



**INTERNATIONAL TRASH
TRAP NETWORK**
Ocean Conservancy
University of Toronto Trash Team

TRASH TRAP DETAILED DATA COLLECTION

This protocol describes a harmonized procedure to document the weight, count and categories of trash (i.e., plastics and other anthropogenic debris) collected by trash traps around the world. The data collected using this protocol can be used to understand local sources of trash to inform upstream solutions and can be synthesized and compared across different locations and timescales to better characterize the global impact of trash trapping efforts.

If you have a cellphone or tablet, download the [Clean Swell App](#) to easily record your trash trapping data and submit to the ITTN.

Technical Notes:

- Please contact info@trashtrapnetwork.org with any questions regarding this protocol.
- This protocol is intended to be used and adapted for all types of trash traps. If you have questions, the ITTN would be happy to advise on how to adapt these methods to your program.
- Follow this protocol at least 5-10 times each year to obtain an accurate representation of the trash collected by your trash trap throughout the seasons.
- Aim to capture at least 1–2 wet events per year (>10 mm of rainfall over 24h).
- We do not expect to see animals in a trash trap, but if you find any live animals in your trash trap, safely place them back into the water. Please record any biota captured (alive or dead) with your data and if possible, include the species and count. If you encounter this more than once, consider adaptations that could be made to avoid negative impacts to aquatic organisms, for example, moving your trash trap to a different location.
- If you are characterizing debris from trash traps at different sites, please thoroughly wash your materials between sites to avoid spreading any non-native species from one location to another.
- Prior to carrying out this protocol, please refer to Appendices B and C for instructions on how to construct the '2 mm sieve' and 'French press sieve' that will be used to separate organic debris and microdebris.

Safety Notes:

- If near a waterbody, wear a lifejacket prior to retrieving your trash trap.
- Check if a power source needs to be switched off prior to collecting debris from the trash trap. If the power is left on, this may damage the device.
- Follow all guidance provided from device manufacturers for safe trash trap and debris retrieval. This may require additional equipment to the items recommended in this protocol.
- Place debris onto a flat surface before sorting by hand to ensure you do not grab anything unexpectedly and wear gloves while sorting through the debris.
- If dangerous items are found, dispose of these with care, e.g., place in a labelled sharps container and safely store for proper disposal.

Materials:

SAFETY EQUIPMENT		
Item	Recommended Materials	Notes
Life jacket	No specific type required	Not required if trash trap is located on land
Gloves	Gardening or dishwashing gloves	Strong and reusable to enable protection from sharp debris
Weather precautions	Sunscreen, water, hat, sunglasses	
Sharps Container	No specific type required	Any plastic container with a secure lid. Must be clearly labelled as 'Sharps'
First Aid Kit	No specific type required	

WASTE CHARACTERIZATION		
Item	Recommended Materials	Notes
Copy of detailed protocol	Find a copy on https://oceanconservancy.org/itn	
Clipboard	No specific type required	If using paper datasheet
Paper datasheet	Find a copy on https://oceanconservancy.org/itn ; print on waterproof paper	If using paper datasheet
Pencil/Pen	No specific type required	If using paper datasheet
Camera	No specific type required	To visually document trash collected
Clean Swell App	Download on Apple Store or Google Play https://oceanconservancy.org/trash-free-seas/international-coastal-cleanup/cleanswell/	
Trash scale	Luggage or fish scale e.g., https://www.walmart.com/ip/N1-Digital-Hanging-Luggage-Scale-Portable-Handheld-Baggage-Scale-88-Pounds-2-Pack-New/377710866	For trash that can be measured by hand
Bag or container	No specific type required	Large and strong enough to hold debris for weighing
Tarpaulin	e.g., https://www.canadiantire.ca/en/pdp/light-duty-poly-tarp-9-x-12-ft-0405030p.html#srp	
Squirt bottle	No specific type required	Fill with water. Used for rinsing microdebris that is attached to macrodebris
Water Source	No specific type required	
Large tweezers	No specific type required	Used for sorting and handling microdebris
Metal spoon	No specific type required	Used for sorting and handling microdebris

