

For a litter-free community

GREATER SYDNEY HARBOUR

REGIONAL LITTER PREVENTION STRATEGY 2021-2030

Draft for consultation



Parramatta River
Catchment Group



**SYDNEY COASTAL
COUNCILS GROUP**

This Greater Sydney Harbour Regional Litter Prevention Strategy (RLPS) was developed by the Sydney Coastal Councils Group (SCCG) in partnership with the Parramatta River Catchment Group (PRCG) with funding from the NSW Environment Protection Authority (EPA). The SCCG has a strong commitment to advancing sustainable management of Sydney's urban coastal and estuarine environment on behalf of their member councils. The PRCG is an alliance of councils, government agencies and community groups working to transform the Parramatta River and its tributaries into living waterways so everyone can benefit from what they have to offer.

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



The project was guided by a Steering Committee consisting of representatives from:

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- Inner West Council
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- Parramatta River Catchment Group (PRCG)
- Sydney Coastal Councils Group (SCCG)

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All images provided by the SCCG and the PRCG unless stated otherwise

Web: [Greater Sydney Harbour Litter Prevention Strategy](#)

ACKNOWLEDGEMENT



We respectfully acknowledge the Traditional Custodians of the Greater Sydney Harbour and also acknowledge other Aboriginal and Torres Strait Islanders who have made the harbour their home. We pay respect to elders past and present.

We acknowledge that Aboriginal and Torres Strait Islander peoples have an intrinsic connection to the land and have cared for country for over 60,000 years. Their lore, traditions and customs have led to the bountiful land, rivers and ocean we all enjoy today. We would like to acknowledge all Aboriginal and Torres Strait Islanders living on the land today.

Image courtesy of Ben Bowen, Shared Path Aboriginal and Torres Strait Islander Corporation

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EXECUTIVE SUMMARY

Greater Sydney Harbour is an international icon and includes the world class Parramatta River and areas of stunning natural beauty along the harbour foreshore and in its catchments. It is a local and international tourist destination as well as a commercial port and has around two million people across 21 local government areas who call the catchment home.

Greater Sydney Harbour's health and beauty is being damaged by litter. When it rains stormwater systems are overwhelmed by the volume of litter carried from streets and carparks and this then overflows into local creeks and waterways. Tonnes of material is captured every year through the efforts of councils, communities, organisations and the NSW Government however a lot more escapes into the broader marine environment. The cost of removing litter from the environment on this scale is currently in the millions of dollars every year.

More litter prevention action is needed in the Greater Sydney Harbour catchment to stop litter at the source before it enters the environment.

The NSW Government has prioritised litter prevention for many years reaching 3% litter reduction and exceeding the NSW Litter target of 40% less litter by 2020. The new litter target of 60% less litter by 2030 and the ground-breaking 30% less plastic by 2025 will continue to lead litter prevention actions in the coming years and should have a significant impact on litter.

Communities also want more action on litter. 82% of respondents to the 2021 Sydney Coastal Councils Group Community Perception on Litter Survey stated that litter is a problem in waterways.

All Councils have responded to this in some way, through planning or by adopting a zero litter to

waterways target. Councils also have many local litter prevention projects on cigarette butts and at public place hotspots. Communities are also doing their part by raising awareness about littered items such as plastic straws and lollipop sticks.

Despite all this activity litter continues to be identified as a major threat to the marine environment and to the Greater Sydney Harbour.

CATCHMENT GROUPS

Two catchment groups in the Greater Sydney Harbour have partnered for a whole catchment approach to litter prevention and to develop this strategy. The Sydney Coastal Councils Group (SCCG) and the Parramatta River Catchment Group (PRCG) together have a membership of 15 of the 21 councils in the Greater Harbour as well as NSW Government agencies and key community groups. They recognise the need for stopping litter entering waterways in the first place by collaborative catchment-wide litter prevention action. Both organisations have begun to implement the EPA's Own it and Act Framework.

The strategy sits alongside other catchment actions to improve the health of the Greater Sydney Harbour. This includes:

- The PRCG's Parramatta River masterplan **Duba, Budu, Barra 10 Steps to a Living River** that aims for a swimmable river by 2025
- The SCCG strategic plan's focus on stormwater
- The Greater Sydney Harbour Coastal Management Program stage 2 study into stormwater led by the SCCG.

The strategy's development was supported by a Steering Committee consisting of three councils

Inner West, Willoughby and the City of Parramatta as well as three community members from Parramatta, Balmain and Scotts Creek Bushcare in Willoughby. A representative of Transport NSW was also involved as well as staff from the PRCG and SCCG.

ABOUT THE STRATEGY

The Greater Sydney Harbour Litter Prevention Strategy outlines a regional collaborative approach for the Greater Sydney Harbour catchment community to contribute to the NSW 2030 target of 60% reduction of litter and 30% less plastic by 2025.

The objectives of the strategy are to:

01

Provide a regional approach to achieve the NSW litter prevention target of 60% reduction in litter by 2030

02

Reduce the volume and incidence of litter entering Sydney Harbour and associated waterways through litter prevention activities

03

Support litter prevention activities within councils and other organisations in the Greater Sydney Harbour catchment

The strategy scope is across the whole of the Greater Sydney Harbour catchment. This includes the sub-catchments of Parramatta River (about 50% of the catchment), Lane Cove River, Middle Harbour and the north and south foreshores of Port Jackson.

The strategy takes a catchment approach to litter prevention because litter is constantly on the move by water, wind, tide and people. It shifts from the land to waterways, the harbour and then out to the open ocean.

LITTER IN THE CATCHMENT

There is a need to better understand litter and litter sources in the catchment and to have more consistent measures.

Litter is described as material up to the size of a shopping bag that has been disposed of in the wrong place. It is also described in the NSW Waste and Sustainable Materials Strategy 2041 as leakage from the circular economy and a valued resource.

The extent of litter in the Greater Sydney Harbour catchment can be estimated by litter capture and measure activities. This data from these activities is variously reported as the number of people attending, or quantified by item, weight or volume. This is collected by multiple councils, community and government organisations. Data is held locally, sometimes shared publicly or reported in media or not fully captured.

The key data collection in the catchment are:

- NSW Maritime's Sydney Harbour Environmental Services team; 2,776 cubic metres of marine debris were removed in 2020
- NSW Key Littered Items Study site at Meadowbank that have identified the type 10 littered items

- Stormwater estimates; between 350-1200 tonnes estimated entering the Parramatta catchment in 2017
- Clean up Australia day events and other community clean-ups; 156 groups participated in the 2021 March Clean Up Day over just three council areas.
- Recent Seabin and AUSMAP data.

The impact of litter in the catchment is not well researched. Litter is held in creeks, mangroves and saltmarsh and washed into the main waterways when it rains. Nurdles from plastic manufacturing have been found on beaches and in the harbour and microplastics measured at multiple sites.

LITTER PREVENTION AND MEASUREMENT IN THE CATCHMENT

Litter prevention policy in NSW is led by the NSW Government. The NSW targets of **60% litter reduction by 2030 and 30% plastics reduction by 2025** have been adopted for this strategy.

All 21 councils in the Greater Sydney Harbour have litter actions. Litter is often part of a broader strategy such as waste and resource recovery, circular economy, clean/green city, environment and waterway health.

Community litter prevention activity is mainly around litter capture and this may be used to raise awareness of a littered item or litter hotspot.

The EPA's litter journey provides a focus for litter prevention activity.



The community want to see industry take a stronger role in the production of items that become litter. The NSW Government is leading actions with the NSW Plastics Actions Plan 2025 and the Waste and Sustainable Materials Strategy 2041.



The community recognise retail outlets and transport corridors as places to prevent litter. Community programs that avoid purchasing at point of sale are active in the catchment and council programs focus on hotspots.



The community had many ideas on infrastructure and cleaning to prevent littering. Councils are continually assessing bin type and placement. Return and Earn centres are reducing containers within the catchment.



There is not enough information across the catchment to understand litter hotspots. The NSW EPA have identified hotspot types and land use mapping in the catchment provides estimates of potential hotspots. The community can identify local hotspots.



There are multiple organisations picking up litter from the catchment contributing to understanding the quantity of litter. More research is needed into the impacts of litter in the wider environment.

The NSW Litter Data framework provides opportunities to incorporate regional catchment litter measure actions into a consolidated framework to better understand the baseline and progress towards the target.

ISSUES AND OPPORTUNITIES

The issues arising for litter prevention across the Greater Sydney Harbour and the potential opportunities for this strategy are as follows:

Litter prevention leadership and governance across the Greater Sydney Harbour

This strategy, led by the SCCG and the PRCG will establish litter prevention governance arrangements that are regional and also sub-catchment/local.

Increased commitment to the litter prevention targets

Consistent commitment will be sought from all organisations to the litter target through the Own it And Act framework. The target will be well communicated and promoted.

Setting a baseline to monitor progression towards the litter target

The strategy is an opportunity to coordinate those who collect litter data at different points on the land and across the catchment. Further monitoring could be established using the Australian Litter Measure.

Gain a better understanding of the impact of litter in the Greater Sydney Harbour catchment

Communicate existing research into litter impacts and seek further research.

Increase litter prevention activities

Implement and support place based community/council projects at the local catchment level that link litter prevention to the health of local waterways and adjacent parks and use the EPA litter prevention resources.

More activity to identify hotspots and hotspot actions

The EPA's resources provide opportunities for training in local litter checks and litter prevention activities. A sub-catchment approach enables communities, councils and others to develop local skills in litter prevention.

Catchment wide litter prevention communications

A publicly available litter prevention website to provide information on activity, stories on what's working, report annually to the community and connect people across the catchment.

GREATER SYDNEY HARBOUR REGIONAL LITTER PREVENTION STRATEGIES

OBJECTIVE	STRATEGIES	ACTIONS
OBJECTIVE 1 Provide a regional approach to achieve the NSW litter prevention target of 60% reduction in litter by 2030.	1. Collaborate for a Litter Free Catchment	1.1 Establish a Litter Prevention Working Group consisting of representatives from local communities and Councils to help identify hotspots and key litter items, and develop and implement initiatives across the region. 1.2 Apply for funding for Regional Litter Coordinators to coordinate regional community litter prevention activities in consultation with key community groups and Councils 1.3 Work with member councils to provide support and capacity building opportunities for local community groups to assist them in delivering litter prevention activities and in sourcing funding. 1.4 Consolidate commitment for the strategy, target and approach.
OBJECTIVE 2 Reduce the volume and incidence of litter entering Sydney Harbour and associated waterways through litter prevention activities.	2. Develop and implement targeted programs and initiatives 3. Develop a shared knowledge base for ongoing litter prevention	2.1 Work with member Councils and community groups to develop and implement place-based action plans for key litter hot spots. 2.2 Work as a region to develop and implement initiatives to address key litter items such as confectionary wrappers, cigarette butts, and takeaway containers 2.3 Utilise annual litter data to identify new hotspots or emerging litter items for ongoing action. Actions 3.1 Create a publicly available online portal for the sharing of information around litter prevention activities for the Greater Sydney Harbour and Parramatta River Catchments. 3.2 Develop a local litter prevention monitoring plan and information sharing hub that can capture relevant data and provide regional context to the NSW Litter Data Framework.
OBJECTIVE 3 Embed litter prevention activities within councils and other organisations in the Greater Sydney Harbour catchment.	4. Promote further litter prevention commitments from key organisations	4.1 Work with member Councils and Community Groups to embed litter prevention targets and directives in their operational plans and policies. 4.2 Work with key partners to develop and deliver education and awareness programs for local schools / industry.

