



# LITTER CONGRESS 2021

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Aerial UTS, Sydney

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# GREEN PAPER

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# NSW Litter Prevention Program: Overview and Achievements



**Rupert Saville**

NSW Environment Protection Authority

Litter harms the environment, reduces amenity and limits community access to quality public spaces. It also impacts mental health and leads to anti-social behaviour. Litter directly costs the NSW economy over \$180 million p/a to manage. Litter's impact on marine environments is a growing community concern, especially the damaging health effects of ingesting microplastics.

Earlier litter programs had not substantially reduced litter, with litter averaging about 7.2 litres per 1000m<sup>2</sup>. NSW continued to be the most littered state.

In 2015, the former Premier Mike Baird announced a Priority to reduce NSW litter volume by 40% by 2020. The target was established to meet community expectations for a clean and healthy environment.

To achieve and sustain the target, our main challenge was to change community behaviour and build stakeholder capacity and ownership to embed best-practice litter prevention across organisations, local government and community.

The Premier's Priority provided an opportunity to build a whole of government response: raise the profile of litter prevention, enlist wider community support to achieve the state-wide target; and established a strategic platform to introduce a container deposit scheme.

While the target was short-term, we aimed to establish and embed

new systems and programs that sustain outcomes into the future.

There's no silver bullet to litter prevention. An integrated, collaborative approach, with innovative programs, was required to substantially change community behaviour. To achieve this, the first NSW Litter Prevention Strategy was developed and implemented - with five key pillars and supporting programs:

1. Rewarding responsible behaviour - introduction of Return and Earn
2. Education - delivering the leading 'Tosser!' campaign
3. Enforcement - introduction of Report to EPA Littering from Vehicles program
4. Infrastructure and clean-up - targeting litter hotspots through council and community grants
5. M&E - assessing and evolving to ensure customer focus and ongoing success

The Premier's Target was achieved in 2020, within the program budget and timeframe.

Based on 2019-20 National Litter Index, NSW achieved a 43% reduction in litter from the 2013-14 baseline, with significant reduction across all litter categories.

To sustain outcomes the strategy was integrated into all partner capacity building with over 120 council and communities trained in the same strategic framework, with ongoing access to program tools, learning, resources, including Tosser campaign material for use at the local level.

The Program ensures outcomes are sustained for the long-term, whereas previous programs witnessed litter rise once focus shifted to other priorities. This was done primarily by institutionalising new systems that will continue beyond the program, specifically Return&Earn and Report-to-EPA.

To ensure lasting behaviour change, the Tosser campaign has continually evolved to drive new disposal norms. The campaign is not just an awareness campaign but has worked hard to change behaviour with social research outcomes identifying clear progress in shifting norms.

In 2019, a Program Framework was established to institutionalise litter prevention in partner organisations to reduce reliance on state government funding. To do this the grants program shifted funding to higher level organisational change strategies to ensure partners take ownership of litter within their jurisdictions for the long term.

In the final years of funding, the program pivoted to future priorities including greater focus on plastic and marine litter. A leading cigarette butt litter trial was implemented in collaboration with 16 councils - with a 50% improvement in smoker binning behaviour, and a new program implemented. The Program is now using the same strategic approach and learnings to support new Plastic Plan outcomes and the NSW Government Marine Estate objectives.

# KEYNOTE PRESENTATION: The Litter Journey: Big picture for litter prevention



**John Lavarack**

NSW Environment Protection Authority

The NSW Litter Prevention Program was funded with \$50 million through Waste Less Recycle More in 2012. In 2014, the rubber hit the road with the government's stated commitment to reduce litter volume by 40% by 2020. To make this happen, the Litter Strategy Framework that sits at the heart of the NSW Litter Prevention Strategy, has driven achievement. This is made up of five approaches, or strategies, to achieve the target.

The first strategy is Reward Responsible Behaviour. This is the government's Container Deposit Scheme which we all know as the Return and Earn program delivered by the Scheme Coordinator Exchange for Change and the Network Operator TOMRA Cleanaway. This attaches a 10c value to every eligible container to motivate people to recycle them at return points.

The second strategy is Education and Awareness, focused on prompting consumers to dispose of rubbish responsibly and to make expectations clear about what is expected of people in public places when disposing of rubbish - to change the norms around litter. This is spearheaded by the successful Don't be a Tosser! campaign.

The third strategy is Infrastructure and Cleaning, focused on having the right bin in the right place and making sure that the presentation of public places makes it clear what is expected of people - to promote the 'Clean = Clean' philosophy, that clean spaces discourage

littering and invite responsible waste disposal - make it fun, even!

The fourth strategy is Regulation and Enforcement, boosting resources to increase awareness that littering is not acceptable and to increase the risk of getting fined if you do litter. We do this in partnership with councils and council ranger staff, and of course through our Report to EPA web app which any citizen can sign up for to report littering from vehicles, and which currently has over 58 thousand registered users.

The fifth and final strategy is Evaluation and Monitoring, initially focused on the use of the National Litter Index (NLI), which has been provided by Keep Australia Beautiful and used to monitor progress to the 40% target. This has since been joined by a wide range of data programs, covered later in this paper.

In 2020, a milestone was reached with a 43% reduction in litter volume measured in the NLI. How did we get here? This is where thinking about the Litter Journey comes in.

The Litter Journey is a way of thinking about litter in terms of the life cycle of an imaginary piece of litter, from its inception as something produced through a manufacturing process. This could be an ice cream that gets distributed through supply chains to points of sale, where a critical stage in the journey is reached. It is purchased and consumed. With the consumption comes disposal choices, or actions, or perhaps habits - the wrapping comes off, the ice cream is eaten, the wooden stick remains. The disposal could be in a bin or it could be littered, to accumulate in a litter hotspot, at which point the next critical stage is reached. It is no longer in the hands of the person who consumed it and is in the environment.

From a hotspot, eventually, rainwater, wind, gravity or mechanical processes like a lawn mower or truck tyres may help to break the litter up and carry it into the wider environment - into drains, waterways, estuaries, and perhaps out to sea. The theme is one of increasing break-up

## 2020 - time to rethink the framework



# The Litter Journey: Big picture for litter prevention

Continued

and dispersal, from the point of manufacture, via the hands of the consumer out into the wider environment where the chance to control what happens to it rapidly diminishes to zero.

We can also consider the fellow travellers along the way. At the start of the Litter Journey business sectors have been critical in decisions to design, make, market, distribute and sell products, some of which may become litter. Then consumers have been critical in the choices they make, and their habits and expectations that form around the disposal of rubbish. Once litter is in a hotspot, place

Having mapped the Litter Journey, we can consider where we have travelled in more detail. We can lay out the five strategies of the journey on the map and bring the story together in a new way.

Rewarding Responsible Behaviour is delivered by business partners, providing an incentive at the point of sale that influences what people will do with beverage container - recycle them back into the circular economy - 5 billion plus recycled since the scheme began in December 2017.

Education and Awareness kicks in at the point of sale, and aims

before it becomes a wider problem in the environment.

Finally, Evaluation and Monitoring tracks the litter through the journey.

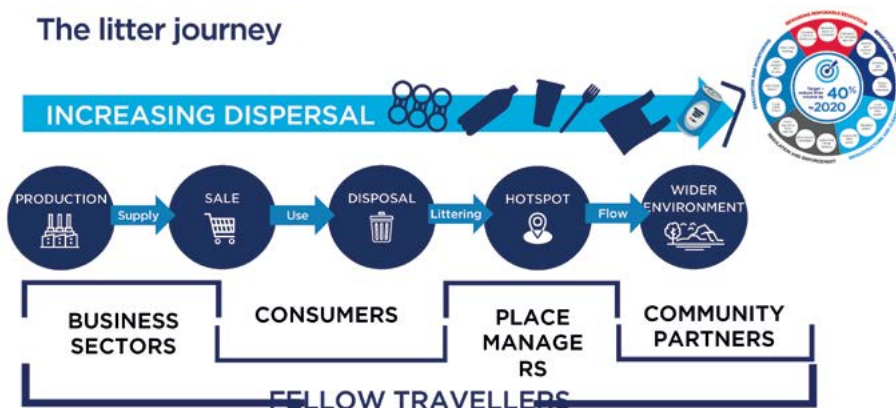
When the litter strategy framework was formulated in 2014, the only mass data on litter focused on land use was the NLI delivered by Keep Australia Beautiful in cooperation with all the states and territories of Australia.

The EPA developed the Local Litter Check in 2013. This is a tool to assess litter hotspots for use by land managers and other concerned citizens and identify the factors for success that can lead to effective litter prevention in that space. In 2018, it was converted to an online tool that is available to anyone to use.

The Butt Litter Check was developed in 2018, focused on reducing cigarette butt littering behaviour. In-depth insights into the littering behaviours and attitudes of the general population were also developed through market research for the successful Don't be a tosser! campaign.

On the seaward side of the story, we have rich data on litter in marine spaces. Tangaroa Blue has delivered the Australian Marine Debris Initiative since 2004, a nation-wide citizen science program.

In 2017, Tangaroa Blue teamed up with the NSW Department of Planning, Industry and Environment (DPIE) Coastal and Wetland Science Unit and the Southern Cross University National Marine Science Centre,



managers have the opportunity to present those places in a way that ensures that litter is minimised and the expectation of responsible rubbish disposal is clear. Once litter escapes into the wider environment then community partners - including the many thousands of volunteers cleaning riverbanks, beaches and other favourite places - will be bagging up the rubbish and asking the question "How can we make this stop?"

to influence decisions and action around disposal - in the bin, or take it home, or into a recycling system.

If the disposal action is littering, then Regulation and Enforcement puts a sting in the tail of the behaviour - sending a signal that this is unacceptable and comes at a cost to the community.

Infrastructure and Cleaning will target hotspots, turning them into an opportunity for behaviour change by stopping the rubbish

to create the Key Littered Items Study. Originally designed to be a second dataset alongside the NLI to monitor the progress of the Container Deposit Scheme, this has evolved into a powerful monitoring program.

Another key dataset that has emerged in the marine space since the strategy started is the Australian Microplastic Assessment Project (AUSMAP), a national citizen science program that launched in 2018, this one delivered by the Total Environment Centre in partnership with Macquarie University Litter Lab. This marine litter data is critical because of the knowledge it brings to the NSW Marine Estate Strategy, launched in 2018, in which the initial threat and risk assessment pinpointed marine debris as the number one critical threat to the marine environment.

These new marine datasets shift the way we see litter. It is critical to note that 80% of the debris that is found in the marine environment comes from the land. The findings of the Key Littered Items Study bring this point home - the great bulk of litter items counted in that data is a small set of very familiar consumer litter items, dominated by plastic single use items - this includes cigarette butts, straws, food wrapping and the like. Targeting consumer behaviour on land makes a difference to what happens in the water. The good news is that both the National Litter Index and the Key Littered Items Study confirmed that the Return and Earn program has halved eligible container litter both on land and in the water -

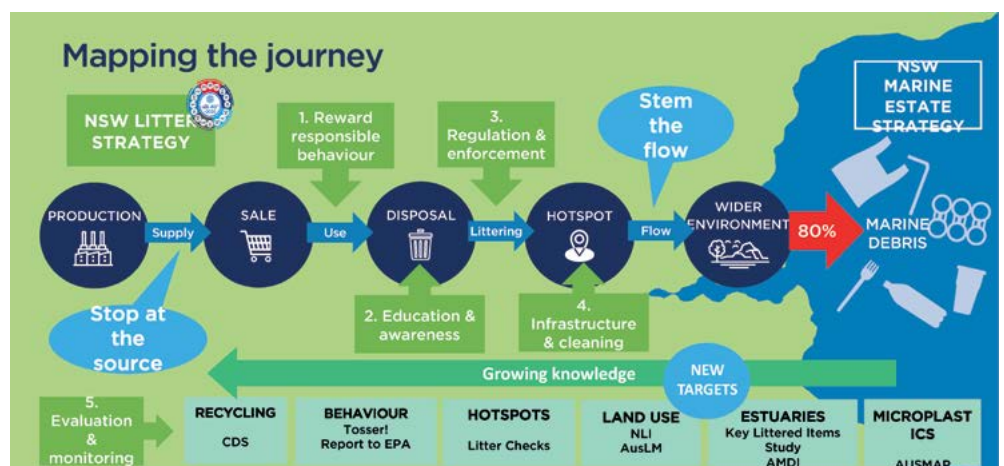
what has been measured has also been reduced.

When we consider the Litter Journey, we can see that the focus of litter strategy on consumer behaviour yields dividends when it includes business sectors, consumers, place managers and community partners in the mix. We can see the opportunities in the rich data that has exploded since the journey began - increasing knowledge that is shared between partners that allows issues to be pinpointed and opportunities leveraged to counter that flow of litter from land to sea. We can see the opportunities from expanding the scope of litter prevention to include source control - for instance work with AUSMAP under the Community Litter Grants Program to identify sources of microplastics traced from waterways back up into catchments. There is also the potential in partnerships to incorporate stormwater management in the litter prevention story - everything from enhancing street sweeping to targeted use of litter traps in drains.

### WHAT IS THE FUTURE?

The EPA and its partners are already testing effective approaches to litter prevention across grant programs that cover cigarette butt litter, litter in coastal estuaries and along inland rivers, microplastics, and engaging culturally and linguistically diverse communities, among other themes. Our grantees include councils, communities, businesses, NGOs and regional organisations. The aim in recent grant rounds has been to drive a partnership approach, called 'Own It and Act', with the EPA working alongside grantees and their partners to collaborate on ambitious strategic litter prevention plans as well as local litter initiatives to protect our environment.

The future is looking promising. We have learned how to reduce litter on a big scale. We know a lot more about litter in 2021 than we did in 2013. The EPA knows that we can succeed in our efforts if we decide, together with our partners and the broader community, to make litter a thing of the past.



# Swap for Good - Empowering business to swap out single-use plastic



**Dr Alicia Lloyd**     **Sasha Lucius**  
Northern Beaches Council

Northern Beaches community members are passionate and Northern Beaches community members are passionate and have a deep connection to their environment. Driven by residents' and community groups' continued concern regarding plastic pollution and waste, Northern Beaches Council adopted the Single Use Plastics Policy and Waste Minimisation for Functions and Events Policy in 2017.

In 2019, to support these policies and address plastic pollution, the Waste Education team developed the Swap for Good business program. As takeaway packaging make up the largest proportion of litter and waste ([NSW Litter Report](#)), the Swap for Good program and resources were developed, focussing on the food and beverage industry. The program has engaged with over 2,200 businesses including large corporations, which have the capacity to reduce 1,050m<sup>3</sup> of plastic waste and litter. In addition, the program has created a collaborative space for almost 40 community groups and social enterprises operating in this space. The program has set the foundations for long-term behaviour change to occur and pivoted to provide safety advice during the pandemic.

## BUSINESS PROGRAM

The Swap for Good business program encourages businesses to transition away from single-use plastic items including but not limited to plastic bags, coffee cups, straws, containers, cutlery and

water bottles. Resources include an information trifold and guides for Behaviour Change, Sustainable Procurement and Marketing. A customer-facing poster was developed to promote their sustainable practices. To activate change, the team developed Action Plans and Supplier Lists, making it a holistic program where changes were easy to implement.

Although the program works directly with businesses, engagement has been multifaceted, with activations through events, shopping centres, markets, phone consultations and face-to-face visits. After the Sustainable Solutions Expo in July 2019, which was attended by 300 business representatives, 92% of attendees said that the event inspired them to make a change. Role model businesses were invited to give a 3-minute pitch and share their story with the business community, inviting others to collaborate and learn from their journey.

## SCHOOL CANTEEN PROGRAM

School canteens are an important

business, shaping the next generations view of acceptable practices and indeed our world. In August 2019, a Swap for Good workshop was presented to 90 Environmental Leaders from local primary schools at Taronga Zoo to implement a plastic reduction program at their school canteen and build their story to inspire behaviour change. On the day a video was created inviting local canteens to sign up. Building on this, the plastic-free school canteen webinar was hosted. There were 170 registrations with almost half of 83 schools on the Northern Beaches attending. After this webinar, action plans tailored to school canteens were developed.

