SYDNEY COASTAL COUNCILS GROUP INC.

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SUBMISSION

Senate Inquiry into Marine Plastic Pollution

September 2015

069-15EN

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Introduction

We are a voluntary Regional Organisation of Councils (ROC) representing 15 Sydney coastal councils (www.sydneycoastalcouncils.com.au). We are the peak NSW ROC representing coastal councils and the third largest based upon population.[1] We have 25 years' experience leading sustainable coastal management.

We harness the individual and collective knowledge of our Member Councils, a suite of technical and academic experts as well as other stakeholders. Engagement is undertaken through a range of communications including meetings, workshops, information sessions and publications. Accordingly, we are able to provide unique insights drawing upon the technical, experiential and local knowledge of our Members.

Member Councils repeatedly identify marine plastic pollution as key concern in our annual Members Survey. Typically 50-80% of the waste that accumulates on beaches, the ocean surface and the seabed is plastic (Barnes et al. 2009; Derraik 2002; Islam & Tanaka 2004). In recent decades plastic pollution in the marine environment has increased dramatically and substantially (Barnes et al. 2009). The NSW EPA estimates that ~5000 tonnes of debris enters Sydney waterways each year.

In light of Member Councils' concerns, in 2011 we produced a technical report entitled *Plastic in the Marine Environment*. The report details, in general terms, the nature and impacts of plastic in the marine environment and the policies and procedures implemented by Member Councils. The report is freely available on our website and we encourage the Inquiry to review it as part of their investigations: http://www.sydneycoastalcouncils.com.au/node/108

Plastic is an integral part of life and is likely to play an increasing future role, potentially intensifying the input and impacts of litter in the marine environment. Its utility, durability and low cost have resulted in its accumulation worldwide. The problems of plastic pollution are multifaceted such that there is no simple single solution. Creative, effective and sustainable management is required coupled with research and monitoring programs. Enlisting community-wide support to reduce use at-source together with economic incentives, legislation and education can significantly assist address impacts.

We commend the Senate for advancing this important issue and welcome the opportunity to contribute to the Inquiry. Our submission focuses on the Terms of Reference for the Inquiry, with commentary and recommendations provided under the following key areas:

1. Current research and scientific understanding
2. Sources of marine plastic pollution
3. Impacts of marine plastic pollution
4. Measures and resourcing for mitigation.

[1] Gooding, A 2012, *A Comparative Analysis of Regional Organisations of Councils in NSW and Western Australia*, Australian Centre of Excellence for Local Government, University of Technology Sydney.

1 Current research and scientific understanding

While much research has focused on the sources and impacts of marine pollution, there is less understanding of potential solutions to the problem. Similarly, while there is considerable literature on polluting behaviour, research on change management and associated theory to facilitate behaviour change in Australia is limited. We know about different types of polluters and what can predispose them to this behaviour. We know there are different perceptions as to what constitutes pollution and that people may interact with the same item or materials in different ways depending on the context. However research and tools are limited and often outdated in relation to understanding how to best change behaviour in a given context and how to implement change management strategies. There is a particular need for research on change management in the Australian context.

For these reasons, we recommend the focus of future research be on identifying and scoping a range of solutions and mitigation options, including:

- Reducing the generation of new non-biodegradable single use plastic products, e,g. research into replacement of plastic bags with biodegradable materials and new product alternatives
- Increasing recycling of existing plastic, e.g. investment/research into recycling technologies
- More effective regulation and/or enforcement of penalties for littering
- Investigation of behavioural change programs in the Australian context
- Options for restoration of degraded systems
- Assessment of the relative costs and benefits of reduction measures
- The effectiveness of existing mitigation measures
- Review of international best practice initiatives.

As this is a national issue, the Australian Government should play a leading role in coordinating and resourcing research efforts, through for example the CSIRO and research support programs such as the Australian Research Council.

Recommendations:

1.1 Focus future research on identifying and scoping a range of solutions and mitigation options, including:

a) Reducing the generation of new non-biodegradable single use plastic products, e,g. research into replacement of plastic bags with biodegradable materials and new product alternatives
b) Increasing recycling of existing plastic, e.g. investment/research into recycling technologies
c) More effective regulation and/or enforcement of penalties for littering
d) Investigation of behavioural change programs in the Australian context
e) Options for restoration of degraded systems
f) Assessment of the relative costs and benefits of reduction measures
g) The effectiveness of existing mitigation measures
h) Review of international best practice initiatives.

1.2 Call upon the Australian Government to play a leading role in coordinating and resourcing research efforts.

2 Sources of marine plastic pollution

Land-based sources represent ~80% of marine plastic pollution (Andrady 2011), with most debris entering along populated coasts, important fishing grounds and shipping corridors (Laist 1987). Plastic pollution originates from intentional or accidental mishandling, namely littering, illegal dumping, runoff, spillage and discharge from rivers, stormwater and sewage outfalls (Barnes et al. 2009; Browne et al. 2010; Derraik 2002). However consideration also needs to be given to the production of plastics in the first instance, prior to them entering the environment as pollution.

