organization's previous waste diversion and reduction initiatives, funded both by the Department of Fisheries and Oceans (DFO) and Environment and Climate Change Canada (ECCC), NAACAP collected and characterized the inorganic debris that collects in storm drain traps installed in 30 storm sewer drains in downtown St. John's (b). This debris was systematically collected, photographed, and categorized according to trash collection and audit protocols created by NAACAP, in communication with DFO, for the purposes of this project. Collection and audits were scheduled to happen on a minimum monthly basis, with more frequent collection in the first month following installation, and as needed based on debris accumulation.

In addition to waste diversion, and the generation of valuable insight into trash accumulation in the St. John's urban centre, this project provided opportunities for public and industry outreach. Trash audit data will be shared on social media, as well as on open-source data platforms such as Marine Debris Tracker. Other data visualization methods were identified and adopted for the purposes of illustrating trash data to the public and to local businesses.

Procedures

Throughout the project the protocols for both collection and characterization underwent several modifications in order to best suit the needs of the project goals, while addressing the volume of debris collected, in addition to safety concerns. All protocols were developed by NAACAP in communication with EnviroPod technicians, DFO, and the City of St. John's, based on the following criteria;

- Compatibility with other LittaTrapTM trash audit data sheets was prioritized, to ensure trash data collected during this Project is contiguous with similar projects happening across Canada and internationally using this equipment.
- Particular consideration was given to the specific trash categories associated with the COVID-19 global pandemic. Specific categories on the data sheet include protective face masks and disposable latex gloves.
- Where possible, compatibility with open-source trash data portals (i.e. Marine Debris Tracker, Open LitterMap) was considered.
- Where possible, compatibility with other provincial trash audit initiatives were considered

Modifications to the protocol occurred following the first Audit and classification in order to accommodate the odours produced by the samples during auditing in NAACAP's

designated office space and to incorporate the procedures used by the International Trash Trapping Network. Thus, introducing a washing component which allowed us to expand our characterization to include micro-plastics. Thus allowing us to submit the characterized data to their database.

Modifications were made again following the third Audit following an incident with an unidentified sharps object, where it pierced the skin through two layers of PPE (Puncture proof gloves and latex gloves). A condensed protocol now focuses on the weights measured in the field and the debris is subsequently disposed of.

While the protocol underwent three revisions, several consistencies remained. First, photos were taken at all sites upon removing the traps from their catch basins. Subsequent photos were taken at all stages of washing and sorting where applicable in June and July audits. Second, the weight of the basket containing the debris and the weight of the empty basket were taken at all available sites during each audit in order to capture the net weight of the initial debris. This data was useful for comparing between all audits despite the changes in the protocol. Third, all versions of the protocol took into account the safe and efficient collection of debris from installed LittaTrapTM with minimal disturbance to nearby businesses and pedestrians, in accordance with provincial COVID-19 work safety guidelines. The original data sheet template and the second version can be located in Appendix A and B respectively.

Methods

The original intention was for the baskets to be installed by NAACAP early spring once winter conditions improved, following the site selection and LittaTrapTM collar installations of the selected 38 catch basins, assisted by DFO and the City of St. John's in late November. However, due to internal staff change over in late spring, basket installation was delayed until May 27th and 28th, 2021.

Audits occurred between 6am-7:30am in order to avoid peak morning traffic, thus preventing unsafe working conditions, as well as avoiding an increased risk of vehicles blocking access to selected catch basins. Furthermore, following the first audit on June 24th and 25th, where NAACAP staff removed the catch basin covers by hand, City of St. John's staff provided assistance with safe cover removal. Two supporting staff members, whose night shifts ended at 7:30am, supported each morning of the following audits. These staff provided invaluable professional expertise and assisted with use of custom hooks to remove catch basin covers, thus reducing the risk of injury to NAACAP staff and volunteers.

Other materials used throughout the project include, latex gloves, personal protective equipment (safety vests, puncture resistant gloves, steel toed shoes, goggles), table top scales, clip board, handheld luggage scale for taking initial weights of the baskets in the field, and tweezers for sorting.

Five audits occurred in total following their installation in May as seen in Table 1. Audits occurred roughly on a monthly basis, and were checked following storm events to

prevent catch basin clogging. There was one instance where one of the catch basins were clogged due to reasons unrelated to the LittaTrapTM and was brought to the attention of DFO and the City of St. John's and the matter was dealt with by the City.

Of the 38 traps, only 30 were initially installed because of construction blocking access to 4 sites, re-occurring difficulties in opening storm drain covers at 3 sites, and 1 collar was not installed prior to basket installation. Subsequently 5 were covered by decks as part of the pedestrian mall. Routine audits occurred at the accessible sites and all were collected, photographed, and weighed by the final audit. Following the final audit, the baskets were washed and stored in the storage unit managed by NAACAP. Appendix C includes a detailed breakdown of site names and locations, and the record of the LittaTrapsTM availability status for each audit, site locations are pictured in Figure 2.

Audit #	Dates	Installed	Accessible
1	June 24 & 25	30	18
2	July 27 & 28	30	22
3	September 2 & 3	30	22
4	October 21 & 22	30	27
5	November 18 & 19	30	30

Table 1: List of the audit dates and the number of installed baskets and accessible baskets at the time of audit collection

