

Analyzing marine trawl microplastics: A guide



Congratulations! You've created and used a do-it-yourself trawl to monitor microplastics!

Now, you have to see if you've caught any plastics, and if so, how to analyze them.

This guide will walk you through how to take the plastics out of your trawl in a kitchen, classroom, or laboratory.

If you have any questions, contact Civic Laboratory for Environmental Action Research through our website, or by emailing our director, Dr. Max Liboiron, at mliwoiron@mun.ca.

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Getting Started

Materials:

- Trawl net (from any of our trawls)
- Spaghetti strainer (as fine as possible)
- Coffee filter
- Tray or pan (we use Pyrex casserole)
- Permanent marker or pen
- Tweezers
- A sink or running water (any temperature)

Set out all your supplies ahead of time and make sure they are clean.

Make sure the work area is clear of breezes, fleece (which might contaminate your sample!), and dirt.



Removing the microplastics

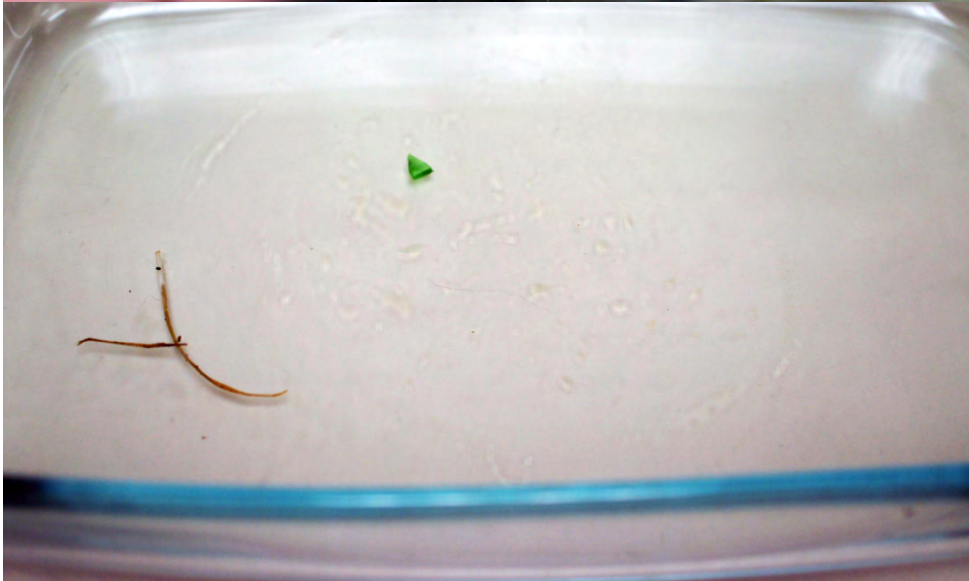


1. Over the tray/pan, flip your trawl net inside out to see if you have any plastics inside. The tray is to catch any plastics that fall out. Sometimes they fall out during transport.

The image above shows plastics and other organic matter caught after tying BabyLegs to a wharf for 30 minutes. If you see plastics immediately, you can pick them out with the tweezers and put them in the coffee filter.

When you've picked out everything you think is plastic, go to the next step.

Make sure you haven't left any plastics behind in the tray! Always work over the tray whenever you can. Plastics often escape during study when they fall, are disturbed by a breeze or your breathing, or through static electricity!



Removing the microplastics

2. Over the strainer, turn the net inside out or upside down (depending on the trawl design).
3. **Gently** rinse water through the net and into the strainer in the sink. Do this in the opposite direction of how water flowed in.

The plastics and other organic matter will fall into the strainer. Avoid splashing and overly strong water flow!

This picture shows BabyLegs, but you would do the same thing with the Ice Cream Scoop or other trawl netting. We do this in the boat with our large trawls as well.



Removing the microplastics



4. Hold the strainer up to a light and pick all the plastic items out, or items you think might be plastic.

5. Put the plastic items on the coffee filter.
If you have more than one trawl sample, label the coffee filter.

6. When you have all the items in the filter, fold the filter and put it upright in a cup to dry overnight.
The items will dry in the filter and you will be able to see if they are plastic more easily, as some organic matter will dry and become brittle.
See our **Spotter's Guide** for determining if what you've picked out is plastic!

To make sure you have all the plastic out of the strainer, turn the strainer upside down and wash it into the pan.
Sometimes you'll see an extra floating plastic that you missed in the strainer!

Amendments and hacks

Since these are do-it-yourself tools, often people will use them in ways and conditions that we don't cover here. That's great, and is what advancing knowledge is all about! Here are some trouble shoots if you are using things a little differently. Also, if you do something we don't anticipate, we would love to hear from you!

Other trawls: This guide showed BabyLegs, but the same process is used for Ice Cream Scoop, and even LADI trawls and Manta trawls. Basically, find a way to keep the sample stable (bag it, etc.) until you get to clean running water, then rinse the sample into a strainer. The rest is identical.

In the field: Sometimes you want to sample all day and have multiple samples, instead of taking each sample into the kitchen or lab to process. In that case, you can try using a hose or jugs of water in the field and rise into a jar instead of a sieve (in the lab/kitchen you then pout the jars into the strainer); or you can have multiple pairs of baby tights for BabyLegs/meshes for Ice Cream Scoop and bag each one. We do not recommend trying to sort plastics from non-plastics in the field! It takes forever and you can easily make mistakes in the wind and uncontrolled conditions.

It's full of gunk!: If the water where you are working is full of organic debris, the trawl can get clogged quickly. We recommend *not* trawling in swampy surface waters at all. If the trawl turns green, you've strained a bunch of algae! You can launder or wash your net and use it again.

Plastic forensics

What do you actually know once you have a sample?

You will know:

- The types of plastics (fragments, films, beads, etc) that are in your body of water.
- The relative frequency of each type of plastic compared to others (perhaps you have a lot of fishing gear, but not many microbeads compared to other places)
- The density of plastics in your water (but only if you charted how much surface area you covered in a trawl– see our datasheet for more information).
- The relative hotspots for plastics if you do sample strategically in different areas.
- Whether there are more or fewer plastics after rainfall events if you trawl before and immediately after rainfalls.

You will not know:

- Where the plastics come from. They might be local, or they might have come from far away. They might be from fishing gear, or from aquaculture. You can't be sure, but you can sometimes get a general idea– but you can't test that general idea, so it remains a hypothesis.
- How long plastics have been in the water. Erosion patterns can tell you that something isn't super fresh, but that's about it. Some things can get tossed around in waves and look quite beat up after short periods of time, while plastics that sink can look pristine even after years.
- About plastics that are smaller than 1mm. You might be able to see some, but research has shown that 1mm is the smallest cut off size that human eyes can reliably identify a plastic.

Don't forget to look out for contamination of plastics from your boat, your kitchen, your fleece coat, paint from the surface of where you are working... we have found plastics from all these sources inside our samples!