

Single Use Plastics – Are We Heading for an Impasse?

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ABSTRACT

The Plastics Industry via Plastics SA (Federation) has shown its concern regarding littering and poor waste management since its formation. In light of this Plastics SA has been supporting environmental cleanups and awareness projects and in particular, for the last 19 years, it has been the patron of the International Coastal Cleanup, which is the world's largest coastal cleanup with the added bonus that most of the material collected is audited. Plastics SA possesses 19 years of data of debris found along the South African Coastline of which plastic forms 85% of the material collected in either underwater or coastal clean-ups. Plastic is seen as one of the major issues facing the sea. It is well documented and is receiving lots of attention especially in the Northern Hemisphere. The federation is also one of 58 Plastics Associations from 34 Countries that signed a commitment in 2011 in support of the Honolulu Commitment to help prevent marine debris. In light of this commitment and having all that data of persistent material found in the environment, the industry needs to be attentive of the criticism from various environmental groups. This condemnation should also be balanced as some of the actions requested is not just unpractical and especially in light of the food and water security in Africa, unfeasible. Only by a strong scientific and economical debate can further actions be implemented to ensure that less material enters the marine environment.

By using the example of micro-beads, ear bud sticks and drinking straws, I want to ask the question, "Do once-use plastics have a future in the absence of a system of retrieval for recycling/energy recovery"?

Once Use Plastics is plastics with a low life cycle of only one use and then discarded. The South African mix of this material is not as diverse as that created in for instance the United States Market, and we need to ensure that it stays that way.

INTRODUCTION.

Plastic litter is now almost ubiquitous in the World's oceans, extending from the coast far out to sea, and down onto the sea floor. Macroscopic plastic (bottles, plastic bags, old toys, etc.) is in evidence on most tourist beaches, in harbours and marinas, and can be readily spotted from boats.

One of the main causes of this global problem is increasing plastic production. The annual production has increased dramatically from 1.5 million tons in the 1950s to approximately 280 million tons in 2011. Micro plastic fragments (smaller than 5 mm), potentially less obvious Nano scale plastic, is readily detectable in sand, sediment and even in marine biota. The latter may originate directly in the micro, nano forms, or result from the breakdown or abrasion of larger pieces of plastic.

Micro plastics have been accumulating in oceans globally over at least the last four decades and have invaded even the most remote marine environments. Knowledge about the effects of this micro-debris is limited, but nonetheless, a scan of global conservation issues identifies micro plastics as one of the main global emerging environmental threats.

Numerous non-governmental organisations, wildlife charities and environmental agencies have drawn attention to the plastic litter issue, yet the scale of the problem is not widely appreciated by the public or politicians. Few, if any, practical measures have been put in place to manage the situation. Concerns extend from the unsightliness of macro plastics affecting coastal tourism, to various effects on ecosystem structure and functions, through adverse impacts on particular species and even the death of individuals. In 2011 the plastics industry took a very bold step by recognising the problem and supporting the Honolulu commitment to help reduce the problem.

The relationship between micro plastics abundance and human population-density has been demonstrated and since the human population continues to increase, the prevalence of micro plastics will also probably increase.

Academics and other researchers have now published several authoritative reports on the effects of plastic litter on marine birds, turtles, marine mammals and other marine vertebrates and invertebrates. Their studies have identified plastic fragments in the water column, in sandy and muddy sediment and in the guts, respiratory structures and tissues of marine species.

The Honolulu commitment:

- a) International organizations, governments at national and sub-national levels, industry, non-governmental organizations, citizens and other stakeholders committed at the 5th Marine Debris Conference in 2011 to;
- b) Make choices that reduce waste in order to halt and reverse the occurrence of marine debris.
- c) Encourage all citizens, industry and governments to take responsibility for their contribution and find solutions to the marine debris problem;
- d) Share openly and freely technical, legal, policy, community-based and economic / market based solutions that will help prevent, reduce and manage marine debris;
- e) Advocate mechanisms that emphasize the prevention or minimization of waste;
- f) Facilitate initiatives that turn waste into a resource in an environmentally sustainable manner;
- g) Develop global, regional, national and local targets to reduce marine debris;
- h) Improve global knowledge, understanding and monitoring of the scale, nature, source and impact of marine debris, and raise awareness of its impact on public health, biodiversity and economic development;
- i) Collaborate with global, regional and sub-regional organisations, to enhance the effectiveness of multi-lateral initiatives aimed at preventing, reducing and managing marine debris;
- j) Encourage financial support for global, regional, national and local actions that contribute to the implementation of the Honolulu Strategy;
- k) Encourage relevant intergovernmental fora, including those at global and regional scales, to express support for the Honolulu Commitment and encourage governments to take action consistent with the objectives and strategic activities outlined in the Honolulu Strategy; and
- l) Participate in a global network of stakeholders committed to understanding, preventing, reducing and managing marine debris in an environmentally sustainable manner;
- m) Contribute to the development and successful implementation of the Honolulu Strategy – a framework for the prevention, reduction and management of marine debris – and its periodic review.