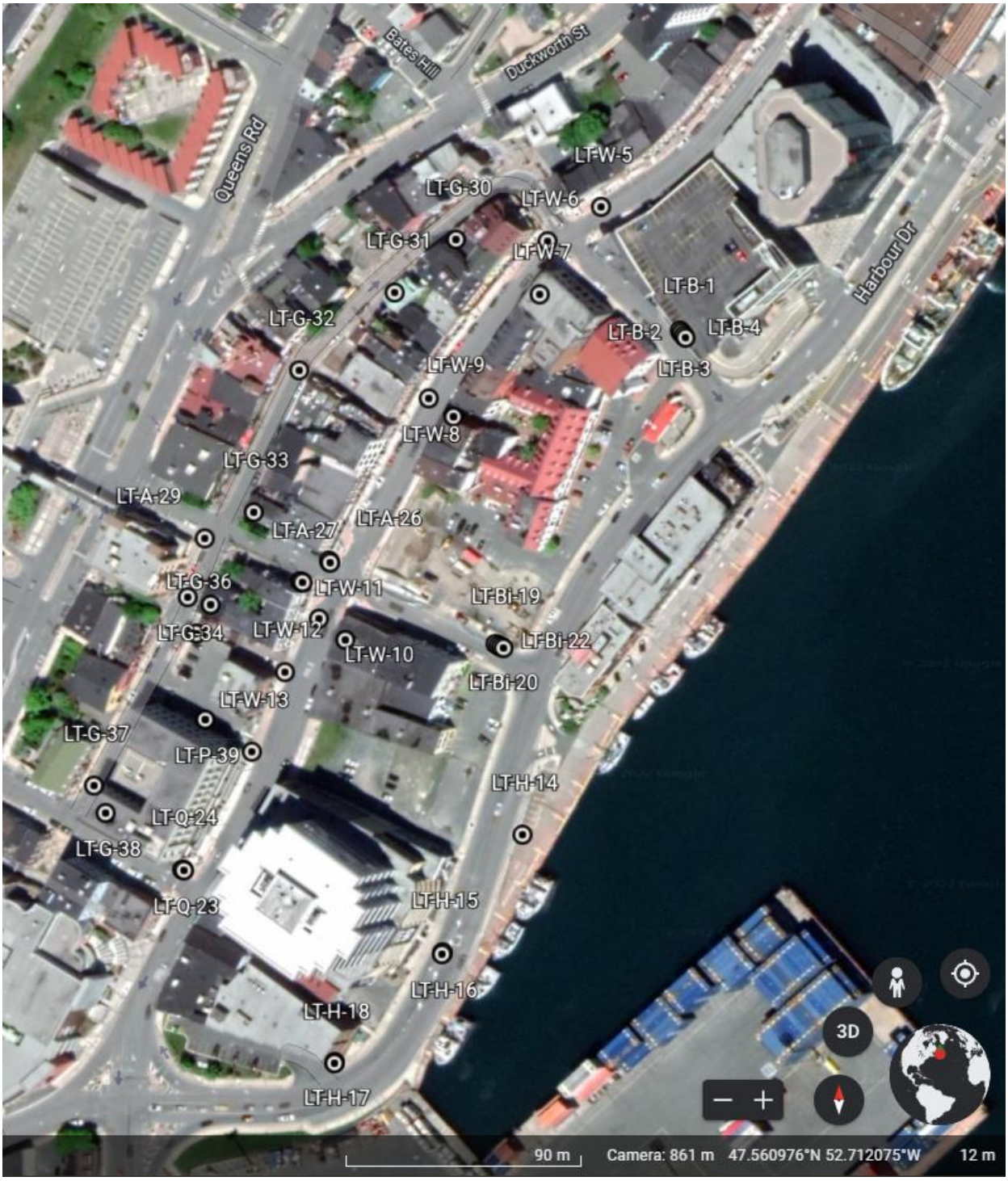

Figure 2: Map of LittaTrapTM site locations in downtown St. John's

Social media posts, posters and handouts were developed in discussion with DFO and the City of St. John's to engage with the downtown St. John's public in the region of the LittaTrapTM sites. Following discussion with the DFO and the City of St. John's the decision was made to forego the painted-on graphic identifying the storm drains

installed with LittaTrapsTM, as a public safety precaution (ex. Public opening the storm drains to retrieve something they dropped into the drain). Trash audit data was uploaded to social media, and the International Trash Trapping Network and monthly email updates were provided to DFO and the City of St. John's.

Figure 3: Two side of the handout created by NAACAP that was distributed at meetings and to the general public in downtown St. John's

Results

June and July Litter Characterization

As part of the audits that occurred in June and July 2022, the protocol included the detailed characterization of the macro-plastics collected by the installed LittaTrapsTM. While the detailed characterization included numerous categories as seen in the original and revised protocols in appendix a, the data was compiled into overarching categories including cigarette butts, food wrappers, soft plastic, hard plastic, paper, and other for ease of interpretation. Two primary comparisons of the above-mentioned categories emerged including contents represented by count and by weight in grams (seen below in Figures 4 and 5).

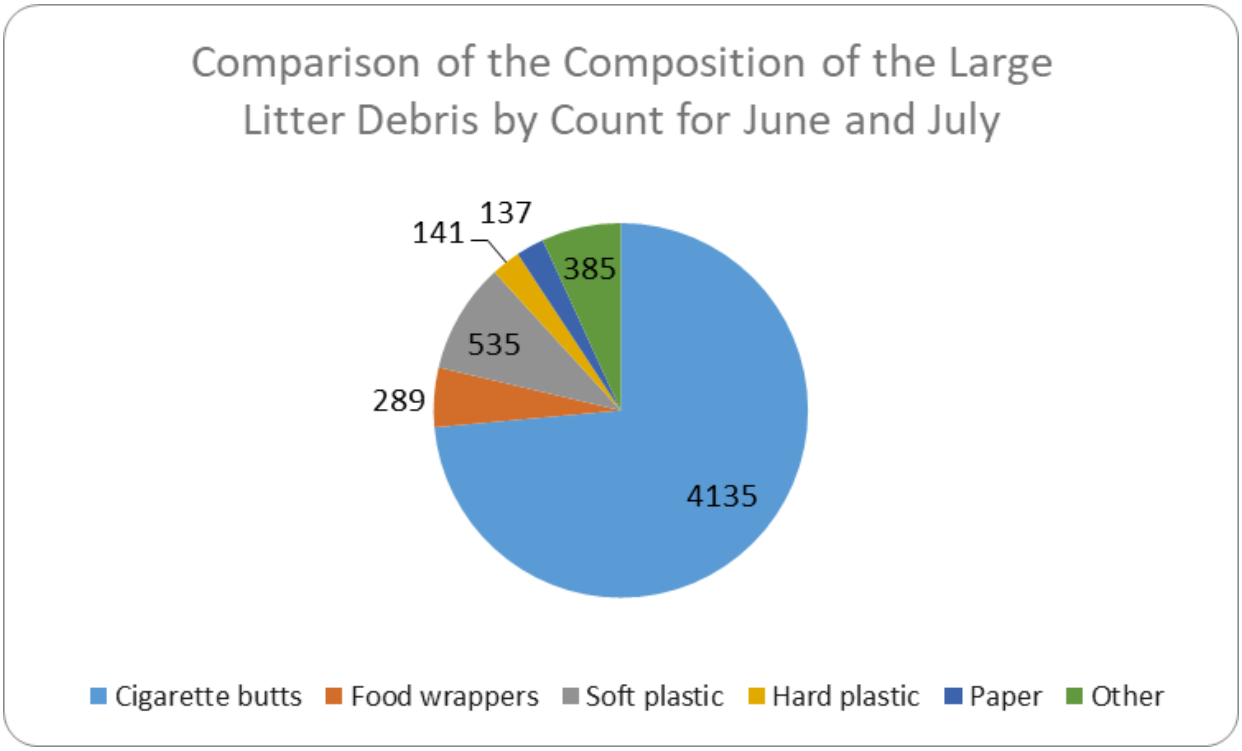

Figure 4: The results of the comparison of the large litter debris counts based on the combined data from the comprehensive June and July characterization audits