In February 2021 the [school canteen support program](#) was launched to support canteens with reusable containers and access to a sustainability consultant. The program is set to reach 6,565 school children and their families. During the program, there are online group meetings with the Councils Waste Education Officers, sustainability consultant, canteen managers and staff. This will be a



School canteen program



# Swap for Good - Empowering business to swap out single-use plastic

Continued

valuable platform to collaborate, troubleshoot and forge ongoing relationships. Although only just commenced, already 3 schools have instigated measures which can eliminate 12,000 plastic popcorn packets, 64,000 soy sauce fish and 11,000 plastic water bottles per year.

## COVID-19 RESPONSE - SWAP CUP PROGRAM

During the pandemic the Swap for Good program pivoted to provide advice which aligned safety with waste reduction. Working closely with Environmental Health Officers, NSW Food Authority and NSW Health, a [case study and video](#) were produced to show three safe methods for reusable coffee cups. Following this in October 2020, Council offered a float of '[swap and go](#)' coffee cups, to help businesses get started with this covid-safe method. There were already 30 swap cup cafes on the Northern Beaches and the program aimed to double that. The swap cups have been taken up by 20 cafes and future surveys and data collection will indicate their success and feedback after 3 months. Depending on the uptake, if 50 customers [use the system at each café](#), the program has the potential

to save more than 620,500 cups from landfill and \$93,000 for local businesses. If 200 customers use the system at each café, this could add up to 2.48 million cups spared from landfill and each café could save in the order of \$10,900 a year.

## COMMUNITY GROUP COLLABORATION

Community Groups on the Northern Beaches have been active in sustainability for many years. Strategically, they are well placed in the Community to make changes and are key to the success of Swap for Good. We brought together almost 40 community groups and social enterprises quarterly to form the [Collaboration Collective](#). Together we combine strengths and co-create an impactful and unified approach to reducing single-use plastics. We learned that the Collaboration for Impact model was a great way to build capacity of community groups and Council in working towards a common goal. Our combined mission statement is to work collaboratively to actively engage the Northern Beaches businesses, schools and community to reduce single-use plastics.

One of the groups in the collaboration collective, Our Blue Dot, decided to align closely with Council's swap cup program. They hit the streets and talked to more than 60 local cafes - from Mona Vale to Palm Beach - and helped set them up with Green Caffein. As a result of more than 100 volunteer hours, the group signed up 30 cafes and presented their results at the Collaboration Collective meeting in November 2020.

At our most recent Collaboration Collective meeting in March 2021, 12 groups are working collaboratively for the upcoming Seaside Scavenge event in May. As a result of a local mural artist, Responsible Cafes and Seaside Scavenge working together, these punning and creative posters were made: Are you "Crabby about single-use plastics?" and "We turtely accept reusables." In the lead up to Seaside Scavenge and during the event, we'll ask locals to share these posters with businesses and urge them to take a Plastic Free Pledge.

## SWAP FOR GOOD RESULTS

Behaviour change campaigns have both short-term goals and long-term objectives, and it can be a challenge to capture the ripple effect. However, we have 200 businesses signed up to Swap for Good.

Working on plastic bags, a local growers' market has reduced 26,000 plastic bags per year. Working on coffee cups, a beachside café has 50% of their customers bringing their own coffee cup, saving \$11,700 per

Contactless Pour



Safely using reusables



Swap & Go Cafes



# Swap for Good - Empowering business to swap out single-use plastic

Continued



year in packaging. To encourage more people to use their mug library, The Beaches Market implemented “No single-use Fridays” once a month. By doing this, they increased the usage from 30 mugs to 280 mugs saving an additional 3,000 coffee cups from landfill per year. Another local café with a mug library is saving \$7,000 per year in disposable cups. If the customer at the front of the que picks up a mug, other customers would see it happening and follow suite, which is how they convinced 20% of their customers to use the mug library.

Working on plastic water bottles and cups, our largest shopping centre has installed 2 water refill stations. This has the potential to significantly reduce single-use plastic water bottles as the centre has 12.4 million visitors per year. A local office eliminated 9,000 plastic cups per year at their water refill station. Working on straws, a local beachside café eliminated 9,000 plastic straws per year. Council’s property team are also active in this space and local businesses are not permitted to use plastic straws at their outdoor seating as part of

a clause in their outdoor dining licence. A local community group, Operation Straw, have noticed a change in the litter of plastic straws. In 2017, the “Strawkle Squad” collected an approximately 600-700 per week from Manly Cove. The group have collected 5,000 straws in the last 3 years. In more recent clean-up events there have been approximately 100-150 plastic straws, which suggests a decrease in this litter most likely in correlation with a decrease in usage of plastic straws.

## NEXT STEPS

On December 2019, Councillors unanimously endorsed the Environment and Climate Change Strategy, Protect. Create. Live., indicating our commitment to divert 85% of waste from landfill by 2040 and reduce single use plastics. To achieve this target, there is scope to leverage off Swap for Good for other waste streams and industries. Northern Beaches Council will continue to play a leadership role as we work towards creating a new social norm and transition to reusable packaging. To promote the principles of the circular economy, especially designing out waste and litter from the start, we will support this behaviour change process through collaboration and sharing stories of success.

## FUNDING ACKNOWLEDGEMENT

This project was funded by the Northern Beaches Council Merger Fund and the NSW Environment Protection Authority, Waste Less Recycle More initiative funded from the waste levy.



# Switch Your Thinking on Plastics - Dive in with the Ocean Action Pod



**Lisa Wriley**  
Total Environment Centre

It is important to us at the Ocean Action Pod to acknowledge country.

We acknowledge with respect the Indigenous custodians of the land and waters wherever we are and work with their spirits to protect Mother Earth.

our various programs. We are seeking sponsorship and potential partnerships to continue our work.

Now five years down the track, after many school visits, engaging thousands of students and many community events encouraging the public to take action on



The Total Environment Centre received a NSW Environmental Trust Grant in 2016 to create the Ocean Action Pod, dreamed up by Andrew Tovey, our Director of Public Programs. It was described as "a unique mobile trailer designed to engage communities and schools with the urgent issue of ocean plastic pollution. This highly-professional educational resource is crammed with creative interactive displays and is available for hire now!" he said. It even has its own solar panels and battery so it can run off the grid. We received some subsequent funding from the Nancy Shelley Bequest Fund and since 2018 we have charged hirers the full cost to deliver

plastic pollution, we describe the Ocean Action Pod as "a funky mobile exhibition with props and educational activities creating action for our oceans. The Pod is super family friendly and its colourful, interactive and creative displays are key features to engaging hearts and minds in a meaningful and memorable way. We empower kids with new knowledge and skills to become Ocean Action Heroes."

Six of the United Nations Sustainable Development Goals are clearly relevant to the

work of the Ocean Action Pod:

- **SDG06 - Clean water and sanitation** (it is essential to have safe water flowing out of taps not bought in single-use plastic bottles)
- **SDG11 - Sustainable cities and communities** (will choose to reduce, refuse, re-use and recycle and will phase out single-use plastics. Re-usables and compostables will become the norm)
- **SDG12 - Responsible consumption and production** (we won't buy single-use plastic or over-packaged products or those containing micro-beads; and synthetic grass has to go!)
- **SDG14 - Life below water** (we need healthy oceans and clean seas; thriving marine life are an essential part of a healthy planet)
- **SDG15 - Life on land** (Kids chant "only rain down the drain", and learn the "Take 3 for the sea" message, while looking at real stormwater drains and photos of ocean outfalls)



SDGs related to Ocean Action Pod

# Switch Your Thinking on Plastics - Dive in with the Ocean Action Pod

Continued



We have developed a smorgasbord of hands-on lessons and activities to deliver our message in meaningful ways. We want healthy oceans and clean beaches.

## WHO EATS WHO?

Students learn about the food web and how interconnectedness is an integral part of the Ocean environment. This helps students understand the impact of plastics in the natural food web.

## THE SPOONS STORY

Students act out the life cycle of a plastic spoon - from the oil field to the canteen counter. Not surprisingly it takes a while to do this, with fun actions and sound effects, and always leads the students to question why society does all this for an item we use for mere minutes and then throw "away"!

## PLASTIC FANTASTIC?

Students consider the impact of asking good questions and making good choices. These questions can be applied every day to every bit of plastic in our lives. How important is it? How long will I use it for? And critically, what are the ocean and planet -friendly alternatives? It becomes pretty clear that many plastics are not fantastic.

## WHAT HAPPENED TO FREDDIE FISH?

Students are immersed in a detective story to find out why fish (and other marine creatures) get sick and how we can stop it

happening to fish and their friends.

## OCEAN ECOLOGY

Students learn about bioaccumulation, biomagnification and toxins that can be found in the ocean and attach to plastic particles to create poison pills for marine life. Where do they come from? How can we stop them from getting there?

## LITTLE THINGS MATTER

Students investigate the little bits of plastic in ordinary beach sand. This is an introduction to microplastics and the important understanding that plastic never goes 'away' - it just breaks up into smaller and smaller pieces.

All of these activities and lessons are delivered by our enthusiastic team of educators and volunteers. At school and community events we also offer Marine Litter Bingo, Quizzes, Posters and sell our Ocean Action Pod tea towels with an image of the sushi soy fish and the words "Plastic - Ruining a Beach Near You".



# Switch Your Thinking on Plastics - Dive in with the Ocean Action Pod

Continued

## THE “PLASTIC FANTASTIC?”

### ACTIVITY

We always tell the students that we are not anti-plastic. Plastic is an amazing invention. It is also a relatively new material and while it has been around a lot longer than any of our students have, there was life before plastic! Ask your grandparents. Even some of our Educators remember paper supermarket bags and milk in glass bottles. Some of us remember when our grandmothers washed and re-used the first plastic sandwich bags. We still have treasured plastic items, given to us as children - over 40 years ago. That is fantastic plastic.

There are lots of positives to plastic that make it so popular. We list as many positives as we can and think of examples such as “it’s lightweight”, so it reduces transport costs and fuel consumption. Then we wonder if each of the special features of plastic have any negative consequences and sadly we find that every feature does, such as, because it is “lightweight”, plastic that is not valued and ends up in the environment can easily be blown into the street and washed down the stormwater drain. ‘Colourful’ plastic is good but it can also then appeal to certain animals who mistake it for food. The list goes on.

We can make better choices about plastics by asking ourselves three questions:

1. How important is it? (Choose from don’t really need it, nice to have, quite important, or really important)
2. How long do we use it for? (Choose from used once, used a few times, used for a few years or used for decades)
3. What are the alternatives? (We show the students cloth bags, stainless steel straws, ‘keep cups’, re-usable containers and water bottles)

The first two questions are written on our colourful banner along the two axes of the grid. Students are given real plastic items, for example a plastic water bottle, a plastic straw, a child’s dummy or a plastic comb and consider the questions for each. They then place the item on the area of the banner that corresponds best with their response. An example would be the plastic straw, “used once” and we “don’t really need it” - is clearly not fantastic plastic. The third question about alternatives, is easy when you know that there are many kinds of re-usable straws should you want one. Another example could be some lego which could be “used for decades” (passed on among family or friends) and is “quite important” so could be considered a ‘fantastic plastic’.

The educator would facilitate a discussion among the students to help them see how they can make good choices - ones that avoid the not so fantastic plastic and lean towards re-usables as much as possible. The

more normal this becomes the less plastic pollution our community will generate. All our actions make a difference.

The Ocean Action Pod is about solutions to plastic pollution. As it says on the back door “It’s our Plastic - It’s our Problem”. You can help spread the message with our six plastic pollution posters titled: How does plastic end up in the ocean? How does plastic endanger marine animals? Get Wise about Plastic, Be an Ocean Action hero, The Story of a Plastic Spoon and Be fantastic, Use less plastic!

You can purchase the intellectual property rights for the six posters and have your organisation’s logo incorporated in the poster and make an unlimited number of prints.

If you would like to find out more or discuss sponsorship with us please see the Expression of Interest form on our website or email [jeff.angel@tec.org.au](mailto:jeff.angel@tec.org.au) directly.

Our website address is [www.oceanactionpod.org](http://www.oceanactionpod.org)



# Return and Earn: A success story for how government, industry and the community can achieve real change



**Danielle Smalley**  
Exchange for Change

The Return and Earn NSW Container Deposit Scheme (CDS) launched in December 2017 as a litter reduction scheme. In the three-plus years since then, however, it has achieved this and much more.

Since it launched, the environmental impact of the scheme is clear, with over 5.6 billion containers returned for recycling through the scheme's network of more than 620 return points across the state.

In fact, the Return and Earn currently sees two out of every three containers supplied into NSW being redeemed through the scheme, translating to over 500,000 tonnes of materials having been recycled to-date and an incredible 43% reduction in drink container litter in NSW, as measured by the Keep Australia Beautiful Annual Litter Index Reports.

Equally impressive have been the economic and social benefits of the scheme. More than \$560 million in refunds back in the hands of the community and over \$22 million for charities and community groups through donations and fees for hosting return points.

These results demonstrate the extent to which the NSW community has embraced Return and Earn and made it part of their everyday lives. The latest consumer research conducted by Kantar Public found that three out of four NSW adults have participated in the scheme, with the majority

participating once a month or more. The research also found that there is strong awareness and support for the scheme, with nearly nine out of every ten adults in the state, and strong satisfaction at 84%.

The community also has confidence that Return and Earn will deliver on its intended purpose:

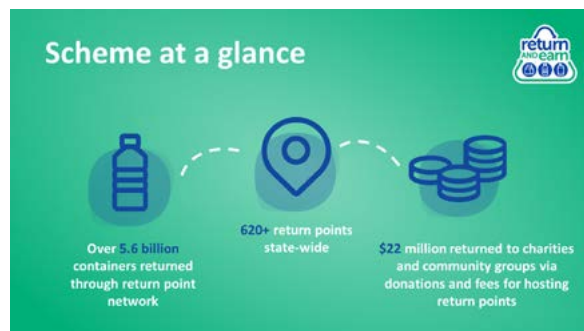
- 79% believe Return and Earn is a scheme they can trust
- 82% believe it will reduce the amount of litter in NSW
- 69% believe it will increase the amount of recycling they do

Which, in short, all underscores the incredible success of the NSW scheme in a relatively short period of time.

## PARTNERSHIP APPROACH DRIVING SUCCESS

At the core of the scheme's success is the public and private partnership between the NSW Government, the scheme coordinator and the network operator, which drives great results.

The NSW Government, through the NSW Environment Protection Authority (NSW EPA), designed the scheme and is the scheme regulator. They manage the registration of all eligible beverage containers supplied into NSW, as well as the obligations and



performance of contracts with the scheme coordinator and network operator.

Exchange for Change is the government-appointed scheme coordinator and is responsible for the financial management of the scheme, managing beverage suppliers and their contributions which fund the scheme, ensuring the scheme's integrity through a robust auditing program, as well as delivering marketing and community education and engagement activities to ensure the community knows how to participate.

# Return and Earn: A success story for how government, industry and the community can achieve real change

Continued

TOMRA Cleanaway is the government-appointed network operator contracted to set up and manage the state-wide network of return points and coordinate the logistics and sale of material to ensure all collected containers are recycled.

strong participation rates, perhaps less recognised but also vital has been the contribution of NSW councils who were quick to see the potential of Return and Earn to benefit their communities and have been actively engaged in encouraging their residents to get involved.

land to TOMRA, technology partner for Return and Earn, to host a reverse vending machine (RVM) for their local community to access, or through a contract with TOMRA Cleanaway to host an automated depot or over-the-counter operation.

**Narrandera Shire Council** is a regional NSW council in the Riverina region of south-western NSW. The council saw the importance of providing a convenient location for their community to enable participation in the scheme and reduce litter in the area. They provided the site for a local RVM and between March 2020 to March 2021, more than 2.15 million containers were returned, resulting in thousands of dollars in refunds back in the hands of the community.

Local businesses have benefited as well. The RVM redemption partner is the local supermarket, with users of the scheme redeeming their vouchers for purchases or cash at their store, with an estimated \$18,000-\$20,000 in refunds being processed each month. The LGA has also seen a significant reduction in the area's litter.

**Strathfield Council**, located in inner Sydney, decided to become a landlord for a return point to achieve higher waste diversion rates and combat plastic litter in their LGA. Their RVM opened in March 2018 and was promoted by an extensive communications program by council.