The Commitment from the Plastics Industry is to:

- a) Contribute to solutions by working in public-private partnerships aimed at preventing marine debris.
- b) Work with the scientific community and researchers to better understand and evaluate the scope, origins and impact of and solutions to marine litter.
- c) Promote comprehensive science-based policies and enforcement of existing laws to prevent marine litter;
- d) Help spread knowledge regarding eco-efficient waste management systems and practices, particularly in communities and countries that border our oceans and watersheds;
- e) Enhance opportunities to recover plastic products for recycling and energy recovery; and
- f) Steward the transport and distribution of plastic resin pellets and products from supplier to customer to prevent product loss and encourage our customers to do the same.

What we know concerning plastic litter in the sea.

- a) Plastic litter is diverse and now very widely distributed in the marine environment.
- b) Many kinds of plastic litter are extremely persistent, often for several decades.
- c) Some kinds of marine organisms are particularly vulnerable to plastic litter, including turtles, marine mammals, suspension feeders and deposit feeders.
- d) Some plastics components and their constituent chemicals can be transferred through marine food webs (e.g. phthalates).
- e) Plastic litter can play a role in facilitating the introduction of invasive species into new localities, thereby influencing both biodiversity and ecosystem structure and functions in some areas.
- f) The use of plastics is continuing unabated and will increase in the future.
- g) Hydrodynamics and degradability determine the fate of litter at sea.
- h) Policymakers, politicians and the public remain largely unaware of the extent of the problem and the magnitude of the threat to marine ecosystems.

Emerging questions.

- a) How much plastic is getting into the marine environment each year?
- b) What are the key sources?
- c) What are geographic distributions of plastic litter of different sizes?
- d) What are the relative proportions of macro, micro and Nano plastic entering the marine environment and which pose the greatest threat?
- e) Where do the different types of plastic litter accumulate?
- f) How long does each type persist?
- g) Is plastic taken up by marine organisms?
- h) Is it damaging to them? Is harm well understood? Which kinds of marine organisms most impacted by macro and micro plastics?
- i) What are the mechanisms by which damage occurs?
- j) How does plastic interact with other environmental pollutants and influence their toxicity?
- k) What is the extent of economic, environmental and human health costs resulting from the presence of plastic litter in the marine environment?

What can be done?

- a) The need to increase awareness of the scale and severity of the issue through public education programmes,
- b) Clear identification of who is responsible for managing plastic production and levels of release into the environment,
- c) Provision of guidelines on the safe disposal of plastics,
- d) Development of regulations to ensure the safe disposal of plastic – and their enforcement,
- e) Reduction of the use of plastics worldwide through international agreements,
- f) Finding environmentally friendly alternative to plastics,
- g) Development and implementation of programmes for the collection and proper disposal of plastics (for example, beach clean ups, collection for recycling and reuse, etc.),
- h) Monitoring trends and effects of marine litter at sea,
- i) Evaluation of the presence and effects of marine debris (particularly micro plastic) in marine environment using marine organisms as sentinel species and applying new integrated monitoring tools.

INDUSTRY SHOWING RESPONSIBILITY? STOPPING THE USE OF A PLASTIC MATERIAL WHICH WAS CLASSIFIED AS A POLLUTANT - THE CASE OF MICRO BEADS.

Unilever eliminated the usage of micro beads in their personal care products in 2012 and was quickly followed by Colgate-Palmolive, Beiersdorf and L'Oreal. 25 NGOs under the auspices of *Beat the Bead* campaign, started by the Plastic Soup Foundation and the North Sea Foundation lobbied for years to eliminate the use of micro plastics in the products. New products came on the market using biodegradable material using the *Beat the Bead* marketing message as platform and very quickly increased their market share. The questions are then asked, would Unilever have taken this step if,

- (a) The pressure groups campaigning against their products were not so active,
- (b) They did not lose market share,
- (c) The micro beads were not proven to be as detrimental to the environment as was show by research...

MARINE DEBRIS RESEARCH AND MITIGATING ACTIONS IN SOUTH AFRICA.

Limited research is being funded on the issue of marine debris in South Africa as there is a larger focus on the question of chemical pollution in South African inshore waters by government entities.

The plastics industry in South Africa via Plastics SA is running various projects to address the issue of marine debris. The most important work being done is to increase recycling of the material and establishing new products to be made from the recycle. Only by increasing the amount of material produced with a longer life from recycled source and by adding value to material for collection would the material hopefully be less discarded.

