



SUBMISSION TO THE SENATE ENQUIRY INTO THE THREAT OF MARINE PLASTIC POLLUTION IN AUSTRALIA AND AUSTRALIAN WATERS

Tangaroa Blue Foundation

Tangaroa Blue Foundation is an Australian registered charity focused on the health of our marine environment, and coordinates the Australian Marine Debris Initiative, an on-ground network of volunteers, communities, organisations and agencies around the country monitoring the impacts of marine debris along their stretch of coastline.





RECENT KEY FINDINGS AND RECOMMENDATIONS IN THE INTERNATIONAL SPHERE

Tangaroa Blue Foundation (TBF) acknowledges the growing body of scientific work being carried out in Australia and overseas on the issue of plastic pollution in the marine environment. We draw attention to the following work which raises issues or directs attention into areas which are important and relevant to the problem both internationally and locally and are either new or have not received attention to date.

Classify plastic waste as hazardous

This call was made by a group of scientists in a “Comment” in the scientific journal, *Nature*. Their call was aimed at classifying plastic waste as hazardous in the major producing countries of USA, China and Europe. The authors argued that changing the classification would lead to immediate clean-up of numerous affected habitats using existing legislation and government funding. The authors also put figures on the scale of the problem. World plastic production stood at .28 billion tonnes in 2012 and is estimated on current trends to rise to 33 billion tonnes by 2050 ⁽¹⁾.

TBF is of the view that a major reorientation in waste management approaches is necessary to address the problem of plastic waste including micro plastic waste. We wish to stress the subject of micro plastic waste in the environment which includes pre-production resin pellets and nano particles, the constantly accumulating particles resulting from the breakup of plastic products, the micro scrubs in personal care products and the micro fibres from clothing released through the sewage system. All present a hazard which is universal in distribution and can impact many marine species and humans. Classifying plastic waste as hazardous needs to become part of the discussion in our approach to the issue in Australia.

Plastic presents a range of threats including injury and death resulting from entanglement and ingestion, and degrading of habitat (e.g. exclusion of turtles from nesting beaches). The most serious but less obvious impact is the impact of endocrine active chemicals found as part of and also attached to plastic items. Many of these chemicals persist in the environment and bio accumulate and bio magnify in the food web.

Population size and quality of waste management systems

The quantity of plastic waste entering the ocean from land sources is largely unknown. Jambeck et al have reported that “Population size and quality of waste management systems largely determine which countries contribute the greatest mass of uncaptured waste available to become marine debris. Without waste management infrastructure improvements, the cumulative quantity of plastic waste available to enter the ocean from the land is predicted to increase by an order of magnitude.” ⁽²⁾.

Australia’s population is clustered around bays, rivers and waterways. As the population grows the input of uncaptured plastic waste into these systems and the oceans also grows. Remediation efforts in NSW waterways and estuaries for example are showing high levels of pollution in these systems. TBF data shows that 62% of this pollution is plastic and 13% is (polystyrene) foam making a total of 75% plastic waste in these systems. The importance of the above mentioned paper is in its directing attention to land sources of plastic waste and drawing attention to the importance of intercepting it.



Sustainability

“Around 4 per cent of world oil production is used as a feedstock to make plastics and a similar amount is used as energy in the process. Yet over a third of current production is used to make items of packaging, which are then rapidly discarded. Given our declining reserves of fossil fuels, and finite capacity for disposal of waste to landfill, this linear use of hydrocarbons, via packaging and other short-lived applications of plastic, is simply not sustainable” ⁽³⁾. This paper from the Royal Society examines the current consensus and future trends for plastic.

TBF data shows that packaging items make up 45% of all items collected in clean-ups at populated coastal sites and inland waterways in Australia. 12% of these come under or would come under the container deposit scheme (CDS) with the CDS item plastic drink bottles accounting for a 5% share. Making progress on this measure alone is very achievable in the sustainability direction. It relieves pressure on waste management systems and landfill capacity, reuses the material, reduces the use of raw feedstock and reduces the threat in the environment.