Since opening, more than 15 million containers have been returned through the local RVM

## Public and private partnership



The network currently has more than 620 return points - including reverse vending machines (RVMs) that are usually co-located with retail, bulk collection centres called automated depots operated by independent businesses, Councils and charities, and over-the-counter return points located in smaller retailers such as newsagencies and corners stores - ensuring easy and convenient access for communities across the state.

### IMPORTANT ROLE OF LOCAL GOVERNMENT

While the collaboration of NSW Government with the beverage industry and waste industry is represented through the scheme partners who deliver the scheme, and the community's enthusiastic response is evident in the scheme's

As landlords of return points - providing their communities with access - supporters actively encouraging locals to participate or sharing in the refund from containers collected by material recovery facilities processing kerbside material, local councils all over NSW have helped shift attitudes to litter and recycling at a grassroots level.

Below is an outline of some of the important ways local councils are supporting their communities in making the most of Return and Earn.

### Providing community access

Currently, there are 33 councils in NSW who provide 39 return points in both metro and regional locations. Councils are involved through licensing a site on council

# Return and Earn: A success story for how government, industry and the community can achieve real change

Continued

located in council's carpark. Council estimates this equates to an estimated 50kg of waste being recycled per person and has contributed to a 65% reduction overall in council's waste.

**For Hunters Hill Council**, their decision to become a landlord of an RVM was based on the need to activate one of their sites and draw local residents to Henley Community Centre, adjacent to where the RVM was placed. The return point is now open and alongside the recycling benefits has drawn the local community to regularly attend the centre.

## Supporting local community groups and charities

Being a landlord of a return point is not the only way councils can support Return and Earn. There are also many examples of councils actively supporting the scheme by encouraging and engaging their local community and community groups to participate.

Overall, more than \$22 million has been returned to community groups and charities through donations and fees from hosting return points since the scheme commenced. There are also more than 1000 community groups on our database who have signed up to learn more about how to fundraise through the scheme: Groups like Lions Clubs, P&Cs, Rotary, sporting clubs, schools and local charities.

**Camden Council** have been great supporters, working closely with their local Scout group to support their fundraising efforts while also help with waste management and

recycling at community events.

Camden Council partnered with Scouts on major events on their community events calendar. The Scout group was responsible for collecting eligible drink containers at their TASTE Food, Wine and Music Festival and the Camden Show with council providing the group with special bins to assist.

Approximately 80% of containers at the festival were collected, that's one container for every two people attending. Over 6,000 containers were collected at the Camden Easter Show and over 7,000 at the Taste festivals, and all funds raised went to support the Scouts with purchasing equipment for their camping and environmental activities.

**Wingecarribee Shire Council** developed a program to encourage and support their local community groups and organisations to fundraise through Return and Earn. They set up the 'Return and Support' project and provided special bins to make it easier for groups to collect.

Launched last year, they have provided 28 bins to 11 schools and four community groups so far.

Like Camden Council, **Queanbeyan Palerang Regional Council** works closely with their local Scout group, 1st Braidwood Scouts, to support their eligible container collections at local community events.





# Return and Earn: A success story for how government, industry and the community can achieve real change

Continued

Again, council provides special bins to assist with the collection drive, with 1st Braidwood Scouts using the fundraising initiative to support the local Rural Fire Service and volunteer group BlazeAid. Funds also go towards purchasing equipment and providing opportunities for Scout members who otherwise cannot afford to participate.

So far, the group has collected over 83,000 bottles and cans, raising \$8,300.

## LOCAL GOVERNMENT VOLUME REPORTS AND OTHER RESOURCES

As scheme coordinator, we have many resources available to councils wanting to get more involved and engage their communities on recycling through Return and Earn.

There is a dedicated page to local councils on the [Return and Earn website](#) where we provide resources including our Local Government Volumes Reports.

The Local Government Volumes Reports are available every six months (in January and July) and outline the number of containers processed through return points by LGA, including by material type, volume and tonnage. A special cumulative three-year report was also produced in December 2020 to mark the scheme's third birthday.

Councils are then able to use their volume data in conjunction with tools such as the NSW EPA's [Recyclator](#) to calculate their

LGA's environmental impact and incorporate this information into their annual reports, State of the Environment Reports or to establish or review sustainability targets.

These reports have also been used to celebrate local community's contribution to a more sustainable future, via council's social media feeds and newsletters, providing fun and engaging content for council's own channels.

Also available on the Return and Earn website's Local Council page, is a helpful toolkit of resources for councils including social media tiles, posters, stickers and case studies. These resources have been developed following consultation with a range of councils and are designed to make it easier for councils to engage their local residents on the benefits of participating in the scheme.

## RECOGNISING COMMUNITY CONTRIBUTIONS

We often hear wonderfully inspiring stories of how community groups, charities and individuals are using the scheme to fundraise for various initiatives that help their community.

Return and Earn has partnered with a range of organisations to sponsor awards to recognise individuals and groups who share our vision for a more sustainable future and to celebrate their achievements. Councils may like to consider nominating a local group or individual for one or more of these awards:

- Australia Day Council of NSW Environmental Citizen of the Year and the new Young Environmental Citizen of the Year Awards
- Keep Australia Beautiful NSW Sustainable Cities Awards
- Keep Australia Beautiful NSW Tidy Towns Awards
- Australian Association of Environmental Educators NSW Return and Earn Program Leader Award.

## WHAT'S NEXT FOR RETURN AND EARN

While the scheme has achieved some incredible milestones to date, there is still a lot more to come. The next 12 months will see us continuing to work with NSW EPA and network operator TOMRA Cleanaway to build on our achievements to-date to encourage even more groups and individuals to get involved in the scheme, more engagement and more containers returned.

We are committed to continually reviewing and improving, and therefore encourage any council, community group or individual who might have suggestions or feedback, to contact us on [contactus@returnandearn.org.au](mailto:contactus@returnandearn.org.au).

We would like to thank all NSW councils for their support of Return and Earn and we look forward to continuing to work with them towards a more sustainable future.

# Igniting a New Scheme: Addressing our most littered item - cigarette butts



**Shannon Mead**  
No More Butts

## 1. OVERVIEW

Over 2.5 million Australian smokers purchase nearly 1 billion packets of cigarettes each year, containing 20 billion cigarette sticks and generating federal revenue from excise and duties of more than \$15 billion annually.

8 billion of these cigarette butts are littered into the Australian environment every year and continue to be reported as the most littered item. With a plastic filter made from cellulose acetate, cigarette butts are not biodegradable. The filter contains toxic chemicals that leach into the environment, causing significant damage.

As a registered environmental charity, No More Butts has been focussed on designing and deploying initiatives to tackle cigarette butt litter and waste, including pushing for the implementation of a new Tobacco Industry Product Stewardship Scheme.

In March 2021, as part of the National Plastics Plan, it was announced that an action would be taken by the Federal Government to initiate an industry-led, cross-sectoral stewardship task force to reduce cigarette butt litter in Australia and consider potential stewardship schemes.

### 1.1. Assumptions

In this document, various sources of published research are referenced. It should be noted that there are discrepancies in research findings of this topic. In this paper,

### Is it really a big problem?

**8** 

**BILLION** cigarette butts are discarded into the Australian environment each year from 24 billion consumed.

**> 20%**  
of all litter.



**NOMOREBUTTS**

we have used different data points to highlight specific situations but cannot guarantee the representations of facts contained within this document. Statements should be used as a guide only.

### 1.2. Cigarette butt waste in Australia

Cigarette butts are reported to be the most littered item in Australia, causing a financial drain to councils and communities, who are primarily responsible for cleaning up this litter.

In 2020, a report from WWF showed that Boston Consulting Group identified that 8 billion cigarette butts are now littered into the environment each year in Australia.

Earlier figures had suggested that 7 billion cigarette butts were being littered each year out of 20 billion being consumed. Using these figures for this specific example, this highlights that 13 billion butts are being sent to landfill each year.

Based on the assumption that each cigarette butt weighs 0.2 grams, this means that more than 2,500 tonnes of this waste plastic ends up in landfill each year, in addition to the direct environmental impact of the littering behaviour.

Based off comments from WWF in 2021, on the assumption that 24 billion cigarette butts are consumed annually, if all of these butts were directed to Qudos Bank Arena, using volumetric estimates, it would be full of cigarette butts in under five years. If just the 8 billion littered butts were collected in this giant ash tray, it would be full in under 15 years.

With a plastic filter made from cellulose acetate, cigarette butts are not biodegradable. Reports suggest that a cigarette butt can exist in the environment for up to 15 years. The process of decomposition is known as photodegradation, as it is based on the sunlight.

# Igniting a New Scheme: Addressing our most littered item - cigarette butts

Continued



### 1.3. Cigarette butt litter in New South Wales

The National Litter Index shows that cigarette butts are consistently the most-littered item in NSW. It is estimated that each year 1.32 billion cigarette butts are littered in NSW.

The NSW Department of Planning, Industry and Environment reports on their web-site that cigarette butts make up 50% of litter items in NSW.

### 1.4. Impacts of cigarette butt littering

Cigarette butts cause significant damage to the environment, including vegetation, marine life and our reef.

The filter of a cigarette is made of cellulose acetate fibers, with the filter modifying the particulate smoke components through particle retention. However, cellulose acetate filters have poor biodegradability and they can take years to decompose under normal environmental conditions.

Residential and bush fires cause

further economic costs and loss of life. An estimated 7% of all bushfires in Australia are caused by discarded cigarette butts and matches.

## 2. PRODUCT STEWARDSHIP

### 2.1. Definition

Product stewardship is an approach to managing the environmental impacts of different products and materials at different stages in their production, use and disposal. It is based on the assumption that there is a shared responsibility for those involved

in producing, selling, using and disposing of products, to ensure that those products or materials are managed in a way that reduces their impact, throughout their lifecycle, on the environment and on human health and safety.

### 2.2. Countries taking action

In Europe, Litterati has deployed pilots where data has been collected to determine the baseline cost associated with cleaning cigarette butt litter. They have then engaged with the government and tobacco companies on budgets for infrastructure and litter collection. In San Francisco, an earlier project provided an overview of annual costs to deal with cigarette butt litter. As a result, the City charges the tobacco companies \$4m USD annually to cover these costs.

### 2.2. Tobacco industry action

Globally, Philip Morris International promotes a vision for a “Smoke-free future” and uses assets, such as their trademarked “The World is Not an Ashtray” website, to promote issues related to discarded cigarette butts. Their

## What could TIPSS cover?



# Igniting a New Scheme: Addressing our most littered item - cigarette butts

Continued

own objective is to reduce their consumption of plastics by 50%.

## 2.3. History of stewardship in Australia

In 2003, tobacco companies in Australia came together to participate in a product stewardship scheme, led by British American Tobacco Australia. They reportedly generated \$5 million in funding and implemented a Butt Litter Trust. There is no information related to ongoing formal engagement; however, Philip Morris noted recently that a product stewardship program is still in place.

## 2.4. Australian Community Stewardship initiatives

In Australia, many state bodies have their own messaging campaigns, with some looking at cigarette butts as an isolated litter source and others considering it along side all other litter.

Most grants that are made available, from organisations such as the EPA, focus on local clean-up events and prevention campaigns, including installations of dedicated infrastructure, rather than national awareness.

## 2.5. The Minister's list of priority products

The Minister's Product List is established by the Product Stewardship Act 2011.

Each year, the Federal Minister for the Environment sets a priority list for possible product stewardship schemes. This list signals the need for industry to work together to develop product stewardship

options for these products and informs the community and industry of those products being considered for accreditation or regulation under the Act.

## 2.6. Scope

No More Butts will continue to engage industry to design and implement an effective product stewardship suite of activities around product design, packaging, litter prevention, collection and recycling.

The products in scope should be identified and prioritised with the following being considered under a future Tobacco Industry Product Stewardship Scheme:

- Filtered cigarettes
- Packaging
- Filters
- Papers
- Lighters
- Vaping and e-cigarette products

## 2.7. Participation

Representatives should be carefully selected to ensure a cross-sectional coverage of all groups impacted by the topic. It is important to note that whilst representatives from every major peak state environmental body and environmental organisation may want to participate, a curated group is critical to ensure productive outputs. It is imperative that participants maintain an objective view and welcome collaboration from other participants.

Whilst the tobacco industry has the greatest ability to minimise adverse

impacts, other stakeholders (such as retailers and consumers), also play a role. Engaging participants to represent groups where there is a higher index of smokers will assist in styling programs and deliverables that have a greater impact. It is critical that industry appoints the most relevant senior people who are accountable for actions agreed by the task force. Finding participants that have had experience in Product Stewardship programs and circular economy initiatives will be important.

In 2020, No More Butts engaged with representatives of two of the three major Australian tobacco companies to conduct an industry roundtable event to identify key issues and collaborate on initiatives. The third would not return contact.

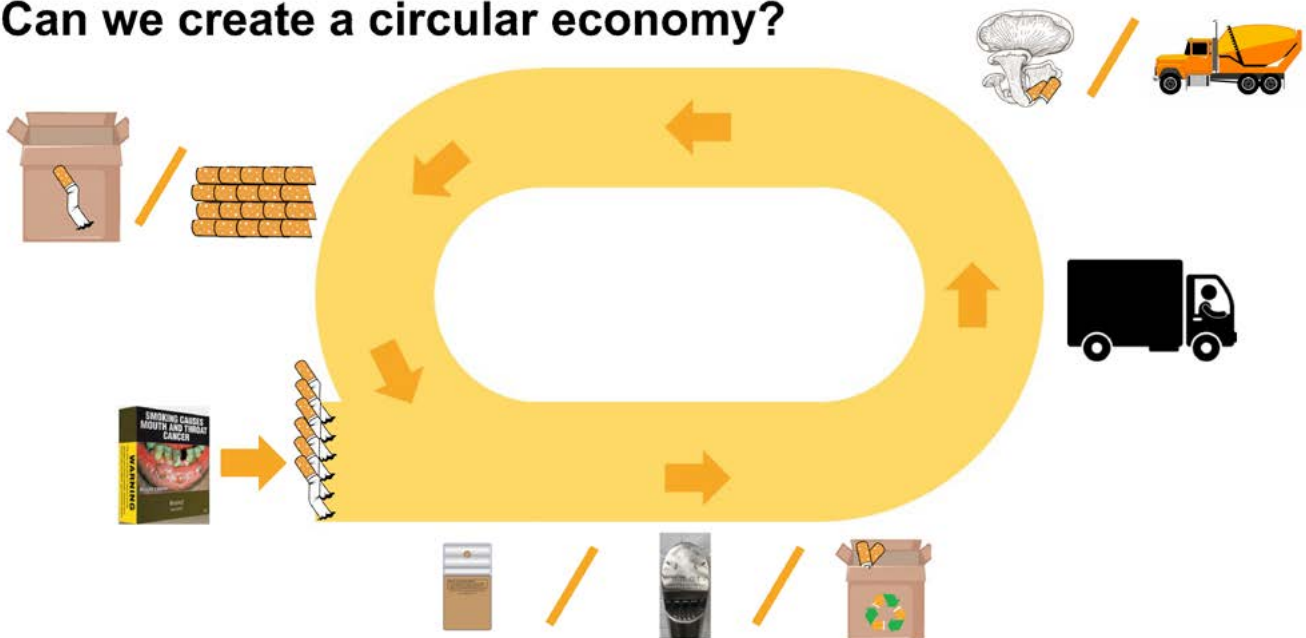
This roundtable approach is similar in nature to the recently proposed task force. With federal government support and funding, it will likely have more urgency and impact and get the right level of engagement.

If industry chooses to not participate in the cross-sectoral task force voluntarily, the Federal Minister for the Environment could be requested to include cigarette butts on the priority product list to help introduce a mandatory stewardship scheme.

## 2.8. Objectives

After the products in scope are agreed, it will need to be established if the primary focus should be on source reduction and DfE (i.e., reduction or removal of

## Can we create a circular economy?



plastics) and/or the lifecycle of the existing products to ensure litter reduction programs, landfill and extension of EOL through circular economy initiatives.

Sources of data and methods to collect future baseline data collection needs to be agreed upon, as does appropriate terminology. Draft Terms of Reference should be agreed upon to set out the objectives for the a Product Stewardship Scheme.

Finally, funding sources and Governance models need to be discussed, including consideration of allocation of Government Taxation Revenue, or the introduction of an EPR scheme and how these funds would be managed, including any consultation with Treasury.

