BeachPatrol Australia

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Sources of Plastic on Beaches

The below comments are from observations from picking up plastic litter from beaches around the top of Port Phillip Bay for more than 15 years including multiyear every day beach clean surveys.

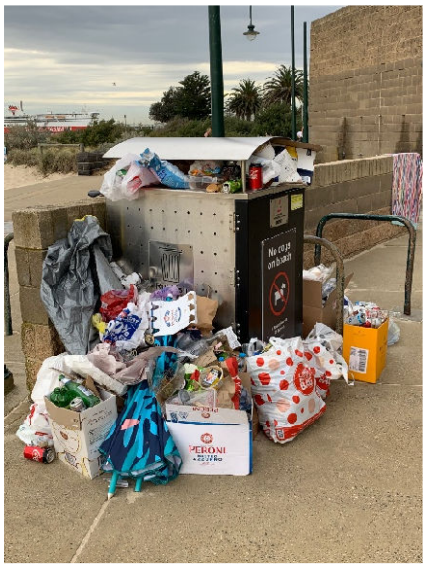
The source of plastic on beaches comes from 3 sources.

1) Washed in from the ocean/bay at high tide lines. This is highly affected by the strength of the onshore winds. High winds bring larger amounts of plastic on to the beaches.

Plastic collected from a tide line after 24 hours after cleaning the beach the day before.

Plastic floating in on the tide line

2) Washed onto the sand again from the ocean/bay after traveling from stormwater/water drains
3) Left by beach goers who litter their items on to the sand or on nearby streets and then get blown on to the beach.



Overflowing bins on a foreshore

All of the above are affected by high winds. On shore winds are responsible for blowing plastic towards a beach and some then gets blown higher up the beach until it gets snagged by plants, sand dunes, fences, walls, etc. Over time, some will get buried in shifting sands.

As plastic is essentially not biodegradable, once buried, it will remain intact for many decades. Out of the ordinary storms can cause sand to reshift and plastic fragments pieces to again get exposed on the beach.

Another reason plastic can appear on a beach that wasn't apparent before, is due to the mechanical beach cleaning machines used by local governments to remove litter and whatever else is on the sand. These machines have high-speed rotating thin tynes that rake the sand and lift most of the plastic (and anything else) and rake these items into a hopper at the rear of the machine. Smaller pieces of plastic can become exposed again, with them passing between the tynes and either deposited on the surface of the sand or remaining somewhat buried.

Most of the plastic is thin film which easily bends around the tynes and does not get picked up by them. Also, the tyres of the tractor and beach cleaning machines can scuff shallow buried plastic back to the surface. They can also break up some more rigid plastic into smaller pieces, which can be left partially or fully buried to be exposed at a later date.

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Other Factors

The beach tractors also have other impacts on beaches not related to plastic collection but more to environmental impacts. A beach is a natural environment and when that is disturbed it has impacts on multiple facets of wildlife and the structure of the beach itself. For example, seaweed washed up onto a beach is an important part of the shoreline habitat and the beach shape. If that is removed by the beach tractor every clean, those habitats and their organisms are destroyed, and any beach reinforcement is constantly removed. Over time this could lead to higher beach erosion and loss of our beaches.

For storm water drains emptying onto the sands, their drain paths to the bay can be disturbed and pushed in different directions. This means any plastic rubbish is also smeared along the beach sands as the drain discharges move around.

A tough question

This impact on a beach of the beach cleaning machines vs the need to remove plastic pollution brings about a difficult and challenging question. Should the beach be cleaned to remove the plastic (and also associated seaweed) and the beach structure potentially suffer for this, or is beach not to be machine raked and the plastic left on the beach undisturbed. It is not practical to think that seaweed can be handpicked through to get all the plastic. And leaving plastic in the seaweed causes potential wildlife impacts?

It is not economically feasible to think that a beach can be manually cleaned of plastic. Labour is expensive. On some days there can be thousands of both soft film and hard bits of plastic per metre 'buried' within seaweed and leaves/twigs. It takes hours to clean just one metre of beach! And tomorrow could be the same all over again.

Another aspect is the plastic on a beach is not just from that beach area alone. Plastic washes down rivers and other waterways from catchments many kilometres away from the beach. Therefore, expecting ratepayers in beach areas only to pay the cost for removal is not capturing all the sources of the plastic and places over cost burdens on the local beach populations. It's a cost for which all jurisdictions should share, not to mention producers of the plastic products!