From 19 years of coastal cleanup data, Plastics SA is addressing the issue of the material predominantly recorded. Most of these projects are dedicated to the material with the highest count on the coastline and to address the reasons for them finding their way into the environment.

On a general survey of South African Beaches you would usually find the following material as shown in the chart. This obviously has regional differences.

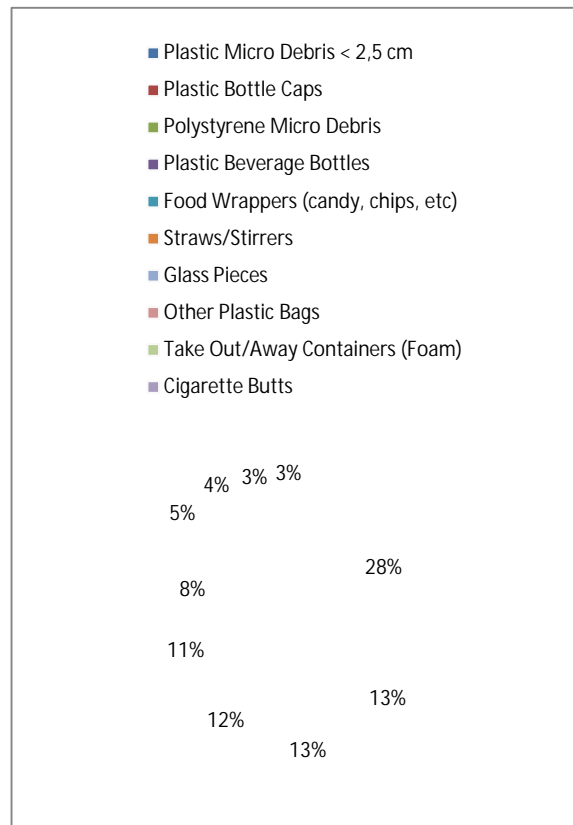


Figure 1. Chart showing the top ten items found on a typical South African Beach.

- a) The plastic item found the most on most beaches, especially urban environments is micro plastics (28%). Not much can be done about this issue due to the size of the material. The plastics industry used to be a great source of the material due to improper management of the pellets and granulated material and the plastics industry has placed measures in place to reduce the amount of this material finding its way into the environment. Independent research in South Africa as well as research in the Northern Hemisphere has shown a global decrease in the material. Unfortunately the larger plastic material in the sea is breaking up and this is fuelling the micro debris pool. Another action that was started in 2013 is to sweep heavily polluted beaches in winter conditions when the sand load on the beaches is reduced. Item number three on the list is micro expanded polystyrene material and via the Polystyrene Packaging Council there are various efforts to recycle the material or use contaminated (fast food containers) material in cement blocks. This increase of recycling is linked to item 9 on the previous chart (take away containers 3%), that the fast food industry depends on. There has been a slow movement away from EPS by the main stream fast food outlets but many still depend on it as a container for take away food.
- b) Item number two is Bottle caps (13%) from mainly soft drink bottles and is the macro material primarily recorded and collected in coastal clean-ups. This material is linked to item 4 on the chart – that of plastics bottles (12%), mainly bottles made from Polyethylene Terephthalate (PET). Design of the caps have led to an increase of recycling so that only one polymer is used in its making and the breaking and attachment of “safety rings” have led to less of this material finding its way into the environment with a decrease in entanglement from this source. With the start of the various polymer groups to increase recycling of the various polymers has led to an increase of the recycling of this material. While PETCO has increased the recycling of PET, POLYCO is focusing on the increase of recycling of Polypropylene (PP).
- c) Linked to number 1 is item number 4 that of EPS beads, which can be reduced by increasing the recycling rates of EPS.
- d) Item number five is packaging material from the confectionary industry (11%). There is steady increase of smaller pieces of food wrappers and crisp packets in the environment and hopefully with our partners we can raise the issue of not littering in South Africa.

- e) Number six on the list (8%) is an area of concern (plastics sticks and straws) as there is no recycling program for straws and plastics sticks from ear buds and to lesser degree, lollipops. The presence of plastic sticks from ear buds is particularly visible on certain beaches as it enters the environment due to the overburdened infrastructure (sewerage plants) not able to capture them. We have approached one of the biggest ear bud manufacturers in South Africa requesting them to put a message on packaging and holding a media drive asking consumers not to throw the material down toilets. So far they have not been cooperative and some of the aquariums think of starting a program similar to the "Beat the Bead" program that stopped the usage of micro beads in the soap industry. This is one of the problems regarding material such as this. If someone else can be blamed for its presence in the environment, the industry is not very willing to assist. The "Beat the Bead" was in a way easier as the manufacturers could not blame anyone except themselves for allowing the material that could not be trapped to enter the environment. This is also a case for the material to be made from bio plastics.
- f) Glass pieces (5%) on South African beaches are the only non-plastic item and its presence on the Top Five list is only due to the increased focus on micro debris. The recycling of glass is very well managed in South Africa. Many of these pieces are as with plastic pellets found on the coast from earlier periods when there was not such a focus on proper stewardship of the material through good waste management and recycling.
- g) Since the implementation of a levy for consumers on the usage of plastic bags there has been a decline in its presence (4% at present) but in non-coastal areas there has been a slow increase in its visibility as consumers became familiar to the paying of the levy. POLYCO is supporting the increase of collection of the material for recycling.
- h) At number 10 (3%) is the global problem of cigarette filters. Although a plastic, it is not being recycled and we are trying to increase the awareness of proper disposal of the material with our partners.

