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Please oppose synthetic turf...
I oppose the over-use and over-consumption of plastic for its many negative effects on the environment such as ingestion by wildlife, entanglement of marine species and the transportation of invasive species. We now understand that this list of negative effects is expanding. Plastic is everywhere in our daily life and is also found everywhere in the environment from the North Pole to South Pole and even at the deepest parts of our ocean. Sadly, there is not a single beach in the world today that is plastic free. Our over-use of plastic is harming our health and the health of our children, which shows to which extent the material we created became a design failure because of its mismanagement and even became harmful and toxic to its own creator. When I say design failure, let me give you an example, single used-plastic, the bags, the plastic bottles, the plastic straws, used for an average of 12 minutes, however if they end up in the environment, they last for months, years and decades.
At the University of Hawaii, at the Center for Microbial Oceanography, Research and Education, we studied the degradation of plastic in the environment. The findings of our research show that the impact of plastic in the environment is even worse than what we thought.
Let me share with you what we discovered: My colleagues were measuring the biological production of methane from seawater. They realized that the concentrations of methane were much higher than expected. In fact, most of the methane was not coming from biological sources, but from the bottles in which they were incubating the seawater. The bottles were made out of a specific polyethylene plastic and when exposed to sunlight, would degrade and emit methane.
Plastic emits methane. Methane is a greenhouse gas.
Methane is 21 times more powerful than CO_2, which is one of the reasons many scientists nowadays are studying methane production in the environment, such as methane coming from the permafrost and agricultural practices. It goes without saying that GHGs are the contributors to climate change.
This unexpected discovery was the start of my two-year postdoctoral studies in Hawaii where I continued focusing on methane, CO_2 and other greenhouse gases emitted from plastics.
We tested the most commonly used type of plastic in the world and discovered that polyethylene is the plastic type that releases methane (CH_4), ethylene (C_2H_4), ethane and propylene at the highest concentrations. Bad news, polyethylene is also the most prevalent plastic produced, consumed and discarded in the environment today. It also degrades quickly due to its weak chemical structure and eventually contributes to the pool of microplastic.
Our study also demonstrated that as the surface area of the plastic increases due to weathering and break-down in the ocean, there is a tremendous increase in methane and ethylene off-gassing: For example, PE powders off-gases methane 488 times more than when the same weight of PE is in pellet form. As plastic degrades, the surface area of the plastic increases. Hence, there is more surface to react with the sunlight and a tremendous increase in

concentrations of methane and also ethylene, another greenhouse gas. This means that with time for the same bottle, more and more greenhouse gases will be produced as the bottle degrades and its surface area increases.
As an Oceanographer, my main focus is in the ocean, but in order to understand our study further we created a comparison of plastics on land not submerged in water. This is when things got really scary. Not only are plastics in water producing greenhouse gases, but when exposed on beaches or in your

backyard, they produce 2 times more methane and 76 times more ethylene versus than when in the ocean.

This indicates that while the negative effects of plastic in the oceans are significant, the greenhouse gases emitted from plastics exposed to air in a terrestrial environment is even greater. Our results even show that once initiated, the production of hydrocarbon gases continues in the dark.

Synthetic turfs are made out of polyethylene, as a result synthetic turf are responsible for emitting greenhouse gases and potentially contributing to climate change as well. Synthetic turf has a huge surface area because of all the small pieces it is made out of, hence the amount of greenhouse gases emitted from synthetic is much higher than a flat sheet of polyethylene, all this surface area also degrades at a highest rate. Synthetic turf is on land and exposed to air directly and therefore responsible for a greater amount of greenhouse gases emitted to the atmosphere.

Overall, this means that the degradation and breakdown of plastic represent a previously unrecognized source of greenhouse gases that are expected to increase—especially as more plastic is produced and accumulated in the environment.

Now apply this information to synthetic turf: synthetic turf are made out of the very material, PE, that produces the most GHGs. Synthetic turf is exposed to air directly which creates even more GHGs. And worse still, synthetic turf has a huge surface area --much larger than the size of the field-- because of all the small plastic “blades” in this large carpet of fake grass.

I hope the facts presented are enough to convince you that choosing synthetic turf is choosing to increase GHG emissions, just as we are working so hard to reverse that. I am asking the Committee to help making sure that used synthetic turf don’t go on releasing greenhouse gases, by prohibiting the use of synthetic turf in playgrounds and athletic field surfaces.

Sincerely,

Dr. Sarah-Jeanne Royer