ABOUT THE STRATEGY

The Greater Sydney Harbour Litter Prevention Strategy outlines a collaborative regional approach for the Greater Sydney Harbour catchment community to contribute to the NSW 2030 target of 60% reduction of litter and 30% less plastic by 2025.

The Greater Sydney Harbour Litter Prevention Strategy is for councils and community organisations and other major landholders within the catchment. It invites everyone to work together within their own catchment to prevent litter.

The Strategy aims to identify regional collaborative actions to preventing items becoming litter in the first place, before it accumulates on streets, in drains, in creeks and rivers and in Sydney Harbour.

The objectives of the strategy are to:

01

Provide a regional approach to achieve the NSW litter prevention target of 60% reduction in litter by 2030

02

Reduce the volume and incidence of litter entering Sydney Harbour and associated waterways through litter prevention activities

03

Support litter prevention activities within councils and other organisations in the Greater Sydney Harbour catchment

The strategy was developed in close collaboration with staff from Inner West Council, City of Parramatta, and Willoughby Council and community representatives from Parraparents, Balmain and Scotts Creek Bushcare. This has ensured valuable information, including litter prevention opportunities and gaps, has informed the strategies and priority actions. The Sydney Coastal Councils Group (SCCG) and the Parramatta River Catchment Group (PRCG) are committed to leading the strategy and have completed and started to implement the NSW EPA's **Own it and Act Framework**.

A REGIONAL CATCHMENT APPROACH

The Greater Sydney Harbour catchment is characterised by waterways - local creeks with bushland, significant rivers with navigable waters and the harbour itself. These are places people enjoy and value and want to see litter-free.

This strategy places the health of waterways at the centre of litter prevention. Embedding litter prevention strategies and programs in the Greater Sydney Harbour catchment area is vital for maintaining and improving waterway health.

A catchment wide litter prevention strategy ensures a coordinated and consistent approach to improving the health of the Greater Sydney Harbour waterways. Councils, regional organisations of councils, community groups, major landholders and the NSW Government all have a part in preventing litter from reaching waterways.

Working together can enhance this existing activity through sharing knowledge, skills and funding. Community groups and councils already have regular clean-ups of particular items (eg straws), in places such as parks, creeks, mangroves and in the harbour itself. There is a now a call from these groups to shift efforts to litter prevention.

LITTER AND CATCHMENTS

Litter is constantly on the move by water, wind, tide and people. It shifts from the land to waterways, the harbour and then out to the open ocean. Litter is found everywhere - from the source to the sea. At any point litter may be captured by a street sweeper, clean ups, from the harbour itself or in stormwater gross pollutant traps. It is costly to capture litter once it is in the environment.

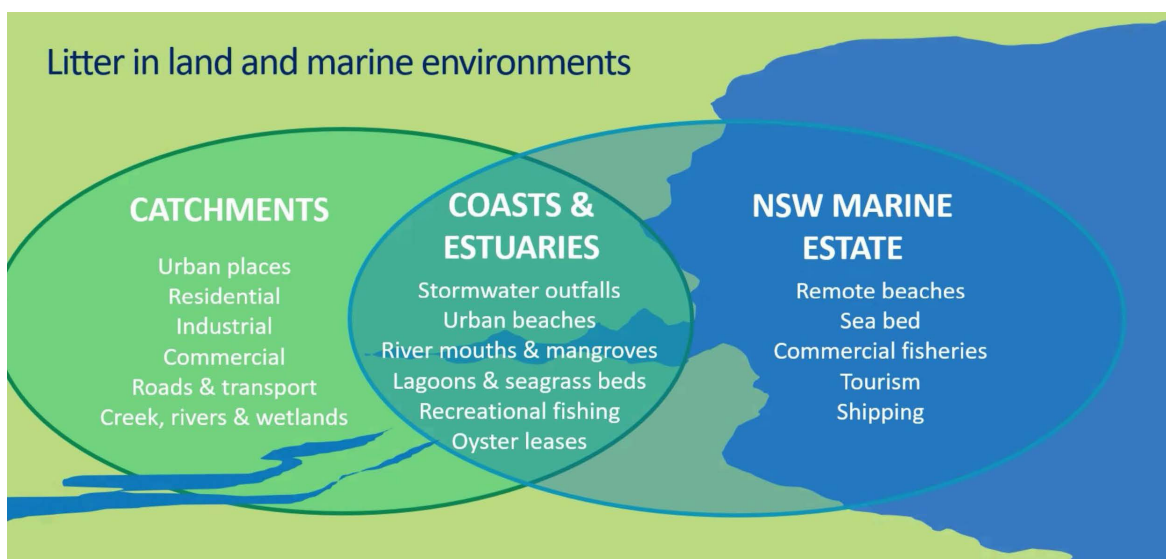


Figure 1. Where Litter Can Be Found (EPA 2021)

Currently there is not enough research into litter movement in the Greater Sydney Harbour catchment. Litter is estimated by volume, weight and item at various points throughout the catchment by multiple organisations and the data is held locally. This litter capture data indicates that the litter types and movement follow the patterns of an urbanised catchment.

The impact of litter in Greater Sydney Harbour catchment and its waterways, including on marine life, is also not well documented. Generic studies such as the 2018 Southern Cross University literature review can provide some understanding of the most common littered items across a range of habitats from beaches to estuaries to underwater and the open ocean.

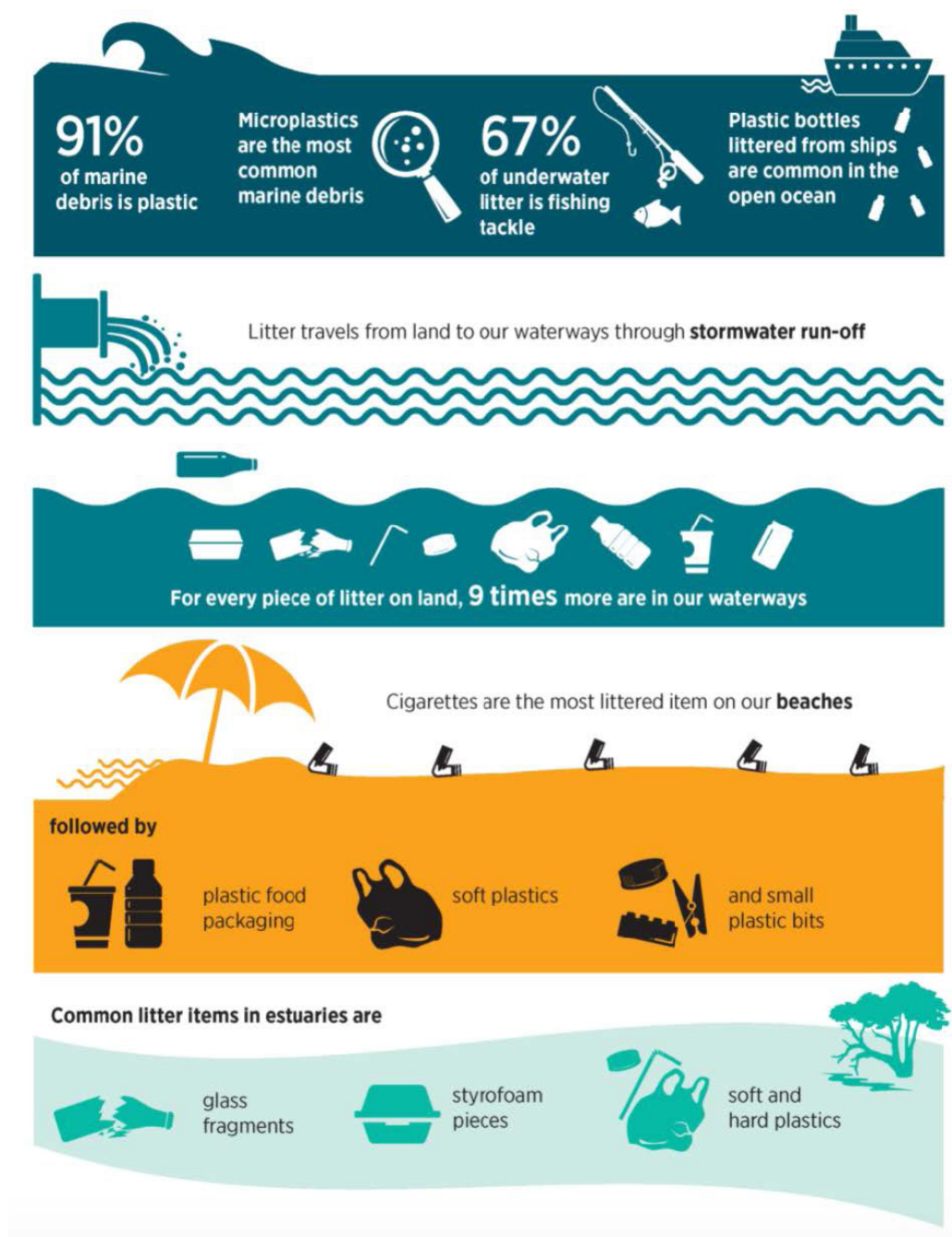


Figure 2: Most common littered items in habitats (Southern Cross University 2018)

THE ROLE OF CATCHMENT GROUPS

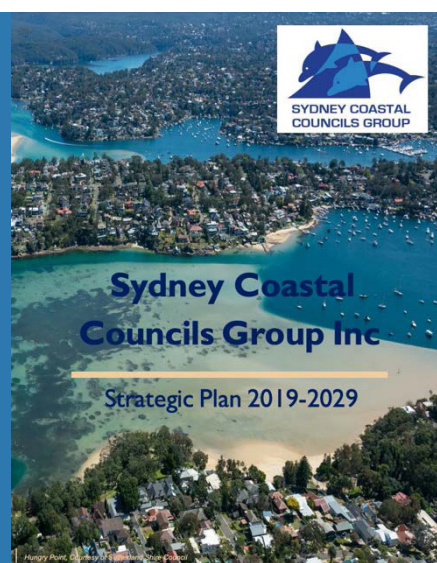
The Greater Sydney Harbour catchment has two catchment groups that have a focus on waterway and catchment health. The groups have collaborated to develop this strategy and have committed to implement it together. Together the group's members cover 15 of the 21 local government areas in the catchment.