None of this material is a real entanglement material, like fishing lines. We started in 2012 with the placement of fishing line retrieval bins on the South African Coastline, especially at popular fishing areas. Fishing line used to be under the top ten materials but due to a decrease in fishing activities in South Africa. (Due to increased protection of the fishing resources and a decrease in fishing stocks which led to less anglers and fishers).

Another item, although not being an entanglement hazard, was the presence of light sticks used in the Large Pelagic Industry (Tuna, Swordfish and Shark) found in increasing numbers on the coast. As the fish resources became more difficult to target due to its scarcity, the technology to catch the animals also increased and the light sticks serves as an added attraction to the bait for the target fish. The industry is not very big in South Africa and we started collecting the material from the harbours where the vessels discharged their catch for recycling. An added bonus was that the vessels started bringing back their monofilament line for recycling which was of better quality than the material retrieved from the fish line bins. The industry has also taken the bold step to support research in the presence of plastics in some species of fish starting with inshore shark species by an independent research team. Plastics SA has also formed a Scientific and Technical Advisory Panel to ensure that the plastics industry does give meaning to its commitment done at the 5th Marine Debris Conference with the other Plastics Industry partners internationally.

CONCLUSION.

Single use plastics are seen in exactly the way the phrase states, it has a single life as it proposes. This does not mean that the polymer it is made from cannot be used to make other articles or even be used to generate energy.

The recycling industry is growing as technology is improving fueled by a higher demand for recycle. Shopping bags, although very visible and having been recorded to harm animal life when discarded, is very visible in the environment and has been the symbol for pollution. Data in South Africa and in other parts of the world have shown a decrease as a pollutant and in many areas it is still not collected for recycling or accepted by the industry as it is contaminated but as mentioned, this is slowly changing. The decrease in its presence in the environment is partly due to an increase in collection and recycling of the material but the fact that consumers have to pay for the bags has probably been the reason for the decrease in its visibility.

Meanwhile we are also seeing materials being generated that do not have any systems for retrieval for recycling due to its size, the ease, and need to discard it for whatever reason. The removal of plastic beads from the cleansing material was critical as it was providing a source for nano-plastic material findings its way into the environment and especially the marine environment. All these materials have mainly one thing in common, they are made into small objects, sticks for the confectionary and grooming industry, drinking straws and single use wrappers for sweets.

The impacts of education and raising awareness are limited and it would be wonderful if the materials as mentioned before are made from a biodegradable source. Some sticks in the confectionary industry are still made out of paper. Maybe we should again, return to paper straws?

After they were made observant of the amount of their material found in urban coastal clean-up data for the last ten years. The largest manufacturer of sanitary products in South Africa, Lil-Lets, have placed advisory symbols on the packaging of their ear bud packaging asking the users to dispense the material in a proper containment system.. In conjunction with media attention on the issue there might be a small reduction of ear bud sticks finding its way into the environment.

Unfortunately, we import more of the material into South Africa than we produce ourselves.

Pressure from government is critical, especially in a background where the vocal pressure from civil society is not as strong regarding recycling and pollution as in developed countries. Of course this pressure must be sound and professional and we should guard against a repeat of the disaster that was Buyisa-e-Bag.

The blame for plastic pollution is simply and lethargically left at the front door of the plastics industry. The Industry is concerned and is trying to address the issue in a sustainable way as they also realize they are dealing with a finite product. The South African plastics industry and manufacturers of once use plastic items could in some areas move to non-oil based material.

To conclude – The Plastics Industry is proving that it is serious about recycling and the words “once use item” need to be re-looked in light of this. Let us have paper straws, sticks, sweet papers again as this is fuelling a pollution that is going unseen as it ends up in the sea. Let us give plastics items that was a problem in the past a change to proof themselves. We are dealing with a finite resource that is making the 21st Century possible for us with its gift in technology, saving energy and food security.

If an item becomes a problem, indeed, remove the problem but be aware of the bigger picture.