

## **What Goes Around Comes Around**

The Arctic is incredibly vulnerable to climate change and studies indicate that increasing surface air temperatures, caused by natural and anthropogenic greenhouse gas emissions are warming the region twice as fast the rest of the planet. Average levels of sea ice have significantly declined and it is predicted that the Arctic Ocean could become ice-free during the summer months this century.

A major contributing factor to global warming is the burning of fossil fuels to produce energy and materials such as plastic. Ubiquitous in modern life, from food packaging to textiles, to microbeads in our cosmetic products, plastic is one of the most versatile materials benefiting people all around the world. However, its use comes at a high price through the continued extraction and burning of fossil fuels, and ultimately through the waste produced.

Growing trends in consumerism, and our desire for convenience has brought the annual global production of plastics to an estimated 300 million tonnes. However, only 14 percent of plastic packaging is collected for recycling, with only 5% of the material value retained for subsequent use. Of the plastic that is recycled most is made into lower-value, non-recyclable applications, with most packaging designed and manufactured for single-use application.

Non-recycled plastic waste goes either to landfill, or through accidental release via surface run-off, rivers or sewers, eventually finds its way from land out to sea, with up to 8 million tonnes of plastic items entering the oceans every year. The impact of this is the rapid, global distribution of waste and its subsequent transfer through the water, land and air, inadvertently affecting the health and wellbeing of humans and other animals alike as we drink, eat, and breathe plastic particles and the chemicals they carry.

Plastics in the ocean can persist for decades at the very least, if not hundreds of years, depending on its location and the particular variables that affect it over time. Little is known about how microplastics behave when exposed to the marine environment. However, they are known to attract and accumulate chemicals, which can then disassociate from the host. Laboratory studies have shown that due to the effect of microplastics marine worms' energy reserves are reduced by up to 50%.

Most plastic litter originating from Britain ends up in the Arctic, taking less than two years get there. In addition, ice core samples taken from the Arctic have been found to contain high concentrations of plastic particulates and scientists have concluded that Arctic sea ice is a major global sink for microplastics, which have been accumulating for decades. As the polar region warms and annual sea ice declines, large quantities of microplastics will likely be released into the already saturated ocean.