Microplastics Talking Points

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Microplastic pollution is ubiquitous in our environment

- There are approximately between 15 to 51 trillion microscopic pieces of plastic, weighing 250,000 tons afloat in our oceans.
- Microplastic is accumulating in the environment. Frozen ice cores from the Arctic Ocean show that microplastic has accumulated far from population centers and suggested that polar sea ice is becoming a major sink for microplastic contamination and, as the ice melts, microplastics can be released into the environment. Sediment cores from Lake Ontario show that microplastic has been accumulating for the past 38 years.
- Archived plankton samples dating as far back as the 1960s indicate a significant increase in plastic fragment abundance over time.
- Plastic debris/litter and microplastics are ubiquitous in the ocean, occurring on remote shorelines, in coastal waters, the seabed of the deep ocean and floating on the sea surface; the quantity observed floating in the open ocean in mid-ocean gyres appears to represent a small fraction of the total input.
- With the exception of the small percentage of plastics that are incinerated, all of the 7800 metric tons of plastic resins and fibers produced over the last 65 years have or will become microplastics.

Microplastic is in our air, drinking water, salt, beer, fish we eat and agricultural soil

- Microplastic has been found in table table salt
- Microplastics is in the air we breathe.
- 93% of 259 bottles of drinking water showed some sign of microplastic contamination. Contamination ranged from 0 to over 10,000 microplastic particles per liter.
- Both treated and untreated tap water contain microplastics
- ¼ of fish from California and Indonesian markets contained microplastic.
- Many agricultural fertilizers contain microplastics.
- Some of the world's most productive agricultural soils are now being affected by microplastic pollution, seriously threatening soil health and food security
- Microplastics should be treated as an economic issue – within the scope of a food and farming strategy - as well as an environmental one.

Microplastics are harmful to environment & animals

- Marine plastics have a social, economic and ecological impact – marine litter has been shown to have significant ecological impacts, causing welfare and conservation concerns, especially for threatened or endangered species; social impacts can include injury and death; and economic losses in several sectors can be substantial
- Microplastics contain many types of additive, which can leach out from the plastic and pollute the environment.

- A single microbead can be up to a million times more toxic than the surrounding sea water.
- Microbeads used in personal care and cosmetic products are a direct source of marine litter, especially in locations with no or limited wastewater treatment in place.
- ¼ of fish from California and Indonesian markets contained microplastic.
- Of the 557 species documented to ingest or entangle in our trash, microplastic ingestion has now been documented for 233 marine species, including 100% of marine turtles, 36% of seals, 59% of whales, and 59% of seabirds, as well as 92 species of fish and 6 species of invertebrates.
- The impacts on the marine environment are still being researched. However, there is evidence that there is scope for significant harm to the marine environment. Microplastic pollution is potentially more environmentally damaging than larger pieces of plastic because small pieces of plastic are more likely to be eaten by wildlife and have a greater surface area which can transfer chemicals to and from the marine environment.

Harms to Animal and Human Health

- Laboratory studies have shown a variety of deleterious effects on the physiological processes of ANIMALS. Further research is needed at environmentally relevant levels for better understanding HUMAN health implications. However, we should be operating under the precautionary principle that microplastics are harmful to human health as well.
- Microplastic ingestion could be a prequel to other diseases by causing chronic inflammation in people's tissues. These include lung and gut injury
- The uptake of plastic particles by humans can occur through the consumption of terrestrial and aquatic food products, drinking water and inhalation.
- Very small (nano-size) microplastics have been shown to cross cell membranes, under laboratory conditions, causing tissue damage.
- Ingested microplastics can affect the physiology of the host organism and potentially compromise its fitness.
- Plastics often contain chemicals added during manufacture and can absorb and concentrate contaminants such as pesticides from the surrounding seawater. There is emerging evidence of transfer of chemicals from ingested plastics into tissues.

Further research is needed on harms of microplastics and human health implications

- *Science Advice for Policy by European Academies (SAPEA)* concludes that microplastics do not pose a widespread risk to the environment and human health. The analysis finds only isolated locations around the globe where concentrations of microplastics in sediments and water are so high that they could present a concern to human health.
    - "Of course, a lack of evidence for risk does not mean we should assume there is no risk," says Bart Koelmans, chair of the working group that created the report. The group acknowledges that its conclusions are based on a series of assumptions. Measurement methods currently available have limitations, and there is a "need for more inquiry," the SAPEA report states.

