Fwd: Concerns regarding greenhouse gas emissions from synthetic turf

The Field Fund <thefieldfund@gmail.com>

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From: Sara-Jeanne Royer <sjroyer@hawaii.edu>
Subject: **Concerns regarding greenhouse gas emissions from synthetic turf**
Date: February 15, 2019 at 5:34:51 PM EST
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To The Martha's Vineyard Commission,

I write as an oceanographer with expertise in plastic pollution to advise against the installation of synthetic turf on Martha's Vineyard. My research has shown that the environmental health impacts posed by plastic carpets and polypropylene shock pads are likely significant and should be at the forefront of any decision regarding these materials.

I am a post-doctoral researcher at the International Pacific Research Center at the University of Hawaii, focusing on the pathways and fate of marine debris and plastic pollution in the ocean. Prior to this position, I studied the emissions of greenhouse gases from plastics in the environment at the Center for Microbial Oceanography, Research and Education. I also recently started a project on microfibers at SCRIPPS Institute of Oceanography at the University of California, San Diego, examining the degradability of plastic and microfibers in the environment. This past August, I was the lead author on a groundbreaking study, *Production of Methane and Ethylene From Plastic in the Environment*, in which we quantifyied greenhouse gas emission from plastics under natural conditions and considered the potential environmental consequences of this process.

We already knew that greenhouse gases are released during the manufacturing of products such as synthetic turf and shock pads, and now we have learned that greenhouse gases continue to be released while they are in use and as they degrade. Specifically, we found that the breakdown of plastic represents a significant source of greenhouse gas pollution that is expected to increase — especially as more plastic is produced and accumulated in the environment. Perhaps this is not surprising since plastic is made from petroleum, but our team at the University of Hawaii were the first to publish data about greenhouse gases and plastic debris. The research has far reaching implications for climate change, waste management, policy making, and our decisions as consumers.

For my research, I looked at the most common types of plastic manufactured, consumed, and littered globally. Of particular concern is the plastic that releases gases at the highest rate: low-density polyethylene (LDPE). We showed that methane and ethylene off-gassing is triggered by solar radiation but continues in the dark and likely over the lifetime of the plastic, accelerating exponentially as the surface area of the plastic increases due to weather and fragmentation. For example, LDPE powders off-gas methane 488 times more than when the same weight of LDPE is in pellet form.

While carbon dioxide is perhaps the most well-known contributor to climate change, methane is a far more potent gas -- shown to be at least 21 times more potent than carbon dioxide. Degrading plastic pollution is a source of climate change gas emissions not previously identified in the global greenhouse gas budget. If we consider globally the total surface of plastic exposed to solar radiation (in landfills, along coastlines, on

playing fields, at playgrounds, in greenhouses, etc.), the problem of methane potency becomes magnified by the amount of plastic that exists worldwide. Ethylene, another greenhouse gas emitted from plastic, is produced in even greater amounts and might contribute significantly to its budget.

Given that most plastic carpets are made out of polyethylene -- the plastic found to release these gases at the highest rate -- and given the high surface area occupied by this material including each individual blade of plastic "grass," synthetic turf likely contributes significantly to greenhouse gas emissions. I strongly urge you to consider how you can reduce these gases through policies restricting the installation of synthetic turf, as well as other synthetic surfaces, to guide consumers to make better choices and reduce plastic production everywhere we can.

Greenhouse gases directly influence climate change, increasing sea level rise, extreme weather events, heat waves, flooding, etc. As an island, Martha's Vineyard is particularly vulnerable to these impacts. As a forward thinking community known for its environmental stewardship and conservation efforts, Martha's Vineyard is uniquely poised be part of the solution regarding climate change. I applaud Island's efforts to ban plastic grocery bags, plastic straws, helium balloons, and now plastic bottles (all made with LPDE) and urge you to demonstrate that same leadership regarding synthetic turf.

Sincerely,

Sarah-Jeanne

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