The Sydney Coastal Councils Group (SCCG) and its members are committed to litter prevention through its Strategic Plan 2019-2029.

GOAL 3

Marine Biodiversity is protected in the bioregion.

Litter prevention is further supported with the highest priority action in the SCCG Operational Plan assigned to:
Develop a regional and consistent approach to the management of marine debris to reduce impacts upon marine biodiversity.



As part of an ongoing commitment to litter prevention, the SCCG is implementing the EPA's Own it and Act Framework (OIAA) which sets up the way forward for partnerships with the community, councils and the EPA on the litter prevention journey.

The OIAA goals of the SCCG are:

1. Leadership:

- Organisation Outcome
- Promote Litter Prevention
- Engage councils and their communities to adopt and implement the RLPS and litter prevention activities

2. Commitment:

- Litter prevention objectives in the Strategic Plan
- Report annually on litter prevention activities
- Facilitate shared ownership of litter prevention targets

3. Permission:

- Regional Litter Prevention Coordinator role

4. Process:

- Implement consistent litter monitoring methods
- Monitor and report on councils and their communities' litter prevention achievements

The Parramatta River Catchment Group (PRCG) and its members have endorsed the litter prevention target.

The PRCG's River Masterplan **Duba, Budu, Barra 10 Steps to a Living River** includes litter as a stormwater pollutant and in community engagement.

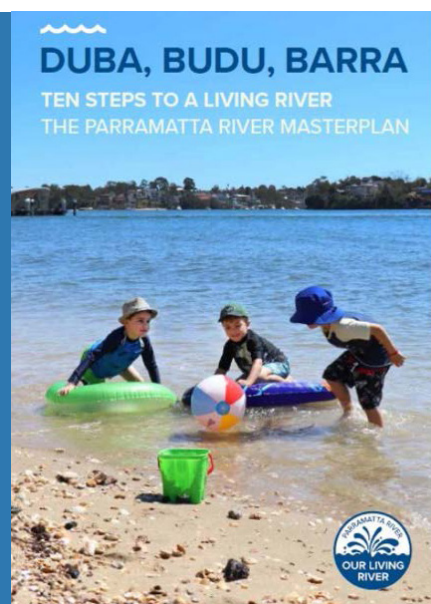
DUBA, BUDU, BARRA 10 STEPS TO A LIVING RIVER

Step 5: Reduce stormwater runoff

Undertake compliance and education activities to reduce stormwater pollution entering the river as outlined in Step 7.

Step 7: Involve the Community

Undertake joint community education and compliance activities focused on reducing stormwater and source pollution where it is linked to community behaviour and actions.



The PRCG are also committed to litter prevention and is implementing the Own it and Act Framework.

OIAA goals of PRCG are:

1. Leadership:

- The Regional Litter Prevention Strategy is a key document to achieve the Parramatta River Masterplan vision.
- Communicate the benefits of Litter Prevention strategies and projects at all PRCG member forums

2. Commitment:

- Embed Litter Prevention in Changemaker course to upskill volunteers in Litter prevention strategies and LLC
- Review Riverkeeper PD to include litter prevention and budget allocation
- Facilitate shared ownership of litter prevention targets

3. Permission:

- Regional Litter Prevention Coordinator role

4. Process:

- Monitor, evaluate and report on litter prevention outcomes
- Celebrate litter prevention successes and share outcomes

ABOUT THE REGIONAL CATCHMENT

Greater Sydney Harbour is a local, state, national and global asset. The Greater Sydney Harbour stretches from the freshwater limits on the Parramatta River downstream to the ocean entrance between North and South Head and covers an area of 532 km². Sydney Harbour and its tidal waterways are diverse and encompasses a wide range of natural processes and values, cultures and communities, uses, pressures and threats. The harbour foreshore is fringed by twelve local government areas, with a total of twenty-one LGAs dispersed across the greater catchment area. Four sub-catchments drain into the harbour estuary: Port Jackson, Parramatta River, Lane Cove River and Middle Harbour sub-catchments (BMT 2018).

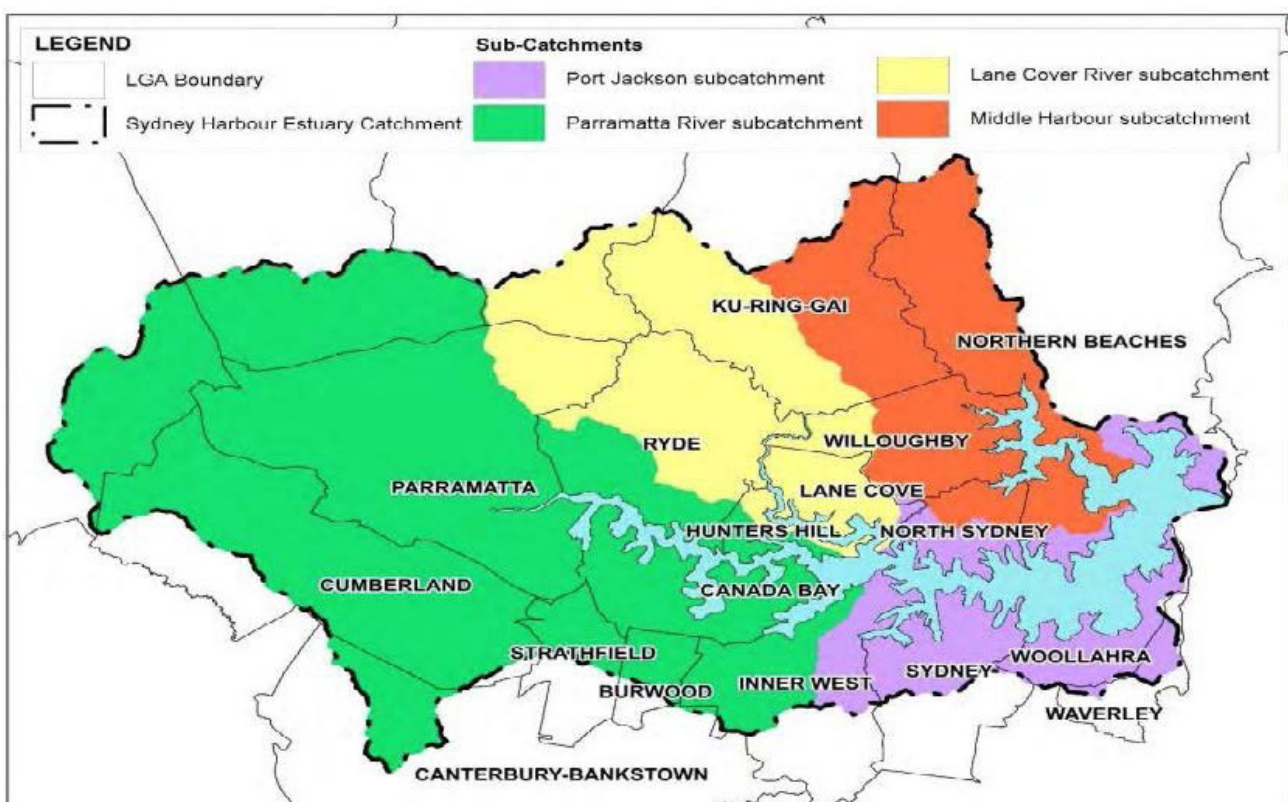


Figure 3. Local government areas and estuary sub-catchments across Sydney Harbour and its tidal waterways. (BMT 2018)

PARRAMATTA RIVER CATCHMENT

The Parramatta River catchment covers approximately 250 km². The river is the main tributary to Sydney Harbour and is tidal to the Charles Street weir at Parramatta. The catchment has been heavily developed and has a long history of industrialisation and urbanisation.

In 2018, Parramatta River Catchment Group members launched the Duba, Budu, Barra 10 Steps to a Living River **Parramatta River Master Plan**.

The key elements from the Plan underpin this strategy:

- An engaged community that loves and cares for their waterways
- Clean, clear water that is safe and supports life in the river
- Healthy ecosystems in the river, the catchment and natural creeks

MIDDLE HARBOUR CATCHMENT

The Middle Harbour catchment is approximately 100 km². The river is a northern tributary arm to Sydney Harbour and an inlet of the Tasman Sea, located north of the Sydney central business district between Grotto Point near Clontarf and Middle Head. Many small creeks drain into Middle Harbour from surrounding hills but no significant rivers flow into it. Middle Harbour has its main source in the upper reaches of Garigal National Park where it forms Middle Harbour Creek and flows southeast to become Middle Harbour at Bungaroo. Bushland covers one-quarter of the catchment, mostly in Garigal National Park and along the mostly rugged shore of Middle Harbour. Land use in the catchment is mainly residential, with a population of approximately 200,000 people, and some industrial and commercial areas.

LANE COVE RIVER CATCHMENT

The Lane Cove River catchment covers approximately 95 km². The river is a northern tributary to Sydney Harbour located on the northern side of Parramatta River joining between Clarkes Point, Woolwich and Greenwich Point, Greenwich and is tidal downstream from the weir near Fullers Bridge.

HARBOUR FORESHORE AREAS (PORT JACKSON) CATCHMENT

Port Jackson is a Harbour that 'comprises of all the waters within an imaginary line joining North Head and South Head. Within this Harbour lie North Harbour, Middle Harbour and Sydney Harbour' (Geographical names Board of New South Wales, Reference no. 47142).

These foreshore catchment areas flowing to Port Jackson are approximately 39 km². The Harbour is semi-diurnal tide dominated and stretches 19 km from the most easterly point at the Tasman Sea at the entrance at North and South heads to the most westerly point where Lane Cove and Parramatta River meet.

The Harbour is heavily embayed. The bays on the southern side of the Harbour tend to be wide and rounded, whereas bays on the south side are generally narrow inlets. A number of recreational and bushland areas, including the Sydney Harbour National Park, are scattered throughout the mainland and many of the bays have beaches. The major central business district of Sydney (1,687 m²) begins at the southern bank at Circular Quay. The northern side of the Harbour is mainly used for residential purposes.

REGIONAL CATCHMENT PLANS FOR GREATER SYDNEY HARBOUR

The Sydney Coastal Councils Group (SCCG) is partnering with 20 councils and key State Government agencies to develop a whole-of-catchment Coastal Management Program (CMP) for Greater Sydney Harbour. The CMP Stage One Scoping Study was completed in 2018. The current stage is focusing on managing threats to water quality from the catchments with an initial study on the impacts of stormwater. The inner and outer harbour stormwater working groups for this project provide an opportunity to collaborate with this litter prevention strategy.

ABOUT LITTER

The scope of this strategy is to prevent litter. There are many other visual pollutants in Sydney Harbour such as organic matter (eg leaves and branches) or discarded infrastructure (eg pontoons) and litter is often captured along these other materials. There are multiple sources of litter that enters the harbour, and the reasons people litter are well documented. The impact of litter is not only visual and a threat to public health but is now recognised as a threat to the marine environment.