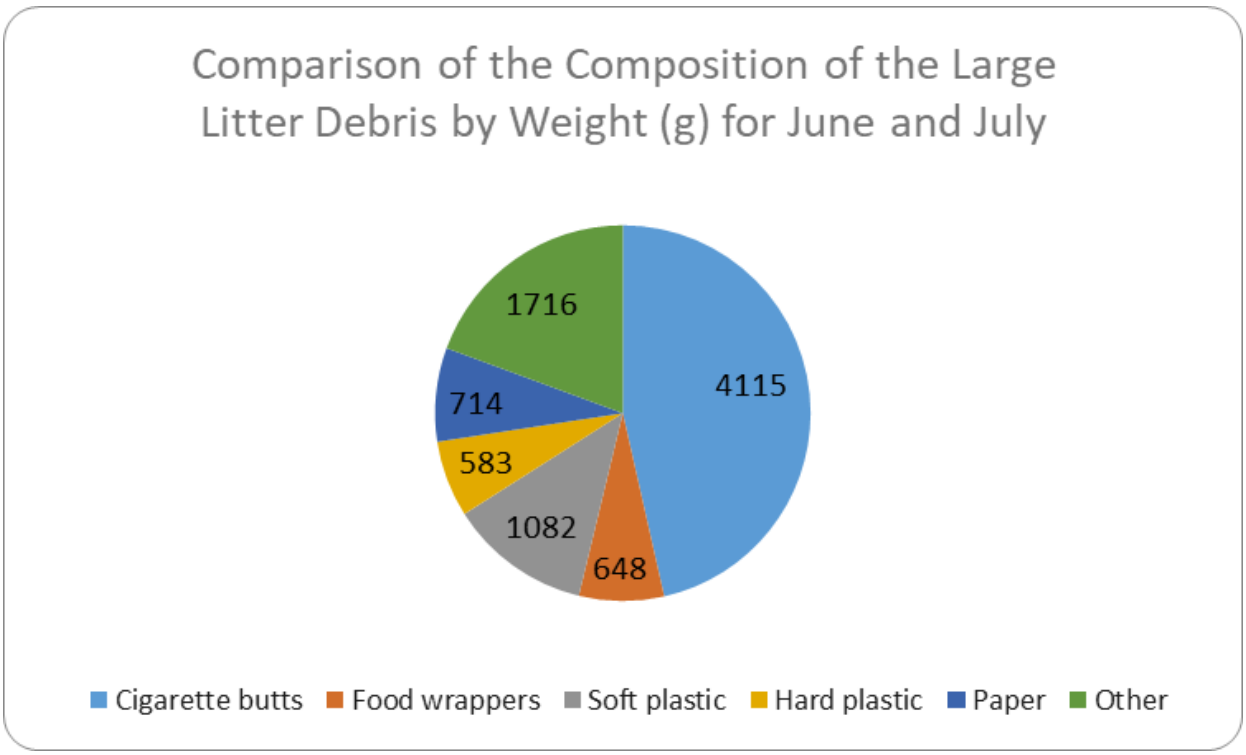

Figure 5: The results of the comparison of the large litter debris weights in grams based on the combined data from the comprehensive June and July characterization audits

As a result, the combined composition of the LittaTrapsTM for the months of June and July were primarily comprised of cigarette butts in both count and weight. Counts descend in quantity in the order cigarette butts, soft plastic, other, food wrappers, hard plastic, and paper. Whereas, litter debris by weight descends in volume in the order Cigarette butts, other, soft plastic, paper, food wrappers, and hard plastic. The differences between the descending order of count and weight can be attributed to factors including the size of the pieces, and how much the material absorbs water.

Since the comparison between litter debris count and weight are not directly related and there was organic debris removed prior to the June and July detailed audits, we are unable to adequately estimate the composition of the audits collected in September, October, and November based on their initial collected weights. However, the initial weight data collected from all audits is still able to represent the spatial and temporal distribution of litter debris which will be expanded on later.

Overall, the data collected in the June and July macro-plastic litter debris detailed characterization allow for an in depth look at the composition of plastic materials entering the ocean via catch basins located across downtown St. John's. Therefore, allowing informed decisions to be made based on future mitigation and educational initiatives.

Microplastic Characterization

Furthermore, as part of the first revised audit protocol supplemented by protocols created by the International Trash Trap Network (ITTN), we were able to assess whether or not the LittaTrapsTM were able to collect micro-plastics and small debris defined as being between 2mm and 3cm in size by the ITTN. As a result, we discovered that the LittaTrapTM baskets were able to retain the small debris, however most was located amongst the large debris, therefore we are unable to conclude how much may have washed through the holes of the net of the baskets.