- *Defra's Chief Scientist* has stated that "it would be extraordinarily difficult to directly measure the effect of microbeads on the marine environment as a whole. Since microbeads are a form of microplastic, evidence concerning microplastics can be used to provide information about the potential environmental impacts of microbeads. We also know that microplastics do not biodegrade significantly and therefore accumulate in the marine environment. Once released into the environment it is impossible to recover microbeads or remediate the effects that could subsequently emerge. In spite of scientific uncertainty the risk of effects is high. This risk also needs to be considered in the context of other stresses experienced by marine organisms including other forms of historical pollution and ocean acidification. Adding stresses from microbeads increases the overall risk. It is therefore sensible to minimise the disposal of microbeads to the marine environment by, whenever possible, using less harmful alternatives."

Source reduction is most effective solution

- The most effective solution to tackling microplastic pollution in the marine environment is to tackle it at the source. This means stemming the flow of primary microplastics, and general plastics, entering the marine environment in the first place.
- Taking action to tackle ocean plastic pollution at source is the best strategy, this is also the most feasible option in the short-term.
- However, there are also opportunities to capture microplastics through washing machine filtration systems and waste and water sewage treatment processes.

Microplastics pollution is an international issue

- It is important to address microplastic pollution as a transnational problem and to understand that plastic in the ocean is in constant motion. It is clear that international action is needed.
- Up to now, NGOs have taken the lead role in addressing this issue. However, this is unsustainable given the increasing costs and demands relating to microplastic pollution. As more evidence emerges about the impact of microplastic pollution, the Government must take on that role.
- Microbead pollution does not respect national borders. Legislative measures to prevent the sale or manufacture of microbeads will be more effective if undertaken on a transnational basis.

There are relatively easy availability of non-synthetic alternatives

- Many companies, governments, and civil society organizations have cited the availability of biodegradable and natural alternatives to plastic microbeads such as including jojoba beads, apricot seeds, and powdered nut shells as reasonable substitutes for plastic microbeads.
- Further, ecolabeling programs (mostly all voluntary) have begun to include the prohibition of plastic, non biodegradable microbeads in their Ecolabel criteria for cosmetics and other personal care products.

Incineration is NOT a good solution

- It produces climate impacting greenhouse gases, persistent pollutants (that can accumulate in land and marine food chains), and can inflict air and ash pollution impacts on local communities. Burning enables poorly designed products to continue being produced, wasting valuable resources that would be better reused or recycled.

Bioplastics are NOT the solution and should be approached with caution

- There are many kinds of bioplastics, so each case needs evaluation, but generally we believe they should be considered with caution. Bioplastics do not help us to challenge our current throwaway society or move up the waste hierarchy to give priority to prevention and reduction, as bioplastics are mostly designed to substitute petroleum-based plastics and often disposable or single-use products. Greenpeace also has concerns that bioplastics resourced from intensive conventional agriculture do not support the shift toward ecological agriculture.
- Simply replacing conventional plastics with bioplastics, including those purporting to be biodegradable, would not offer a sustainable solution to land or marine pollution and can actually increase the tendency for people to litter.

It's not as simple as just removing the plastics that we can see

- It's estimated that 94% of the plastic that enters the ocean ends up on the seafloor. Barely 1% of marine plastics are found floating at or near the ocean surface and 5% end up on beaches.
- A single plastic bottle can fragment to pollute our oceans with thousands of pieces of microplastic, which are ingested by marine life and enter our food supply. Simply removing plastics from beaches and the ocean will never tackle the scale of the problem we are facing.
- The only way to deal with this pollution crisis is to stop single-use plastic production at the source. (This is why we recommend that any beach cleanup should also include a brand audit to identify the corporations responsible for ocean pollution.)