WHAT IS LITTER?

Litter is a material that has been discarded in the wrong place. It is described as material up to the size of a shopping bag; anything larger is considered illegal dumping.

Under section 144A of the Protection of the Environment Operations Act 1997 (POEO Act), 'litter' includes:

- any solid or liquid domestic or commercial refuse, debris or rubbish including any glass, metal, cigarette butts, paper, fabric, wood, food, abandoned vehicles, abandoned vehicle parts, construction or demolition material, garden remnants and clippings, soil, sand or rocks, deposited in or on a place, whether or not it has any value when or after being deposited in or on the place; and
- any other material, substance or thing deposited in or on a place if its size, shape, nature or volume makes the place where it has been deposited disorderly or detrimentally affects the proper use of that place.

There are multiple ways items can become litter.

Under section 144A of the POEO Act, 'depositing litter' in or on a place includes:

- dropping or throwing litter in, on, into or onto the place, or
- leaving litter in or on the place, or
- putting litter in such a location that it falls, descends, blows, is washed, percolates or otherwise escapes or is likely to fall, descend, blow, be washed, percolate or otherwise escape into or onto the place, or
- causing, permitting or allowing litter to fall, descend, blow, be washed, percolate or otherwise escape into or onto the place.

The perception of litter has changed. The NSW Government has released the new **Waste and Sustainable Materials Strategy 2041**, (WASM) outlining how NSW will transition towards a circular economy. WASM identifies litter as leakage from the circular economy placing an economic value on litter as a wasted resource. This adds to the existing impacts on the values of clean, safe and healthy environments.



LITTER IN THE GREATER SYDNEY HARBOUR CATCHMENT

Litter enters the harbour through many sources. The diagram below from the NSW EPA's Litter Prevention Toolkit (NSW EPA 2019) shows the possible sources of litter. While litter behaviour is at the centre of littering there are also other factors such as wildlife, wind, and overfull bins that contribute to litter. Litter moves through the stormwater system after rain.

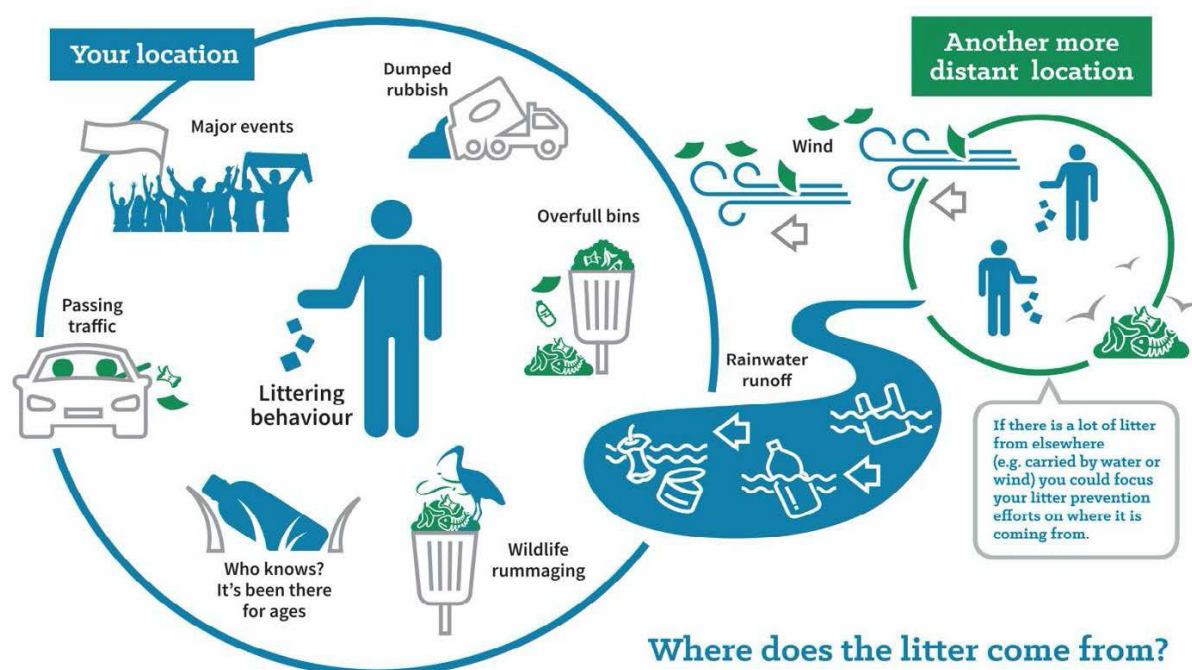


Figure 4. Sources of litter (EPA 2019)

The scale of litter entering Greater Sydney Harbour can be estimated by current capture and clean ups although as noted earlier further research is needed to better understand litter sources. In 2017, it was estimated that the potential quantity of litter that enters the stormwater network of the Parramatta River catchment was between 350,000 kilograms and 1,200,000 kilograms annually. This estimate does not include the large volumes of litter material collected before entering the stormwater network (through manual litter-picking and mechanical street-sweeping) (Source: WSROC 2017)

The NSW Government has a monitoring site at Meadowbank along the Parramatta River as part of **The Key Littered Items Study** (KLIS). This is a long-term program for monitoring marine debris along the NSW coast which shows what types and quantities of marine debris can be found in our coastal and marine waters.

Generally, the KLIS found that:

- the 4 most common litter types found in urban estuaries are confectionary and snack packaging, plastic lids and bottle tops, straws and cigarette butts. These 4 items can make up almost 50% of the consumer items found.
- In 2019, consumer items accounted for half of all the items in the KLIS. These are things like takeaway containers, plastic bags and straws. Most of the other half of debris objects found is generally litter that has broken down into smaller bits of plastic, glass and other material.

LITTER IN THE GREATER SYDNEY HARBOUR CATCHMENT

The Meadowbank Key Littered Items Study site has found that the top 10 littered items at that site are:

1. Confectionery wrappers
2. Straws
3. Cigarette butts
4. Other food packaging
5. Beverage container lids
6. Tape
7. Other plastic lids
8. Coffee cup lids
9. Plastic cup lids
10. Lollipop sticks

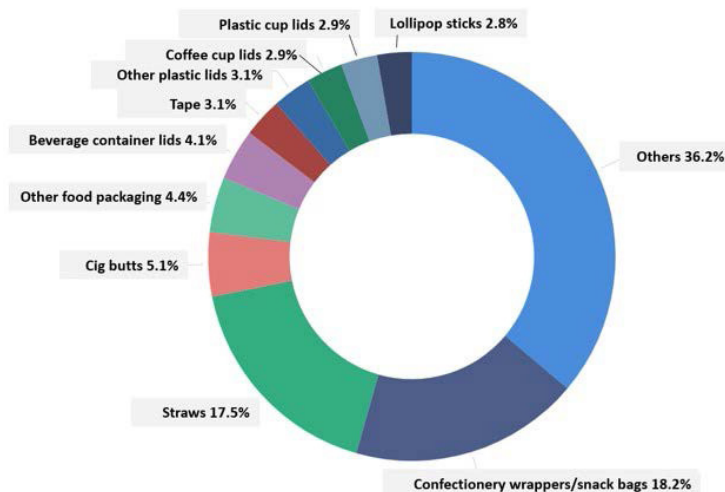


Figure 5: Key Littered items Study

In 2020 Sydney Harbour Environmental Services team removed 2,776 cubic metres of marine debris. NSW Maritime through its Maritime Environmental Services team ensures removal of hazards to navigation, litter and waste from the navigable waters of Port Jackson (Sydney Harbour), navigable tributaries (Parramatta and Lane Cove Rivers) and public beaches and foreshores up to Mean High Water Mark. The litter is removed from beaches, foreshores and navigable waters aligned with a Harbour Cleaning Program which is influenced by tides, winds and seasons.

A detailed analysis by count, volume and weight of the marine debris collected in September 2019 revealed that most of the non-organic litter was plastic (about 90%) and plastic sheet/film was the most prevalent.

Category	Count	Volume	Weight
Beverage Container	14	11.02	455
Beverage-Related	87	6.33	382
Hard Plastic	274	25.56	1874
Plastic sheet/Film	755	108.10	2145
Smoking-related Plastic	3	0.65	50
Takeaway Container	99	7.70	420
Plastic Foam	54	0.23	565
ope-like Plastic	19	0.23	85
Plastic Litter Overall	1305	159.81	5976

Table 1 Sydney Harbour Litter Report (Karimi 2019 unpub)

WHY DO PEOPLE LITTER?

A significant amount of litter research shows that there is no such thing as a typical litterer. The same person may litter in one place but not in another; littering can be intentional or accidental; litterers cannot be identified by age, ethnicity or socio-economic background.

The 2021 Sydney Coastal Councils Group Community Perception on Litter Survey elicited 480 responses from across the Greater Sydney Harbour area. Interestingly, 82% of respondents live near a creek, river, lake, or canal, with 89% using those waterways for recreation.

What the community told us:

- litter is a problem in waterways (82%).
- litter in their local area is a major/moderate problem (74%)
- their local creeks, rivers, lakes and canals are heavily littered (61%)
- people litter because they don't care about the effects of litter (62%)

Littering behaviours and attitudes identified show that the type of litter matters to people. For example, there are worse types of litter (nonbiodegradable or harmful) and more acceptable types of litter (biodegradable or edible for animals).

NSW Government research has also identified the litter behaviour cues shown in Table 2 (NSW Government 2019). Consideration of these cues is important when developing targeted behavioural change projects in a place, community, sector or by type.

Behaviour cue	Outcomes
Type of item	People are most likely to litter cigarette butts, probably because there is no bin nearby or butts are seen as 'only small'.
Type of place	People are more likely to litter in places such as bus stops or where they think they will not be seen.
Cleanliness of the place	People are less likely to litter somewhere that is clean, with well cared-for street furniture and bins, and no graffiti or vandalism.
Bins	People are less likely to litter if there is a bin nearby, however they are more likely to do so if the bin itself is dirty.
Signs	People are more likely to put waste in the right place if there are clear, consistent and relevant signs nearby.
Knowledge	People may be less likely to litter when they understand where their litter ends up.
What others are doing	People will litter if others do. For example, people may leave litter piled next to a bin or under stadium seats because others have.

Table 2 Litter behaviour cues (NSW Govt 2019).

THE IMPACTS OF LITTER

Litter harms our waterways, harbour, and oceans. The NSW Marine Estate Management Authority identified marine debris as a threat to the marine estate and is taking steps to address this issue by undertaking the marine debris threat and risk assessment. This assessment aims to identify what types of marine debris are the greatest threats to our marine wildlife and to the values that society derives from the marine estate.