### 2.9. Outcomes

Overall TIPSS outcomes need to be based on impactful activities across multiple streams and should include:

- Reduction in direct and indirect costs related to cigarette butt waste across local government
- Amendment of the Tobacco Plain Packaging Act to enable sustainable packaging and the inclusion of the ARL to guide recycling communication
- Creation of opportunities for Australian-made infrastructure to avoid importation of products to address the issue
- Retail availability of Australian-made sustainable portable ashtrays
- Implementation of a national approach and taxonomy for data collection for tobacco related litter
- Funding programs to support innovation and new circular economies, related to cigarette butt research and recycling
- Introduction of a national recycling scheme, which provides an incentive for community to retrieve and return cigarette butts
- Introduction of sorting centres and recycling hubs

## Is there any low-hanging fruit?

1 billion non-recyclable cigarette packets are purchased annually



# Igniting a New Scheme: Addressing our most littered item - cigarette butts

Continued

- Introduction of a 'return-and-earn' scheme, to encourage community and smoker collection
- Growth in community projects using cigarette butts as sustainable source material
- Creation of employment opportunities across construction and manufacturing

## 2.10. Implementation plan

The agreed principles and outcomes of the task force will likely drive the implementation plan of TIPSS; however, some considerations are listed below:

- Research into alternative materials for cigarette butt filters - Design for Environment (DfE)
- Design and deploy a national smokers survey, to understand behavioural triggers, awareness of cigarette contents and environmental impacts (behavioural)
- National awareness campaigns on the contents of cigarette butt filters and the impact to the environment (similar to the Grim Reaper AIDS campaign, or the TAC Drink Drive campaign)
- Implementation of smoke-free zones (beaches) and designated smoking areas
- Implementation of 'smoke-safe' permits for building and construction sites
- Standardisation of littering fines nationally
- Empowerment of more officers, including parking inspectors, to implement fines

- Availability of recyclable portable ash trays at all points of purchase
- Inclusion of a recycled and re-usable portable ash trays at the tobacco company factory to ensure 100% coverage of a solution for smokers
- Standardisation of approach to infrastructure
- Investigation into IoT and AI for data collection within infrastructure
- Research funding via grants to advance research into recycling methods and uses for recycled products

## 2.11. KPI guidance

Specific metrics should be set as a result of agreed outcomes, but could include:

- Reduction in litter rates
- Reduction in costs incurred by councils related to cigarette butt litter and waste
- Increase in landfill re-direction rates
- Increase in number of smoke-free beaches
- Increase in awareness of the environmental impact of littering cigarette butts

## 2.12. Funding and Governance

With an estimated \$15.6 billion in federal excise and customs taxation revenue on tobacco products in 2021, there is an opportunity to discuss a provision of one percent of this revenue to be directed to initiatives that reduce the environmental impact of cigarette butt litter.

No More Butts believes that eventually an EPR scheme should be implemented after initial data can be validated. As such, future TIPSS budgets could be funded proportionately by market share of each of the tobacco companies selling in Australia.

Once the task force is implemented, a formal governance process would need to be established to ascertain the flow and control of funding for initiatives of TIPSS.

Feasibility studies required to be carried out prior to final implementation of TIPSS would also require funding. It is proposed that the Federal Government provides funding for these activities until a formal governance structure can be identified.

## How could TIPSS be funded?



• Federal Government revenue from excise and duties

• Producer mark-up

• Cost of cigarette

**1% =**  
**>\$150 million**

# WA Naturally Thanks You – Regional Roadside litter prevention program



**Linda Thoresen**     **Rohan Swan**  
Keep Australia Beautiful WA

Roadsides, in particular regional highways, are consistently one of the most littered sites in WA. Whilst the amount of roadside litter has reduced by approximately 44 % since 2015, roadside litter hasn't changed much as a proportion of the WA litter stream in ten years and still represents about 60% of the volume of litter in WA (not including illegal dumping). Additionally, approximately 70% of the volume of roadside litter is made up of material that has been thrown out of a vehicle window (e.g., cans, bottles, food-wrappers, et cetera).

litter. KABC was receiving a large amount of community and ministerial correspondence regarding roadside litter, with a lot of anger being directed at MRWA. KABC supported MRWA by stating that while it is their responsibility for removal, they did not put it there and they are doing what they can to clean it up.

MRWA estimated that it cost their agency \$8 million a year to remove litter from roadsides, which did not include emptying bins and other maintenance related activities. KABC suggested to MRWA to

located 300km from a town with the message 'Litter and you will be fined', despite the chances of being caught littering and receiving a fine being almost zero.

There was also no consistent messaging around the state regarding litter and virtually no signs encouraging litter prevention. KABC suggested some new litter prevention messaging and locating the signage in litter hotspots to see what happened.

KABC reviewed other signage around Australia and the world, finding some very engaging, creative and unique signage, in particular relating to the impact of litter upon native wildlife, which research had shown elicits the strongest emotional response.

KABC suggested some more engaging signage and MRWA agreed to a message regarding wildlife, which resulted in the signage below being developed.



Examples of roadside litter signage in Western Australia

Action on roadside litter in WA has historically been focussed on the illegal aspect of littering and associated penalties. Essentially, there was very little action on litter prevention.

In 2010, the Keep Australia Beautiful Council of Western Australia (KABC) engaged with Main Roads Western Australia (MRWA) to discuss roadside

direct some of that money towards prevention, which was the start of an MoU regarding roadside litter prevention between the two agencies.

KABC reviewed current roadside signage and while there was some signage on roadsides it was all based around the illegality of littering and there was also little context for the placement of the signage. Some signs were



Examples of Mitchell Freeway litter prevention signage in WA

# WA Naturally Thanks You – Regional Roadside litter prevention program

Continued

The signs with the **Litter Hurts Wildlife** message were a major shift for MRWA as it was a message not related to a law or a direction. These signs were installed on Freeway off ramps where litter loads are typically high. Results of litter audits showed that in locations where there was signage, there was a significant reduction in the amount of litter thrown from vehicles.

Another area of interest for KABC was roadside rest areas, which also provoked a high level of complaint.

KABC worked with MRWA on some signage for those areas, buoyed by the success of the Freeway signage, MRWA developed bolder designs installing the below at the entry point to the rest areas.

KABC has been advised that the amount of litter, particularly from overflowing bins, has reduced at sites using these signs. While there was more creativity in the design - with information about environmental damage - essentially, they were still about enforcement, illegality and penalties.

In 2024 -15, when KABC commenced the overarching litter campaign **Bin It** with the tag line 'you know it's the right thing to do', it shifted back into the social responsibility space like the 'do the right thing' campaign of the 70s and 80s.

We proposed linking that concept with roadside litter and thank Western Australians for acting in a responsible manner with litter while on regional roads, rather than hit them in the hip

pocket, which had been relatively ineffective in changing the behaviour of litterers.

This was the birth in 2016 of 'WA naturally thanks you'. The campaign included messaging around the impact of litter on wildlife.

The Woylie, a native Australian marsupial, was used as a key image of the program and 'Put your rubbish in a bin' and 'WA naturally thanks you' were the key calls to action and reward messages.

signage was installed and car litter bags were available (up to 70% reductions at some sites).

A post program survey distributed to the public via a market research company received 1,900 responses and included excellent



Signage and car litter bag from the initial WA naturally thanks you roadside litter prevention campaign

KABC funded the installation of 30 roadside signs and distributed 300,000 car litter bags at roadhouses on three major regional WA highways. Litter audits were conducted on five roads at sites that were litter hotspots, including the three highways where the program was active and two control sites on highways where no action was taken. Like the freeway and rest area projects, significant reductions in the type of litter thrown from vehicles was observed on highways where

feedback, both positive and negative.

Positive feedback showed good recognition of the signs and a high level of support for roadside litter prevention resources such as signage and litter bags. Interestingly, nearly every person surveyed agreed that it was important for government and other authorities to invest in creative ways to tackle litter.

The negative feedback received focused on the sign design. The most common comments included



# WA Naturally Thanks You – Regional Roadside litter prevention program

Continued

the text on the sign being hard to read from a distance at high speed (even though it was approved by MRWA), and the woylie was not a well-known animal. Some people commented that they thought the program was a rodent prevention program. That is, if you do not litter, then you will not attract rats. Some suggestions proposed making the signs clearer and using more iconic animals.

KABC took the results and feedback back to MRWA and proposed a state-wide rollout of the program. The estimated cost is \$400,000 to which MRWA agreed after some negotiation.

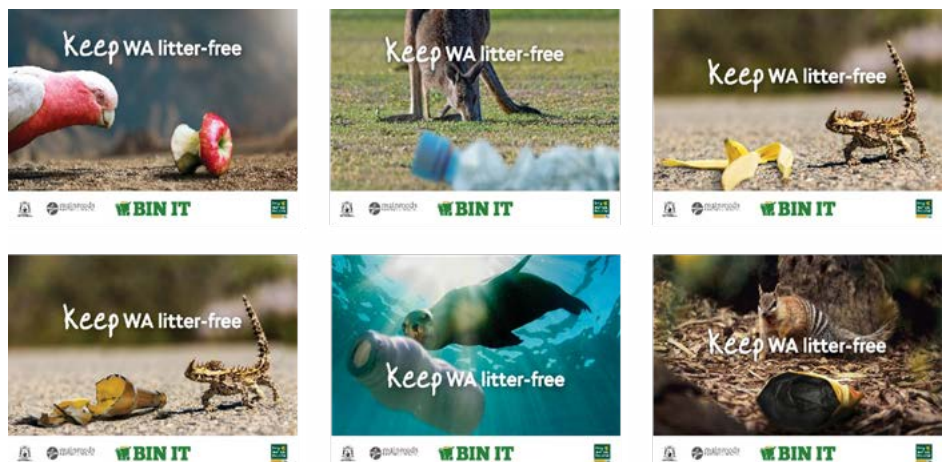
KABC developed new material for signage, which was concept tested with groups of people who had admitted to littering on country roads. The material that elicited the biggest response was images of wildlife being impacted by litter. The final designs show the most beautiful scenery and animals, with a twist, to show how out of context litter is.

The signage uses the KEEP from Keep Australia Beautiful as a call to action along with BIN IT, with keeping a hold of rubbish being the initial behavioural step to not throwing material out the car window.

There was an issue with the organic material as MRWA felt that they would have people complaining to them that there are other much bigger litter issues that apple cores and banana peels (such as beverage containers and dumped tyres). Due to this, messages around organic litter will stay in the



The final design of the BIN IT roadside sign



Several iterations of the sign were developed to use in various locations

background on social media rather than being a core part of the initial roadside signage campaign.

Staying with the KEEP theme, the Keep Bag is a reusable, compostable car litter bag that is designed to encourage road users to hold onto their rubbish until it can be disposed of responsibly.

The compostable bag is a compromise to ensure that the product is fit for purpose but also meets community expectations

around WA government policy on lightweight single use plastic bags and single use plastics in general. KABC is well aware of the shortcomings of compostable plastics and has included other key messages stating that while KABC is initially providing bags, in future we want people to bring their own bag, box, bucket or any other item to put their rubbish into until they can put it in a bin.

Each bag also includes a QR

# WA Naturally Thanks You – Regional Roadside litter prevention program

Continued

code that links to the Bin it to Win it quiz, which provide rewards for partaking in the quiz and includes links to social media with further information on litter and messaging around the programs objectives. Posters and information will also be installed at roadhouses thanking people for doing the right thing with their rubbish and will be located next to dispensers.

from general litter measurements such as AusLM and the WA CDS team audits. There will also be a public survey pre and post program to gauge interaction with the program. Roadhouses and other bag distribution points will also provide feedback and MRWA maintenance crew data will be used to evaluate the cost benefit to MRWA.

- Reduced roadside litter in regional WA
- Consistent messaging regarding litter in WA
- More effective education amongst the public regarding the impact of litter on the environment
- Reduced effort and cost by Main Roads WA to clean-up litter
- Reduced complaints about roadside litter



The KEEP car litter bag with QR code linking to the Bin It to Win it quiz designed to engage and provide more information on litter.

The roadside signage and roadhouse material are supported by a comprehensive social media campaign including YouTube ads, Spotify voice overs, and if funds allow Petrol Station Pump videos with voice overs.

To evaluate the program KABC will be conducting project specific litter audits as well as taking results

It is intended that the program will be rolled out in the second half of 2021 on major regional roads in WA. Signage placement will be critical as will the selection of where the bags will be distributed from.

The following outcomes from the implementation of the program are expected:

The Keep Australia Beautiful Council of Western Australia has set an ambitious target of a 40 percent reduction in litter by 2025 which is guided by the 2021-2025 WA Litter Prevention Strategy. Roadsides are one of the key focus areas of this strategy and the WA naturally thanks you joint project between KABC and MRWA sits alongside other KABC and State Government initiatives such as the WA Containers for Change beverage container deposit scheme as essential drivers to achieving this target.

For further information contact Rohan Swan on [rohan.swan@kabc.wa.gov.au](mailto:rohan.swan@kabc.wa.gov.au) or 08 6364 6660.



# Reducing litter one purchase at a time



**Juliet Scrine**

The Eaton Gorge Theatre Company

Since 2004, The Eaton Gorge Theatre Company (EGTC) has been working with councils using theatrical techniques and humour to engage the community in environmental issues, including litter. The performances and characters are designed and written to compliment marketing activities and messaging of the individual councils to achieve results in behaviour change.

EGTC use the strategy of education by stealth. Our characters and written performances are always fun, eye-catching and a little silly. Once our audience are engaged, we then deliver the intended message. By utilising this approach, community messaging is more effective and higher numbers of the community are impacted.

Over the past two years, EGTC has:

- Developed three new performances for schools
- Developed new on-the-street characters to target litter and where it comes from
- Created videos to be used as in class resources and social media campaigns

These fun incursions, videos, festival and roadside interactions bring a smile to people's faces while also getting them to think about what they purchase and where the container ends up.

## **CASE STUDY: THE LITTERBUG AND THE RUBBER JELLYFISH, NORTHERN BEACHES COUNCIL July – Sept 2019 STAGES 1 - 3**

The performance for primary school children was written to compliment Northern Beaches Councils Swap this for That campaign and focused primarily on litter from parties, in particular helium balloons or rubber jellyfish.

Children were taken on a journey with the Litterbug to explore other options for parties that would reduce the amount of litter left behind including paper napkins, plastic bottles and single



*The Litterbug*

use plastic food packaging. The children were encouraged to come up with their own ideas of what they could use instead.

The show went to 15 schools, performing to 2357 children.

## **CASE STUDY 2: THE LITTERBUG RUINS CHRISTMAS, NORTHERN BEACHES COUNCIL Nov – Dec 2019 STAGES 1 - 3**

This performance was specifically targeting litter from Christmas parties, especially the small plastic pieces that are dropped after eating a candy cane. The show starred one of Santa's elves and the Litterbug.

The Elf, with help from the children in the audience, helped the Litterbug have a litter free Christmas by Swapping this for That.

The show was performed as an end of year treat for four Northern Beaches Schools and reached over 800 students.

## **CASE STUDY 3: THE KING AND QUEEN OF GREEN CHRISTMAS SHOW, SHOALHAVEN CITY COUNCIL Nov – Dec 2019 STAGES 1 - 3**

Shoalhaven City Council were running a campaign to focus on reducing waste and litter at Christmas time by asking constituents to think about gift giving, food purchases, Christmas parties and the impact

these products could have on the environment.

The King and Queen of Green spoke about what litter was and its impact on the environment in the Shoalhaven area. They also had their own version of the 12 days of Christmas, with 12 ideas for litter free and litter reducing gifts, such as reusable coffee cups, reusable straws, cutlery sets and bento boxes.

The show was performed to five schools in the region, reaching over 1500 students.

#### **CASE STUDY 4: THE LITTERATTI, WESROC Dec 2019 and Jan 2020**

The Litteratti were two characters based on the EPA campaign If its not in the Bin then it's on you. The premise of the interaction was that the Litteratti were influencers and were wanting to get photos with as many people as they could.

The appearance took place at litter hot spots in Blacktown and Penrith and included popular parks, shopping centres and take away food outlets. We created our own Instagram site and posted images up across the day. The Litteratti were accompanied by a WESROC educator who was available to answer questions.

