THE SONEVA DIALOGUE

BACKGROUND BRIEF

Ocean plastics: A tale of our times

The presence of plastic waste in the oceans represents an emerging threat to global fisheries, with unknown but possibly major implications in the near future. Governments and industry are beginning to address this threat, while numerous innovative approaches to adapt to and mitigate the problem are developing.

Overview

As new applications for plastics in consumer goods continue to emerge, and our demand for them sharply rises, scientists have begun to see a startling trend of plastics making their way into the marine environment with alarming impacts on the ecosystems.

Global plastic production in 2010 amounted to 270 million metric tons. In the same year, there were 275 million metric tons of total plastic waste globally – 8 million tons of which leached into the ocean[1]. This has been going on for so long that there is now an estimated 6,350-245,000 metric tons of plastic waste floating on the ocean surface[1].

Different kinds of plastic pollution

The best documented type of marine plastic is surface plastic, which makes up, for example, the 'garbage patches' (or 'gyres') littering the world's oceans. Surface plastic however only represent a small fraction of the total plastics in the oceans, possibly as little as 1%. The rest sinks, becomes part of the sediment on the seafloor, gets trapped in ice, or is washed onto beaches.

Plastics have been recovered from many species of fish and have been an important factor in increased mortality among seabirds, sea turtles, fish, and ocean mammals. The extent of the problem is not yet known, but there is increasing concern that plastic ingestion by marine animals is widespread, with implications for marine ecosystems and potentially also for human health. In addition to the issue of ingestion, marine plastics also cause entanglements, habitat damage, spread of non-native species, and 'ghostfishing', a phenomenon caused by marine life getting caught in derelict or lost fishing gear.

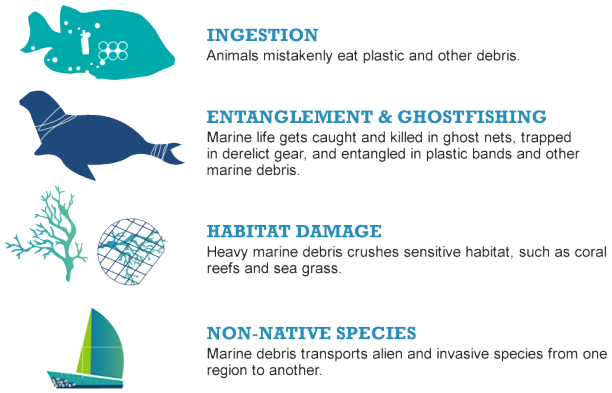

Figure 1: Impacts of marine debris - https://marinedebrisblog.wordpress.com/2015/09/11/impacts-of-marine-debris-the-struggle-for-marine-animals/ 9/11/2015

Most plastics persist in the marine environment, and even biodegradable plastics break down extremely slowly. Instead, this plastic slowly 'weathers', with sunlight and tidal action breaking it down into smaller bits.

Future challenges

Marine plastics are spread over millions of square miles and consist predominantly of degraded plastic. These micro-plastics can be the same size as many planktonic organisms living in the water column, and representing a key food source for many fish species. Removal requires a process to not just remove large plastics, but also to separate micro- and nano-size plastic from living organisms of the same size, which is not feasible with existing technologies.

Getting off the plastics treadmill

According to CSIRO, Australia's national science agency, global production of plastics doubles every decade. Even if a workable collecting mechanism could be developed, it would have to be significantly scaled to have