Councils within the Greater Sydney Harbour also recognise that litter is a threat to the marine environment. The City of Ryde, Burwood Council and the City of Sydney have all adopted a 'Zero Litter to River' target by 2030.

Key institutions within the Greater Sydney Harbour have a focus on marine and water way health. These include the Sydney Institute of Marine Science at Mosman, the Sydney Wetlands Institute at Sydney Olympic Park and the Taronga Conservation Society at Mosman.

In the Greater Sydney Harbour catchment, litter is captured in wetlands (mangroves and saltmarsh). The scope of this issue is recognised by the community and others with multiple clean-up programs along the water's edge. Mangroves and wetlands are scattered across Greater Sydney Harbour, fringing contributing creeks, and covering large sections of Middle Harbour, Lane Cove and Parramatta rivers.

Middle Harbour	Middle Harbour, Gordon, Moores, Scotts, Sugarloaf and Carroll creeks, Fig Tree Cove, Bantry Bay and Echo Point
Lane Cove	Blue Gum, Pages, Buffalo, Tannery, Brickmakers and Tambourine Creeks
Parramatta River	Powells and Haslams creeks, Yaralla and Brays bays, Newington Nature Reserve and Duck River

Table 3. Coastal wetlands (mangroves and saltmarsh) locations in Greater Sydney Harbour (Source: BMT 2018)

The **NSW Government's Coastal Management maps** shows the extent of Greater Sydney's mangroves and saltmarsh providing an indication of the potential impact of litter in these areas.

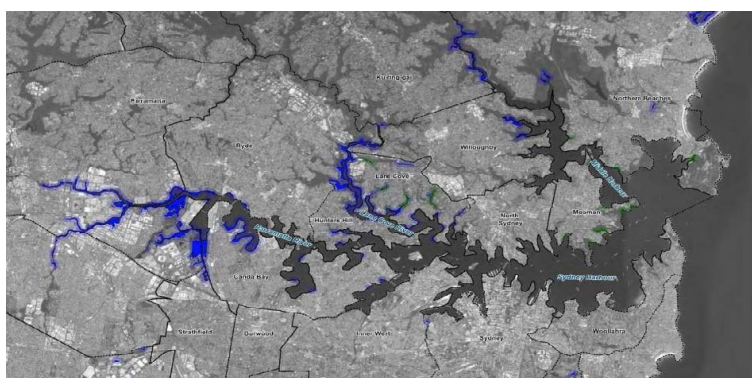


Figure 6. Coastal wetlands in the Greater Sydney Harbour (SOURCE BMT 2018)

Litter is also washed onto harbour beaches and foreshore areas where it may be recovered by Maritime Environmental Services Team, community groups and others. This can become a health hazard as items such as broken glass and syringes can injure people.

Litter that is not trapped in mangroves flows through to the broader marine environment. The NSW Government in the financial year 2020, estimated 575 million items of plastic litter generated in NSW made its way into our waterways and terrestrial and marine environments. Eight million tonnes of plastic leaks into our oceans every year (The NSW Plastics Plan Discussion Paper 2020). The litter comes from urban stormwater discharge and represents the highest level of threat to estuarine and ocean waters.

Litter is a health issue. **The Public Health Association of Australia** notes significant and distinct risks to human health from littered plastic, including cascading exposure as plastic degrades – leaching toxic additives and accumulating in food chains through soils and water.

Microplastics are small pieces of litter less than five millimetres and can be broken down parts of litter or micro waste products. Microplastics are being found in the world's highest mountains and in the deepest oceans. While this strategy does not focus on microplastics, citizen science monitoring may be included in the data framework model. More information on microplastics can be found at the Australian Microplastic Assessment Project (**AUSMAP**).

A litter-free place is a liveable place. Litter in public places is considered unsightly and can affect the community's use and enjoyment of a park, school, street or shopping centre. Councils have long

recognised this and allocate significant resources to keeping public places litter free.

The presence of litter has an impact on swimming in waterways. Swimming in the Parramatta River

and harbour is a key priority for Parramatta River catchment councils and other harbour council

Litter has financial impacts and is costly to remove once it is in the environment. The Environmental Protection Authority (EPA) estimates the cost of litter services nationally is approximately \$300 to \$350 million annually. A 2016, survey of NSW local councils, public and private land managers, and community groups found that more than \$180 million is spent each year on managing litter. In the navigable waters of Sydney Harbour, floating litter is continuously removed by the NSW Government, while multiple council and community programs also remove litter.

Litter is a lost resource and has an impact on raw materials and production. When an item is prevented from becoming litter, it is no longer a lost resource. In 2019-20, 161,300 tonnes of materials was reused or recycled in the Return and Earn Program. (**Return and Earn: Annual Statutory Report 2019–20**).

Another lost resource are nurdles. Nurdles are small pellets of plastic resin used as a raw material in the manufacture of plastic products. Their size and appearance (usually clear) mean marine wildlife often mistakes nurdles for food. (DPIE 2021). There are at least 10 plastic manufacturers within the catchment. Nurdles have been found on beaches and at stormwater outlets within the harbour. The NSW Plastics Action Plan will reduce the risk of nurdles entering the environment and assist councils and plastic manufacturers to implement the global initiative Operation Clean Sweep.

LITTER PREVENTION

This section describes litter prevention activities within the Greater Sydney Harbour catchment.

Litter prevention is generally described by the actions that everyone can take to avoid materials becoming litter. These actions start at the production of materials, sale, use and finally disposal. There are multiple opportunities to prevent litter in the lifecycle of materials.

THE ROLE OF THE NSW GOVERNMENT

Litter prevention policy in NSW is led by the NSW Government. The NSW targets of **60% litter reduction by 2030 and 30% plastics reduction by 2025** have been adopted for this strategy.

Since 2004, the NSW Government has been reporting on litter and building evidence-based resources, toolkits and research to understand litter prevention better, with some success. In 2015, litter became a Premier's priority with a target to reduce litter volume by 40% by 2020 and this was exceeded reaching 43%.

NSW Government Litter programs targets	Targets	Stopping litter at the source	Support for litter prevention	Reducing litter in the marine environment
NSW Marine Estate Management Strategy				Targeted marine litter campaign and Marine Litter Working Group
NSW Waste Less Recycle More initiative and the NSW Litter Prevention Strategy	Reduce the volume of litter by 40% by 2020	\$50 million committed to litter prevention from 2012 to 2021		
NSW Waste and Sustainable Materials Strategy 2041 The NSW Plastics Action Plan 2025	Overall litter reduction target of 60% by 2030 Plastic litter reduction target of 30% by 2025	Phase out of problematic plastics (including single use plastics); Investigation of cigarette butt Extended producer responsibility Action on nurdles	\$38 million for litter prevention programs to 2027: \$10 million in council grants; New litter data framework.	Progress to litter reduction targets is monitored using a Marine Litter Measure (Key Littered Items)

Table 4 NSW Government commitments to litter prevention (Source: Cooks River Litter Prevention Strategy).

THE NSW LITTER PREVENTION STRATEGY

The **NSW Litter Prevention Strategy** and accompanying plan provides tools and resources for councils, communities and others to take actions to prevent litter.

The NSW Litter Prevention Strategy 2019-2022 vision is:

‘We want New South Wales to be a clean, safe and healthy environment that we can all share and enjoy.’

To achieve the vision, the strategy outlines the following five approaches that continue to inform successful litter prevention projects across NSW

1. Rewarding responsible behaviour
2. Education and awareness
3. Infrastructure and clean-up
4. Regulation and enforcement
5. Evaluation and monitoring

These five approaches are discussed in the context of the litter journey.

These approaches are seen in the many inspiring litter prevention actions from the community and councils across the Greater Sydney Harbour Catchment. These actions tell the story of littered items and raise awareness of locally littered items as well as provide relevant infrastructure and signs.

Below is a snapshot of just some of the litter prevention projects across the catchment developed by councils, communities and other organisations.

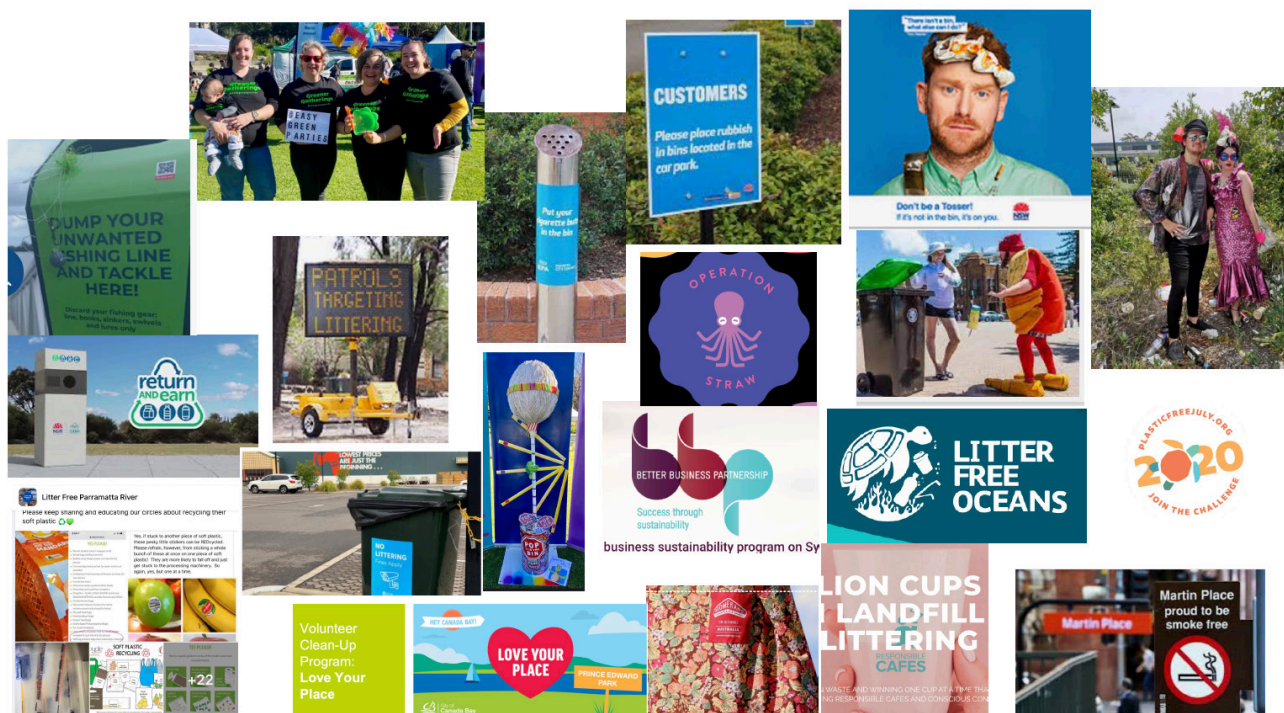


Figure 7: Snapshot of litter prevention actions

COUNCILS' LITTER PREVENTION ACTIONS

Local councils have been responding to the community's desire for litter free public places for many years with litter prevention projects and campaigns. The 21 local councils of the Greater Sydney Harbour catchment focus on litter through different organisational sections (see Appendix 1)

In councils, litter is often part of a broader strategy such as:

- Waste and Resource Recovery
- Circular Economy
- Clean/Green City
- Environment

Some councils have developed specific litter prevention plans while others have undertaken litter prevention projects.

