Want clean water? Think twice before tossing that cigarette

Soheil Sassani, 13/12/2018, Melbourne, Australia

By the end of this year, Victorians will toss a good 330 million cigarette butts on sidewalks, in streets and down city drains. Of more concern, the Victorian Litter Action Alliance also warns that 100 million of them will end up in Port Phillip Bay – a 745 square mile expanse of water around which Melbourne and its municipalities reside.

Trent Williams is an "offshore" volunteer at Sea Shepherd. The organization is best known for its confrontation of Japanese whaling ships with water cannons. According to the *Australian Broadcasting Corporation (ABC)* Sea Shepherd abandoned the campaign in 2017 when the Japanese fleets militarized themselves with weapons and surveillance equipment.

However, while their anti-whaling campaigns were chronicled in a television series called *The Whale Wars,* a bulk of the organization's work involves organizing beach and waterway cleanups.

So how dangerous is a cigarette butt? The short answer provided by the Victorian Litter Alliance is that butts contain 4,000 chemicals, 43 of which can cause cancer. "Once it hits the water, it's going to start deteriorating and breaking up into small pieces," said Williams. He added that in the six years that he's been involved in beach, waterway and storm drain cleanups, the most common piece of litter he and his teams continuously encounter in Melbourne is hard plastic.

"When I'm talking about hard plastic, I'm talking about pieces that might be more like a bottle lid […] and things that have been broken up into smaller pieces," said Williams who also listed plastic bags, bottles and fishing lines as other commonplace pollutants.

100 Million cigarettes or bottle caps may seem like a lot of litter, but it's certainly less than the 4.8 to 12.7 million metric tons of plastic, estimated by University of Georgia's Engineer School to have entered the oceans in 2010 alone.

In the same way that cigarettes account for a portion of the total litter count, the Earth's oceans are only a part of a larger cycle that includes the food on the tip of our forks and what comes out the other end. Toxicity in our waters exists not due to a lack of filtration or clean-up schemes but because of careless, mindless littering.

~~~

I followed the start of a litter's journey with Cave Clan – an anarchistic group that started with three friends in the 1980s. I met the group at a park in east-Melbourne. At 2 p.m., our guide Iso – yes it's a pseudo name – directed us toward the open section of a storm drain where we quietly made our way out of the sunny October morning and into the dark, damp drain.
~~~

Iso claimed to have explored close to 200 storm water drains in Melbourne and other Australian states. He described the group as a "growing band of like-minded people who go down drains, drink beer and explore."

Iso claimed that over the years, the most common piece of litter he has come across underground are, "food packets, chip packets, beer bottles [and] occasionally in some areas things like syringes." The 25-year-old considers cans and bottles to be the most commonplace litter in Australia's drains and the most visible, because they float.

Crouched and immersed ankle-deep in a surging stream forked by my feet, I marched in darkness, following the close splattering steps in front of me. A chameleon of odors – mostly detergent with the occasional tang of sewage – permeated the narrow, dark space. Every now and again, my searching flashlight beam landed on memory grids spray-painted by previous storm water drain explorers; other times, it landed at my feet where the murky-white water rushed an occasional cigarette butt past my ankles.

According to Victorian Litter Action Alliance, in charge of the State's litter management and prevention, over 15 tons of illegally dumped rubbish was collected in 2009-2010. The agency claimed that in the same time period, over 4,000 litter traps installed in Melbourne to filter the storm water system, generated 2,700 tons of trash. While the Alliance doesn't provide more recent figures, increase in littering can be speculated by the rise of Melbourne's population – an increase of over 1.6 million people since 2010 according to the Australian Bureau of Statistics.

Not all drains in Melbourne have pollutant traps. Iso said drains built prior to the 1980s generally do not have any kind of filtration. In its 2013-2018 *Storm Water Strategy,* Melbourne Water backed this up, noting that only in the latter two decades of the 20th century did the city begin to invest in storm water treatment for its expanding suburbs.

With the sound of falling water ahead, the narrow, brick-lined storm water drain I had been crouching through soon opened to a large, well-lit basin. Water from three other round cavities cascaded over single cement steps beneath them, creating the unmistakable sound of a small, natural waterfall.

A few meters ahead, where the wide outflow of the drain connected with Yarra River, soft ripples from leisure boats motoring across swept bottles, cigarette butts, bags and white foam back toward me.