Toxicity & climate change

How climate change will affect the marine plastic pollution problem has attracted little attention. A paper on the toxicology of climate change discusses “effects of climate change on the environmental distribution and toxicity of chemical pollutants” ⁽⁴⁾. This paper focussed on amongst others the changes in toxicity, behaviour and distribution of persistent organic pollutants (POPs) due to global warming.

Although significant quantities of plastic pollution occupy our waterway and estuarine systems there is little examination of the toxic impacts and how these will change with rising temperature. Our estuarine systems provide critical breeding and feeding habitat and increasing exposure and toxicity will impact the food web in adjacent seas and beyond.

SOURCES OF MARINE PLASTIC POLLUTION IN AUSTRALIA

Tangaroa Blue Foundation (TBF) has been involved in an expanding range of marine debris activities since 2004. Central to these activities has been beach clean-ups including data collection carried out by our volunteers and partners. The following overview of marine debris sources in Australia comes from our experiences and analysis from our data set.

Distribution of plastic pollution

There are usually two main sources of debris on any beach. The first is debris coming from local land sources which include any human activity in the locality and upstream sources conveyed by drains and waterways. The second is debris washing in from offshore sources including shipping, commercial fishing, ocean current borne debris and debris originating from land sources at other parts of the coast. TBF estimates the proportion of these offshore and onshore sources using a statistical tool, the Land Sea Source Index (LSSI). In very general terms 60% of debris has a local land origin at coastal sites in and near population centres while sites away from populated areas have around 23% local origin. All estuaries and waterways are assumed to have 100% local inputs. There are very significant regional differences in these proportions for coastal sites due to a range of factors including population density, prevailing wind and current regimes and regional onshore and offshore activity such as industry, shipping and commercial fishing. We are of the view that it is critical these regional differences are taken into account when assessing management strategies for plastic pollution.



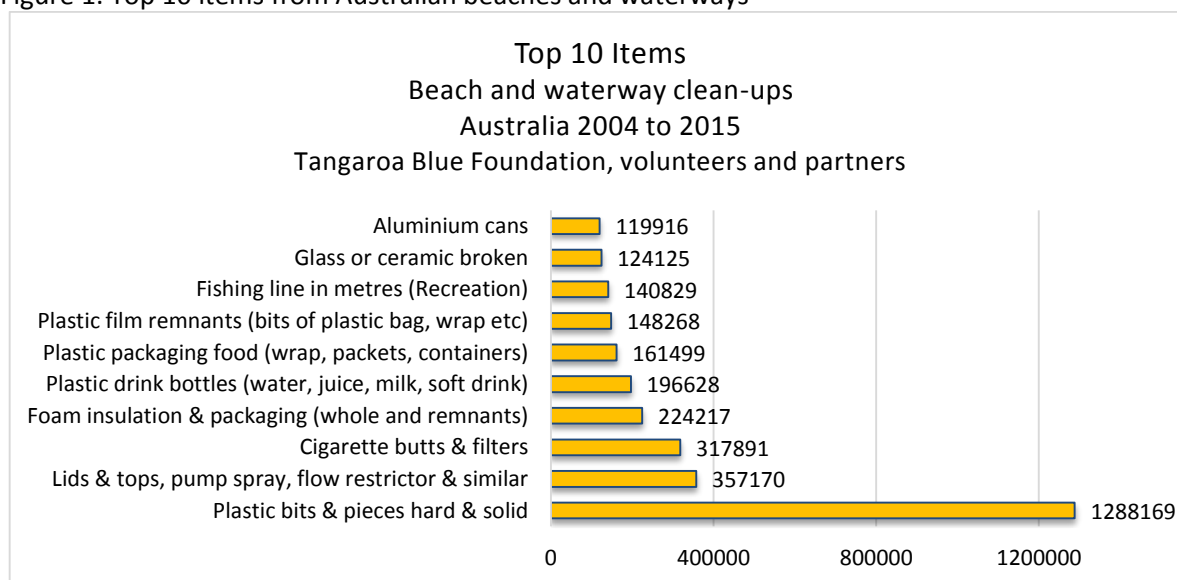
A large amount of plastic debris is hidden in the coastal, estuarine and riverine systems. On coasts the debris is either buried by shifting sands or blown into the dunes where it is caught by vegetation and banked for future release. In estuaries and waterways debris is trapped in vegetation, particularly in mangrove systems where very large volumes of plastic debris can impact these critical habitats. Data on the abundance of debris is based on what can be observed and collected and there is no current estimate on the abundance of hidden debris in the coastal or estuarine systems.