Focus area	General environment	Clean public places	Healthy waterways	Waste management	Circular economy	Specific litter plan
Number	2	6	10	7	2	3

Table 5. Mentions of litter in Greater Sydney Harbour councils' planning documents.

Councils in Greater Sydney Harbour have many litter prevention projects. Two examples are below.

In 2019 the City of Parramatta implemented 'McDonalds Car Park Litter Campaign' at McDonalds Rydalmere and the adjoining Bunnings. Both car parks had been identified as hotspots for food and drink packaging as they were a common rest area or meeting point.

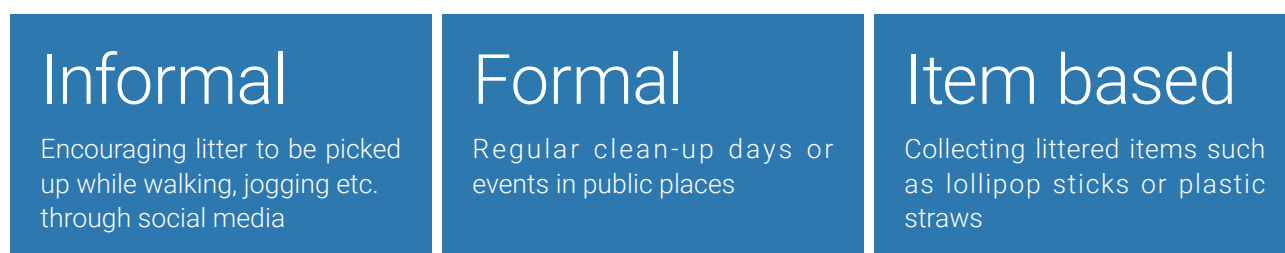
Council used a mix of education, infrastructure, enforcement and clean up strategies in partnership with McDonalds Rydalmere and Bunnings Rydalmere. The campaign reduced the number of items littered at the site by 86% and the volume of litter by 99%.



In 2020 Inner West Council integrated litter reduction into place making at Roberts Lane. The Roberts Corner Happy Plant space worked with the local community to turn an unkempt littered site into a community space by planting a tree, plants and artwork. Roberts Corner is now a treasured community hub used by residents from the surrounding streets with an active group of over 75 local members participating in a closed Facebook Group called 'Roberts Corner the Happy Plant Space'. There is zero litter.

COMMUNITY GROUP ACTIONS

Many community members are working to clean up litter. Community litter capture may be characterised as:



These actions remove significant quantities of litter and involve many people. Actions are occurring across the catchment. It is often measured by the number of items collected or by volume (bags). Often the events also raise awareness on the problems of litter.

Litter prevention activities tend to be implemented by more formal community groups, sometimes in partnership with a council or not for profit organisation. Groups often target one part of the litter stream such as single use plastic bags and coffee cups. Data on the litter avoidance outcomes is often kept with the project or locally.

In 2019, the EPA funded the NSW Ethnic Communities Council to work with the Sydney Olympic Park Authority at Homebush to implement 'CALD Communities Litter Less' to reduce picnic litter.

THE LITTER JOURNEY

It is estimated that 80% of items found in the marine environment came from the land. This may be at any time between production to disposal. The actions that can be taken at each step to prevent litter are described by the NSW EPA as the litter journey. Litter can be measured at each point of the litter journey.

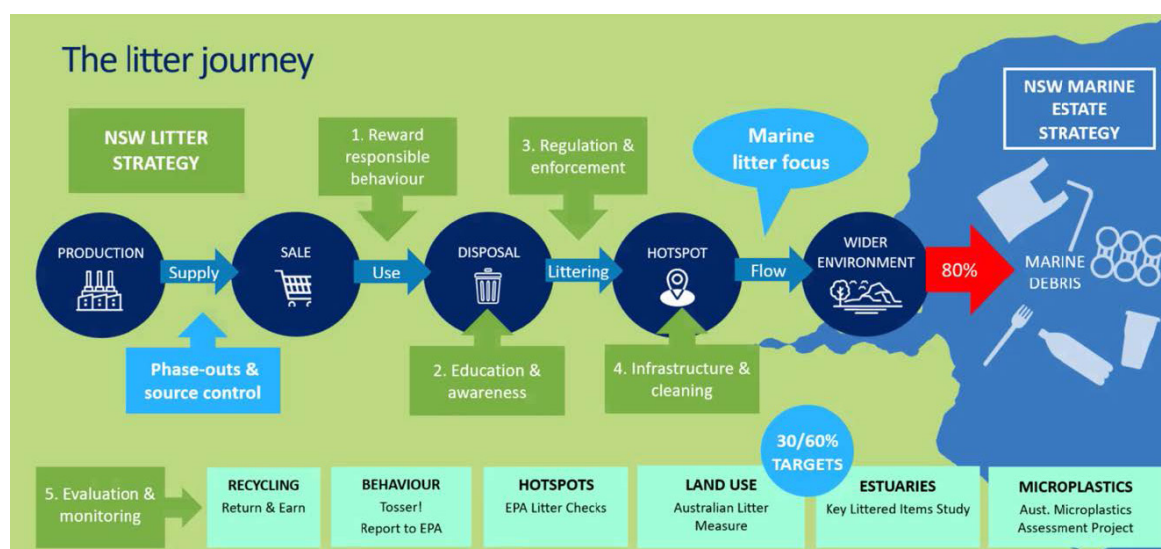


Figure 8 The Litter Journey (NSW EPA)

LITTER PREVENTION AT THE SOURCE



During community consultations community members identified the need to stop the production of items that can become litter. Some suggestions included:

- Partnerships with industry to move away from single use items
- Advocacy for less food packaging
- Understanding more about plastic manufacturing in the catchment

Single use item production

Items that are produced for a single-use and designed as disposable make up most items found in litter counts. These include confectionery wrappers, plastic straws, lollipop sticks and coffee cup lids.

Nurdles

The production of these items can also lead to litter. Plastics manufacturing use small pellets called nurdles as the first step in making a plastic item and these can escape into the environment and ocean. There are many plastic manufacturers within the regional catchment and nurdles have been found on beaches along Parramatta River.

Industrial areas

The industrial areas are also a source of litter and are one of the top four littered areas in NSW. This litter can be the result of products escaped during transport, overflowing bins and poor waste management, takeaway food litter and general littering behaviour. Industrial areas are only a small proportion of the catchment land use however these areas are concentrated and have a high impact.

CURRENT CATCHMENT ACTIONS

The NSW Government is leading actions to prevent litter at production and this will have a significant impact on the type of litter found in the catchment.

Action One of the NSW Plastics Action Plan 2025 is to introduce new legislation to reduce harmful plastics. This includes:

- phasing out the production of problematic plastics and single use items such as plastic straws, stirrers, cutlery, expanded polystyrene food service items and cotton buds with plastic sticks
- setting design standards to limit the impact of harmful plastics
- making producers and brand owners of plastic packaging more responsible.

Action Two provides a \$10 million Circular Materials Fund to help producers shift to better plastic products.

Action Four is for the NSW Government to investigate an extended producer responsibility scheme for cigarette butt litter.

Action Five provides funding to plastic manufacturers to reduce the risk of nurdles entering the environment.

Currently there is not enough data to understand the nature of litter in industrial areas within the

catchment and further investigation is needed on plastic manufacturing in the catchment.

SUPPLY AND SALE



Transport routes and retail areas are in the top four littered places in NSW.

Community members have identified big shopping areas, transport routes such as the light rail corridor and major roads such as Liverpool Road as hotspots.

Litter is escaping from these places into local waterways such as Toongabbie Creek, Duck River and Scotts Creek and into Sydney Olympic Parklands. Some suggestions to reduce litter from these places include:

- more consumer awareness and education to avoid purchasing single use items
- educate and make businesses responsible for packaging.

CURRENT CATCHMENT ACTIONS

The NSW EPA provides communication and campaign toolkits and project materials for litter prevention,

e.g.:

- Don't be a Tosser for councils and communities.
- Cigarette butt litter

Actions that educate on avoiding purchasing single use items are being led by councils, communities and industry across the catchment and include:

- Plastic Free July is promoted by Parramatta Council and others as a way to actively prevent litter
- Green Caffein is supported by 6 councils in the Greater Sydney Harbour area, and encourages local cafes to provide reusable cups.

- Responsible cafes is supported by 6 councils and one community group in the catchment and encourage cafes to offer a discount when customers bring their own cups.
- Boomerang bags has around 10 community groups within the catchment making reusable bags that replace plastic.
- Better Business Partnerships is a free council-funded business sustainability program on Sydney's North Shore supporting businesses in Ku-ring-gai, North Sydney and Willoughby LGAs that runs bye bye plastics to assist businesses to reduce single use plastic.
- The Collaboration Collective is a Northern Beaches initiative to reduce single-use plastics.
- Litter Free Parramatta River and other community social media sites encourage communities to reduce litter

USE AND DISPOSAL



Any item can become litter once it is used even if it is designed to have more than one use. The correct disposal of items requires the right infrastructure (eg bins, recycling, reuse options) and the right behaviour (eg signs and awareness campaigns).

The community and councils have identified the many awareness and education actions already in place and some new ideas.

Infrastructure and cleaning ideas:

- increase signs and tangle bins for recreational fishing
- better bin placement and more bins in river and foreshore parks
- consider smart bins that alert council when full and compact waste
- clean up unkept places and long grass as these places capture litter

Education and awareness ideas:

- increase messaging for local communities adapting the EPA's Hey Tosser! Campaign
- increase education and awareness about picnic waste at popular places
- awareness and bins for tourist bus hotspots
- increase the council public place event and hire agreements about waste

Regulation and enforcement ideas:

- increase litter monitoring and enforcement by paid litter monitors
- better information on how to report litterers
- consider banning specific items such as balloons

CURRENT CATCHMENT ACTIONS

- Return and Earn return points across the catchment councils have captured thousands of containers including 3.7 million containers at the Taronga Zoo site since 2017. Anecdotally communities report less containers in clean-up activities.
- Reverse Garbage is a regional resource-based business in Marrickville taking industrial offcuts for reuse
- The Bower Reuse and Repair Centre in Marrickville has agreements with 17 catchment councils to collect unwanted household goods and rehome them.
- Cigarette butt projects that target butt hotspots have been successfully implemented by councils and community groups across the catchment with the support of EPA funding.
- Councils are continually assessing bin placement and bin types in response to emerging litter hotspots.
- Councils have established local messaging such as Canada Bay's 'Let's put litter in its place'
- Some councils are members of Regional Organisations of Councils (ROC's) that work together on specific litter issues.