"We are reporting [pollution] more and more frequently now," said Iso. "A lot of the time when we find something worth reporting, it's some kind of liquid pollution." The 25-year-old said a week prior, he reported what looked and smelled like a great deal of spoiled milk. Over the years he has seen paint and other chemicals dumped, which he suspected is the result of conscious, industrial littering.

"We have a vested interest in keeping the drains clean because the last thing we want is somebody dumping a barrel of diesel down the drain and then we'd have a swim in it," Iso added.

~~~
~~~

The city of Port Phillip, located directly on the northern tip of Port Phillip Bay, reported that 300 drains from ten municipalities empty directly into the bay. The city's website further indicated that while the district's 197 pollutant traps have been responsible for collecting 150 tons of trash per year, "no matter where in Melbourne litter is discarded it will eventually find its way into the bay."

One step the Environmental Protection Authority (EPA) Victoria is taking to combat the grim state of Port Phillip Bay's water is through a scheme called *Report Litter.* This program allows people to phone in or report illegal littering online.

In an August 2018 statement released by the agency, it was reported that just after 8 p.m. on Christmas day 2017, a man in Coolaroo was reported for throwing his cigarette butt out of his car window and was later charged with fines adding up to $1,600 AUD.

While *Report Litter* may be helping – though there is no hard data to back it – Port Phillip Bay remains heavily polluted. A *2016-2017 Report Card* for catchments along the Yarra River – the city's perennial river emptying into the Port Phillip Bay – demonstrated that 43.2 % of the sampled water was "very poor and under severe stress."

In order to keep residents informed, the government has dedicated a website called *Yarra & Bay* which continuously updates a map of the area with swimming conditions based on water quality. The legend of the map includes: "Good: suitable for swimming (green pin), Fair: may not be suitable for swimming (yellow pin), Poor: not suitable for swimming (red pin) and N/A (forecast data unavailable)."

In reality however, pollution is not measured by colored dots. One way to truly grasp the affect pollution has on organisms and the food chain, is to examine our own bodies. In October of 2018, American National Public Radio (NPR) reported evidence of microplastics found in human stool.

According to a *National Geographic* report on the same subject, some of these microplastics can be five times smaller than the width of human hair. The research, led by Philipp Schwabl of Medical University of Vienna, included three men and five women who kept a food diary for a week and then provided stool samples for testing – all of whom tested positive for plastic. While Schwabl's research is a first of its kind, he said the next step is to find the direct effects of microplastics on human health.

~~~

In 1999, Melbourne Water's *Urban Stormwater: Best Practice Management Guidelines* became the blueprint aiming at a long-term solution to Port Phillip Bay's water pollution. Melbourne Water attributes suburban expansion to surging nitrogen levels in the bay. This, according to the report, became a catalyst for the birth and implementation of the *Water Sensitive Urban Design (WSUD)* in 1999.

Jun Lee, an Engineer at Morphum Environmental, a consultancy group, explains WSUD as a sponge – rain gardens identical to street verges or small urban gardens – toward which rainwater is guided. Once the water enters one of these locations, he said, it passes
~~~

through a series of filters. The clean water is then either collected at the bottom for reuse as grey water – non-drinkable – or discharged into the city drain systems, litter-free.

Lee added that new infrastructures in Melbourne are required to implement WSUD in order to receive license for development. According to him, a portion of Morphum Environmental's work consists of advising Melbourne's Council on WSUD for these new developments.

Melbourne Water's *WSUD Guidelines for South Eastern Councils* provides a checklist for developers and emphasizes a need to educate all parties involved for the expansion of the program. Lee said it ultimately comes to each council within Melbourne to decide how many of these rain gardens they want to implement. The City of Port Phillip's website, for example, states 84 sites as already constructed. The City of Melbourne's metropolitan district reports of 14 projects of varying sizes – including a 170-acre wetland.

Regarding the future of WSUD, Lee says that while it is possible to have large scale parks capable of filtering and storing rainwater, "it is probably better to have more space to look into other Water Sensitive Urban Design options such as wetlands or retention ponds," where much larger amounts of water can be stored, filtered and even eventually treated for drinking.

~~~

Government programs, targeted at irradiating or slowing down the worst effects of our litter on the ecosystem that lives on the other side of our pipelines, are yet to prove their full capacity. There simply isn't enough data to support a high success rate. Counting on future plans – like turning rainwater into drinking water at a large scale – have not yet materialized to help the current state of the oceans' pollution.

Waiting for Iso to signal us out of the dingy tunnels, I wonder how much of the trash rippling back and forth is due to littering because ultimately, our choices seem to be the most effective filters.
~~~