MICRODEBRIS SEPARATION MATERIALS

Item	Recommended Materials	Notes
Painters Bucket	e.g., https://www.homedepot.ca/product/e-hofmann-plastics-19l-5-gallon-graduated-measuring-bucket/1000784935?rrec=true	Approx. 20 L and/or 30 cm diameter.
Wire mesh	e.g., Chicken wire mesh	Mesh for French press sieve 2.5 cm mesh size
Tin snips	No specific type required	Wire cutters or similar tools are also appropriate
Door Jamb or Window Seal	e.g., https://www.homedepot.ca/product/m-d-building-products-1-inch-x-81-inch-premium-door-jamb-replacement-seal-brown/1001120736	To cover the edge of the French press sieve. Must be flexible, approximately 100cm size
Cabinet Pull	e.g., https://www.homedepot.ca/product/richelieu-roosevelt-collection-3-in-76-2-mm-center-to-center-matte-black-contemporary-cabinet-pull/1001004650	Handle to remove the French press sieve from the bucket
Wooden Strip	No specific type required	Base to mount cabinet pull. Will be cut to same diameter as wire mesh
Frame	Wood, plastic tub, or box sieve for soil, e.g., https://www.amazon.ca/gp/product/B000TAOYRQ?pf_rd_r=SVQXWDKT2KHZVRJ72GG&pf_rd_p=b84b7a33-3e6c-498a-8674-6a34958d31c1&pd_rd_r=27b66e37-509b-46bb-9c19-879f263afeba&pd_rd_w=K7KoW&pd_rd_wg=2F1Tv&ref=ped_gw_unk	Frame for 2mm sieve. If using wood (recommended to minimize plastic use), create a frame from four pieces of lumber. If using a plastic tub or box sieve, cut out the bottom and replace with 2mm mesh.
Hacksaw	No specific type required	Miter saw or similar tools are also appropriate
Drill	No specific type required	Screwdriver is also appropriate
Hardware Cloth	e.g., https://www.amazon.com/Woven-X60cm-Coarse-gauze-Stainless/dp/B01N4RCHFU/ref=sr_1_2?keywords=2mm&qid=1638831821&s=industrial&sr=1-2	Base of 2 mm mesh sieve
Staple gun and staples	No specific type required	To join 2mm wire mesh to frame. Alternatives include duct tape, screws, or glue
Knife/Box Cutter	No specific type required	

See Appendices B and C for additional instructions for constructing the 2 mm sieve and French press sieve.

Procedure:

Step 1: Fill in site and trash trap details

- 1) Record your group name, trash trap id, type of trash trap, and data collection details (simple or detailed data collection and collection of macrodebris (>2.5 cm) and/or microdebris (<2.5 cm)).
- 2) Record the number of people reporting data, date of debris collection, length of time trapping trash, type of environment, location of device, and if there was a rainfall event (>10 mm) since the last time the trap was emptied.

Step 2: Weigh the debris

- 1) Record if you are weighing trash and organic debris together or not. If you are weighing these together, record and estimate by mass of the percentage of debris that is organics. Note – organics are typically much heavier than plastic debris and thus this estimate can be tricky to guess using visual cues only. To inform your estimate, we recommend weighing the debris and organics separately at least once to get an idea of what the organics in your trap typically weigh.
- 2) If weighing the contents of your trash trap in a bag or container, record the weight of the empty bag/container first. If you are not weighing debris in a container, or if you are taring your container before weighing debris, put 0 for 'weight of empty container'.
- 3) Record if you are weighing a subsample of the debris removed. If you are subsampling, estimate the approximate percentage of debris subsampled. Note – if you subsample your debris for weighing, then continue to work with this subsample moving forward. From the debris that is weighed, you also have the option to subsample again for categorizing and counting.
- 4) Record the weight of debris and the unit of measurement (lb or kg).