HOTSPOTS



A litter hotspot is an area where litter is a problem. There are several ways to determine a litter hotspot. For example, data from council operations such as street sweeping or gross pollutant traps, can determine an area with high volumes of litter; input from community-run clean up events or information from council complaint lines can trigger an area to become a hotspot.

The City of Parramatta's Litter Study (City of Parramatta 2019) identified 30 hot spot sites to investigate using the NSW EPA's Local Litter Check guidelines. These sites are scattered throughout the local government area.

The 2018/2019 National Litter Index shows that, by item number, the most littered places in NSW are industrial sites, followed by retail sites and car parks. The most littered NSW sites in terms of volume per 1,000m³, occurs in industrial sites, followed by car parks and along highways. (KAB 2019).

The Sydney Harbour Region land use map below provides an indication of potential litter hot spots across the catchment area. Public places comprise around 53% of land use, with parklands and bushland mainly along waterways. Industrial areas are scattered across the whole catchment and, while there are large commercial areas, there are also scattered smaller retail places. These are all potential litter hotspots.

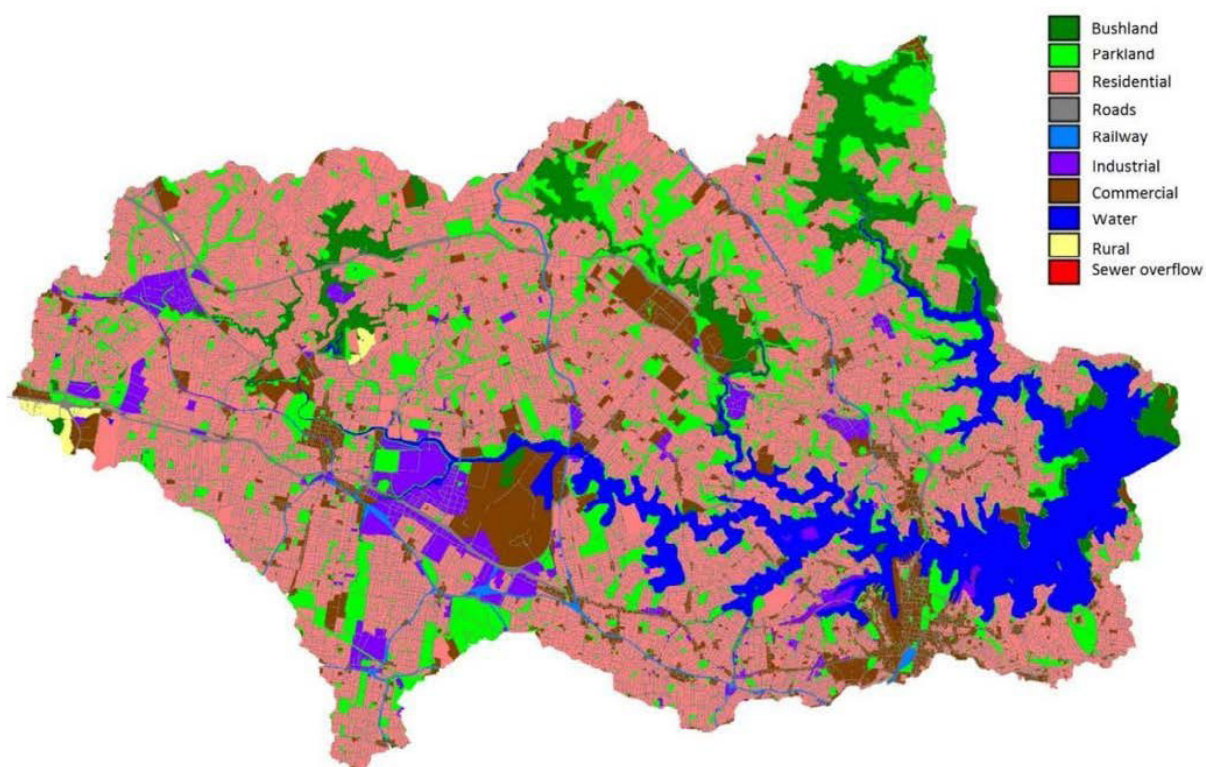


Figure 9. Land use map Sydney Harbour Catchment (Sydney Harbour Catchment Model draft report 2018)

LITTER CAPTURE IN THE WIDER ENVIRONMENT



Litter is captured in the stormwater systems by councils and Sydney Water by gross pollutant traps and other devices. During a rain event these systems are often overwhelmed due to the quantity and speed of water running off hard surfaces such as roads, carparks and driveways. Stormwater also brings other pollutants such as nutrients, faecal matter from dogs, and organic matter such as grass clippings.

Sydney Coastal Catchment Group is coordinating a stormwater study across the catchment in partnership with catchment councils and the Parramatta River Catchment Group. This study is part of a whole of catchment and harbour plan called the Greater Sydney Harbour Coastal Management Program (CMP). When completed the CMP will have agreed actions for each council on issues including stormwater management.

Community groups are also capturing litter in the wider environment along waterways and in the harbour itself. These actions also raise awareness of the issues to change behaviour.

CURRENT CATCHMENT ACTIONS

The following is a sample of current litter capture activities:

- Litter Free Parramatta River encourages communities to reduce litter
- Plastic Pluckers runs regular clean-ups along the Parramatta River
- Keen to Clean has regular clean-ups around the Canada Bay area
- The Seabin project in 20-21 had 16 sea bins in 8 locations in the harbour capturing 16.5 tonnes of marine litter.
- Corporate clean-ups and team building litter pick-ups in North Sydney and along the Parramatta River, supported by community groups and councils
- Get Fitter with Litter is a Clean Up Australia Adopt a Street project that encourages

residents to pick up litter and is promoted through bushcare in Willoughby Council LGA

- Sydney by kayak is supported by North Sydney Council and runs weekly kayak tours picking up litter in the harbour.
- North Arm Sailing Club in Middle Harbour removes litter from Sugarloaf Bay.
- Key littered items are collected by community groups, such as lollipop sticks along the Parramatta River parklands by Parraparents, and Strawkle at Manly Cove that picks up straws while snorkelling.
- On 7 March 2021 Clean Up Australia Day had 156 groups participating in clean up events across Willoughby Council, Parramatta City Council and Inner West Council.
- Maritime Environmental Services Team remove litter and other marine debris from all navigable waters

MEASURING LITTER PREVENTION

Progress towards the target of 60% less litter by 2030 requires measuring and monitoring the impact of litter prevention actions across the catchment. Currently, the impact of the many litter prevention actions is not captured or the data is held locally. This creates a challenge to understand the current litter baseline and to track progress toward the 2030 target.

Each litter prevention action has its own measure that is usually by volume, item, weight or numbers of people participating. Monitoring points can occur from production to marine debris. The main source for tracking progress toward the target is the NSW EPA's Litter Data Framework.

NSW LITTER DATA FRAMEWORK

The NSW Litter Data Framework is used at a state level to measure long-range trends in litter data and determine priorities and policy impact.

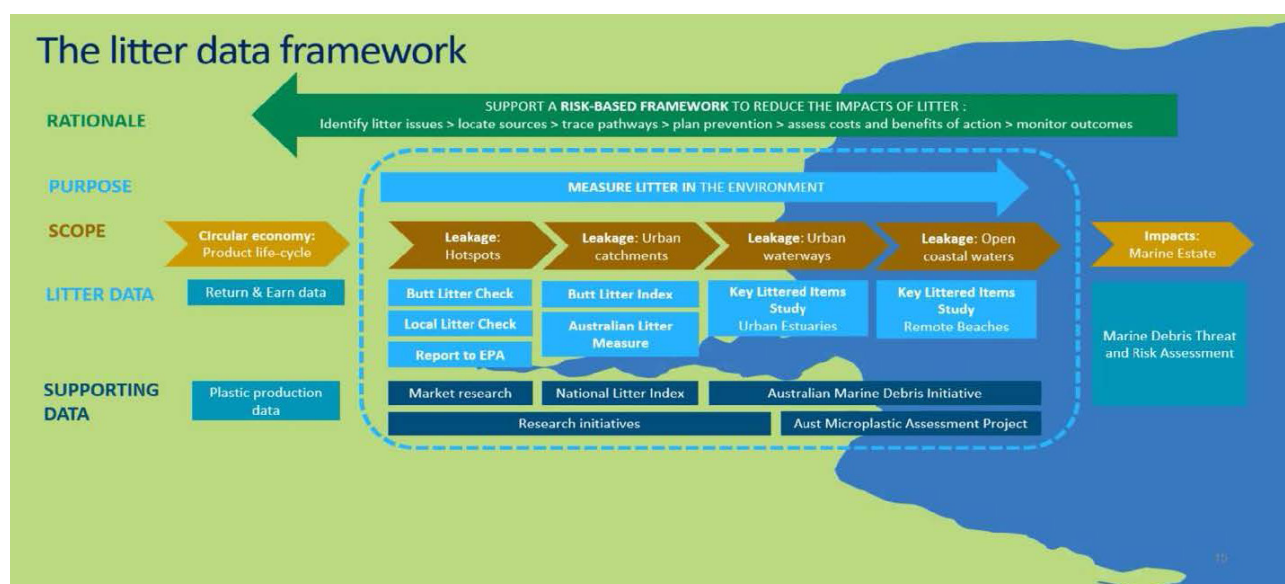


Figure 10. outline of NSW EPA's litter data risk-based framework

TRACKING CONTAINERS AND PLASTICS

The framework includes data on the impact of the Return and Earn scheme and the NSW Plastics Action Plan. These have a significant impact on the volume and type of litter found in the environment. Collection data for the Return and Earn scheme is publicly available and reported by council area every six months (www.returnandearn.org.au).



LAND BASED LITTER DATA

Litter can be measured before it gets into waterways at hotspots. The EPA tools include:

- Cigarette butt litter checks
- Local litter checks
- Reporting to the EPA

CATCHMENT SCALE LITTER DATA

There is currently no data consistency to enable a better understanding of the volume and type of litter coming from each catchment into the harbour. This would assist with developing local litter prevention plans. Estimates for the Parramatta River catchment are based on stormwater and don't include the type of litter. A breakdown of the Marine Environmental Service collection in 2019 identified the types of

litter that was collected from the greater harbour generally. Litter can be measured at key points in a catchment. The EPA tools are:

- Australian Litter Measure (AusLM) – commenced in 2021 and has an accessible online database
- Key Littered Items Study (KLIS) - since 2017 with the only Harbour site at Meadowbank

Further catchment scale data can be collected through the Australian Microplastic Assessment Project (AUSMAP). This is a citizen science project that assesses the average quantity of microplastics per square metre found in each location for each sampling session. It also shows the colour, type and size of the microplastics. There are currently multiple monitoring sites in the Greater Sydney Harbour catchment, the majority found to have moderate to high amounts of microplastics. This data is publicly available at Ausmap.org



MARINE LITTER DATA



The NSW Government monitor the impact of litter in the broader marine environment through the Key Litter Items Study on remote beaches and through the Marine Debris Threat and Risk assessment process.