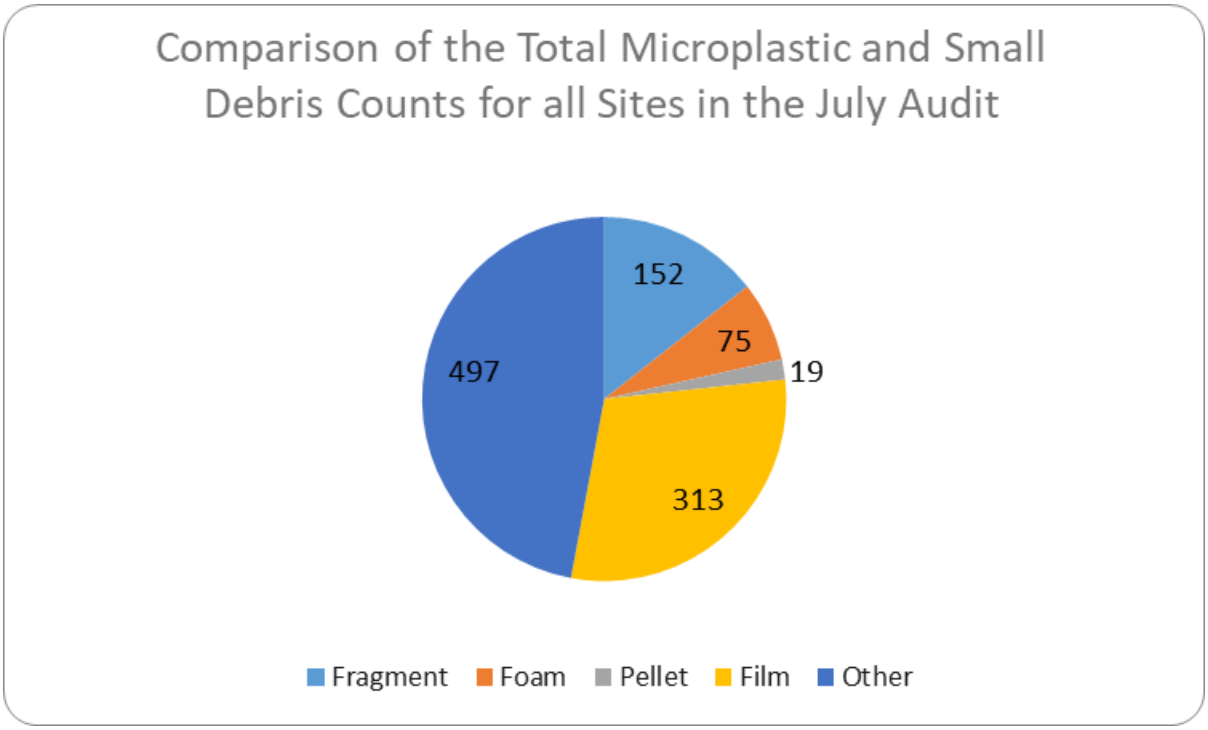

Figure 6: The results of the comparison of the small litter debris and micro-plastic counts based on the July characterization audit

From all the sites collected during the July audit, other was the largest collected category, followed by film, fragment, foam, and pellet. Therefore, further contributing to the overall understanding of the types of plastic that is entering the ocean via catch basins in the downtown area.

Large debris weights for all audits and their spatial and temporal distribution.

As previously mentioned, the data collected of the initial weights from all sites during all 5 audits allows for the better understanding of the spatial and temporal distribution of the collected debris. Consideration must be made that due to the difficulties in estimating the composition of the audits following July, we are unable to conclude the composition of inorganic plastic versus organic and inorganic debris such as gravel, which may have influenced several weights in the fall season. However, photos were taken at each site prior to emptying the baskets, therefore beyond the initial weight further investigations can be made when analyzing the photos when deciding their individual composition.

For the purposes of this report, initial weights were the sole contributor for the spatial and temporal analysis since they adequately represent the total debris collected during each month's audit and how they differ spatially across downtown St. John's. This is further justified by the current understanding of the material composition found in the June and July audits, proving that the LittaTrapsTM do indeed collect large volumes of litter debris. Therefore, understanding the initial volume of the material collected allows for informed decisions moving forward, such as the potential for a regular collection and

disposal of the contents of the LittaTrapsTM in high volume areas and seasons, thus increasing the efficacy of future projects and initiatives.

As a result, the spatial distribution of volume of litter debris collected is evident in both the map and table below, where certain traps routinely had high initial weights. These sites were primarily located along George Street and Water Street between Adelaide Street and where George Street becomes Becks Cove. Where as sites located along Becks Cove, Harbour Drive, and Queens Street had lower collected volumes. This is because of the frequency and type of use experienced at the various site locations by people, and that George Street and Water Street are the first to receive litter debris being washed downhill by storm water. Thus, suggesting that spatial gradient of volume received at the various sites across downtown St. John's. However, there is several discrepancies that occurred that may skew results slight such as traps that were left uncollected for more than one month as a result of stuck grate covers, cars parked blocking access, and the installation of decks for the summer/fall season. These discrepancies are outlined in the Table 1, and unlike the occurrences of temporarily inaccessible catch basins, the catch basins that were covered by decks provided important feedback. They allowed the further understanding of the reality that despite being blocked, litter debris still managed to wash into the catch basins, and that the LittaTrapsTM were able to be left for up to 5 months without intermittent retrieval and did not over flow with debris, nor did they block the flow of water.

Lastly, Figures 7 and 8 do demonstrate that there is temporal distribution of the collected debris, where there was more debris collected in the fall than in the early summer. However, as previously mentioned this may not accurately represent the volume of plastic debris collected to the volume of natural inorganic and organic debris. This warrants that further detailed composition analysis via photo analysis and/or additional field seasons may increase the knowledge of whether the temporal distribution is solely related to plastic debris. However, for the purpose of this study, this data allows for the improved understanding of use of LittaTrapsTM as a management tool for preventing all types of debris from entering the catch basin system and subsequently the ocean including large amounts of litter debris as proven in the June and July audits.

