

**Aim:** To find out if there is a higher concentration of microplastics in sediment or in surface water. We are also comparing our findings to their location to urban areas.

## Background

Microplastics come from a range of places, such as industrial waste, fibres, and tires and measure 0.05mm and smaller. Microplastics are infecting our marine ecosystem. The most common types of microplastics are PE, PS, PVC, and polyester. The main colours of microplastics are pink, blue and red.

## Hypothesis

We predict that there will be more microplastics in the inner harbour than the open ocean. We believe this is because it is closer to human interaction. We predict that the concentration of microplastics will be higher in the sediment than in the water on the harbour because once it is in the sediment, it will stay there, whereas surface water tends to move around more.

## Method

### Ponar Grab

250 ml of sediment was added to a jar of 500ml of NaCl solution. We shook the jar and left it to sit. The microplastics floated to the top.

### Plankton Tow

We collected 1L of surface water from each site and took 100 ml to sample.

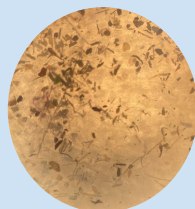
We took 10 ml of all our samples and counted the microplastics. We then multiplied our results to get an average figure for each site.



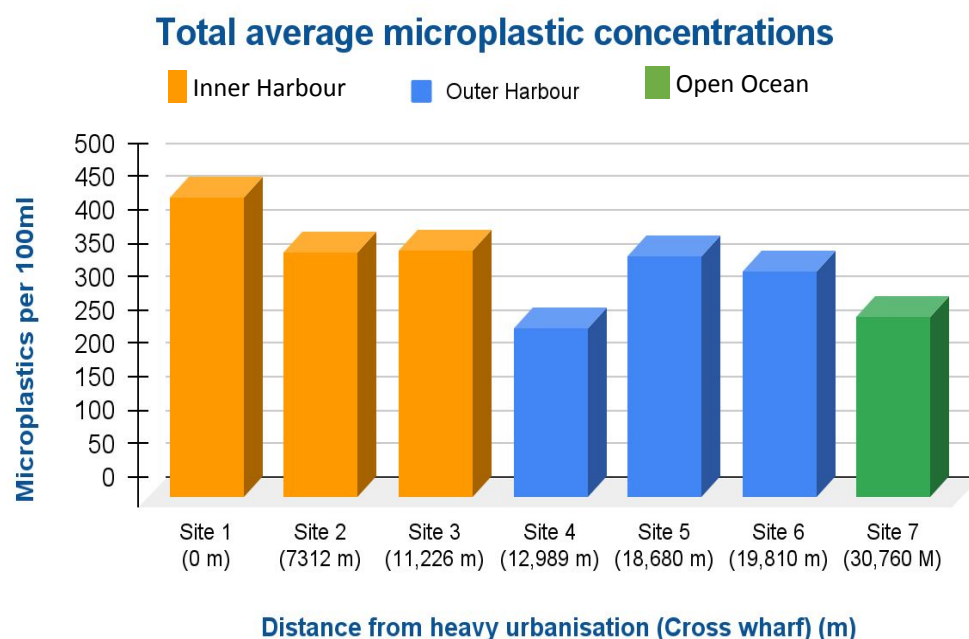
Ponar Grab



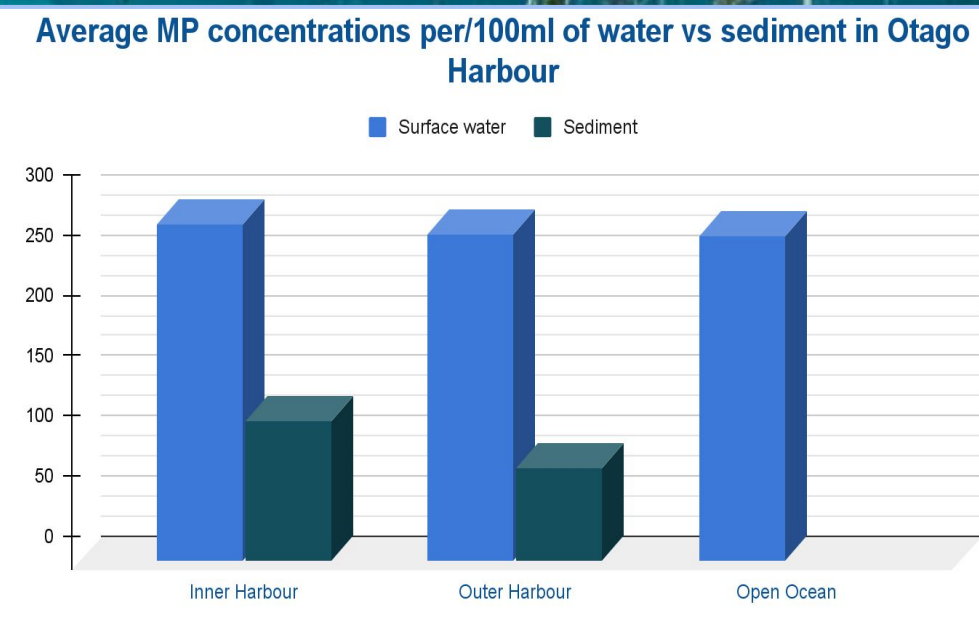
Plankton Net



Microscope view

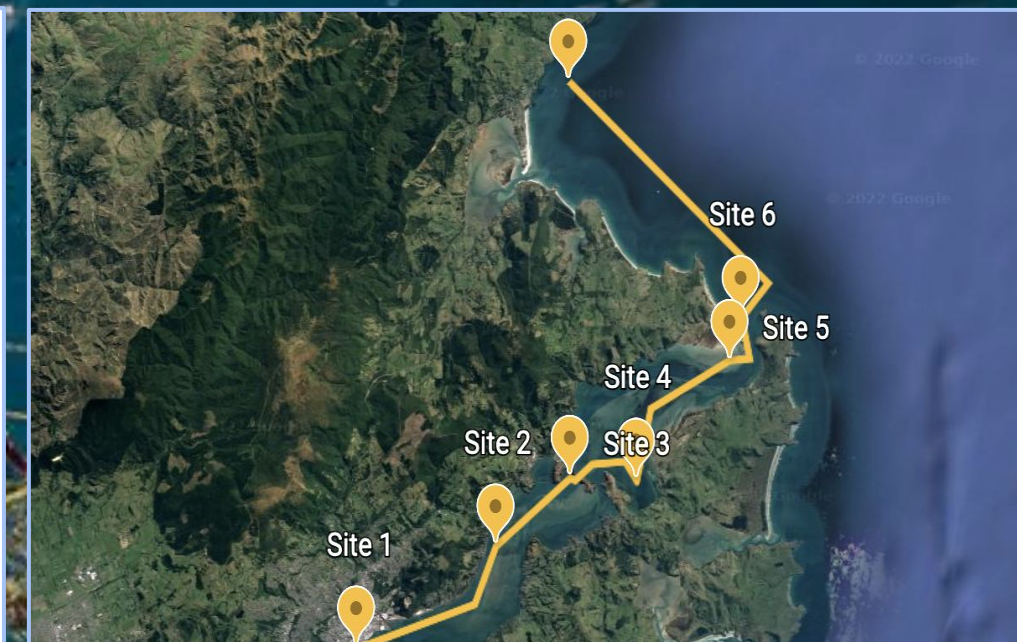