The Seabin Project and the Microplastics Assessment Project also have sites within the harbour with data publicly available.

ADDITIONAL LITTER MEASURES

Local litter monitoring and reporting is important as it can track the success of local actions and contribute to understanding what has worked.

Across the Greater Sydney Harbour catchment litter data is mainly collected through clean up and capture activities after it has leaked into the environment. This is undertaken by councils, community groups and individuals, not for profit organisations, businesses and the NSW Government. The data is mostly held within each organisation making it a challenge to understand the litter story across the catchment.

The volume, weight and type of items collected is often reported to raise awareness of local litter issues. It may also include data on the number of people attending an event and the geographic spread of events.

Monitoring may also include reporting on the number of infringements as an indicator of litter prevention success. New infrastructure can be reported, such as bins in public places and the associated reduction in litter. The number of litter prevention pledges and commitments can also be tracked as an indicator of intention.

The litter prevention projects, and actions of councils and communities can also be captured to tell the project stories and share learning on what works. This qualitative data can be collected at a local and catchment level.

A central catchment litter monitoring portal for the community could provide an additional resource to the NSW Litter Data Framework and help to understand what is working locally and regionally to prevent litter. It could capture both qualitative data (case studies) and quantitative data.



LITTER PREVENTION STRATEGIES

Litter related activities in the Greater Sydney Harbour are generally locally supported by communities and councils and other organisations. To reach the targets of 60% less litter by 2030 and 25% less plastic by 2025 in the Greater Sydney harbour will need more prevention activity and coordinated approaches..

STRATEGY ISSUES AND OPPORTUNITIES

Issue: Litter prevention leadership and governance across the Greater Sydney Harbour

The strategy has been developed through a partnership of the catchment groups - the Sydney Coastal Councils Group and the Parramatta River Catchment Group and with funding from the NSW EPA. The Steering Committee consisted of voluntary community members and three councils that nominated to pilot the project. A representative of Transport for NSW also participated. This was sustained over a very challenging year of COVID that impacted the way the strategy was developed.

This governance model has shown that councils, community members, catchment groups and NSW Government representatives can work together through challenging times on a complex issue such as litter prevention.

In 2022 cross sectoral governance will continue. A small Steering Group will be established to guide the implementation across the whole catchment. In each sub-catchment the existing litter groups, councils and others will be invited to work together in a local working group to better understand local litter issues and to develop local actions and messaging. Further groups may be established as interest in litter prevention collaboration grows.

Issue: Increased commitment to the litter prevention targets

Councils have litter as a priority in planning around waste, clean public places and waterway health. Community groups focus on local litter issues. There is a need to communicate the litter prevention targets and gain commitment from local government, key community organisations and other major landholders. All organisations can be encouraged to implement The EPA's Own It and Act checklist and framework.

Issue: Setting a baseline to monitor progression towards the litter target.

The current understanding of the scale of litter in the catchment is based on the litter picked up once it is in the environment by the Environment Services team, council stormwater systems, groups such as AUSMAP and Seabin and community clean-ups. These provide an indication of volume, weight or type with most data held locally or not captured. Most of this litter captured is subject to winds, tides and storms and could have travelled some distance. The Key Littered Item Study site at Meadowbank provides good data on the number and type of items however there is only one site and it is midway in the catchment.

These activities all contribute to developing a baseline to enable tracking towards the target of 60% less litter by 2030 and 25% less plastic by 2025. The strategy is an opportunity to coordinate those who collect litter data at different points on the land and across the catchment. Further monitoring could be established using the Australian Litter Measure. The strategy will also enable agreement across multiple organisations on a baseline and a monitoring plan and a monitoring working group may be established.

Issue: Gain a better understanding the impact of litter in the Greater Sydney Harbour catchment

The impact of litter in the Greater Sydney Harbour is not well understood and the impact of the litter leaving the harbour into the greater marine environment is also not communicated well to the harbour community. Existing research into impacts could be more widely communicated and further research identified to better understand litter impacts and the types of litter prevention projects that are needed.

Issue: An increase in litter prevention activities

The litter activity across the community, councils and council groups, and industry has a strong focus on litter capture once litter is in the environment. The EPA estimates 80% of marine litter comes from the land so despite all this effort litter is still escaping into the marine environment. The removal of litter by councils and the community is also a financial cost and a cost of volunteer time.

The NSW Government's Plastics Action Plan 2025, Waste and Sustainable Materials Strategy 2041 and the EPA's Litter Prevention Strategy, funding and resources provide an opportunity to significantly increase the projects and actions to prevent litter. The gradual phase out of single use items through the implementation of the NSW Plastics Action Plan could support a refocus of action from clean up and capture activities to litter prevention.

The community want to see a litter free harbour, creeks and rivers. Place based community/council projects at the local catchment level can link litter prevention to the health of local waterways and adjacent parks. The Greater Sydney Harbour

catchment communities, including councils and industry are a resource that can implement litter prevention projects and actions locally and regionally.

Issue: More activity to identify hotspots and hotspot actions

Hotspot identification is a key tool to understanding litter and developing a litter prevention project. The identification of hotspots is not consistent across the catchment and data is generally held locally. Similarly, the learning about what has worked in litter prevention is not generally shared.

The EPA's resources provide opportunities for training in local litter checks and litter prevention activities. A sub-catchment approach enables communities, councils and others to develop local skills in litter prevention.

Issue: Catchment wide litter prevention communications

Litter messaging is generally local at council level and there is no catchment wide narrative about litter prevention and its impacts on creeks, rivers and the harbour. There is an opportunity to raise the profile of litter in the catchment and litter prevention by creating a litter free narrative around the litter target at multiple levels across the catchment. This could build on each council's litter messaging, the EPA's Hey Tosser! campaign and other resources focussed on waterway health. A publicly available litter prevention website could provide information on activity, stories on what's working, report annually to the community and connect people across the catchment.

LITTER PREVENTION STRATEGIES

OBJECTIVE 1:

Provide a regional approach to achieve the NSW litter prevention target of 60% reduction in litter by 2030.

STRATEGY	ACTION	MEASURE
1. Collaborate for a litter free catchment	<p>1.1 Establish a Litter Prevention Working Group consisting of representatives from local communities and Council to help identify hotspots and key litter items and develop and implement initiatives across the region.</p> <p>1.2 Apply for funding for a Regional Litter Coordinator to coordinate regional community litter prevention activities in consultation with key community groups and councils</p> <p>1.3 Work with member councils to provide support and capacity building opportunities for local community groups to assist them in delivering litter prevention activities and sourcing funding.</p> <p>1.4 Consolidate commitment for the strategy, target and approach from councils, key community groups and other major landholders.</p>	<p>By 2022 the PRCG and the SCCG have cross sectoral Litter Prevention Working Groups.</p> <p>SCCG receives funding for a Regional Litter Coordinator for 2022-2023.</p> <p>An increase in the number of member councils supporting community groups and the level of funding received.</p> <p>An increase in the number of committed organisations.</p>

OBJECTIVE 2:

Reduce the volume and incidence of litter entering Sydney Harbour and associated waterways through litter prevention activities.

STRATEGY	ACTION	MEASURE
2. Develop and implement targeted programs and initiative	<p>2.1 Work with member Councils and community groups to develop and implement place-based action plans for key litter hot spots.</p> <p>2.2 Work as a region and with the EPA to develop and implement initiatives to address key litter items such as confectionary wrappers, cigarette butts, and takeaway containers</p>	<p>Place based actions plans developed in each sub catchment and at least one project conducted in each sub-catchment.</p> <p>One region wide initiative developed on a priority littered item.</p> <p>Litter data coordinated and hotspots identified in each sub- catchment annually.</p> <p>SCCG establishes an online litter prevention portal.</p> <p>The SCCG develops a local and regional litter prevention monitoring plan.</p>
3. Develop a shared knowledge base for ongoing litter prevention	<p>2.3 Utilise annual litter data to identify new hotspots or emerging litter items for ongoing action.</p> <p>3.1 Create a publicly available online portal for the sharing and reporting information around litter prevention activities for the Greater Sydney Harbour and Parramatta River Catchments.</p> <p>3.2 Develop a local litter prevention monitoring plan and information sharing hub that can capture relevant data and provide regional context to the NSW Litter Data Framework.</p>	

OBJECTIVE 3:

Support litter prevention activities within councils and other organisations in the Greater Sydney Harbour catchment.

STRATEGY	ACTION	MEASURE
4. Support litter prevention commitment for all key stakeholders	<p>4.1 Work with member councils and community groups to embed litter prevention targets and directives in their operational plans and policies using the Own it and Act Framework.</p> <p>4.2 Work with key partners to develop and deliver education and awareness programs for local schools / industry.</p>	<p>An increase in the number of organisations that have completed and implemented the Own It And Act Framework .</p> <p>By 2023 one regional project and key partners identified, and a project scope developed, funded and implemented.</p>

REFERENCES

BMT 2018 Greater Sydney Harbour Estuary Coastal Management Program Scoping Study Final Report

Cooks River Litter Prevention Strategy 2021 (River Canoe Club)

DPIE 2021 NSW Waste and Sustainable Materials Strategy 2041

Lavarack, J 2021 "The Litter Journey: Big picture for litter prevention" Proceedings of the Litter Congress 2021, Keep Australia Beautiful NSW.

NSW EPA 2019 NSW EPA Litter Prevention Toolkit

NSW Department of Planning, Industry and Environment (DPIE) 2021c "Key Littered Items Study" web page: <https://www.environment.nsw.gov.au/research-andpublications/our-science-and-research/our-research/ water/coastal-and-marine-research-and-monitoring/ marine-debris/key-littered-items-study>

NSW Govt 2019 NSW Litter Prevention Strategy 2019–2022. NSW Environment Protection Authority, Sydney, December 2019.

NSW Department of Planning, Industry and Environment (DPIE) 2021b Plastics Action Plan 2021.

NSW EPA 2013 NSW Litter Prevention Kit: Things you should know about litter and litterers.

NSW EPA 2019a EPA Litter Prevention Kit Part 2: Delivering effective local litter prevention projects.

NSW Government 2018 Marine Estate Management Strategy 2018-2028.

Parramatta City Council Litter Hotspot Study 2019

Return and Earn Annual Statutory report 19-20 (exchangeforchange.com.au)

Southern Cross University 2018 Key items of debris infographic

Sydney Harbour Catchment Model draft report 2018 (Sydney Coastal Councils Group)