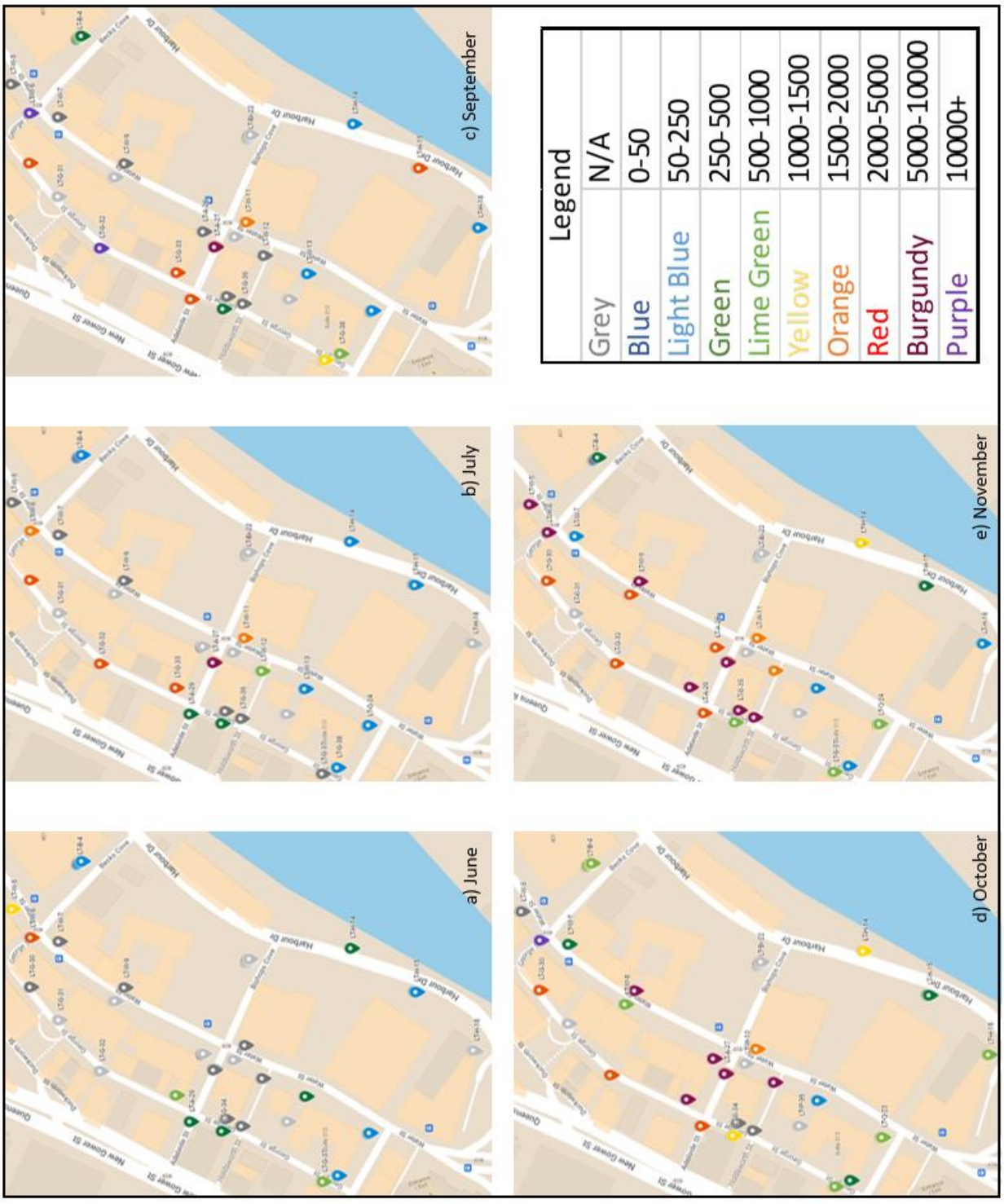

Figure 7: Spatial distribution of LittaTrapsTM based on weight (g) at time of collection for the audits in June, July, September, October and November 2021. Colour description; grey represents all traps not installed/inaccessible due to catch basin cover stuck, blocked by car, or deck; the remaining colours indicate the range of the net weight of each LittaTrap contents in grams at the time of audit.

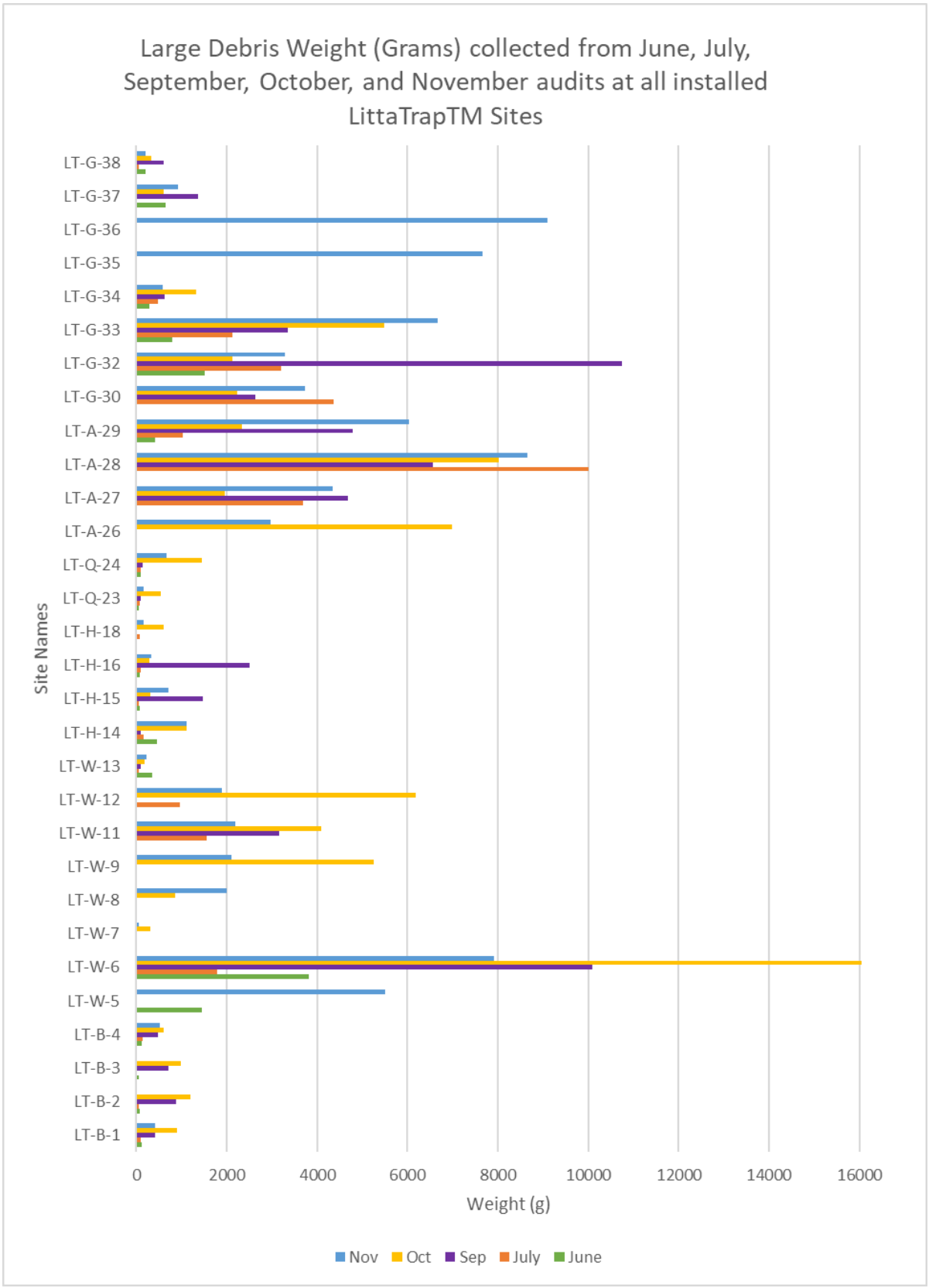
Large Debris Weight (Grams) collected from June, July, September, October, and November audits at all installed LittaTrapTM Sites
Site Names
LT-G-38
LT-G-37
LT-G-36
LT-G-35
LT-G-34
LT-G-33
LT-G-32
LT-G-30
LT-A-29
LT-A-28
LT-A-27
LT-A-26
LT-Q-24
LT-Q-23
LT-H-18
LT-H-16
LT-H-15
LT-H-14
LT-W-13
LT-W-12
LT-W-11
LT-W-9
LT-W-8
LT-W-7
LT-W-6
LT-W-5
LT-B-4
LT-B-3
LT-B-2
LT-B-1
0
2000
4000
6000
8000
10000
12000
14000
16000
Weight (g)
Nov
Oct
Sep
July
June