Step 3: Categorize and count the macrodebris (>2.5 cm)

- 1) Place a tarpaulin down on the area you will be sorting the macrodebris.
- 2) Place all debris onto the tarpaulin.
- 3) Record if you are subsampling from the debris weighed before categorizing and counting the macrodebris. If you are subsampling, estimate the approximate percentage of debris subsampled.
- 4) Separate all macrodebris items (> 2.5 cm, Figure 1) from the debris mixture. If you find pieces of microdebris attached to the macrodebris, rinse these into the bucket using water from the squirt bottle. You will later use this bucket to separate microdebris from organic debris.
- 5) Record the count and categories of all macrodebris items. In addition to the categories provided, take note of any items of local interest that may be important to inform local pollution management.
- 6) If you would like a visual record of your trash, take a photograph of all macrodebris items together.

Step 4: Separate microdebris (2 mm – 2.5 cm) from organic debris.

Please note this step may not be required if you capture very little organic debris in your trash trap.

- 1) Place two large handfuls of the microdebris and organic debris mixture into the bottom of the bucket.
- 2) Fill up the bucket with water, spraying down the contents in a circular motion while doing so until it is approximately three quarters full. Let the water settle for about one minute to allow the microdebris to float to the surface.
- 3) Remove any large floating organic debris e.g., sticks or branches, and rinse the surface of each piece into the bucket using some water. If sharp/dangerous materials float to the surface, dispose of them carefully and record them in your data if applicable.
- 4) Place the French press sieve into the bucket and slowly push it down toward the bottom of the bucket until it feels secure.
- 5) Wait to allow the microdebris to resurface through the sieve. The organic debris will remain at the bottom of the bucket under the press.

- 6) Place the 2 mm sieve on the ground. With the French press sieve still inside the bucket, slowly pour the floating debris and water from the bucket into the 2 mm sieve.
- 7) Once all water has been poured out of the bucket, repeat steps 2 - 7 twice more. In total you will rinse each bucket of debris three times. Once triple rinsed, remove the remaining organic debris from the bucket and place this to the side where it can be properly disposed of later.
- 8) Repeat steps 2 - 8 until you have separated all microdebris from the organic debris.
- 9) After using this method, there may still be some microdebris attached to the organic debris. For this reason, some groups may choose not to return the organic debris back into the environment and instead might dispose of this in the garbage. In some circumstances the organic debris may be of ecological importance, and it may be more beneficial to return this to the environment with significantly less plastic contamination than before. **Please consult with relevant local stakeholders to decide on the most appropriate method for handling organic debris in your scenario.**

Step 5: Categorize and count microdebris (2 mm – 2.5 cm)

- 1) The 2mm sieve should now contain microdebris and some small pieces of organic debris. Remove the microdebris from the sieve and place it onto the tarpaulin. Use the metal spoon to scrape the corners and sides of the sieve.
- 2) Record if you are subsampling again to categorize and count the microdebris. If you are subsampling, estimate the approximate percentage of microdebris subsampled.
- 3) Record the count and categories of all microdebris items. Using tweezers can be helpful for moving and separating microdebris items. See Appendix A below to correctly identify the size and categories of microdebris.
- 4) If you would like a visual record of your trash, take a photograph of all microdebris items together.
- 5) Place the trash trap back into its deployment or storage location.
- 6) Dispose of the debris according to your local regulations, organizational goals or priorities for ecosystem health. For example, you may dispose of all debris into the garbage, or choose to separate out recyclables and/or organic matter to dispose of these separately.

If you are using a paper datasheet, submit this to info@trashtrapnetwork.org to share your data with the ITTN.