Many industries use and generate significant volumes of plastic. The food industry in particular is a major source of single-use plastic packaging. Other industries such as the tobacco and retail industries are also responsible for the generation of significant volumes of plastic, which invariably enter our environment through improper disposal. Microplastics (particles <5 mm) present particular environmental problems. They are manufactured (e.g. feedstock in plastic manufacture; spherules used in cleaning, cosmetics and airblasting media) or are the breakdown products of meso- and macroplastics (Andrady 2011; Barnes et al. 2009; Browne et al. 2007; Derraik 2002). A major contributor is washing machine wastewater which enters the sewage network and is subsequently discharged into marine environment via treatment plants (Browne et al. 2011). A single garment can produce >1900 fibres per wash with polyester (67%) and acrylic (17%) the dominant fibres (Browne et al. 2011). Other items that enter the sewage system are also problematic, such as sanitary products and wipes.

Once these plastics enter the environment, there is large spatial and temporal variation in their distribution due to geomorphology, human activity and physical factors such as wind (and thus currents and wave-action) and the size, shape and density of plastic (Barnes et al. 2009; Browne et al. 2010; Ryan et al. 2009; Thompson et al. 2009). Particular attention needs to be paid to diffuse sources of pollution, as their cumulative impacts are highly destructive and they are typically more difficult to contain and manage than acute sources.

Recommendations

2.1 Ensure mitigation initiatives take account of the variables that affect pollution sources, such as intended or accidental activities, spatial and temporal distribution, human and non-human dispersal, and acute and diffuse sources.

2.2 Consider the production and use of plastics before they enter the environment as pollution, with a particular focus on industries that generate significant volumes of plastic.

2.3 Consider methods and resources to support land and water authorities undertake ongoing monitoring and assessment of sources and quantities of plastic debris in the environment.

2.4 Make information on sources of marine plastic pollution more accessible.

3 Impacts of marine plastic pollution

Consideration of the quadruple-bottom line impacts (environmental, social, economic *and* governance) of plastic pollution is necessary. Table 1 provides an overview of some of these impacts, though it is far from exhaustive.

TABLE 1. THE RISKS AND IMPLICATIONS OF PLASTIC IN THE MARINE ENVIRONMENT

NATURE OF RISK	IMPLICATIONS
Environmental	
Physical	Entanglement leading to impaired movement, feeding and respiration; strangling / choking
	Ingestion leading to impaired feeding and food assimilation and thus reduced reproductive output; clogging of the feeding apparatus and the digestive system; and physical internal injuries
	Debris can physically damage habitats through abrasion, scouring, ensnaring and smothering
Poisoning	Ingested debris can accumulate in the gut and translocate into the circulatory system
	Transfer of contaminants absorbed by plastic into body tissues
	Concentration of toxins along the food chain
Biochemistry	Debris on the sea floor can inhibit gas exchange between sediment and overlying waters causing hypoxia or anoxia
Geochemistry	Microplastics reduce the temperature and increase the permeability of sediments which can impact upon biota
Community structure	The accumulation of plastic can alter benthic community structure e.g. via smothering, habitat changes
Organisms	Drift plastics are colonised by motile, encrusting and fouling organisms (e.g. bacteria, diatoms, algae, barnacles, hydroids and tunicates) and act as vectors for 'hitchhiking' non-indigenous and/or pest species
	Attract some marine species which mistake plastic as prey or represent a play object or an item of curiosity (e.g. seals to packing loops)
Economic	
	Impacts on fisheries due to affected marine life
	Substantial clean-up costs, particularly for Local Government
	Negative impacts on tourism and coastal amenity
	Impacts on public safety
	Loss of ecosystem services
	Damage from debris to recreational and commercial vessels
Social	
	Adverse health impacts through consumption of contaminated fish and marine species
	Aesthetically displeasing
	Debris can damage recreational and commercial vessels
Governance	
	Significant costs associated with litter collection and clean-up services
	Community expectation for public authorities to mitigate pollution
	Littering/dumping of rubbish/marine debris identified by NSW community as the greatest threat to the Marine Estate in a 2014 survey (Sweeney Research, 2014)

Source: Barnes 2002; Barnes et al. 2009; Browne et al. 2010; Carson et al. 2011; Derraik 2002; Gregory 2009; Joyner & Frew 1991; Laist 1987; Quayle 1992; Sheavly & Register 2007; Thompson et al. 2009

Beyond identifying the impacts, it is necessary to assess their relative priority in terms of their risk to QBL values. This will help to ensure that mitigation efforts can be appropriately targeted.