Storms and cyclones flush debris out episodically. This process can be observed in the tropical north, especially in Queensland, when at the beginning of the wet season the “first flush” sends large amounts of plastic debris out into the adjacent ocean and onto local beaches. Its impact is also evident when tropical cyclones re mobilise debris and drive it in volumes onto island and coastal beaches. Increasingly frequent storm events associated with climate change are now also flushing overwhelming volumes of litter into the waterways and estuaries. For example in NSW, clean-up efforts are showing storms and flooding producing large flushes of debris in waterways and estuaries while in Queensland, clean-ups carried out post tropical cyclone Marcia produced very large volumes of debris from areas impacted.

Identifying sources of plastic pollution

The first 8 of the top ranking 10 items found in clean-ups around Australia are plastic and 4 of these are directly related to packaging.

Figure 1. Top 10 items from Australian beaches and waterways





The following two graphs provide an estimation of plastic pollution sources for locations in or near populated areas and for sites well away from them ⁽⁵⁾. Mitigation actions for the first two (green bars) are within the domain of various levels of government and Not for Profit organisations with actions ranging from waste management and drainage measures through to community education and source reduction activities. Commercial fishing (light blue bar) becomes a state government, industry organisation and operator responsibility. Garbage washed ashore can be attributed to shipping and debris from other countries arriving via ocean currents as well as debris moving along a coast from other mainland location (dark blue bar). This is in the sphere of federal government and agency responsibilities. Plastic remnants represent the growing legacy of plastic breaking up into ever smaller pieces (pink bar). Please note that the category “local litter” includes all plastic waste from all land sources including from the drainage system.

Figure 2. Percentage of plastic debris from each source – locations in or near populated areas

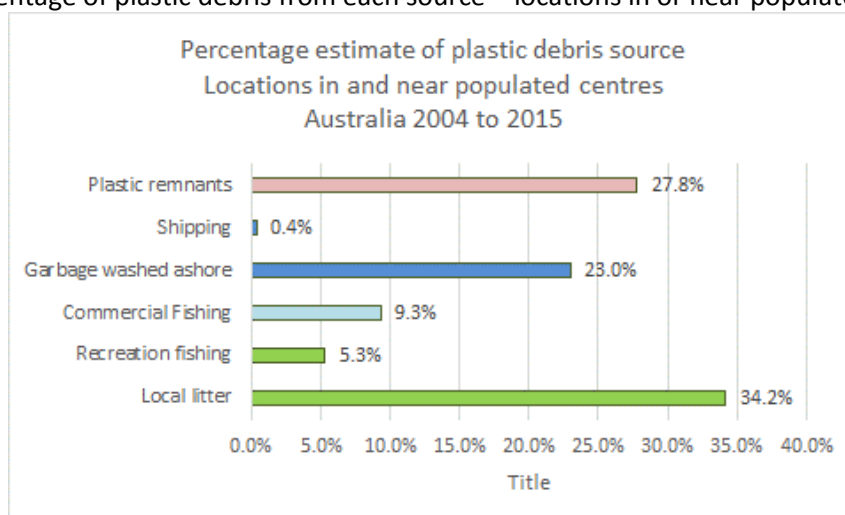
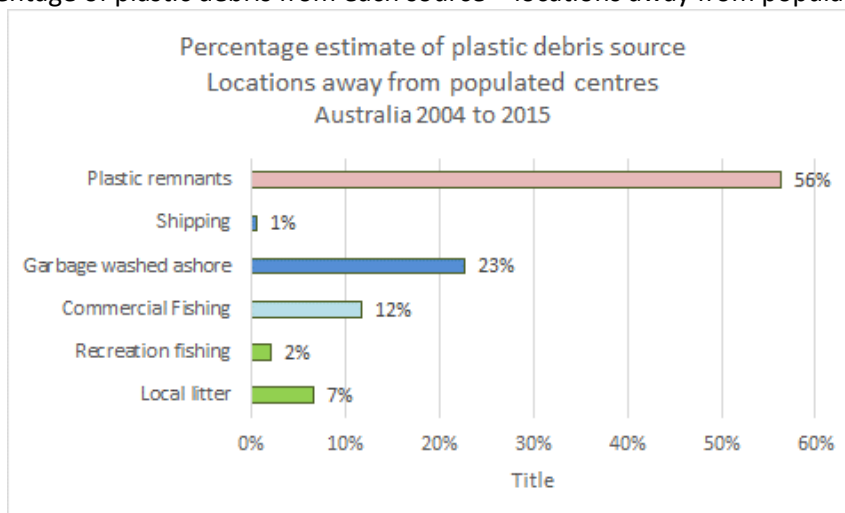