Figure 8: Comparison of the initial weights (grams) collected for all 30 sites between all five audits (June, July, September, October, and November)

Future uses/recommendations

We recommend that the use of the LittaTrapsTM continue to be used. However, their use would be most beneficial as a waste capture mitigation effort. As such, they should be installed early spring once weather conditions improve and regularly monitored and emptied into trash bags for the immediate disposal of the debris. We recommend emptying the traps on a minimum monthly basis, with increased monitoring of their status following significant rainfall events. We discovered that collection is most efficient in the early morning hours in order to avoid peak traffic, and when using iron hooks as a safe practice.

We do not recommend using LittaTrapsTM for a detailed debris characterization in urban areas, as there were several complications as highlighted in this report. These included: smell, space required for rinsing debris, and safety concerns, but these concerns do not necessarily impact their effectiveness as a mitigation tool.

In total, the installed traps were able to collect and prevent 248.84kg of debris from entering the ocean over their 6-month installation. In an ideal situation, we would prefer no litter/debris would enter the ocean via catch basins, but considering debris is evidently entering catch basins in downtown St. John's, LittaTrapsTM should be used going forward as an effective mitigation method to remove debris. Therefore, providing a strong starting point for future projects, while also offering an effective mitigation technique with the extended use of LittaTrapsTM to be ideally facilitated at the municipal level, given their knowledge of and expertise with the local storm sewer network infrastructure

Conclusion

The results of this project contribute to a broader understanding of the volume of macro plastics and litter debris that is entering the marine ecosystem via storm water runoff into catch basins in downtown St. John's, in addition to the establishment of effective protocols, and procedures for the use of LittaTrapsTM in St. John's. Since the cities catch basins flow directly into the ocean, this project was able to effectively mitigate the volume of debris that would have otherwise entered the ocean. Based on our results we are able to conclude where the highest volume of debris is entering spatially across the city, and estimate the composition of the LittaTrapsTM by initial weight and photos taken upon collection, as a result of our comprehensive composition audit of the first two collections in June and July. We can also conclude that despite some sites having been covered during the summer, debris still managed to enter the system. This information, along with the development of efficient procedures and protocols, allows for the better understanding for future mitigation and educational efforts that could effectively reduce the volume of litter debris entering the ocean.

Appendix A: Original Audit Protocol

NAACAP

LittaTrap Collection and Audit Protocol

PPE During In-Situ Collection

- Steel-toe boots
- High-visibility vest
- Long-sleeve pants and shirt
- Puncture-proof gloves (nitrile or latex gloves underneath if desired)
- Face mask (over nose and mouth)
- Eye guard/ face shield
- Hard hat
- Other Safety Materials During In-Situ Collection
- Traffic Cones (4+)
- Shoulder Caddy

Information Recorded During Installation/First Collection

- Slope
- Wind exposure
- Nearby Amenities (parking areas, bus stops, shops restaurants, etc… include definition of amenities used in this context)
- Land use in the catch basin area
- Pictures of the inside of the catch basin
- Pictures of the catchment area from the catch basin, capturing all angles

Information Recorded During Each Subsequent Collection

- Comments on any unusual activity, pollutants etc
- Pictures of the catchment area from the catch basin, capturing all angles
- Fill level of basket
- Condition of basket

Basket Collection Procedure

When collecting the contents of the LittaTrap basket, care must be taken to ensure that loss of material and injury is prevented. This section outlines the steps for collecting the contents of the LittaTrap basket. When recording any written information, ensure that two identical copies are taken, preferably one digital and one written copy to prevent loss of data due to incident.

1. First, don the appropriate health and safety gear (high visibility vest, gloves, etc) and place any other safety equipment such as traffic cones as required by traffic and regulations.
2. Next, take pictures of the surrounding catchment area and make note of any unusual activity.
3. Now, the catch basin grate is removed, if it can be done safely, with one person standing slightly up road from the person opening the grate to ensure safety from traffic if no traffic cones are available.

4. Once the grate is removed, sweep any debris on the sides of the deflector panels into the basket before removal to prevent loss of material.
5. Remove the basket and record the fill volume and then put to the side, without spilling the contents (If a third party is responsible for collection, a volume estimate can be added to the label with the following intervals: 0-25%, 25-50%,50-75%,75-100%, and 100% full).
6. Take pictures of the inside of the catch basin clearly showing any inlets and outlets as well as the bottom of the basin. Once the pictures are taken, it is recommended to close the grate before moving on if reasonable.
7. Take the basket and empty into the desired container, taking care to avoid spilling. If any of the material is spilled before entering the container, make sure best efforts are given to get the spilled material into the container.
8. Seal the container and label with the site name and date of collection. Take care to make sure that the label won't smear or be removed if the container is subject to moisture or rubbing during transport.
9. Once containers are brought to the sorting area, open the containers or bags and place in an area where excess water can dry until they are sorted. Ideal sample moisture conditions are that there is just enough water in the sediment to prevent dust from irritating nose and eyes.