**Figure 2:** Bar graph showing the combined average microplastic concentrations for both the surface water and the sediment at increasing distances from heavy urbanisation.



**Figure 3:** Bar graph comparing the average MP concentration between surface water and sediment at the inner harbour, outer harbour and the open ocean in Dunedin New Zealand

**Kaitiakitanga:** The more we understand about microplastics, the more we are able to protect marine life from their threat.



**Figure 1:** Map showing sample locations in Dunedin. Site 1 is located at cross wharf where this is heavy urbanisation, as we move closer to site 7 urbanisation decreases.

## Discussion

As shown in figure 2, the concentration of microplastics per/100ml decreases as you move further away from the inner harbour towards the open ocean (Blueskin Bay). Urbanisation has a greater impact on microplastic levels since humans use a variety of plastic which results in microplastics forming, and run-off drains bring microplastics into the harbour, supporting the validity of our hypothesis.

Figure 3 shows that the concentration of microplastics in sediment is much lower than the concentration in surface water. We believe this is due to the ocean currents circulating the microplastics at the surface keeping them from settling to the ground. This is not what we predicted in our hypothesis.

Water from the Leith River creates a low-density freshwater layer that traps microplastics further down within salt water layer. This gradient decreases further from the inner harbour, creating a high concentration of surface microplastics in the high density salt water at outer harbour sites.

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