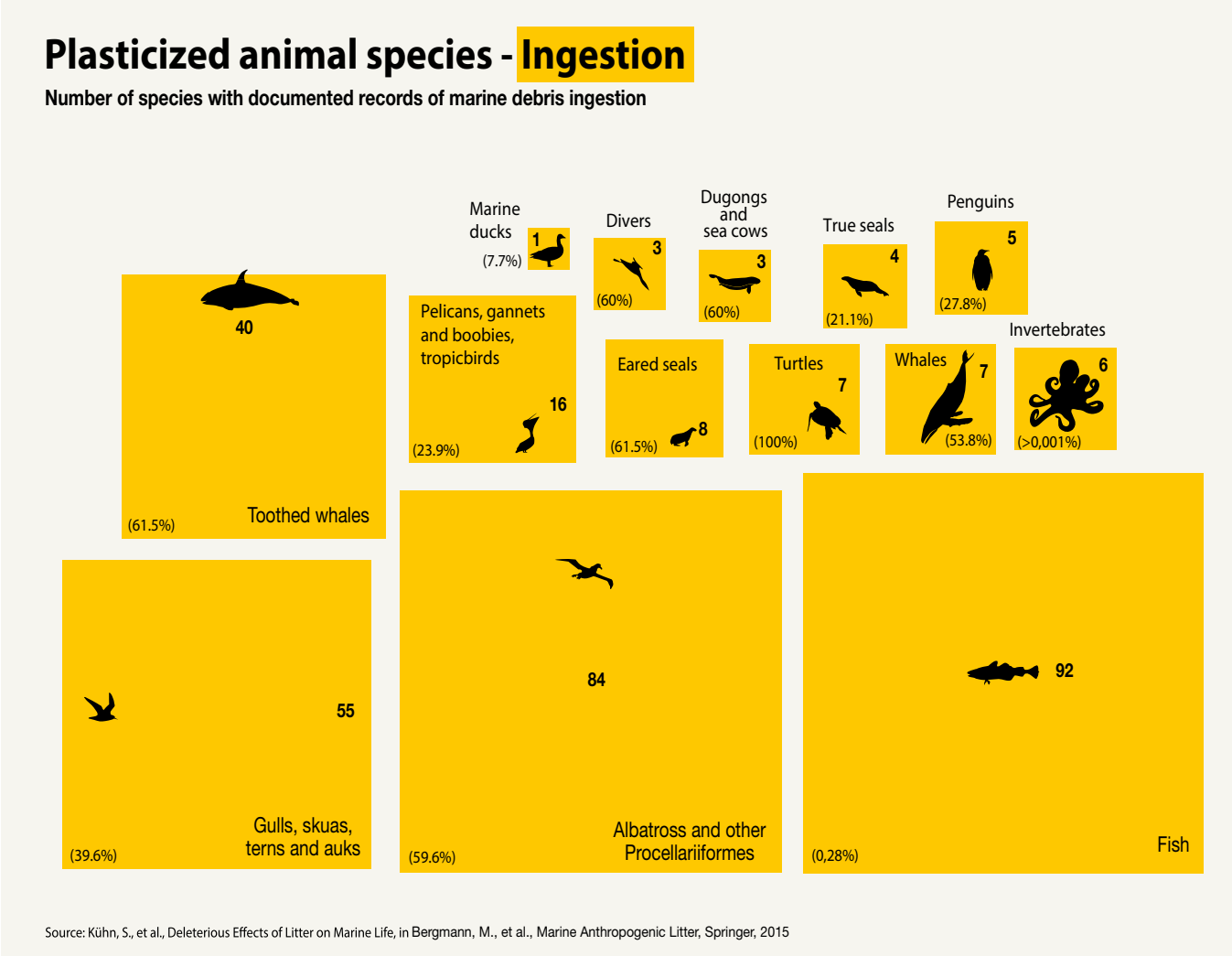

Figure 2: UNEP Report, Marine Litter Vital Graphics, http://www.grida.no/publications/vg/marine-litter/

any serious impact. Unless there are dramatic improvements in waste management infrastructure, the cumulative quantity of plastic waste available to enter the ocean from land is predicted to increase by an order of magnitude by 2025[1]. Some scenarios[4] even suggest that the total weight of plastics in the oceans could reach the same order of magnitude as that of fish.