Microplastics: Scientific Facts & Uses

Microplastics

- 'Microplastics' are defined as any synthetic solid particle or polymeric matrix, with regular or irregular shape and with size ranging from 1 µm to 5 mm, of either primary or secondary manufacturing origin, which are insoluble in water.
- 'Primary Microplastics' is a term typically used to refer to microplastics originally manufactured to be that size. Primary microplastics can include but are not limited to microbeads as they can also refer to industrial plastic powders and pellets.
- 'Secondary Microplastics' are defined as small particle pieces that have resulted from the fragmentation and weathering of larger plastic items.
- Microplastics are composed of mostly six major types of petroleum-based polymers: polyethylene (PE), polypropylene (PP), expanded polystyrene (PS), polyvinyl chloride (PVC), polyamide (PA), also known as nylon and polyethylene terephthalate (PET)
- Microplastics in the marine environment are typically found as pellets, fragments, or fibers and are composed of diverse polymers, some denser than seawater and expected to sink to the seafloor, such as polyamide, polyester, polymerizing vinyl chloride (PVC), and acrylic, among others. Others are lighter than seawater and are often found floating at the surface, including polyethylene, polypropylene, and polystyrene.
- Microplastics contain many types of additives, such as plasticizer, flame retardant, heat stabilizer, filler, impact modifier, antioxidant, colorant, lubricant, and light stabilizer.
- Primary Microplastics are extensively used in industry and manufacturing, for example: as abrasives in air/water-blasting to clean the surfaces of buildings and ships' hulls; as powders for injection moulding; and, more recently, for 3D printing.
- They are also used in so-called personal care and cosmetic products (PCCPs), often to improve the cleaning function or impart colour - examples include toothpaste, cosmetics, cleansing agents and skin exfoliators.

Microbeads

- Microbeads are defined as a plastic sphere, typically less than or equal to 5 mm in size. Microbeads can vary in chemical composition, size, roundness and density.
- Globally, microbeads are used in personal care products, other consumer applications, and various industrial applications. Examples included below:
- Personal Care Products: scrubs/peelings, shower/bath products, facial cleaners, creams, deodorants, make-up foundations, nail polishes, eye colours, shaving creams, bubble baths, hair colorings, insect repellants, toothpaste, eye shadows, blush powders, hairsprays, liquid makeups, mascaras, baby products, lotions, and sunscreens.
    - Microbeads and other plastic ingredients are present in different personal care products at different percentages, ranging from less than 1% to more than 90% in some cases.

    - For example, a typical exfoliating shower gel can contain roughly as much microplastic in the cosmetic formulation as is used to make the plastic packaging it comes in.
    - Consumer uses/products including cleaning products and printer toner.
- Industrial products such as abrasive media (i.e. plastic blasting at shipyards, productions facilities such as garment and car parts),
- Industry (i.e. oil and gas exploration, textile printing, and automotive molding),
- Other plastics products (i.e. anti-slip and anti-blocking applications) and medical applications (biotechnology and biomedical research)
- Each year the US emits enough microbeads to wrap around the world 7x.

Microfibers

- Microfibers, a type of microplastic is a threadlike particle less than 5 millimeters long.
- Microfibers - also called microplastic fibers - are a subset of microplastics
- ALL fabrics and fibers shed, whether natural or synthetic.
- Fiber shedding from textiles may occur through all stages of the production process, as well as at the consumer use/wash phase.
- Examples of products that shed microfibers - tires, fashion apparel, sport/outdoor apparel, industrial textiles (i.e. carpets), and home textiles (i.e. bedding, furniture, window treatments, towels).
- A single domestic wash can release around 700,000 fibers to wastewater.
- Microfibers are one of the most common global microplastic pollutants along shorelines, in surface waters and in the open ocean.

Nurdles/Pellets

- Nurdles are categorized under primary microplastics and are the form 'raw' plastics are produced in, for transport to production facilities for further processing.
- Nurdles are plastic resin beads/pellets, that come in a variety of colors, are disk or cylindrical in shape and a few mm in diameter - about the size of a lentil.
- They are unintentionally spilled into the environment and found floating in water and on shorelines worldwide.
- Plastic resin pellets serve as both a transport medium and a potential source of toxic chemicals in the marine environment.
- Countless billion nurdles are used each year to make nearly all our plastic products but many end up washing up on our shores.