PPE During Litter Audit

- Long-sleeve pants and shirt
- Puncture-proof gloves (nitrile or latex gloves underneath if desired)
- Face mask (over nose and mouth)
- Eye guard/ face shield

Procedure for sorting/counting litter

Once the contents of the basket have been collected, they can be sorted. The basket contents are referred to as samples in this section. An ideal location to sort the basket contents is on a wide flat table or bench that is protected from the elements and in a well-ventilated area. The following steps outline the suggested procedure for sorting the basket contents. Remember to record two identical sets of data for each sample (a picture or copy of the sampling sheet after it is filled out is sufficient)

1. Place a covering over the work area such as a tarp or plastic sheet.
2. Put on PPE
3. Record the site name, collection date, date of sorting, and moisture content of the sample (dry or wet)
4. Weigh the sample to the nearest 100 g. Record the value.
5. Empty the sample container onto the designated sorting area and capture a photo of the sample next to a small white

board or similar item that shows the site name and collection date.

6. Sort the sample into a sediment/organics and litter piles based on the designated litter categories.
7. Once sorted, take a photo of the sorted sample, again including a label showing the site name, sample weight, fill volume estimate, and collection date. This provides a backup if the counting sheet is lost.

8. Count the litter, weighing each category (Sample sheet indicating litter categories under appendix) and record the data. If there is not enough litter to weigh each category individually, then a total litter mass should be recorded. Litter categories are based on UNEP/IOC Guidelines (Cheshire et al., 2009)

a. If there are too many pieces to reasonably count, take 10 random subsamples containing ten pieces each, and weigh each. Take the average of these and extrapolate against the total weight of the pieces to get the estimated number of pieces.

9. Estimate and record the ratio of sediment to organic matter in the remaining pile to the nearest 10 percent (Note: the organic matter and sediment can be separated and weighed but can be time consuming and difficult).
10. Place the litter into containers according to category. These containers will hold the total litter captured throughout the study for a visual representation of the total litter captured.
11. Place the Organics/sediment back into the original container if sediment samples are to be taken, otherwise store or dispose according to preference or practicality.

LittaTrap™ Counting Sheet

Count pieces where possible: If you cannot, take 10 subsamples and extrapolate against the average.

Date of Collection: **Date of Counting:**

Location/ID:

Personnel Collected: **Personnel Counting:**

Initial Bag Weight (kg): **Moisture Status: Wet** **Dry**

Volume Estimate: **Photo: Before** **After**

Type of pollutant		**Number of pieces (or volume)**	**Total pcs / weight**
Example			10 / 1.7 g
Plastic	Cigarette butts		
	Food wrappers		
	Soft plastic		
	Hard plastic		
	Gum		
	Bottle caps		
	Straws		
	Other		
	Sponges		
	Polystyrene		
	Disp. Gloves		
	band aids		
Processed wood	Cardboard		
	Paper		
	Wood		
Metals	Bottle caps		
	Pieces		
	Aluminium foil		
	Can tabs		
	Other		
Rubber	Balloon pieces		
	Rubber bands		
	Rubber pieces		
Glass	Glass pieces		
Cloth	Cloth		
	String		
	Cotton		
	Face Masks		
Other (describe)			
Total	Organic %		
	Sediment %		
	Litter weight (g)		

Comments:

References

Cheshire, A.C., Adler, E., Barbière, J., Cohen, Y., Evans, S., Jarayabhand, S., Jeftic, L., Jung, R.T., Kinsey, S., Kusui, E.T., Lavine, I., Manyara, P., Oosterbaan, L., Pereira, M.A., Sheavly, S., Tkalin, A., Varadarajan, S., Wenneker, B., Westphalen, G. (2009). UNEP/IOC Guidelines on Survey and Monitoring of Marine Litter. UNEP Regional Seas Reports and Studies, No. 186; IOC Technical Series No. 83: xii + 120 pp

Appendix B: Revised Audit Protocol

LittaTrap™ Collection and Counting Sheet

Name of organization/group:			
Date Trash Capture Device (TDC) retrieved:			Time Retrieved:
Date TDC was last emptied:			**Time last emptied:**
Location of TDC: St. John's, NL		**Type of TDC:** LittaTrap TM	
Wind: ☐ **Windy** ☐ **Calm** **Direction:**	**Wet event >10mm during deployment:** ☐ **Yes** ☐ **No**		**Weather conditions:** ☐ **Sunny** ☐ **Cloudy** ☐ **Rainy**
Fullness of TCD: ☐ **Full to the brim** ☐ **Half full** ☐ **Quarter full**	**Picture taken:** ☐ **Yes** ☐ **No**	**Weight of full TC:** **(kg)** **Weight of empty TC:** **(kg)** **Total weight of debris in TC:** **(kg)** ***(Transfer container =TC)***	

Large Anthropogenic Debris (Greater Than 3cm)

Date of Collection:		**Date of Counting:**	
Location/ID:		**Personnel Counting:**	
Moisture Status: Wet Dry		**Photo: Before**	**After**
Weight of empty Ziploc:	**(g)**	**Total count:**	
Weight of Large debris in Ziploc:	**(g)**	**Final weight of Large debris:**	**(g)**

Type of pollutant		**Number of pieces (or volume)**	**Total pcs / weight**
Example			10 / 1.7 g
Plastic	Cigarette butts		
	Food wrappers		
	Soft plastic		
	Hard plastic		

	Gum		
	Bottle caps		
	Straws		
	Other		
	Sponges		
	Polystyrene		
	Disp. Gloves		
	band aids		
Processed wood	Cardboard		
	Paper		
	Wood		
Metals	Bottle caps		
	Pieces		
	Aluminium foil		
	Can tabs		
	Other		
Rubber	Balloon pieces		
	Rubber bands		
	Rubber pieces		
Glass	Glass pieces		
Cloth	Cloth		
	String		
	Cotton		
	Face Masks		
Other (describe)			

Small Anthropogenic Debris (Smaller than 3cm and greater that 2mm)

Date of Collection:		**Date of Counting:**	
Location/ID:		**Personnel Counting:**	
Moisture Status: Wet Dry		**Photo: Before After**	
Did you subsample?	☐ Yes ☐ No		
Weight of empty Ziploc:	**(g)**	**Weight of Small debris in Ziploc:**	**(g)**
Final weight of Large debris:	**(g)**	**Extrapolated weight of subsample:**	**(g)**
Count of small debris in sample/subsample:			
Extrapolated Total Count based on subsample:			

Item:	Tally	Final Count	Comments/Notes
Hard Fragment			

		Extrapolated full count:	
Foam		Extrapolated full count:	
Pellets		Extrapolated full count:	
Film		Extrapolated full count:	
Other		Extrapolated full count:	

Appendix C: Detailed breakdown of site names and locations, and the record of the LittaTrapsTM availability status for each audit