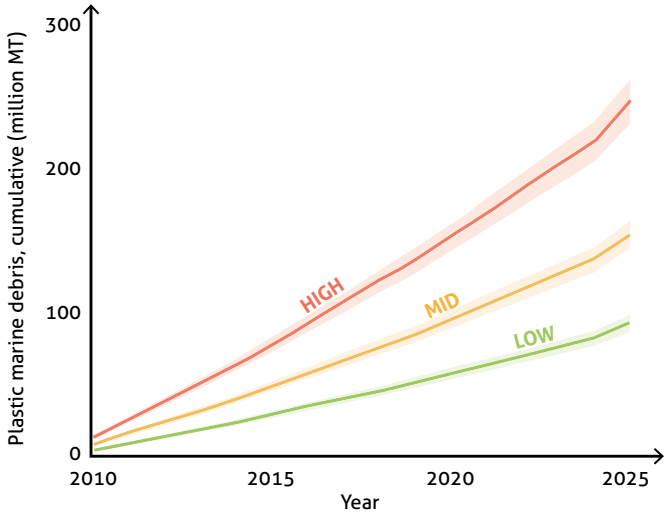

Figure 3: Different scenarios of cumulative million MT

Existing initiatives already under way

A number of potential solutions have been proposed to help reduce the amount of plastic in the marine environment. They generally fall into three categories: preventing plastic from leaching into the ocean in the first instance; remediating the plastics already in the marine environment; and 'circular economy solutions' that reuse ocean plastics in consumer products.

Prevention

- Bans on specific products such as plastic bags or micro-beads from cosmetic products and other micro-plastics.
- Better coastal waste management, including in rapidly developing countries where production and consumption of plastics is outpacing local waste management capacity (e.g., China, Indonesia, Philippines, Vietnam, and Thailand)
- Reduction in use of plastic bags and other disposable plastic items.
- Edible food-based 'plastics', e.g., edible six-pack rings made from brewery by-products.

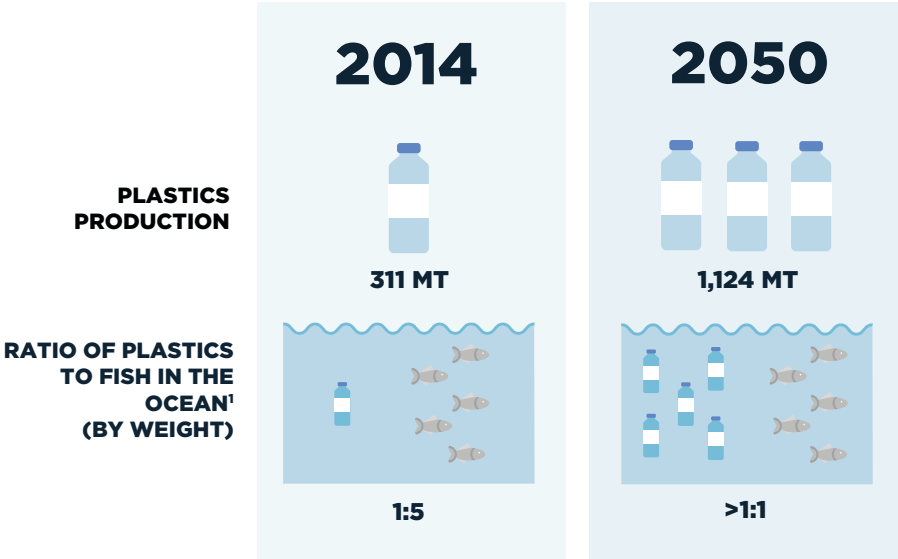

Figure 4: WEF report, The New Plastic Economy, http://www.bbc.com/news/magazine-35562253, January 2016

- Industry Initiatives - 60 plastics industry groups in 34 countries have voluntarily signed the Declaration of the Global Plastics Associations for Solutions on Marine Litter. They have agreed on a framework to work with governments, NGOs, researchers and other stakeholders to prevent marine litter. Since the Declaration was issued in 2011, 260 marine litter solutions projects have been planned or put into action

Remediation

- The Ocean Cleanup – uses ocean currents to funnel plastics into a V-shaped array.
- The Water Wheel – solar powered device removes plastics at the source using a 'debris raking system'.
- The 'Oclean' Filtration System - an offshore litter cleaner designed to help collect ocean pollution like plastic particles and other floating types of waste.

Circular economy solutions

In the report "The New Plastics Economy"[4], the Ellen MacArthur Foundation, together with WEF and McKinsey & Company, sets out a vision for an economy where plastics never become waste; rather, they re-enter the economy as valuable technical or biological nutrients. The New Plastics Economy is underpinned by and aligns with principles of the circular economy. Its ambition is to deliver better system-wide economic and environmental outcomes by creating an effective after-use plastics economy, drastically reducing the leakage of plastics into natural systems (in particular the ocean) and other negative externalities; and decoupling from fossil feedstocks. Examples of circular economy solutions includes; making bottles, sports shoes, yarn for blue jeans, fishing nets or carpets from recycled ocean plastics.

References

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