The costumes certainly attracted attention, and many of the people we spoke too had seen the EPA campaign.

It was an effective way to re-emphasise the message of the campaign in a fun and interactive way.

#### **CASE STUDY 5: THE RUBBISH WORKERS, WAVERLEY COUNCIL Feb 2020**

This campaign was focused on the forgotten bits of litter, and we worked in conjunction with a well know local ranger, Angela.

#### **CASE STUDY 6 – VIDEO PRODUCTION AND LIVE STREAMING March 2020 – Now**

EGTC worked with various councils using video to communicate a message about litter during the COVID 19 pandemic.

1. **Cockroach video series** was produced for ISJO and focused on the different ways smokers dispose of their butts.
2. **QPRC:** The Litter bug and Lisa the Litter Guard went to a local park in Queanbeyan and recorded our 45min show using the QPRC Platypus Mascot to localise the performance. The show was then edited into 3 shorter sections that are now being used in the local preschools and primary schools by the waste education team as a teaching resource.
3. **Willoughby Council:** World Environment Day live stream performance of Kylies Calamity. This show focuses on litter from cars and illegal dumping and its affect on the environment. Willoughby Council promoted the live show and encouraged schools and the community to book in to watch.

4. **Bayside Council:** RRRR Pirates 45-minute performance was run as a livestream show as a part of the school holiday program. The Performance also came with activity ideas and a a resource sheet. The RRR Pirates focus on litter that ends up in the ocean and ways to prevent it by rethinking, reusing, repurposing and reusing.

#### **CONCLUSION**

Theatrical, fun approaches to litter education are a part of a wider messaging campaign. The EGTC performances are used to highlight specific litter messages and can be fine-tuned to meet specific marketing goals and target markets.

#### **Here are comments from some of the schools we visited:**

*The children loved it and thought it was a little "Crazy" but funny!*

*It really got the message of 'use this instead of that" for birthday party ideas.*

*Thank you, Litterbug team, for visiting our school. We so enjoyed your entertaining performance and came away thinking about all the different kinds of material we use daily and how we can swap ... this for that!*

# Sorry, we're open!



Marina DeBris

Every day for the past 20 years, I have been picking up waste from my local beaches and the street. The question I ask myself isn't so much about how that rubbish got there (though that is important), but why that item was used at all and then, so quickly discarded?

## THE JOURNEY

In 2009, while living in Venice Beach, CA, I was invited to a high school class where Anna Cummins from 5 Gyres was giving a talk. When she showed an image, there was an audible gasp in the room. That was a turning point for me in two ways. Firstly, that I had to use my visual skills to raise awareness, and secondly, that I had to speak up for all species we humans are causing harm to.

As a graphic designer, I knew the importance of creating a message purely through visuals. I also knew that humour could play a role.

The idea for the Inconvenience Store came to me when I realized the majority of what I was picking up were convenience items. I created a mock shopping catalogue of some of the items I found washed up.



## THE INSPIRATION

The (first) two fur babies that rescued me - Bonza, found in a box on a construction site, and Possum who had been in the pound at least twice before she found me - were very influential in my journey.

In the beginning I was on a mission to figure out the best ways to deal with their waste. That started by digging a huge hole and adding enzymes to break it down. But with two large dogs, this filled up pretty quickly. Then I purchased a composter strictly for dog waste. It broke down three times, and I found myself on too many occasions tediously cleaning out the pooh from all the nooks and crannies. I said to myself, "who does this?!" My final solution ended up being using found bags, and reusing them until they were no longer usable, bringing them home and flushing it down the toilet (not the bag) but only when I was flushing anyway. TMI?

This was also the beginning of my next, and most important, journey where I began to ask myself some hard hitting question. For instance, why is this exact same breed of dog likely to have vastly different lives? The one bred by humans (for profit) will likely find a happy home, while others may live their entire lives in a pound or even be euthanised. And, that's not to say the dog may not end up in a puppy mill used for breeding purposes. This can go for different breeds within the same species.

## THE LIES WE FEED OURSELVES

Then, I took a hard look in the mirror and asked myself, "if I can

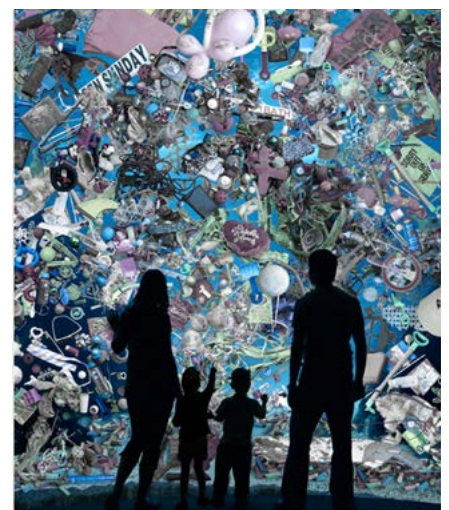
develop such a strong bond with another species, why were any other species exploitable and consumable?"

Over the years I discovered the answers, and it's about speciesism, greed, not wanting to know the truth and, what is accepted as the norm. I knew deep in my soul, that I could no longer be part of these cruel industries, so I became a vegan and an activist for animal rights.

And, if this isn't enough reason to quit these industries, we all know about the devastation these industries are causing to the environment, our health and in particular the ocean. But I digress, or do I?

*"There will be more plastic than fish in the ocean by 2050."*

I created this graphic called *Aquarium of the Pacific Gyre*.



It illustrates what an aquarium of the future might look like.

In 2015 at Sculpture by the Sea, I created a giant version.

Using humour again, it came with a key naming all the marine

## Sorry, we're open!

creatures in the tank with their scientific names and habits.

### THE INCONVENIENCE STORE

The Inconvenience Store was born at Sculpture by the Sea.

All items were found on two beaches, all packaging (and some of the display stands) were sourced from the street.



Several people thought it was an actual convenience store, but my favourite quote was someone describing the installation to his friends as "This is like art that shouldn't even exist". I knew the store was working, because people of all ages immediately became engaged (it also won three awards).

The biggest disconnect is that many people think these items are 'literally' tossed in the ocean or left on the beach. By far, that is the hardest issue to convey: that we all bare some responsibility and anything thrown 'away' can end up in the ocean. We also know that items going to landfill is just as destructive.

### WASTED OPPORTUNITY SHOP

Another issue we face is how many perfectly good household items are tossed on the street.

I worked with Randwick council and came up with the creation of a pop up shop at the Eco Living Festival, where I collected household furnishings from the street only and sold them at the Eco festival.

The shop was called The Wasted Opportunity Shop, and raised over \$500 for the Bower Repair Centre, created a list for where items could be donated or repaired before the last resort of discarding them. The remainder was donated to St Vinnies.

### OTHER WORKS- BEACH COUTURE: A HAUTE MESS

A collection of wearable art made from washed up waste that has not been cleaned or altered, so the viewer gets the true impact of our waste.

But, until then, Inconvenience Store is available for hire!



*Takeaway Queen.* Photo Richard Flynn



*Storm Brewing,* commissioned by MLC Centre made of over 1500 discarded single use coffee cup lids collected in one month period in the centre.



*Dirty Laundry & Do I make Myself Clear,* a series photographed in Elizabeth Bay House by Stephen Wong.

# Bins to Barriers: Are fines for littering effective?



**Dr Bowen Fung** **Saul Wodak**  
Behavioural Insights Team

## THE GOALS OF LITTER ENFORCEMENT

The ultimate goal of litter enforcement is to eradicate littering behaviour from the culture of Australia completely. This requires thinking about both intrinsic and extrinsic factors that motivate people to litter. A classic behavioural lens on this often focuses on intrinsic factors: social norms, friction costs, and sense of responsibility. But extrinsic factors can also drastically shape behaviour and are often easier to control.

The most straightforward extrinsic factor is a financial penalty issued when an individual litters - what many behavioural economists might refer to as a "hard nudge". But do financial penalties actually change people's behaviour? Can they stop individuals, or communities, from littering?

## RESEARCH WITH BIT AND THE NSW EPA

The Behavioural Insights team began a stream of research to answer this question in July 2020 with the Litter Prevention Unit within the Department of Planning, Industry and Environment. The overall aim of this this collaboration and research project was to investigate the effectiveness of litter enforcement at changing litter disposal behaviours.

We conducted a host of research activities including:

- An extensive literature review on enforcement strategies and best practice

- An analysis of littering-related penalty infringement notice data from Revenue NSW
- A survey of 96 individuals from NSW organisations covered by the Environment Operations Act 1997 (POEO Act)
- Three focus groups: with Authorised Officers, littering fine recipients, and recipients who are frequent smokers from NSW
- Eleven in-depth interviews with Authorised Officers, rangers, and team managers from NSW

## BARRIERS TO EFFECTIVE ENFORCEMENT

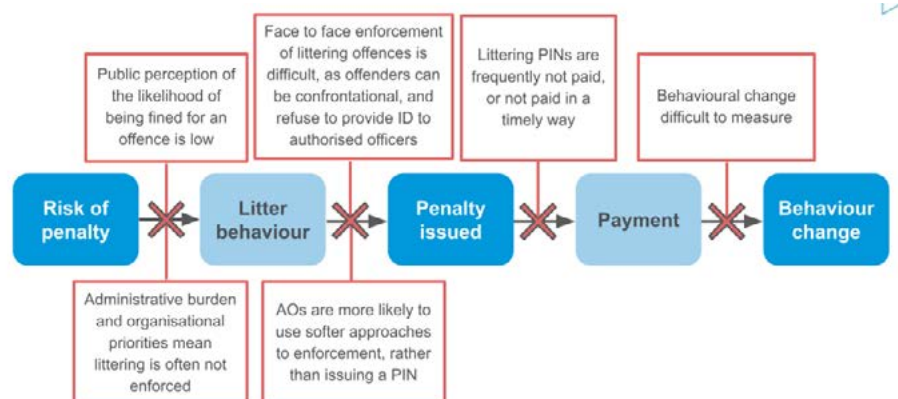
One of the first things we discovered is that there is no existing evidence for best practice litter enforcement, and only scant data on whether financial penalties are effective in the first place. This was due to a mix of reasons:

- Litter behaviour is relatively rare, and difficult to directly observe
- Self-report littering is unreliable
- Litter counts are an unreliable measure of littering behaviour

- Many evaluations trialled "kitchen sink" approaches, with multiple strategies that did not isolate enforcement specifically

What was also apparent in the literature, is that the driving factor for behavioural change was not enforcement per se, but rather the perceived risk of receiving a financial penalty. This highlights that the primary intention of fines is preventative, and to act as a general deterrent to the community, rather than a specific deterrent to an individual offender. Notably, the public's perceived risk of receiving a littering fine is very low. We think while evident to most people, this is vital to keep in mind, as it is easy to slip into a mindset where performance metrics for enforcement focus on revenue or the number of penalties issued, rather than what we're actually to change: perceived risk.

One barrier identified from our interviews and surveys was difficulties with issuing face-to-face fines. Authorised officers frequently report resourcing limitations for on-the-ground enforcement, difficulty in eliciting ID from



offenders, and find the process of issuing penalties administratively burdensome. Despite this, face-to-face fines are more likely to be paid on time - remotely issued fines are paid 25 days later on average. We think this is a good indication that personal interaction in enforcement is more effective - there are lots of reasons why this could be the case (e.g. stronger emotional response, chance for education, more concrete evidence, and closer psychological proximity to the event).

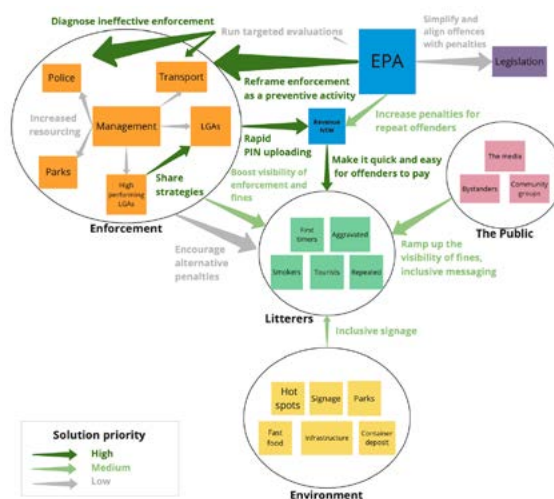
We also identified issues with payments themselves. A surprisingly large number of litter-related fines (49%) were not paid on time. (Some organisations had substantially lower payment rates - which raises the question of why their enforcement strategies are less effective.) Fines that were paid on time were still paid 41 days after the offence, on average. Fines that were paid late were paid on average 150 days after the offence! These delays create enormous psychological distance between the littering behaviour and the punishment that is meant to deter that behaviour - and there is considerably literature that shows that these delays make learning extremely ineffective. Importantly, the offenders aren't necessarily to blame for late payments. Most penalty payments only become available three days after the offence. When the ideal is that the punishment swiftly follows the offence, even these delays are likely to render a fine less effective.

When we spoke to authorised

officers and fine recipients about the value of fines, we found mixed opinions about whether the fine amounts were too small or too large. What was clear from the data is that a vast majority of fines (with over 40 unique offence codes) cluster into only two amounts. We think this might be partly responsible for recipients' confusion or frustration that the fines they received weren't proportional to what they thought their offence should attract.

## WHAT CAN WE DO TO MAKE ENFORCEMENT MORE EFFECTIVE?

The findings above shed light on the complexity of litter enforcement - and point to barriers that need to be overcome before we can concretely ask the question of whether enforcement is effective.



Solution map

It's clear that there are some deficiencies that, if overcome, are quite likely to make enforcement more effective.

For example, making fines quick

and easy to pay. We know that financial penalties are more effective if paid immediately after an offence. Smaller value fines, on-the-spot fines, and payment plans could all help to increase the effectiveness of a penalty in punishing the offence.

We also think that the financial cost of a penalty should signal its societal cost, and this can serve dual purpose as an educational tool. By better aligning offences with penalties, it sends a more precise message to offenders, and can make the penalties feel justified.

In order to help authorised officers overcome difficulties issuing penalties, centralised directives can help provide skill-sharing, training, and resources for local enforcement. Keeping the goal of deterrence in mind, reframing enforcement as about increasing visibility rather than issuing penalties might compel more organisations and agencies to prioritise anti-litter strategies.

Finally, we think there are specific operational factors that are a good target for a robust evaluation. We can look at relatively closed environments, like train stations, for field studies to assess what works and what doesn't work to increase the perception that an individual could be fined for littering.

The good news is that litter counts are decreasing, and we are gradually moving toward our goal of eradicating littering behaviour. All we need is a little more of a nudge to get there.



# Computer says no: Using journey mapping to improve the experience of 50,000 community litter reporters



Alice Morgan

NSW Environment Protection Authority

If you see someone littering from a vehicle in NSW, you can report them to the NSW Environment Protection Authority (EPA). The EPA will then review this report and a fine of \$250 for individuals and \$500 for corporations may be issued.

The Report to EPA application was launched in February 2015. As at May 2021, it has seen 56,900 members of the community register, with 75,700 reports made and 46,000 penalty notices issued by the EPA from those reports.

The EPA saw that there were some issues affecting the user experience, and after five years in production, it was time for a much-needed update to the Report to EPA application.

The website interface and backend applications were out of date with limited technology support. This included multiple handoffs, system transfers and various communication channels. It was a complex process that made acting on reports onerous. These online transactions could be streamlined by simplifying the process.

Community reporters were not compelled to interact with the platform due to its barriers. The application did not align to the behaviours of a person reporting an incident, which then limited the usage and organic growth of the application.

In response, a Customer Journey Mapping project was undertaken. This used qualitative research to gain an in-depth understanding of reporters' behaviour, their

experience using the application, and what would better meet their needs.

From speaking to 20 reporters and members of the community, the EPA better understood their behaviours, motivations, goals, needs and frustrations. Reporters told us their pain points and confirmed common complaints received by the EPA.

This identified that:

- Reporting for the majority of participants involved a degree of emotion, both as a trigger to report but also as a sustained feeling that drives reporters to a range of behaviours.
- Reporters either report because they feel a strong sense of community or justice that is violated when they observe others littering. Or, if they're more rationally driven, they report because they see it as their positive contribution to the environment.
- Registration and login were a barrier. Reporters needed to complete their own details first before the car registration of the offender.
- The emotional nature of reporting means that there is a limited window within which people will lodge a report. The longer a reporter has to wait between seeing an incident of littering and being able to report, the more likely it is that they will become distracted, forget, or deprioritise their report because the emotional

impetus to do so will fade.

