

Carparks to cockles – Plastic pathways in Te Taitokerau (Northland)

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Plastic pollution pervades globally, affecting oceans, air, and land. Despite its ubiquity, limited knowledge exists on local plastic pathways. The following displays collaborative efforts by Northland Regional Council, Crown Research Institutes, iwi, hapū, global researchers, and organisations studying plastic pollution impacts and pathways in Te Taitokerau (Northland). This also serves as a follow-up summary to the ‘Coastal litter monitoring in Northland’ article in *Coastal News*, Issue 77, pp. 6-7 (March 2022).

What we did

The following details stormwater and beach litter surveys, focusing on macro-plastics (larger than 5 mm). It also covers surveys on microplastics (smaller than 5 mm), conducted in areas near or chosen for their high recreational activity and geographical distribution across Te Taitokerau and the partners we worked with:

- Macroplastic stormwater surveys (LittaTrap™/Stormwater360)
- Macroplastic beach litter surveys (Litter Intelligence)
- Microplastic in beach sediments (Scion, ESR, and AIM²)
- Microplastic in marine waters (Blue Cradle, AIM² and ESR)^d.
- Microplastic in shellfish (AIM² and ESR).

What we found

Stormwater litter loading rates varied significantly between land use categories. A total of six high risk land uses were identified: ‘Fast food’, ‘Retail’, ‘Hospital’, ‘Playgrounds/skateparks’, ‘Carparks’ and ‘Transport, postal and warehousing’.

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- d Results from one of three trawls at seven locations. MBIE fund code C03X1802.

Plastic pollution and its pathways (Fig. 1) in Te Taitokerau are consistent with global studies. Plastic litter, accidentally or intentionally, enters stormwater networks then waterways where it continues to ‘break up’ into smaller particles. Plastic fibres originating from rope, clothing, or textiles were commonly found shapes in this microplastic research.

Plastic fragments were the next most common shape found in these microplastic studies. Hard plastic fragments were commonly found in our LittaTrap™ and beach litter surveys.

Plastic polymers polyethylene terephthalate (PET), polyethylene (PE), and polypropylene (PP) were commonly found in our microplastic studies. These are also the easiest to recycle numbers 1, 2, and 5 in Aotearoa New Zealand.

Research shows that microplastic colours in several Aotearoa¹ and South Pacific² marine fishes were predominately black or blue, while shellfish mainly ingested clear or blue. Hard microplastic fragments follow a similar trend. Colouring plastics imparts specific properties, aiding identification of contamination sources (Fig. 2). In Aotearoa New Zealand, fish and baleen whale scats commonly display black and blue, contrasting with clear in common dolphins³, aligning with Te Taitokerau marine trawl samples.

Plastic pollution, despite widespread recognition, is still growing and will persist for centuries even if humans stopped producing and using plastics today. Plastic demand drives global transport and production, risking pollution. Sea transport poses major risks like nurdle spills and lost plastic items. Therefore, reducing



Figure 1: Key findings from all surveys and studies (Northland Regional Council).

consumption crucially mitigates pollution. Acquiring only necessary items significantly decreases plastic's lifecycle pollution from extraction to disposal.

Ultimately, humans are responsible for plastic production and the associated pollution via the use of plastic-enabled products. This is a global issue anchored in systems of production and consumption in a linear economic model, where plastic items are convenient and waste management practices and infrastructures are often absent or inadequate.

References

- 1 Clere, I et al. (2022). *Marine Pollution Bulletin* 184. <https://doi.org/10.1016/j.marpolbul.2022.114121>
- 2 Markic, A et al. (2018). *Marine Pollution Bulletin* 136. <https://doi.org/10.1016/j.marpolbul.2018.09.031>
- 3 Zantis, L et al. (2022). *Science of The Total Environment* 818. <https://doi.org/10.1016/j.scitotenv.2021.151815>

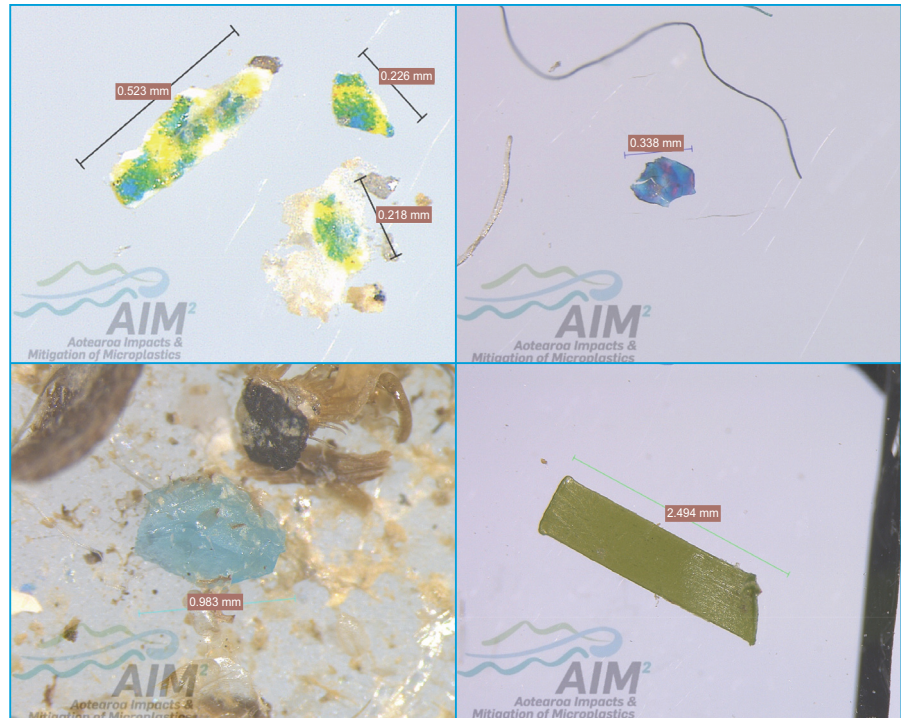


Figure 2: Examples of microplastics collected in Te Taitokerau marine trawls. PET [top left]; Acrylic [top right]; PE [bottom left]; and PP [bottom right] (Images: ESR/AIM²).