Recommendations

3.1 Consider the quadruple-bottom line (QBL) impacts of marine plastic pollution.

3.2 Develop a methodology for assessing impacts in terms of their risk to QBL values, so that mitigation efforts can be targeted effectively.

4 Measures and resourcing for mitigation

There are a number of immediate and short-term changes that the Australian Government can and should introduce to significantly mitigate the impacts of marine plastic pollution. As a matter of priority, the Government should focus on resourcing and implementing the following measures:

- Introducing Container Deposit Legislation (CDL)[2]
- Banning plastic bags at supermarkets
- Developing product stewardship programs to phase out the production of single-use plastic products and unnecessary plastic packaging
- Mandating appropriate labelling for products that contain plastics such as micro-beads (e.g. in cosmetics and washing powders) so that consumers can make informed choices
- Reviewing the Government's own procurement policies and procedures to avoid plastic packaging and single use plastics.

To help affected industries adjust to these measures, the Government should also develop suitable structural adjustment programs and engage industry in their design and implementation. This could be executed through existing mechanisms such as the Australian Packaging Covenant and associated *National Environment Protection (Used Packaging Materials) Measure 2011*. The Packaging Covenant and 'Do the right thing' campaign are two examples of positive industry action and demonstrate the capacity to positively engage industry to reduce plastic pollution.

Beyond these immediate changes, other mitigation options should be considered across the waste hierarchy (Figure 1). Greater investment at the top of the hierarchy will deliver cost savings lower down. To appropriately guide investment, a cost-benefit analysis of mitigation options across the waste hierarchy should be undertaken.

Education and behaviour change programs should be a major focus of mitigation efforts. The Government should develop a national education / awareness campaign for plastic avoidance and correct disposal / recycling in partnership with State and Local Governments. Promoting descriptive norms to influence behaviour has been found to be extremely valuable in mediating community action and change (UK Cabinet 2011). These should be targeted at specific user groups, such as boat users, fishers and beach visitors.

As the impacts of plastic are many and varied, solutions must be equally diverse. A whole-of-government approach is required, that includes industry and communities. Due to the scale of the problem, national leadership is essential. In addition, the Federal Government should lead the

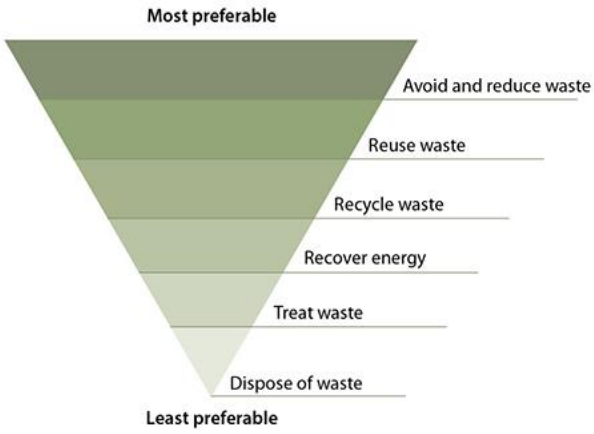

FIGURE 1. THE WASTE HIERARCHY
Source: NSW Environment Protection Authority

[2] The *Independent Review of Container Deposit Legislation in NSW* found that the introduction of CDL would potentially have a net economic benefit of $100-150 million per year (Institute for Sustainable Futures, 2002). This did not include the value of increased amenity due to a reduction in litter, which has been the major driver for the introduction of CDL within Australia and overseas. CDL has the added benefits of distributing waste management costs more equitably, reducing litter, increasing community awareness and engagement regarding waste management, and significantly improving resource recovery. The Boomerang Alliance (2008) estimates that CDL has the potential to increase recycling rates of containers from the present level of 40% to up to 80%.

development of an international agreement with neighbouring countries throughout the Asia-Pacific to facilitate a regional approach to reducing marine plastic pollution. Given that plastics can travel extensive distances through ocean currents and wave action, a regional approach is essential.

Recommendations

4.1 Call upon the Australian Government to take immediate action to resource and implement the following measures:

a) Introduce Container Deposit Legislation (CDL)
b) Ban plastic bags at supermarkets
c) Develop product stewardship programs to phase out the production of single-use plastic products and unnecessary plastic packaging
d) Mandate appropriate labelling for products that contain plastics such as micro-beads (e.g. in cosmetics and washing powders) so that consumers can make informed choices
e) Review the Government's own procurement policies and procedures to avoid plastic packaging and single use plastics.

4.2 Develop suitable structural adjustment programs for affected industries and engage industry in their design and implementation.

4.3 Undertake a cost-benefit analysis of mitigation options across the waste hierarchy.

4.4 Call upon the Australian Government to develop a national education / awareness campaign for plastic avoidance and correct disposal / recycling, in partnership with State and Local Governments.

4.5 Call upon the Australian Government to develop an international agreement that facilitates a regional approach to reducing marine plastic pollution in the Asia-Pacific.

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