- The map feature was redundant. Once the reporter had reached the point of inputting the location, they were far from the point of where the incident initially occurred. The map was used to confirm visually the reporter was where they thought they were at the time, especially in an unfamiliar location.
- When reporting for the first time, participants were often unaware of the detail that was needed. Users couldn't scan through the questions first to see what was required of them and so did not capture all the details at the time of the incident.
- Evidence is important to some reporters - photos and videos acted as a deterrent for contesting a report. Uploads of photo and video need to work in the same journey. Going to court causes anxiety for reporters, and they see evidence as a way to protect themselves
- Most importantly, reporters wanted feedback. They wanted to know if the EPA did something with their report, or if the person received a fine. They wanted to be rewarded for their effort. The lack of feedback deterred reporters to maintain motivation in consistently reporting. Without feedback there was no recognition that their efforts were resulting in something positive and it was worth their time.

# Computer says no: Using journey mapping to improve the experience of 50,000 community litter reporters

Continued

The new application shifted the input of reporting data to the beginning of the process to allow reporters to offload unfamiliar information straight away. The requirement for a password was removed, and now SMS verification is utilised. It follows a choose your own adventure format. A user can now click anywhere to complete their preferred information first, and it saves as they go. It also has a save and continue later function, so

a reporter can submit a previously completed report.

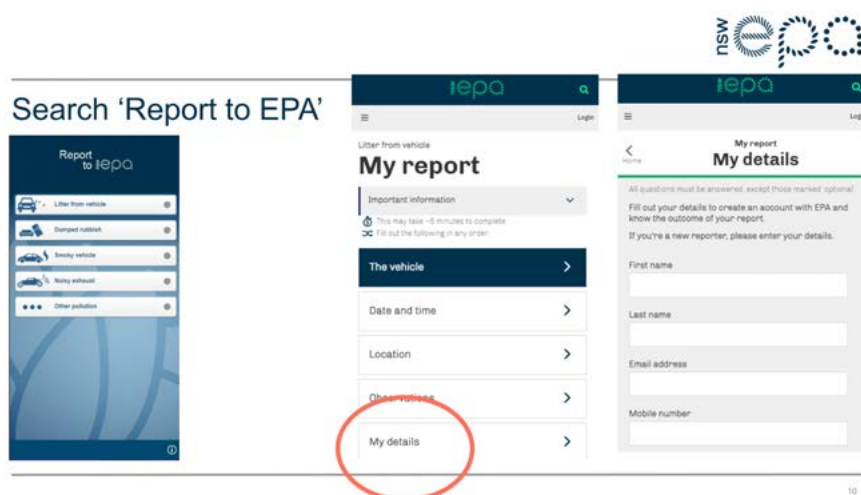
The application is now fully accessible and secure. The platform is responsive and supports capabilities users are familiar with. This includes native device features, and the NSW Government Digital Design System. The EPA closed the loop. Reporters now get the valuable feedback they were asking for, every step of the way.

The success of the application and its design elements have improved the customer experience. The EPA receives around 20 reports per day.

Success means there are reduced community complaints due to improved usability of the application. There is effective engagement with reporters through the system by providing feedback on outcomes of reports made.

There is less burden placed on the EPA's Enviroline and IT department responding to community requests for application or technical support. The EPA is now gaining more opportunities to register and maintain an active community of litter reporters.

The EPA's vision as a world class regulator is being strengthened by having a high-profile, customer-first application that works effectively.



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**SUSTAINABLE CITIES**

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[www.kabnsw.org.au](http://www.kabnsw.org.au)

# Comparing land and marine litter counts to understand the litter journey



**Edwina Foulsham**

NSW Dept of Planning, Industry and Environment

- 1: NSW Dept of Planning, Industry and Environment
- 2: National Marine Science Centre, Southern Cross University, Coffs Harbour
- 3: The Tangaroa Blue Foundation
- 4: Hunter Local Land Services

Every three months, the NSW DPIE studies the quantity of litter found in NSW coastal waterways to understand the broader impact of litter on the marine environment. The Key Littered Items Study provides a measure of the amount of litter found in estuaries. Comparing this data with terrestrial litter counts provides a rich story on what litter from land, flows into our waterways. This ongoing study continues to inform litter prevention strategies led by the NSW Government and key stakeholders.

## THE KEY LITTERED ITEMS STUDY (KLIS)

The Key Littered Items Study (KLIS) is a long-term monitoring project involving the scientific assessment of marine debris in urbanised estuaries and on remote ocean beaches.

The KLIS, starting in 2017, is a collaboration between NSW DPIE, NSW EPA, Southern Cross University, Tangaroa Blue and Hunter Local Land Services. It provides the key evidence base for debris in the marine estate and monitors the impacts of management actions e.g. CDS. The study provides information at local, regional & state-wide scales and is used to identify problem debris items. The KLIS is currently the NSW Governments only active

litter monitoring program and is being used to inform future management & policy.

## URBAN ESTUARINE ENVIRONMENTS

Ten mangrove dominated sites along the NSW coast are located downstream from well populated urban catchments and the sites are spread between local Land Service regions. Each site contains 4 transects of 20m, in which a litter survey is undertaken every quarter at low tide so all litter that is collected across the entire intertidal zone. All debris items >/+ 5mm are collected, classified and counted using a system that includes, and expands upon that or both the NLI and the TB AMDI database.

## Using terrestrial litter counts to marine debris monitoring to investigate the litter journey

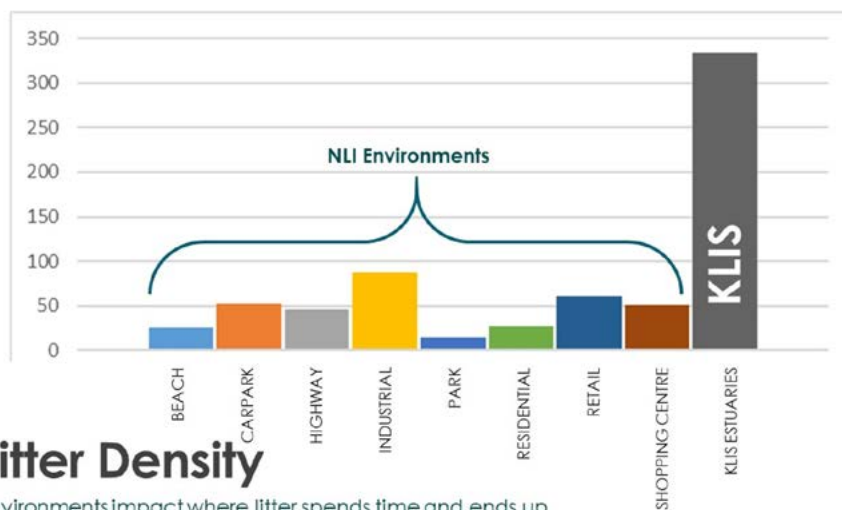
Urban estuaries accumulate a significantly higher density of litter items (items/per 1000m<sup>2</sup>) than is

found in terrestrial environments surveyed in the NLI. Over the period of the KLIS debris densities have been anywhere from three to 30 times more in estuary sites than in NLI environments. Figure 1 shows the long term averages of densities by environment over the course of the KLIS and equivalent NLI litter surveys.

## Comparisons between litter and debris monitoring programs can provide insights into processes and varied issues

Table 2 compares statistics for different items or groups of items between the KLIS debris surveys and NLI terrestrial surveys. These similarities and differences provide insight into the litter journey and highlight distinct priorities for the different environments.

The most commonly found items in both KLIS and NLI environments are detailed in Figure 2. This shows both similarities and differences between the litter/debris found. Notably different



## Litter Density

Environments impact where litter spends time and ends up

Figure 1: Average annual density of litter items/ 1000m<sup>2</sup> in NLI environments and KLIS urban estuary sites, 2017-2019.

# Comparing land and marine litter counts to understand the litter journey

Continued

ITEMS		NLI (2019)	KLIS estuaries (2019)	
PLASTIC	(all)	61%	88%	
	Cigarette Butts	37%	3%	Cigarette butts can get caught in leaf litter, get heavy with filtered sediments etc. as they are in the water. This causes the butts to sink rather than float with other plastic items
	Plastic Items	24%	42%	
	Fragments	0%	43%	Mechanical action of the water, storm water, tides etc. contribute to the breakdown of plastic items in the water
PLASTIC BAGS		1%	18%	These bags are highly mobile and tend to accumulate in estuaries, mangroves etc.

Table 2: Percentage of Litter Items types in Urban Estuarine Sites in NSW: Comparative statistics with NLI data

is the dominance of cigarette butts in the NLI, the dominance of fragments in urban estuaries and the two environments both have a significant issue with confectionary and snack wrappers.

## MARINE DEBRIS MONITORING FOR MANAGEMENT

### Grey Single Use Plastic Bags

The KLIS has enabled us to monitor the ongoing impact of the voluntary single use bag ban implemented by Woolworths and Coles in 2018. Figure three

demonstrates the reduction in the number of grey plastic bags that have been found since the implementation of the voluntary ban.

### KLIS: Informing Policy

The KLIS is currently being used to support ongoing management and assessment of marine debris initiatives including the following.

NSW EPA

- Upcoming revision of the litter prevention strategy
- Monitoring program and

tracking progress to reduction targets

- NSW plastics plan

The NSW Marine Estate Management Strategy:

- THE KLIS is a Key Performance Indicator for monitoring initiative progress
- The KLIS is informing the marine 'Don't be a Tosser' campaign
- The KLIS is providing data for a marine debris specific threat and risk assessment in NSW

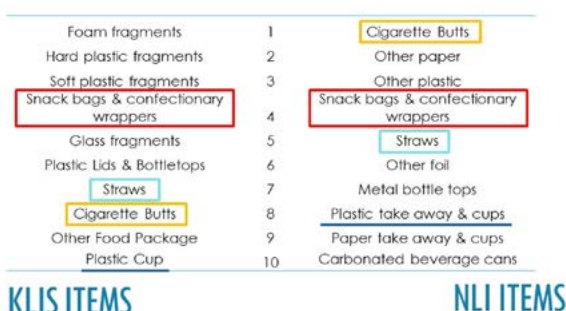


Figure 2: Top 10 littered items in 2019 - KLIS and NLI

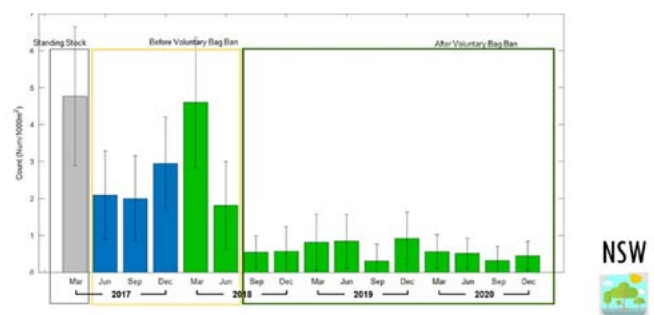


Figure 3: Average count/1000m² of grey plastic bags found in urban estuary sites since the beginning of the KLIS.

# The Buses, Trains and Automobiles Project – Frustration came before the achievement



**Brandon Andrei**  
Blacktown City Council

## THE BLACKTOWN TRANSPORT INTERCHANGE, ONE OF THE GATEWAYS TO OUR CITY

In 2019, Sydney Trains reached out to Blacktown City Council for help. They were experiencing litter issues at the Blacktown transport interchange which incorporated a bus interchange, Blacktown train station, commuter car parks and a taxi stand. The littered appearance gave people a poor first impression of our City, so we were happy to assist.

After having an initial site meeting with Sydney Trains, the solution seemed simple. We needed to upgrade the bins, install signage and undertake engagement and enforcement. We put together a project plan, partnered with Sydney Trains and obtained a \$60,000 Round 5 Council Litter Prevention Grant from the NSW EPA.



## WE THOUGHT THIS WAS GOING TO BE A QUICK AND EASY PROJECT TO COMPLETE

However, the project was not as straight forward as we hoped.

We encountered:

- confusion as Sydney Trains and Council had been emptying and maintaining bins at the bus interchange for years as neither organisation knew who owned them
- a clash of bin styles and design standards. The project came to a halt whilst we worked out whose bin was to be installed
- a possible solution to a long-standing problem where approximately 100 trolleys a day were being left at the bus terminal and at the taxi stand. After much effort and



negotiation, we got the major supermarkets and shopping centre to work towards installing a trolley wheel lock system

- a global pandemic which put many aspects of our project on hold. This included community service clean ups, enforcement and engagement. We also encountered an influx of littered facemasks during the height of the COVID-19 pandemic
- a difference of opinion within the state government departments on our advertising and signage plan. This meant we needed to develop a Plan B and focus our efforts on Council land and target cigarette butts instead.

## BUT THROUGH THIS FRUSTRATION THERE IS ACHIEVEMENT

The project has already resulted in:

- an average of 50% litter reduction across the site
- replacement of 15 small bins with 34 large, general waste and recycling bin enclosures
- clarity around land ownership and responsibilities resulting in an improved cleansing regime
- collaboration with Corrective Services where a group of offenders work off their community service hours by picking up litter at the Blacktown transport interchange, every Sunday

# The Buses, Trains and Automobiles Project – Frustration came before the achievement

Continued

- a possible solution to the longstanding abandoned shopping trolley problem
- excellent working relationship between Sydney Trains, SUEZ, Corrective Services and Council
- joint engagement events with SUEZ, engaging with 461 commuters
- 811 reusable water bottles, reusable coffee cups and messaged phone wallets given away to reduce the littering of single use items
- 240,000 people engaged through our Facebook litter prevention campaign
- 16 littering fines and 5 warnings issued
- a solid Plan B to reduce cigarette butt litter on Council land resulted in 9 cigarette butt bins and 72 pavement decals purchased to guide smokers to the soon to be installed butt bins.



This project will conclude shortly and we are excited to find out what the results of our final local litter checks will be.

We thank the NSW Environment Protection Authority for funding this project through a Round 5 Council Litter Prevention grant.



# Tackling New Year's Eve Litter at Sydney Harbour for Good: Genius or madness?



**Joanne Taranto**  
Good for the Hood

*Event litter is an ongoing challenge for councils and event managers to tackle. Can place based approaches with a social purpose enhance attendee compliance? What about if you add a statewide natural disaster and almost complete darkness into the mix?*

New Year's Eve at Clarke's Point in Woolwich is a popular community event supported by Hunters Hill Council every year. The event attracts up to 15,000 local revellers across foreshore parks who picnic from early afternoon into the evening. The event is ticketed and passes are highly sought after. The nature of the location and event can mean it generates large volumes of litter. Event bins are provided by council waste contractors, however significant cleansing has been required in

previous years after the event, to clean up the park. Giving the proximity to waterways, the risk of marine pollution is significant.

Large numbers of eligible containers under the NSW Return and Earn scheme are also expected at the event as attendees bring their own food and beverages. This has contributed as one of the more littered items at this time of year. Good For the Hood were contacted to provide an event litter solution and all was set for success. That was until 2019 threw everyone a rather large, fiery curveball.

## DISASTER STRIKES

New Year's Eve 2019 was book-ended by some of the worst bushfires in living memory for the residents of New South Wales. Burning since September 2019 and well into March 2021, more than 46 million acres and at least 3,500 homes were destroyed in what felt like a natural disaster of apocalyptic proportions. Sydney was not immune and the weather on 31 December 2019 was some of the worst Sydney had experienced during the nightmarish season. Visibility and air quality due to smoke was at an all-time low, temperatures had hit over 43 degrees Celsius by midday and at 6:00pm, a large southerly buster hit the harbour with wind gusts up to 45km/h.

## WHAT WAS THE PLAN, STAN?

Good For the Hood's planned their involvement into three

components leading up to the event:

- A (wo)manned event education station with custom recycling and litter education materials targeting the jovial New Year's Eve crowd
- Roaming Bin attendants dressed in hi vis with "Ask me to talk rubbish" on their backs; and
- A public post-event clean-up which brought community groups and the public together as a charity fundraiser.

## BLOWN AWAY BY THE RESPONSE

An event marquee station was set up with recycling information, a sorting activity and flyers.