APPENDIX A: Categorization of macro and microdebris

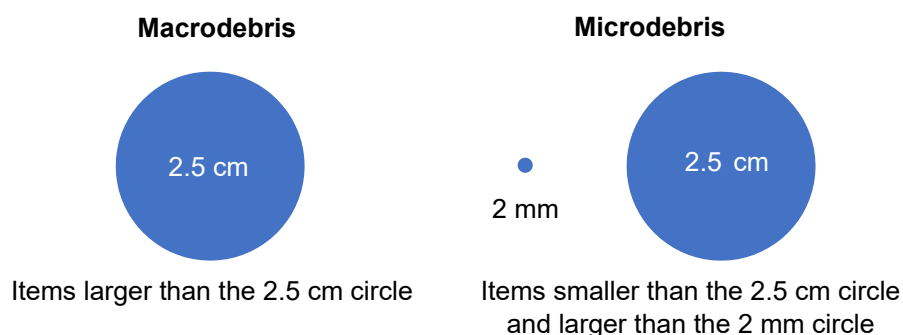
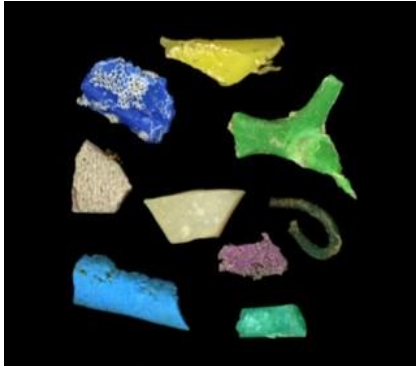





Figure 1: Markers to identify between macrodebris and microdebris

Table 1: Microdebris Categories

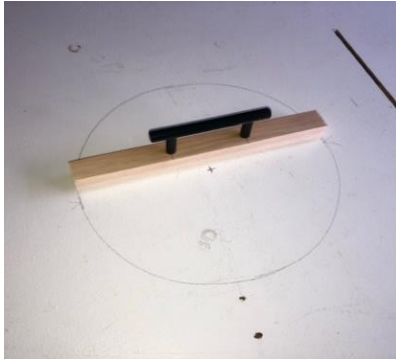
MICRODEBRIS	DESCRIPTION	EXAMPLE
<p>Fragment</p>	<p>Fragments have a rigid structure and sometimes irregular shape. They can be round, subround, angular, or subangular. They are not always equally thick throughout and can appear twisted or curled. Shavings from plastic manufacturing fit within this category. Fragments can be any color or combination of colors.</p>	
<p>Foam</p>	<p>Foams are soft, compressible, and cloud-like. They are usually white and/or opaque but can be any color.</p>	
<p>Pellet</p>	<p>Pellets (sometimes called “nurdles”) are similar to spheres but tend to be larger, generally ranging between 3 to 5 mm. Pellets are often rounded or cylindrical in shape. Both spheres and pellets can be any color.</p>	
<p>Film</p>	<p>Films are flat, thin, and malleable. Films can fold or crease but do not break apart easily. Films are typically partially or fully transparent and are found in a range of colors.</p>	

Descriptions are from Rochman et al. 2019 ‘Rethinking microplastics as a diverse contaminant suite’. Images from Alexander Kunz, Microplastic Research in Taiwan.

Appendix B: Constructing the French press sieve

Procedure:

- 1) Confirm the internal diameter of your bucket measuring approximately 3" from the bottom.
- 2) Cut a circle of wire mesh at a diameter $\frac{1}{2}$ " less than the internal diameter of the bucket.
- 3) Cut the wood strip to the same length as the diameter of the wire mesh.
- 4) Mount the cabinet pull to the center of the wood strip – see the image below as an example.



- 5) Attach the bottom of the wood strip to the wire mesh with staples.
- 6) Attach one end of the flexible seal to one end of the wood strip and stretch the seal around the circumference of the wire mesh, staple it to the opposite end of the wood strip, and continue to stretch it around the wire mesh until back at the other end, trim the excess seal and staple in place. See the image below as an example.



- 7) Refer to the images below as an example of the finished product. Please note the wire mesh in these photographs is a prototype and has a smaller gauge than is recommended in this protocol.



Appendix C: Constructing the 2 mm sieve

Procedure:

- 1) Create the frame for the 2 mm sieve. If you are using a plastic tub or box sieve, cut out the bottom using the hacksaw (or similar equipment). If you are using wood to construct the frame, cut your wood to size with mitered ends and connect the four pieces together using metal screws.
- 2) Cut the hardware cloth to your desired size using the tin snips (or similar equipment).
- 3) Attach the hardware cloth to your frame, using your preferred method (e.g. duct tape, staples, glue).
See images below as examples of the finished 2 mm sieve with a plastic frame and a wooden frame.