Figure 3. Percentage of plastic debris from each source – locations away from populated areas





RECOMMENDATIONS

Threat abatement plan (TAP)

The Australian Governments Threat Abatement Plan for the impacts of marine debris on vertebrate marine life (2009) (TAP) is currently being revised. TBF would like to stress that this plan is essential but needs to be driven. In the previous life of the plan there was very little direction regarding its implementation and integration into especially regional activities around marine debris.

Regional focus

TBF considers a regional focus is of strategic benefit. At the regional level the governance arrangements (Local government, natural resource management, not for profit organisations, ports etc.) can provide a highly successful level of partnerships, innovation and connection bringing together local community initiatives, regional strategies and national endeavours such as the TAP.

Source reduction

A source reduction approach is recommended. There are many ways for plastic products to enter the environment but there is no simple solution to prevent their entry. TBF has based its system around gathering data from clean-up activities, using this data to identify sources of debris and using this source information to assist in developing source reduction plans. These plans provide an additional focus for community effort by complimenting clean-up effort with initiatives aimed at finding solutions. Source reduction plans operate at the community and enterprise levels. Plans with a wider scope become industry and regional plans. The whole process builds community and industry participation and awareness about plastic pollution.

Sustainability and plastic as a resource

Sustainability needs to become a key part of the approach to the plastic waste problem in Australia. The use of raw plastic feedstock and the continued treating of end of life plastic items as waste is unsustainable. Effort needs to put into finding new ways and stepping up existing ways of reusing reconstituting and recycling plastic waste so that a value is placed on it.

Community and industry education and behaviour change together with design and material change in the products we use and consume form the preventative line of defence. With respect to infrastructure, the waste management system and the built drainage system are the first two lines of defence for intercepting litter and preventing it from becoming marine debris. Clean-ups are the last line of defence. Clean-ups may for the time being be the only line of defence in remote regions such as Cape York. Clean-up strategies will continue to provide a wealth of information which can be directed through source reduction activities at the plastic waste problem.



NOTES AND REFERENCES

- (1) Comment in Nature Volume 494, 14 February 2013
- (2) Plastic waste inputs from the land into the ocean Jenna R Jamjeck et al Science Vol 347, issue 6223 13 February 2015
- (3) Plastics, the environment and human health: current consensus and future trends Philosophical Transactions of the Royal Society (2009)
- (4) The toxicology of climate change: Environmental contaminants in a warming world Environment International (2009)
- (5) This statistic has been developed by TBF and groups identifiable items according to their source category and these are recreation fishing, commercial fishing, shipping and plastic remnants. Items not easily identified with a category are then divided into the categories of local litter and garbage washed ashore using the LSSI to calculate the proportion.

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