For the first three hours, answers were provided to attendees who started to arrive about their frequently asked recycling questions, how they could reduce their domestic waste and how to dispose of problem waste items appropriately.

The NSW EPA's 'Report a Tossler' program and Community Recycling Centres were also spruiked. Several hundred interactions were had in those early hours, but at 5:45pm the wind hit. Tents were blown away, equipment snapped and bins toppled. The education tent was quickly dismantled, and after a regroup, it was decided onsite education would have to continue (as best as possible) using the roaming bin attendants.



# Tackling New Year's Eve Litter at Sydney Harbour for Good: Genius or madness?

Continued

## CAN I TAKE THAT FOR YOU?

Mobile bin attendants were the real hit of the event. Moving between the crowd and helping revellers collect their waste was half the battle in managing onsite litter. Punters used small bags which were provided to them at arrival and then sorted the waste as the bin attendee visited their spot. As the event was winding down,



the attendants were positioned alongside the most frequently used exits to assist the revellers to sort and dispose of their rubbish properly. It's amazing how good even intoxicated people can be at source separation.

Attendants also provided opportunities for questions and suggestions for which bin waste should go into. Where an error had been observed, attendants

would move the items into the correct bin, but made a joke of it and were always quick to celebrate when people got it right. Close to 1000 interactions were had with attendees by the five staff and three volunteers for the New Year's Eve portion of the event. In the darkness, it was hard to see the impact of the efforts, but this became clear in the light of the next day.

## CLEANING UP FOR GOOD

A New Year's Day clean-up was another unlikely success. Who really wants to get up at 8:00am on New Year's Day to face the mess of drunk revellers from the night before? That's when the amazing charity partners and 24 volunteers came in.

Three New Year's Day sites of Henley Reserve, Kelly's Bush and Clarke's Point were all targeted. Local Charities, Generous and the Grateful and the Tzu Chi Buddhist community from Eastwood provided the majority of volunteers. The collected refunds from the eligible return and earn containers were donated to these groups.

Five wheelie bins of landfill and recyclables were collected from the three sites. Despite having the highest number of people, the littering rates were lowest at the Clarke's Point site where Good for the Hood staff had been mostly positioned. The most heavily littered area was the car park area between Clarke's Point and Kelly's Bush where there had been

far fewer people, but very few appearances by litter attendants.

## SO WHAT?

Despite inclement weather, a looming natural disaster, low visibility, high numbers of intoxicated revellers and an exposed and difficult to access site, the efforts were still successful at ensuring event litter rates were down.

The model also enabled community engagement opportunities. Council was already going to have to foot the bill for cleaning up, but this way also helped meet a number of their Community Strategic Plan objectives.

The use of Bin Attendants improved littering rates significantly. There was also no contamination of the 1700 collected Return and Earn containers.

The Clarke's Point site, that had bin attendants and had the lion share of attendees, had the smallest amount of post event litter. Contrast this with the small pocket park at the top of Woolwich Road where there were no bin attendants and far fewer revellers, over 2500 pieces of litter were collected from a small 20 square metre pocket park alone. Bin attendants were also useful to identify areas of anti-social behaviour and were able to alert Police officers on two occasions of issues which were unfolding.



# Tackling New Year's Eve Litter at Sydney Harbour for Good: Genius or madness?

Continued

## WHAT NOW?

Good For the Hood would argue that tackling litter during an event is not only a fantastic opportunity but it also allows for other unintended benefits. Waste education in a fun and relaxed setting with community by attendants who are there to support, not judge, is a great way to improve compliance. By connecting charitable partners at any opportunity, this also brings other for-purpose benefits for all.

The real question is, would we sign up to do it again? You betcha. You bring the bins, and we can help your community make sparks fly.



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# Insights on verge litter in industrial areas



**Sue Burton**  
Cooks River Alliance

## LITTER IN THE COOKS RIVER

At first glance, the Cooks River looks like the most littered waterway in Sydney. The combination of a highly urbanised concrete catchment and a narrow channel means that rain pushes litter quickly into the river where it is more visible than in other larger waterways across Sydney. While there is a large volume of litter removed weekly from the river, a significant amount of fugitive litter is not captured.

## CLEAN STREET CLEAN CREEK

This project sought to reduce the litter load before it reached the river and its tributaries.

The overall target was a 40% reduction of litter in the project areas as measured through the Local Litter Checks.

The project was on Coxs Creek in the industrial areas of Strathfield South and South Lakemba within Strathfield Council and the City of Canterbury Bankstown. It was coordinated by the Cooks River Alliance.

All businesses in the industrial areas were invited to take a responsible role in waste management of shared public spaces, specifically, the road verges fronting their premises. The project aimed to engender responsibility, stewardship and pride in the local streetscape.

Clean Street Clean Creek found that contributing to a bigger project was important to businesses. Personal engagement was the most appropriate method to engage with businesses to

reduce litter on the verge.

Businesses reported that a clean verge was good for business.

The project incorporated the following methods:

- Local Litter Counts and Rapid Verge Assessments
- Introduction letters delivered to businesses in Lakemba and several newspaper advertisements across both LGAs alerting the public to the campaign
- A direct engagement strategy, incorporating education, three staged questionnaire surveys, action plans, monitoring and acknowledgment of positive behaviour. Owners, managers and representatives of businesses were targeted
- Don't be a Tosser, report to EPA, messaging installed on Amber VMS signs targeting itinerant users of the industrial area (parking, drive through, lunch break) multiple weeks duration
- Installation of 'Don't be a Tosser' banners on local buses, side and back. Thirty-two weeks duration
- Installation of 'The drain is just for rain' decals on drains and curb sides
- Don't be a Tosser (Sami) corflute posters placed on 'Clean Street Champion' business frontages to demonstrate both business support and how a clean street verge should look
- Provision of butt bins to engaged and interested businesses



Coxs Creek confluence with Cooks River and South Strathfield Industrial area



Litter Boom Hurlstone Park, Cooks River



Top & bottom: Project promotion and awareness



## INSIGHT ONE: UNDERSTAND THE BUSINESSES

Who were the businesses? An initial face to face survey was done with each business manager or owner. This revealed that of the 208 properties approached, there were 176 that were occupied and 120 potential businesses for the project. Ultimately, 46 businesses completed the three surveys and full project, around 38% of the available businesses.

Some of the initial data collected was:

- business size by number of employees (most were under 20, a few over 50)
- length of time in the business
- ownership of the property
- use of social media (highly variable)
- type of business (50% warehousing/distribution)

## INSIGHT TWO: UNDERSTAND BUSINESS VIEWS ON LITTER AND VERGES

Clean Street Clean Creek sought to understand the businesses perceptions of litter, the drivers for actions and any changes over the course of the project. The three face to face surveys tracked the initial intentions and perceptions, intentions to act and resulting actions and finally the resulting changes in behaviour. These surveys were developed and interpreted by an external project evaluator.

Survey One asked about the perceptions of litter in the industrial area, whether they

maintain the verge and what more would they do.

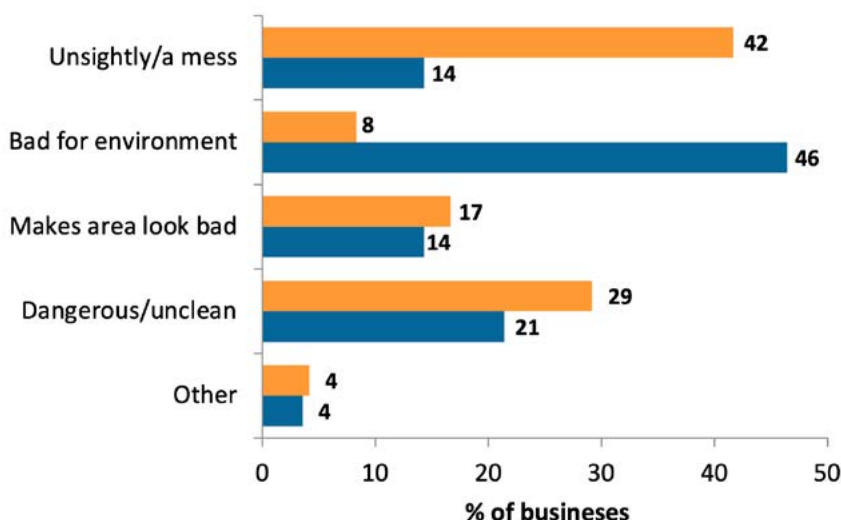
The following reasons were given by businesses who considered verge litter to be a problem.

The most common reason businesses in Lakemba thought litter and rubbish on verges is a problem is that it is unsightly, while in Strathfield the concern is that it is bad for the environment. Health and safety issues are secondary

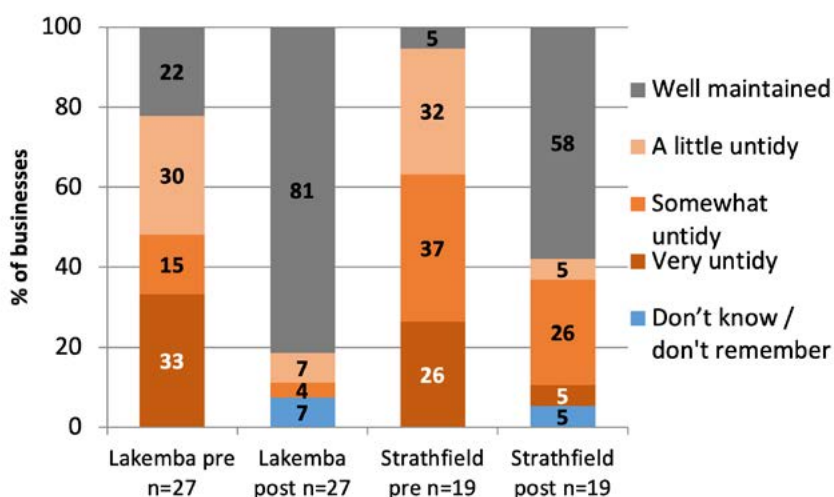
reasons in both areas.

Businesses in both areas were most likely to think the litter and heavier materials came from others, such as people passing through. Businesses in Strathfield could identify a broader range of sources and were more likely to put responsibility on other businesses.

Most businesses stated that, prior to the project, they did something



Business views on litter and verges (orange is Lakemba; blue is Strathfield)



Perceptions of general verge tidiness in their area at the start and end of the project (from businesses completing the project)

to maintain the verge and that they did this mostly because it was the public face of the business or that they like it clean and tidy. Most thought that the industrial area generally had some degree of untidiness.

### INSIGHT THREE: ESTABLISH INDEPENDENT DATA

Along with business perceptions and knowledge the project collected data about each business's verge condition through two Rapid Verge Assessments (RVA).

Clean Street Clean Creek provided

all businesses with a pre project RVA result via letter and in person. Following the first visit Councils then mowed the verges and cleaned up any litter or dumped material.

The RVA's showed a mixed response over the entire project area with a slight decline in RVA ratings across the 46 businesses who participated in the full survey aspect of the project.

Concurrently, four hotspot Local Litter Count events were completed. For Strathfield South, the average hotspot loads decreased by 65% in volume and

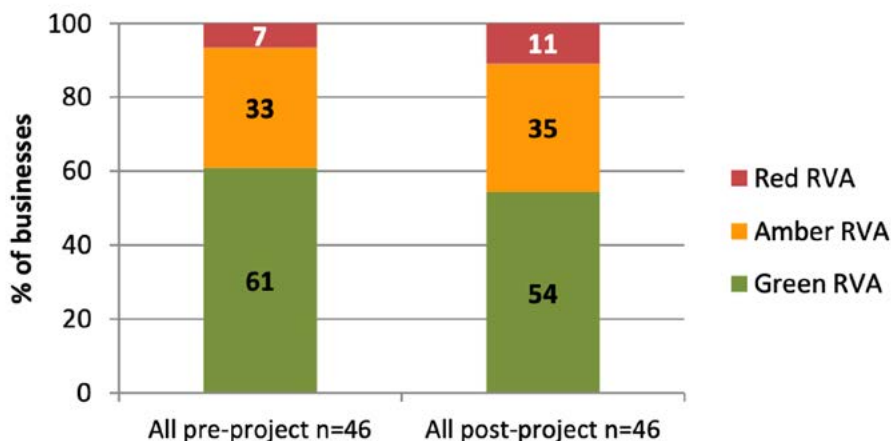
63% in items from the November 2017 to April 2019 surveys. For Lakemba, two hot spot sites exhibited a combined litter reduction of 78% in volume and a 59% decrease of litter items from

November 2017 to April 2019 surveys.

Both the RVA and Local Litter Counts were done at points in time and as such were dependent on weather and any other activity. Both need to be done regularly to establish changes or patterns over time as litter in industrial areas is inherently variable.

Green	Amber	Red
<ul style="list-style-type: none"> <li>No litter found on verge or kerbside</li> <li>Mowed grass on verge</li> <li>Verge is visibly maintained well and is safe</li> </ul>	<ul style="list-style-type: none"> <li>Little attempt at verge maintenance</li> <li>Small pieces of litter sporadically distributed across the verge</li> <li>Business waste on verge</li> </ul>	<ul style="list-style-type: none"> <li>Unkempt and unsafe verge</li> <li>No attempt at verge maintenance</li> <li>Zero attempt at litter management</li> <li>Litter from premises evident on the verge and street</li> <li>Litter surrounding stormwater drain</li> </ul>

Characteristics of the Rapid Verge Assessment



Pre- and post- RVA results

## INSIGHT FOUR: PROVIDE ACTION PLANS AND SUPPORT

Each of the 46 participating businesses received a Clean Street Clean Creek Action Plan relevant to their own verge. A Champions Plan was developed for the 27 businesses with a Green pre-project RVA. Most businesses reported that the plan was understandable and committed to implementing the actions that were no cost or low cost.

## INSIGHT FIVE: FOLLOW UP AND EVALUATE

Clean Street Clean Creek businesses completed a final survey at the end of the project. This provided information on the activities, challenges, the changes in perception of litter and the value of the project to each business.

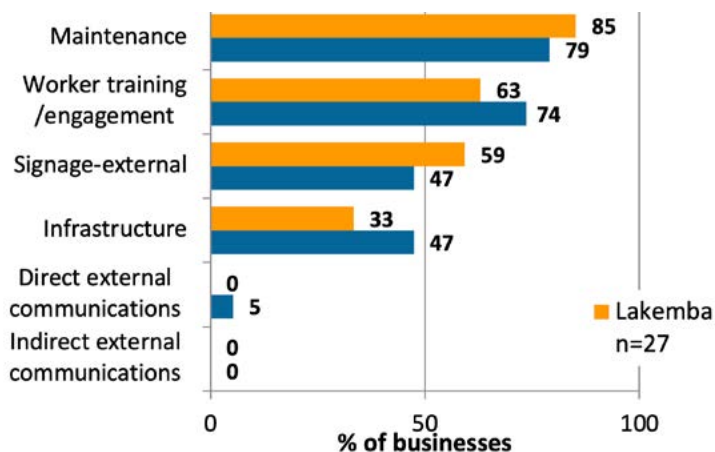
There was an increase in businesses who thought that the verge tidiness had improved. This was supported by the Local Litter Check data that showed a reduction in volume and numbers of littered items. Interestingly the final RVA showed a decline in green RVA's.

Most businesses, in accordance with their intentions, reported that they undertook maintenance activities. Installation of suggested infrastructure was the least carried through from intention to action across the project.

By the end of the project, the key driver for verge maintenance across both areas was a perception that clean and tidy verges were good for business.

Category	Possible actions
Infrastructure	Provide additional waste bins; general and/or recycling
	Request and install butt bins
	Reorganise loading/unloading areas to minimise escaped materials
	Install bin signs
Maintenance	Mow verge grass regularly (frequency according to season)
	Check footpath, grass and gutter for rubbish each day/week
	Empty bins to waste bins regularly (before they overflow)
	Clean up at least once/week
	Store stock completely within the business property
	Keep going doing a great job maintaining the area
Worker training /engagement	Train workers to avoid litter in loading/unloading goods for the business
	Communicate with and encourage workers to use the bins provide and taking pride in the business' exterior appearance.
Signage	Display project participation certificate
	Display 'Hey Tosser' signage
	Install instructional bin signage
External communications	Talk (or otherwise communicate directly) with other businesses in the area about keeping rubbish off streets.
	Call Council to report dumped rubbish
	Call Council to report broken or dangerous footpath, bollards etc

Sample actions that could be undertaken



Actions undertaken by business

Takeaway containers and plastics were the most commonly cited type of litter businesses see most in Strathfield, whereas Lakemba businesses cited a broad range of items, including some significantly larger and heavier than takeaway containers but both areas saw the source of the litter predominantly as being passers-by.