Street	ID Code	Shp File ID	Lat	Long	Installed	Notes	Audit 1 Updates	Audit 2 Updates	Audit 3 Updates	Audit 4 Updates	Audit 5 Updates
Becks Cove	LT-B-1	6020	N47° 33' 42.619426	W52° 42' 31.820414	Y		collected	collected	collected	collected	collected
Becks Cove	LT-B-2	6019	N47° 33' 42.647755	W52° 42' 31.856474	Y		collected	collected	collected	collected	collected
Becks Cove	LT-B-3	6018	N47° 33' 42.680403	W52° 42' 31.896911	Y		collected	collected	collected	collected	collected
Becks Cove	LT-B-4	6017	N47° 33' 42.707047	W52° 42' 31.932697	Y		collected	collected	collected	collected	collected
Water Street	LT-W-5	6015	N47° 33' 44.232519	W52° 42' 33.46014	Y		collected	covered by deck	covered by deck	covered by deck	collected
Water Street	LT-W-6	6014	N47° 33' 43.801787	W52° 42' 34.453283	Y		collected	collected	collected	collected	collected
Water Street	LT-W-7	6016	N47° 33' 43.144593	W52° 42' 34.586343	Y	Covered by deck	N/A	N/A	N/A	collected	collected
Water Street	LT-W-8	6038	N47° 33' 41.848088	W52° 42' 36.634781	Y	Covered by deck	N/A	N/A	N/A	collected	collected
Water Street	LT-W-9	6037	N47° 33' 41.62146	W52° 42' 36.167812	Y	Covered by deck	N/A	N/A	N/A	collected	collected
Water Street	LT-W-10	6029	N47° 33' 39.09164	W52° 42' 38.660976	N	Stuck / not installed	covered by deck	covered by deck	covered by deck	Stuck / not instal	Not Installed
Water Street	LT-W-11	6028	N47° 33' 38.825602	W52° 42' 38.167251	Y		covered by car	collected	collected	collected	collected
Water Street	LT-W-12	6032	N47° 33' 38.421714	W52° 42' 39.292894	Y		Stuck installed	collected	Stucked	collected	collected
Water Street	LT-W-13	6034	N47° 33' 37.423578	W52° 42' 39.907896	Y		collected	collected	collected	collected	collected
Harbour Drive	LT-H-14	6023	N47° 33' 36.363731	W52° 42' 34.818931	Y		collected	collected	collected	collected	collected
Harbour Drive	LT-H-15	6021	N47° 33' 34.879394	W52° 42' 36.312125	Y		collected	collected	collected	collected	collected
Harbour Drive	LT-H-16	6022	N47° 33' 34.855534	W52° 42' 36.327379	Y		collected	collected	collected	collected	collected
Harbour Drive	LT-H-17	6036	N47° 33' 33.504523	W52° 42' 38.338886	Y	Not sure if both of	Update: not installed	Not Installed	Not Installed	Not Installed	Not Installed
Harbour Drive	LT-H-18	6035	N47° 33' 33.486342	W52° 42' 38.346014	N	these are installed	covered by car	collected	covered by car	collected	collected
Bishops Cove	LT-Bi-19	6003	N47° 33' 38.720109	W52° 42' 35.185184	N	Construction	N/A	N/A	N/A	N/A	N/A
Bishops Cove	LT-Bi-20	6002	N47° 33' 38.737816	W52° 42' 35.233659	N	Construction	N/A	N/A	N/A	N/A	N/A
Bishops Cove	LT-Bi-21	6001	N47° 33' 38.753261	W52° 42' 35.284276	N	Construction	N/A	N/A	N/A	N/A	N/A
Bishops Cove	LT-Bi-22	6000	N47° 33' 38.771632	W52° 42' 35.339474	N	Construction	N/A	N/A	N/A	N/A	N/A
Queen Street	LT-Q-23	6031	N47° 33' 35.937994	W52° 42' 41.170388	Y		collected	collected	collected	collected	collected
Queen Street	LT-Q-24	6030	N47° 33' 35.950869	W52° 42' 41.203748	Y		collected	collected	collected	collected	collected
Adelaide Stree	LT-A-25	6027	N47° 33' 39.792889	W52° 42' 38.456101	N	Stuck / not installed	N/A	N/A	N/A	N/A	N/A
Adelaide Stree	LT-A-26	6026	N47° 33' 39.81924	W52° 42' 38.478647	Y		forgot	covered by car	Collected but Mis	collected	collected
Adelaide Stree	LT-A-27	6024	N47° 33' 39.546425	W52° 42' 38.96993	Y		forgot	collected	collected	collected	collected
Adelaide Stree	LT-A-28	6025	N47° 33' 39.560454	W52° 42' 39.011355	Y		forgot	collected	collected	collected	collected
Adelaide Stree	LT-A-29	6004	N47° 33' 40.096766	W52° 42' 40.794472	Y	High Water (resolve	collected	collected	collected	collected	collected
George Street	LT-G-30	6013	N47° 33' 43.81724	W52° 42' 36.158246	Y		Stuck installed	collected	collected	collected	collected
George Street	LT-G-31	6012	N47° 33' 43.158198	W52° 42' 37.29009	N	Stuck / not installed	N/A	N/A	N/A	N/A	N/A
George Street	LT-G-32	6011	N47° 33' 42.191095	W52° 42' 39.050683	Y		collected	collected	collected	collected	collected
George Street	LT-G-33	6010	N47° 33' 40.422807	W52° 42' 39.886092	Y		collected	collected	collected	collected	collected
George Street	LT-G-34	6009	N47° 33' 39.361887	W52° 42' 41.10853	Y		collected	collected	collected	collected	collected
George Street	LT-G-35	6008	N47° 33' 39.268492	W52° 42' 40.682619	Y	Covered by deck	Covered by deck	N/A	N/A	N/A	collected
George Street	LT-G-36	6007	N47° 33' 38.907351	W52° 42' 40.949413	Y	Covered by deck	Covered by deck	N/A	N/A	N/A	collected
George Street	LT-G-37	6005	N47° 33' 37.009413	W52° 42' 42.847274	Y		collected	covered by car	collected	collected	collected
George Street	LT-G-38	6006	N47° 33' 36.664416	W52° 42' 42.631333	Y		collected	collected	collected	collected	collected
Parking lot	LT-P-39	6033	N47° 33' 37.829973	W52° 42' 40.779434	N	No Collar installed	N/A	N/A	N/A	N/A	N/A