Manta Trawling

The basics

Manta trawls are commonly used to sample for small pieces of plastics, commonly known as microplastics, in the surface level. They do not provide representative samples of the water column as a whole.

Manta Nets are effective providing that they can sample undistrurbed water surface. However the manta net has been found to be less productive at collecting microfibres, with losses of over 99% being recorded. The research papers are linked below, open source where available. However they are extensively used to provide researchers and policy makers with information on the concentration of microplastics on the surface of the worlds waterbodies.

https://www.researchgate.net/publication/308996622_Grab_vs_neuston_tow_net_a_microplastic_sampling_performance_comparison_and_possible_advances_in_the_field

https://www.researchgate.net/publication/322954259_Analytical_methodologies_for_monitoring_micronanoplastics_Which_are_fit_for_purpose

https://www.researchgate.net/publication/323739853_A_review_of_methods_for_measuring_microplastics_in_aquatic_environments

If you are looking for research purposes, there are also a lot of available research in open source scientific journals where manta nets have been used to help you decide if this is the right choice, as there are a number of different techniques to sampling for microplastics.

https://www.sciencedirect.com/browse/journals-and-books (click open access)

https://onlinelibrary.wiley.com/search/advanced

Or are self published by appropriate researchers and academics on www.researchgate.net

Using a trawl

There are certain limitations to the use of the trawl to make sure it is effective. Sea state is key, if the surface of the water is broken and mixed with air then the sample will potentially be contaminated with airborne plastics, or not be able to capture a reliable sample effectively. Making sure the vessel itself doesn't create the same issue, the trawl must be sampling undisturbed water as best as possible.
Maximum speed for the normal sized trawl can is only 4 knots (5 Gyres make one capable of 8knots) but ideal speed should be 2-3 knots. This is important if you are passage planning as it may not be possible with the speed of the tide or currents in the area, or to reach your next destination in time!

On a sailing boat

With a little bit of adjustment a trawl can be deployed from the spinnaka pole. Depending on the size of the vessel a team of four is ideal to manage lines on the side of the vessel from either end of the boat and managing the net in the middle. Don't forget to have someone for the timing and the GPS recording.

On a motor boat

Motorboats are more challenging to deploy the net from as they create more wash and (unless they already survey) may need adaptions that can affect their stability so do some research or seek advice from the licensing authorities before starting.

Necessary precautions

When towing an extra piece of kit there are some additional points to consider in your passage plan and in making the sampling effective. We have discussed the speed required for the trawl to be effective, calm waters are also required to maintain a good sample of the surface and prevent contamination from air.

Contamination sources must be considered, right from the ropes used, the mesh of the net, to the clothes that the team are wearing. You can plan your sampling to minimise these sources, but it is also a good idea to take samples of ropes etc, and note if anyone was wearing manmade fibres and the colour, so that the anaylsist can evaluate if it was from contaminated source.

Getting your trawl

If you are planning an expedition or going on a trip but you want to use the trip to do something more you can use a trawl during your journey. Deciding what size and how you wish to transport it will help with your decision making.

Buy

You can buy or commission a net maker to buy a net if you are going to use it frequently. Www.duncanandassociates.co.uk or Www.hydrobios.de or http://aquaticresearch.com/

Rent

A number of organisations, normally charities, have a number offers that came be rented. Academic institutes can also have nets that they aren't using that they may allow you to use. Www.5gryes.com have a hire service at around $3000 dollars, they have both a normal size trawl that can withstand up to 4knots, or micromanta that can withstand and sample at up to 8 knots.

Www.living-river.org We run a programme on the Thames and Medway Estuaries. Hire is available of the spare net, but currently there is only one frame which limits when we can release it.

Greenpeace have carried out a number of microplastic voyages, as have a number of other charities.

Some academic institutes have trawls and may be able to offer you the equipment if it is not in use.

Make your own

There are various design drawings available for the typical design of a manta trawl online. Be careful what materials you use especially regarding their weight and the respectve part of the vessel's ability to lift and manage the trawl and its sample.

Enjoy exploring our wonderful watery world!