### WHAT DID WE LEARN?

- Industrial areas are complex by nature with mixes of large and small properties, industrial parks and standalone businesses. There can be substantial turnover of lessees, contributing an itinerant component to the industrial area community

- Business types that have a public interface as part of their commerce, tend to have cleaner, less littered verges. Littering may be happening but these businesses clean it up
- Business attitude to litter within an industrial area is highly variable
- Behaviour change and reduction in littering is likely dependent not just on local business attitude but also itinerant visitor and wider community attitude
- Commonplace illegally dumped material reduces the broader care factor for verge condition and may increase littering behaviour
- Increased compliance activity in combination with other strategies is possibly critical to ongoing successful outcomes in industrial areas.
- The success of engaging and involving businesses who have highly littered, poorly maintained verges, is much lower than those with intermediate or well-maintained verges
- Local litter counts on their own, if carried out in limited numbers, may not be a reliable measure of change for a much larger area that is shown to be highly variable in litter loads
- It is likely that locally existing litter loads are highly dependent upon the maintenance regime of businesses and their willingness to clean up after 'others'

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# Developing a Framework for Microplastic Litter Reduction across NSW



Dr Michelle Blewitt Dr Scott Wilson  
& Kylie Tymoszuk  
AUSMAP

**M. Blewitt<sup>1</sup>; K. Tymoszuk<sup>1</sup>; S. Wilson<sup>1,2</sup>**

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<sup>2</sup> The Litter Lab, Department of Earth & Environmental Sciences, Macquarie University, Sydney

Plastic pollution is an ever-growing problem and with at least 80% of this pollutant generated as litter from local sources (Willis et al. 2017), it is important to understand the sources and pathways to better manage the issues. One form this plastic pollution takes is as 'microplastics' (<5 mm in diameter) which are either from the break-up of larger items or the direct discharge of microplastics (e.g. pre-production resin pellets). These microplastics are known to be ingested by a range of aquatic organisms, from plankton through to whales, and can cause potential harm (Wright et al. 2013). To be better informed about the risks of microplastics it is critical to measure and quantify their sources and sinks.

The Australian Microplastic Assessment Project (AUSMAP) is seeking to do this by engaging high-schools and local communities to collect scientific data on the prevalence of microplastics or 'hotspots' in Australia's aquatic environments (both marine and freshwater) through a standardised practical citizen science methodology. AUSMAP, managed through the Total Environment Centre in partnership with academic institutions like Macquarie University, trains 'leaders' who then engage their local community and

build the capacity for educating the wider community, businesses and local governments about the plastic pollution problem. This leads to ingrained education and empowerment, and an increased ability to take leadership of these complex systemic problems. This can be achieved by collecting localised data from major sources, such as our cities and towns, and making the information publicly available to the community, industry and decision makers.

Our team of citizen scientists not only quantify microplastics, but help to identify type (e.g. hard fragments, resin pellets, fibres, soft plastics or foam), colour and shape of the plastics; vital to ascertain potential sources and impacts. Plastics are then sent to research partners for microplastic

verification and chemical contaminants analysis. Information is then communicated back to communities via the AUSMAP webpage, social media and online interactive hotspot map.

Since inception in mid-2018, AUSMAP have trained and accredited 736 Leaders in the program at 46 training events across Australia. Our team have designed and distributed 175 field kits and worked alongside over 330 groups, including teachers, environmental educators, local government, research organisations, businesses and community members. Across Australia, we have collected approximately 380 samples, engaged directly with over 8,000 participants, equating to over 35,000 volunteer hours,



Figure 1: Microplastic sampling and AUSMAP community engagement

and removed over 500,000 microplastics from our waterways (Figure 1).

Recently, AUSMAP, in collaboration with partners, has progressed to locate sources of microplastics through a series of catchment-based sampling techniques. The following case study illustrates the process as a model for future application more broadly.

### DEE WHY CASE STUDY

Dee Why Lagoon, on Sydney's Northern Beaches, is a protected wetland, important for migratory shorebirds and as a nursery ground for marine life. In 2019, this lagoon was also recognised as a microplastic hotspot with subsequent sampling demonstrating that different parts of the catchment were responsible for specific litter items. Through a NSW EPA Round 5 Litter Grant, and partnering with Northern Beaches Council, The Surfrider Foundation and Macquarie University, the AUSMAP team investigated the microplastic sources more closely and ran community litter awareness days, including participation for key stakeholders in sampling and analysis, as a way to encourage behaviour change. Stormwater outlet netting and street level drain pit baskets were installed to determine litter sources across different land use types in the targeted catchment (e.g. Low density residential, Recreational and Special use and Light industrial).

The 14 pit traps collectively prevented approximately 450 kg

of debris from entering the local waterway over the eight months of sampling. The majority of this debris (98%) consisted of organic material and soil (Figure 2), indicating that natural substances were also being washed into local waterways and may be a contributing factor for silting up or in-filling of the lagoon. Of the

2% of synthetic debris by weight, over 60,000 micro-litter particles were identified, which made up over 80% by number of the total synthetic load (Figure 3).

There was a high degree of variability in micro-litter between individual traps. Figure 4 illustrated that in one-month, amounts at a site can vary from

### Organic vs Synthetic Weights (Kg)

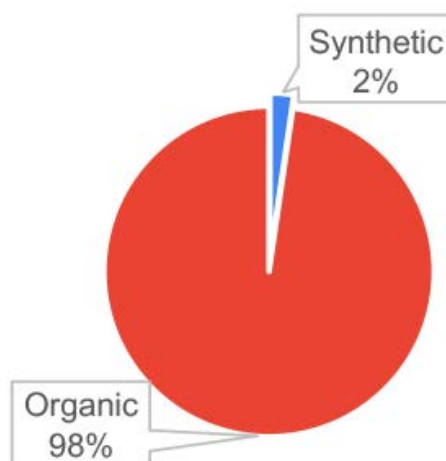


Figure 2: Percentage of types of debris by weight

### Micro vs Macro Synthetic Litter

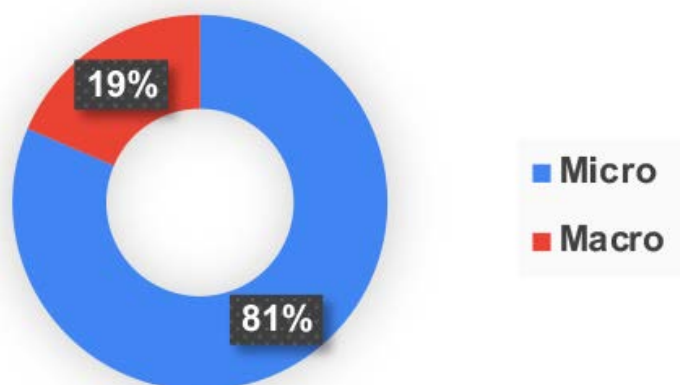


Figure 3: Percentage of synthetic litter by size class



35 to 900 items. The land-use type and the weather over the months influenced the runoff types and amounts. With the sampling conducted during La Nina, these volumes were reflected of an overly wet period in the sample area (> 900 mm falling over the 8 months) and further sampling during dry periods is recommended to ascertain runoff fluctuations more broadly. In the light industrial locations glass, film and foam micro-litter was the dominant types, and the only location where industrial pellets were found. In the locations near to a synthetic field, rubber crumb was the dominant item. In the residential zone, a mixture of items were found including hard plastics fragments. This variability highlights the importance of land-use in determining microplastic sources, and hence sub-

catchment level education and management strategies are recommended for greatest impact.

### CONCLUSIONS

AUSMAP has demonstrated to be a reliable and affordable tool in identifying microplastic hotspots in our waterways, as well as a unique way to educate and inform community and stakeholders of localised plastic pollution issues. The Dee Why case study demonstrated that microplastic can be tracked back to source, and that microplastics are already evident in high loads at the neighbourhood and streetscape level before entering waterways. This highlights that the stormwater system is a major conduit for microplastics and that any management should consider mechanisms to control this form of plastic pollution. The study

also has provided a preliminary model based on nets and traps for reducing litter and microplastics in a catchment that is currently being validated in other areas.

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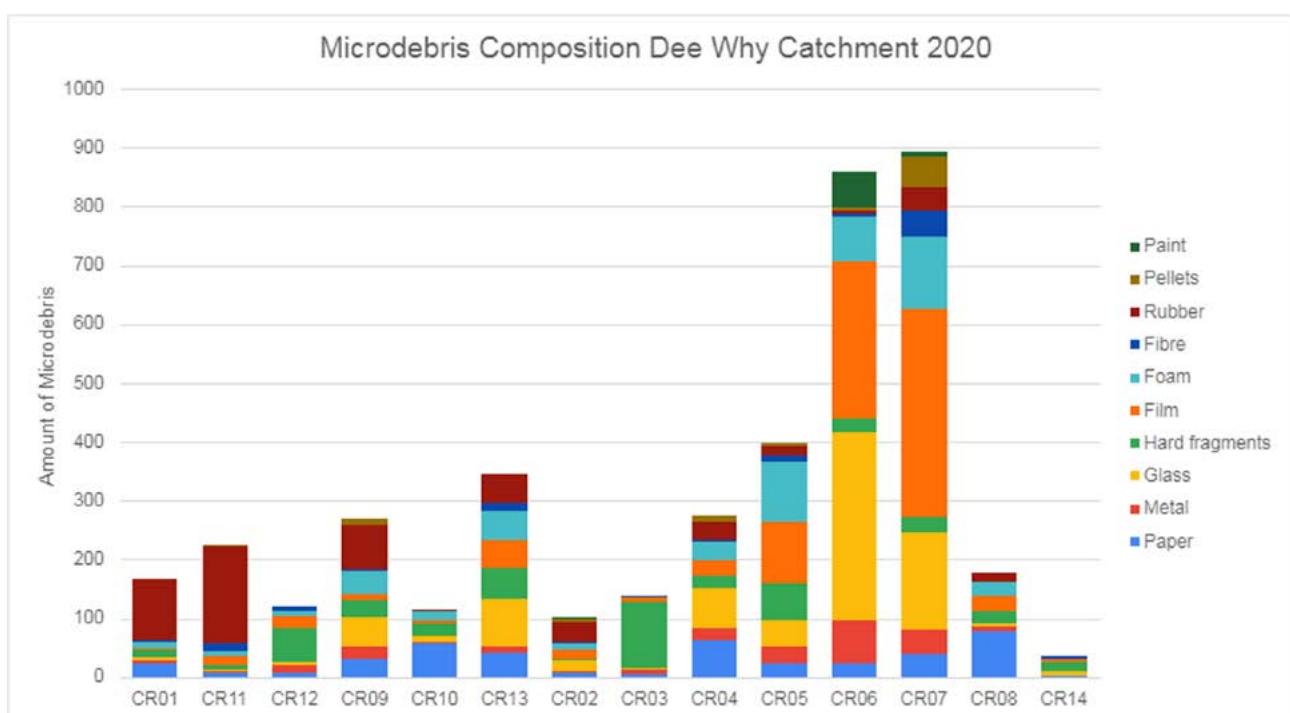


Figure 4: Example of micro-litter amounts and types across 14 sites for a month

# Litter Free Estuaries



**Siobhan Threlfall**  
Ocean Watch Australia

## ABOUT US

OceanWatch Australia (OWA) is the National Marine NRM, we strive to ensure Australia’s marine environment is healthy, productive, valued, and used in a responsible way. Litter prevention is key to achieving our vision.

## BACKGROUND

Estuaries are valuable habitats that provide crucial ecosystem goods and services, support industries, provide nursery grounds for marine species, and create visual amenity. Litter can affect the health and productivity of vital estuarine habitats which can be detrimental to the industries and marine species that rely upon them and can lead to a loss in visual amenity. OWA frequently works with seafood industry and water users on issues relating to the health and productivity of these vital ecosystems identifying litter as a key issue impacting estuaries. In recent years OWA has conducted estuary clean-ups across NSW through our tide to tip program which has helped us to raise awareness of marine debris issues and develop a greater understanding of the dynamics of litter within NSW estuaries. This has led us to the development of the Litter Free Estuaries Project.

## PROJECT AIMS

Through the Litter Free Estuaries project, OWA aims to:

- Develop an effective framework for quantifying and reducing litter in estuaries, targeting litter at the

foreshore, on and under the water.

- Refine the Litter Prevention Framework through pilot study in Brisbane Water.

## LITTER PREVENTION FRAMEWORK

In the development of the Litter Prevention Framework OWA will review existing litter survey types, litter sources, historical data, infrastructure, and monitoring techniques. OWA will also consult with individuals and organisations with local experience in litter prevention.

OWA recognises that there are a variety of techniques currently used to audit the litter found in and around our waterways. Through this project OWA will analyse these techniques, liaising with experienced organisations to determine which are be most appropriate techniques to assess litter in estuarine ecosystems.

The Framework itself will guide users through the following procedures:

- Identifying the most

appropriate survey technique for the scenario or location.

- Identifying typical litter hotspots
- Engaging with local government and other stakeholders.
- Field testing techniques with interested groups and organisations.

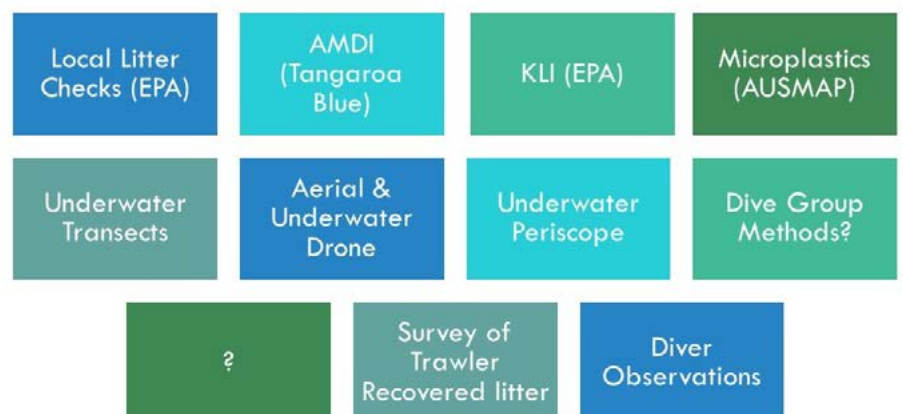
The following procedures are a focus for future work on the framework, however, may not be covered within the timeframe of the current project:

- Determining the source of litter
- Implementing litter prevention measures
- Monitoring and evaluating litter prevention measures.

## PILOT STUDY: BRISBANE WATER

To develop and refine the framework OWA will pilot a study in the Brisbane Water estuary. Through this study OWA will:

- Test the assumptions of the framework in a variety of



Survey techniques

## Litter Free Estuaries

- estuary habitats and areas.
- Investigate different techniques for auditing litter (e.g. Local Litter Checks, Key Littered Items, AMDI) to determine their effectiveness in assessing litter in various scenarios (e.g., shoreline litter, submerged litter, floating litter).
- Gauge an understanding of the litter issues that plague the estuary.
- Collect baseline litter data for Brisbane Water. This data will allow us to track changes in litter into the future and monitor the progress of litter prevention measures.
- Engage local stakeholders in litter prevention activities, including Central Coast Council, community groups, local NGOs, and the local aquaculture industry.

- A method to link estuary litter to terrestrial litter prevention effort.
- Applicable litter prevention initiatives in estuaries across the state.

### ACKNOWLEDGEMENTS

This project is an NSW Environment Protection Authority, Waste Less Recycle More initiative funded from the waste levy.



### LITTER FREE ESTUARIES VISION

OWA envisages the Litter Free estuaries program leading to the following outcomes:

- An engaged and educated community that takes ownership of litter on the foreshore, on the water, and under the water and understands the importance of healthy estuarine ecosystems.
- The availability of a litter prevention framework that seeks a baseline for a poorly understood subset of litter using a variety of methodologies for various oceanic and estuary scenarios (depth, visibility, pollutant, safety).





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